

Memorial de Cálculo da modelagem para o cenário de dispersão de nuvem de gás inflamável em relação ao Ramal Sul – pequeno vazamento/período diurno

SITE DATA:

Location: CURITIBA, BRAZIL

Building Air Exchanges Per Hour: 0.66 (unsheltered single storied)

Time: August 1, 2017 1644 hours ST (user specified)

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

Ambient Boiling Point: -162.8° C

Vapor Pressure at Ambient Temperature: greater than 1 atm

Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 3 meters/second from ENE at 3 meters

Ground Roughness: open country Cloud Cover: 0 tenths

Air Temperature: 25° C Stability Class: E

No Inversion Height Relative Humidity: 80%

SOURCE STRENGTH:

Flammable gas escaping from pipe (not burning)

Pipe Diameter: 0.8 inches Pipe Length: 8000 meters

Unbroken end of the pipe is connected to an infinite source

Pipe Roughness: smooth Hole Area: 0.50 sq in

Pipe Press: 17 atmospheres Pipe Temperature: 20° C

Release Duration: ALOHA limited the duration to 1 hour

Max Average Sustained Release Rate: 1.66 kilograms/min
(averaged over a minute or more)

Total Amount Released: 49.1 kilograms

THREAT ZONE:

Threat Modeled: Flammable Area of Vapor Cloud

Model Run: Gaussian

Red : 13 meters --- (30000 ppm = 60% LEL = Flame Pockets)

Note: Threat zone was not drawn because effects of near-field patchiness
make dispersion predictions less reliable for short distances.

Yellow: 31 meters --- (5000 ppm = 10% LEL)

Note: Threat zone was not drawn because effects of near-field patchiness
make dispersion predictions less reliable for short distances.

Memorial de Cálculo da modelagem para o cenário de dispersão de nuvem de gás inflamável em relação ao Ramal Sul – grande vazamento/período diurno

SITE DATA:

Location: CURITIBA, BRAZIL

Building Air Exchanges Per Hour: 0.66 (unsheltered single storied)

Time: August 1, 2017 1644 hours ST (user specified)

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

Ambient Boiling Point: -162.8° C

Vapor Pressure at Ambient Temperature: greater than 1 atm

Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 3 meters/second from ENE at 3 meters

Ground Roughness: open country Cloud Cover: 0 tenths

Air Temperature: 25° C Stability Class: E

No Inversion Height Relative Humidity: 80%

SOURCE STRENGTH:

Flammable gas escaping from pipe (not burning)

Pipe Diameter: 4 inches Pipe Length: 8000 meters

Unbroken end of the pipe is connected to an infinite source

Pipe Roughness: smooth Hole Area: 12.6 sq in

Pipe Press: 17 atmospheres Pipe Temperature: 20° C

Release Duration: ALOHA limited the duration to 1 hour

Max Average Sustained Release Rate: 108 kilograms/min

(averaged over a minute or more)

Total Amount Released: 3,341 kilograms

THREAT ZONE:

Threat Modeled: Flammable Area of Vapor Cloud

Model Run: Gaussian

Red : 105 meters --- (30000 ppm = 60% LEL = Flame Pockets)

Yellow: 263 meters --- (5000 ppm = 10% LEL)

Memorial de Cálculo da modelagem para o cenário de dispersão de nuvem de gás inflamável em relação ao Ramal Sul – pequeno vazamento/período noturno

SITE DATA:

Location: CURITIBA, BRAZIL

Building Air Exchanges Per Hour: 0.41 (unsheltered single storied)

Time: August 1, 2017 1923 hours ST (user specified)

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

Ambient Boiling Point: -162.8° C

Vapor Pressure at Ambient Temperature: greater than 1 atm

Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 2 meters/second from ENE at 3 meters

Ground Roughness: open country Cloud Cover: 0 tenths

Air Temperature: 20° C Stability Class: E

No Inversion Height Relative Humidity: 80%

SOURCE STRENGTH:

Flammable gas escaping from pipe (not burning)

Pipe Diameter: 0.8 inches Pipe Length: 8000 meters

Unbroken end of the pipe is connected to an infinite source

Pipe Roughness: smooth Hole Area: 0.50 sq in

Pipe Press: 17 atmospheres Pipe Temperature: 20° C

Release Duration: ALOHA limited the duration to 1 hour

Max Average Sustained Release Rate: 1.66 kilograms/min
(averaged over a minute or more)

Total Amount Released: 49.1 kilograms

THREAT ZONE:

Threat Modeled: Flammable Area of Vapor Cloud

Model Run: Gaussian

Red : 16 meters --- (30000 ppm = 60% LEL = Flame Pockets)

Note: Threat zone was not drawn because effects of near-field patchiness
make dispersion predictions less reliable for short distances.

Yellow: 38 meters --- (5000 ppm = 10% LEL)

Note: Threat zone was not drawn because effects of near-field patchiness
make dispersion predictions less reliable for short distances.

Memorial de Cálculo da modelagem para o cenário de dispersão de nuvem de gás inflamável
em relação ao Ramal Sul – grande vazamento/período noturno

SITE DATA:

Location: CURITIBA, BRAZIL

Building Air Exchanges Per Hour: 0.41 (unsheltered single storied)

Time: August 1, 2017 1923 hours ST (user specified)

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

Ambient Boiling Point: -162.8° C

Vapor Pressure at Ambient Temperature: greater than 1 atm

Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 2 meters/second from ENE at 3 meters

Ground Roughness: open country Cloud Cover: 0 tenths

Air Temperature: 20° C Stability Class: E

No Inversion Height Relative Humidity: 80%

SOURCE STRENGTH:

Flammable gas escaping from pipe (not burning)

Pipe Diameter: 4 inches Pipe Length: 8000 meters

Unbroken end of the pipe is connected to an infinite source

Pipe Roughness: smooth Hole Area: 12.6 sq in

Pipe Press: 17 atmospheres Pipe Temperature: 20° C

Release Duration: ALOHA limited the duration to 1 hour

Max Average Sustained Release Rate: 108 kilograms/min
(averaged over a minute or more)

Total Amount Released: 3,341 kilograms

THREAT ZONE:

Threat Modeled: Flammable Area of Vapor Cloud

Model Run: Gaussian

Red : 128 meters --- (30000 ppm = 60% LEL = Flame Pockets)

Yellow: 304 meters --- (5000 ppm = 10% LEL)

Memorial de Cálculo da modelagem para o cenário de dispersão de nuvem de gás inflamável em relação ao Ramal Sudeste – pequeno vazamento/período diurno

SITE DATA:

Location: CURITIBA, BRAZIL

Building Air Exchanges Per Hour: 0.66 (unsheltered single storied)

Time: August 3, 2017 1942 hours ST (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

Ambient Boiling Point: -162.8° C

Vapor Pressure at Ambient Temperature: greater than 1 atm

Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 3 meters/second from ENE at 3 meters

Ground Roughness: open country Cloud Cover: 0 tenths

Air Temperature: 25° C Stability Class: E

No Inversion Height Relative Humidity: 80%

SOURCE STRENGTH:

Flammable gas escaping from pipe (not burning)

Pipe Diameter: 2 centimeters Pipe Length: 1000 meters

Unbroken end of the pipe is connected to an infinite source

Pipe Roughness: smooth Hole Area: 3.14 sq cm

Pipe Press: 7 atmospheres Pipe Temperature: 20° C

Release Duration: ALOHA limited the duration to 1 hour

Max Average Sustained Release Rate: 971 grams/min

(averaged over a minute or more)

Total Amount Released: 52.4 kilograms

THREAT ZONE:

Threat Modeled: Flammable Area of Vapor Cloud

Model Run: Gaussian

Red : 10 meters --- (30000 ppm = 60% LEL = Flame Pockets)

Note: Threat zone was not drawn because effects of near-field patchiness
make dispersion predictions less reliable for short distances.

Yellow: 24 meters --- (5000 ppm = 10% LEL)

Note: Threat zone was not drawn because effects of near-field patchiness
make dispersion predictions less reliable for short distances.

Memorial de Cálculo da modelagem para o cenário de dispersão de nuvem de gás inflamável em relação ao Ramal Sudeste – grande vazamento/período diurno

SITE DATA:

Location: CURITIBA, BRAZIL

Building Air Exchanges Per Hour: 0.66 (unsheltered single storied)

Time: August 3, 2017 1954 hours ST (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

Ambient Boiling Point: -161.9° C

Vapor Pressure at Ambient Temperature: greater than 1 atm

Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 3 meters/second from ENE at 3 meters

Ground Roughness: open country Cloud Cover: 0 tenths

Air Temperature: 25° C Stability Class: E

No Inversion Height Relative Humidity: 80%

SOURCE STRENGTH:

Flammable gas escaping from pipe (not burning)

Pipe Diameter: 10 centimeters Pipe Length: 1000 meters

Unbroken end of the pipe is connected to an infinite source

Pipe Roughness: smooth Hole Area: 78.5 sq cm

Pipe Press: 7 atmospheres Pipe Temperature: 20° C

Release Duration: ALOHA limited the duration to 1 hour

Max Average Sustained Release Rate: 64.7 kilograms/min

(averaged over a minute or more)

Total Amount Released: 3,607 kilograms

THREAT ZONE:

Threat Modeled: Flammable Area of Vapor Cloud

Model Run: Gaussian

Red : 81 meters --- (30000 ppm = 60% LEL = Flame Pockets)

Yellow: 202 meters --- (5000 ppm = 10% LEL)

Memorial de Cálculo da modelagem para o cenário de dispersão de nuvem de gás inflamável em relação ao Ramal Sudeste – pequeno vazamento/período noturno

SITE DATA:

Location: CURITIBA, BRAZIL

Building Air Exchanges Per Hour: 0.41 (unsheltered single storied)

Time: August 3, 2017 2007 hours ST (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

Ambient Boiling Point: -162.8° C

Vapor Pressure at Ambient Temperature: greater than 1 atm

Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 2 meters/second from ENE at 3 meters

Ground Roughness: open country Cloud Cover: 0 tenths

Air Temperature: 20° C Stability Class: E

No Inversion Height Relative Humidity: 80%

SOURCE STRENGTH:

Flammable gas escaping from pipe (not burning)

Pipe Diameter: 2 centimeters Pipe Length: 1000 meters

Unbroken end of the pipe is connected to an infinite source

Pipe Roughness: smooth Hole Area: 3.14 sq cm

Pipe Press: 7 atmospheres Pipe Temperature: 20° C

Release Duration: ALOHA limited the duration to 1 hour

Max Average Sustained Release Rate: 971 grams/min

(averaged over a minute or more)

Total Amount Released: 52.4 kilograms

THREAT ZONE:

Threat Modeled: Flammable Area of Vapor Cloud

Model Run: Gaussian

Red : 12 meters --- (30000 ppm = 60% LEL = Flame Pockets)

Note: Threat zone was not drawn because effects of near-field patchiness

make dispersion predictions less reliable for short distances.

Yellow: 29 meters --- (5000 ppm = 10% LEL)

Note: Threat zone was not drawn because effects of near-field patchiness

make dispersion predictions less reliable for short distances.

Memorial de Cálculo da modelagem para o cenário de dispersão de nuvem de gás inflamável em relação ao Ramal Sudeste – grande vazamento/período noturno

SITE DATA:

Location: CURITIBA, BRAZIL

Building Air Exchanges Per Hour: 0.41 (unsheltered single storied)

Time: August 3, 2017 2016 hours ST (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

Ambient Boiling Point: -161.9° C

Vapor Pressure at Ambient Temperature: greater than 1 atm

Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 2 meters/second from ENE at 3 meters

Ground Roughness: open country Cloud Cover: 0 tenths

Air Temperature: 20° C Stability Class: E

No Inversion Height Relative Humidity: 80%

SOURCE STRENGTH:

Flammable gas escaping from pipe (not burning)

Pipe Diameter: 10 centimeters Pipe Length: 1000 meters

Unbroken end of the pipe is connected to an infinite source

Pipe Roughness: smooth Hole Area: 78.5 sq cm

Pipe Press: 7 atmospheres Pipe Temperature: 20° C

Release Duration: ALOHA limited the duration to 1 hour

Max Average Sustained Release Rate: 64.7 kilograms/min

(averaged over a minute or more)

Total Amount Released: 3,607 kilograms

THREAT ZONE:

Threat Modeled: Flammable Area of Vapor Cloud

Model Run: Gaussian

Red : 99 meters --- (30000 ppm = 60% LEL = Flame Pockets)

Yellow: 243 meters --- (5000 ppm = 10% LEL)

Memorial de Cálculo da modelagem para o cenário de dispersão de nuvem de gás inflamável em relação ao Ramal Centro-Leste – pequeno vazamento/período diurno

SITE DATA:

Location: CURITIBA, BRAZIL

Building Air Exchanges Per Hour: 0.66 (unsheltered single storied)

Time: August 3, 2017 2022 hours ST (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

Ambient Boiling Point: -161.9° C

Vapor Pressure at Ambient Temperature: greater than 1 atm

Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 3 meters/second from ENE at 3 meters

Ground Roughness: open country Cloud Cover: 0 tenths

Air Temperature: 25° C Stability Class: E

No Inversion Height Relative Humidity: 80%

SOURCE STRENGTH:

Flammable gas escaping from pipe (not burning)

Pipe Diameter: 2 centimeters Pipe Length: 1000 meters

Unbroken end of the pipe is connected to an infinite source

Pipe Roughness: smooth Hole Area: 3.14 sq cm

Pipe Press: 7 atmospheres Pipe Temperature: 20° C

Release Duration: ALOHA limited the duration to 1 hour

Max Average Sustained Release Rate: 966 grams/min

(averaged over a minute or more)

Total Amount Released: 52.4 kilograms

THREAT ZONE:

Threat Modeled: Flammable Area of Vapor Cloud

Model Run: Gaussian

Red : 10 meters --- (30000 ppm = 60% LEL = Flame Pockets)

Note: Threat zone was not drawn because effects of near-field patchiness
make dispersion predictions less reliable for short distances.

Yellow: 24 meters --- (5000 ppm = 10% LEL)

Note: Threat zone was not drawn because effects of near-field patchiness
make dispersion predictions less reliable for short distances.

Memorial de Cálculo da modelagem para o cenário de dispersão de nuvem de gás inflamável em relação ao Ramal Centro-Leste – grande vazamento/período diurno

SITE DATA:

Location: CURITIBA, BRAZIL

Building Air Exchanges Per Hour: 0.66 (unsheltered single storied)

Time: August 6, 2017 1644 hours ST (user specified)

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

Ambient Boiling Point: -162.8° C

Vapor Pressure at Ambient Temperature: greater than 1 atm

Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 3 meters/second from ENE at 3 meters

Ground Roughness: open country Cloud Cover: 0 tenths

Air Temperature: 25° C Stability Class: E

No Inversion Height Relative Humidity: 80%

SOURCE STRENGTH:

Flammable gas is burning as it escapes from pipe

Pipe Diameter: 0.8 inches

Pipe Length: 8000 meters

Unbroken end of the pipe is connected to an infinite source

Pipe Roughness: smooth

Hole Area: 0.50 sq in

Pipe Press: 17 atmospheres

Pipe Temperature: 20° C

Max Flame Length: 2 meters

Burn Duration: ALOHA limited the duration to 1 hour

Max Burn Rate: 54.4 kilograms/min

Total Amount Burned: 49.1 kilograms

THREAT ZONE:

Threat Modeled: Thermal radiation from jet fire

Red : less than 10 meters(10.9 yards) --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: less than 10 meters(10.9 yards) --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: less than 10 meters(10.9 yards) --- (2.0 kW/(sq m) = pain within 60 sec)

Memória de Cálculo da modelagem para o cenário de incêndio com geração de jato de fogo e radiação térmica em relação ao Ramal Sul e Noroeste – pequeno vazamento/períodos diurno e noturno.

SITE DATA:

Location: CURITIBA, BRAZIL

Building Air Exchanges Per Hour: 0.66 (unsheltered single storied)

Time: August 6, 2017 1644 hours ST (user specified)

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

Ambient Boiling Point: -162.8° C

Vapor Pressure at Ambient Temperature: greater than 1 atm

Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 2 meters/second from ENE at 3 meters

Ground Roughness: open country Cloud Cover: 0 tenths

Air Temperature: 20° C

Stability Class: E

No Inversion Height

Relative Humidity: 80%

SOURCE STRENGTH:

Flammable gas is burning as it escapes from pipe

Pipe Diameter: 0.8 inches

Pipe Length: 8000 meters

Unbroken end of the pipe is connected to an infinite source

Pipe Roughness: smooth

Hole Area: 0.50 sq in

Pipe Press: 17 atmospheres

Pipe Temperature: 20° C

Max Flame Length: 2 meters

Burn Duration: ALOHA limited the duration to 1 hour

Max Burn Rate: 54.4 kilograms/min

Total Amount Burned: 49.1 kilograms

THREAT ZONE:

Threat Modeled: Thermal radiation from jet fire

Red : less than 10 meters(10.9 yards) --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: less than 10 meters(10.9 yards) --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: less than 10 meters(10.9 yards) --- (2.0 kW/(sq m) = pain within 60 sec)

Memória de Cálculo da modelagem para o cenário de incêndio com geração de jato de fogo e radiação térmica em relação aos Ramais Sul e Noroeste – grande vazamento/períodos diurno e noturno.

SITE DATA:

Location: CURITIBA, BRAZIL

Building Air Exchanges Per Hour: 0.66 (unsheltered single storied)

Time: August 7, 2017 0046 hours ST (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

Ambient Boiling Point: -162.8° C

Vapor Pressure at Ambient Temperature: greater than 1 atm

Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 3 meters/second from ENE at 3 meters

Ground Roughness: open country Cloud Cover: 0 tenths

Air Temperature: 25° C Stability Class: E

No Inversion Height Relative Humidity: 80%

SOURCE STRENGTH:

Flammable gas is burning as it escapes from pipe

Pipe Diameter: 4 inches Pipe Length: 8000 meters

Unbroken end of the pipe is connected to an infinite source

Pipe Roughness: smooth Hole Area: 12.6 sq in

Pipe Press: 17 atmospheres Pipe Temperature: 20° C

Max Flame Length: 9 meters

Burn Duration: ALOHA limited the duration to 1 hour

Max Burn Rate: 1,360 kilograms/min

Total Amount Burned: 3,341 kilograms

THREAT ZONE:

Threat Modeled: Thermal radiation from jet fire

Red : 13 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: 18 meters --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: 28 meters --- (2.0 kW/(sq m) = pain within 60 sec)

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

Ambient Boiling Point: -162.8° C

Vapor Pressure at Ambient Temperature: greater than 1 atm

Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 2 meters/second from ENE at 3 meters

Ground Roughness: open country Cloud Cover: 0 tenths

Air Temperature: 20° C Stability Class: E

No Inversion Height Relative Humidity: 80%

SOURCE STRENGTH:

Flammable gas is burning as it escapes from pipe

Pipe Diameter: 4 inches Pipe Length: 8000 meters

Unbroken end of the pipe is connected to an infinite source

Pipe Roughness: smooth Hole Area: 12.6 sq in

Pipe Press: 17 atmospheres Pipe Temperature: 20° C

Max Flame Length: 9 meters

Burn Duration: ALOHA limited the duration to 1 hour

Max Burn Rate: 1,360 kilograms/min

Total Amount Burned: 3,341 kilograms

THREAT ZONE:

Threat Modeled: Thermal radiation from jet fire

Red : 13 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: 18 meters --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: 28 meters --- (2.0 kW/(sq m) = pain within 60 sec)

Memória de cálculo da modelagem para o cenário de incêndio com geração de jato de fogo com relação aos Ramais Sudeste, Centro-Leste, Nordeste, Centro-Norte, Noroeste Oeste, Santa Quitéria e João Bettega/duto de 200 mm – pequeno vazamento/períodos diurno e noturno

SITE DATA:

Location: CURITIBA, BRAZIL

Building Air Exchanges Per Hour: 0.67 (unsheltered single storied)

Time: August 7, 2017 1116 hours ST (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

Ambient Boiling Point: -162.8° C

Vapor Pressure at Ambient Temperature: greater than 1 atm

Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 3 meters/second from ENE at 3 meters

Ground Roughness: open country Cloud Cover: 0 tenths

Air Temperature: 25° C Stability Class: C

No Inversion Height Relative Humidity: 80%

SOURCE STRENGTH:

Flammable gas is burning as it escapes from pipe

Pipe Diameter: 2 centimeters Pipe Length: 1000 meters

Unbroken end of the pipe is connected to an infinite source

Pipe Roughness: smooth Hole Area: 3.14 sq cm

Pipe Press: 7 atmospheres Pipe Temperature: 20° C

Max Flame Length: 2 meters

Burn Duration: ALOHA limited the duration to 1 hour

Max Burn Rate: 20 kilograms/min

Total Amount Burned: 52.4 kilograms

THREAT ZONE:

Threat Modeled: Thermal radiation from jet fire

Red : less than 10 meters(10.9 yards) --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: less than 10 meters(10.9 yards) --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: less than 10 meters(10.9 yards) --- (2.0 kW/(sq m) = pain within 60 sec)

SITE DATA:

Location: CURITIBA, BRAZIL

Building Air Exchanges Per Hour: 0.42 (unsheltered single storied)

Time: August 7, 2017 1131 hours ST (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

Ambient Boiling Point: -162.8° C

Vapor Pressure at Ambient Temperature: greater than 1 atm

Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 2 meters/second from ENE at 3 meters

Ground Roughness: open country Cloud Cover: 0 tenths

Air Temperature: 20° C Stability Class: B

No Inversion Height Relative Humidity: 80%

SOURCE STRENGTH:

Flammable gas is burning as it escapes from pipe

Pipe Diameter: 2 centimeters Pipe Length: 1000 meters

Unbroken end of the pipe is connected to an infinite source

Pipe Roughness: smooth Hole Area: 3.14 sq cm

Pipe Press: 7 atmospheres Pipe Temperature: 20° C

Max Flame Length: 2 meters

Burn Duration: ALOHA limited the duration to 1 hour

Max Burn Rate: 20 kilograms/min

Total Amount Burned: 52.4 kilograms

THREAT ZONE:

Threat Modeled: Thermal radiation from jet fire

Red : less than 10 meters(10.9 yards) --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: less than 10 meters(10.9 yards) --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: less than 10 meters(10.9 yards) --- (2.0 kW/(sq m) = pain within 60 sec)

Grande vazamento diurno

SITE DATA:

Location: CURITIBA, BRAZIL

Building Air Exchanges Per Hour: 0.67 (unsheltered single storied)

Time: August 7, 2017 1136 hours ST (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

Ambient Boiling Point: -162.8° C

Vapor Pressure at Ambient Temperature: greater than 1 atm

Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)

Wind: 3 meters/second from ENE at 3 meters

Ground Roughness: open country Cloud Cover: 0 tenths

Air Temperature: 25° C Stability Class: B

No Inversion Height Relative Humidity: 80%

SOURCE STRENGTH:

Flammable gas is burning as it escapes from pipe

Pipe Diameter: 10 centimeters Pipe Length: 1000 meters

Unbroken end of the pipe is connected to an infinite source

Pipe Roughness: smooth Hole Area: 78.5 sq cm

Pipe Press: 7 atmosferes Pipe Temperature: 20° C

Max Flame Length: 8 meters

Burn Duration: ALOHA limited the duration to 1 hour

Max Burn Rate: 500 kilograms/min

Total Amount Burned: 3,611 kilograms

THREAT ZONE:

Threat Modeled: Thermal radiation from jet fire

Red : 10 meters --- (10.0 kW/(sq m) = potentially lethal within 60 sec)

Orange: 14 meters --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)

Yellow: 21 meters --- (2.0 kW/(sq m) = pain within 60 sec)