

NEW ENGLAND TRANRAIL, LLC.

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September 26, 2016

SENT ELECTRONICALLY TO ALL PARTIES

Victoria Rutson
Director
Office of Environmental Analysis
Surface Transportation Board
Washington, DC 20423

Re: Docket No. FD 34797 (Sub-No. 1), New England Transrail, LLC, d/b/a
Wilmington & Woburn Terminal Railway—Construction, Acquisition &
Operation Exemption—in Wilmington and Woburn, Mass.; First Information
Request [Clarification & Supplemental]

Dear Ms. Rutson:

The following represents Clarification and Supplemental information regarding previously submitted responses to the STB Information Request dated August 29, 2016 as per email correspondence with Ms. Danielle Gosselin on September 9, 2016. The attached information includes minor track modifications with input from Olin Corporation which provide their required access and workspace requirements for the area surrounding Treatment Plant B. There were accommodative modifications to the track alignment and further clarification with regard to Question #8 and NET's response under sub-headings 'Tank Cars' and 'Hopper Cars' which involved "commodities to be moved" including "details on the materials themselves, including quantities and how they will be handled."

Tank Car(s) [Clarification and Supplement]:

There have been four (4) primary liquid commodities for which there has been potential customer interest in being transloaded at the proposed facility, they are: Liquid Petroleum Gas (LPG, also referred to as LP-Gas or Liquid Propane), Ethanol, Biodiesel (B99 grade), and Glycols (of types: Propylene). LPG will be transferred from tank cars positioned on Tracks G and H only. Ethanol, Biodiesel, and Glycol will be transferred from tank cars positioned on Tracks J and K. None of the four (4) liquids discussed herein, nor any other sensitive material will be treated, stored, generated, nor disposed within the Ground Water Protection District ("GWPD") which partially resides on the property. The following paragraphs describe the transfer operations for each product at the facility.

LPG will be transferred, pursuant to the applicable provisions of 49 CFR Part 174 (as described in DOT Compliance Guide 29) from tank cars to aboveground pressurized storage tanks located to the East of the new tracks in a manner compliant with NFPA 58 and USEPA's AP 7.1.1.6. A fixed aboveground receipt header system located between Tracks G and H will be connected to the bottom outlet of the tank car by a hose, and a fixed swing-arm, also located between G and H will be connected to the top access port of the tank car. A compressor will be utilized to pressurize the tank car through the top port and LPG will be transferred through the receipt header to one of three aboveground storage tanks through structurally-supported overhead piping. As the LPG is offloaded from a tank car into the storage tank¹, LPG vapor will be drawn from the tank through the compressor and compressed into the tank car. At the end of the transfer operation, when all liquid has been emptied from the tank car, vapor recovery will be employed. This is accomplished by valves being reversed so that vapors and elevated gas pressure in the tank car will be removed and forced back into the aboveground tank through the liquid transfer piping. The gas transferred through the liquid piping cools the gas and condenses this back to a liquid, to reduce system pressures to design conditions. LPG will also be transferred from the aboveground storage tanks to awaiting tank trucks, at a truck loading stand, for over-the-road transport. The transfer operations will utilize a fixed pumping system to transfer the LPG through aboveground steel piping and hoses connected to the tank trucks. LPG vapor will also be returned to the bulk tanks through hoses connected to the tank trucks and via steel aboveground piping. Due to its inherent vapor pressure, LPG will remain a liquid at ambient temperatures with a relatively low tank pressure. A Fire Safety Analysis ("FSA") was performed for the facility in accordance with NFPA 58 Liquid Petroleum Gas Code, and is attached for review. Due to the closed circuit nature of the transfer and storage operations, fugitive emissions are considered to be minimal and only associated with the breaking of connections at the end of the transfer operations. Low loss connection fittings will be utilized to reduce the volume of gas escaping when hoses are disconnected. To further reduce potential emissions, hoses will not be vented to atmosphere between transfers, and the remaining residual gas pressure will remain in the disconnected hoses at all times. All product transfer will be compliant with USEPA's AP 7.1.1.6.

Ethanol will be transloaded from tank cars to awaiting tank trucks. Transloading of Ethanol from Track J, or K, will include connecting a hose between the bottom outlet of the tank car and a portable transloader ("transloader"). The transloader is a vehicle or trailer equipped with all meters, pumps and valving necessary to perform the transloading operation. Hoses will also be connected from the pump discharge on the transloader to the bottom connection on the awaiting tank truck. Vapor Balancing, as per USEPA's AP-42 will be employed and ethanol vapors will be returned to the tank car from the tank truck being filled through hose connections. A Potential To Emit calculation has been performed for the facility and shown to be below the threshold that would constitute the facility being a major source of emissions. The PTE calculations are attached hereto for review.

¹ A Fire Safety Analysis ("FSA"), performed by NET, indicates that water quantity deliverable over a ten minute period is a limiting factor for propane tanks. NET proposes a 30,000 gallon water tank to supplement municipal water supply when adding LPG tanks in the location depicted on the facility layout.

Biodiesel and Glycols will be transloaded from Tracks J and K similar to the operation for Ethanol, and a full containment system will be utilized to capture 100% of the volume contained in the largest tank cars. Sealed concrete beneath the tracks will be utilized to direct any spills from the transloading area to an impervious containment basin, and a Spill Prevention, Control, and Countermeasures (SPCC) plan will be enacted to meet EPA regulations for the transloading of any applicable commodities.

All transloading operations described herein will be performed by qualified and trained personnel. Proper firefighting equipment (e.g. dry chemical extinguishers, water spray, monitor nozzles, and deluge systems) and safety equipment (e.g. eye wash stations, showers, personal protective equipment) will be on-site and available along with appropriate fire extinguishing materials (e.g. appropriate water quantity, alcohol resistant foam, etc.), and cleanup equipment and materials. All such commodities will be transloaded pursuant to the applicable provisions of 49 CFR Part 173 and 49 CFR Part 174.

Hopper Cars [Clarification]

Hopper cars containing dry bulk materials (i.e. sand, aggregate, grains, flour, plastics) will be positioned on Tracks C and D (see site plan attached hereto). If handling pumpable materials, such as grains, flour and plastics, the material will be pumped from the hopper car with a portable pump positioned next to the rail car, and directly into a truck stationed next to the portable pump. If handling materials which must be stockpiled, such as sand, aggregate or salt, the same will arrive in bottom discharging hopper cars. A portable conveyor with an unloading tray will be positioned under the hopper car discharge flange, which will receive and convey the material to a stockpile to be located nearby. The material will then be loaded by a front end loader either onto a portable conveyor to be discharged into a dump truck or directly into the dump truck.

If you have any questions or require further details in connection with the foregoing, please give me a call directly at (973)-930-8041 or call Ronald A. Klempner at (201) 840-0766.

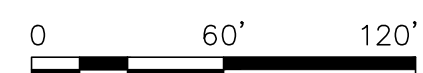
Very truly yours,

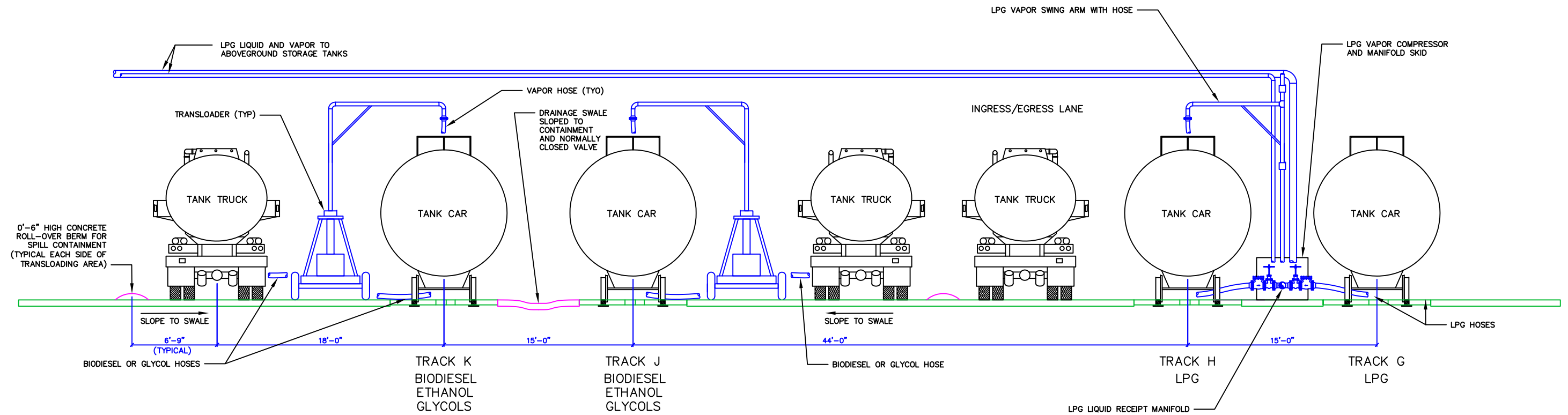
NEW ENGLAND TRANSRAIL, LLC.



Rob Jones
Managing Principal

Cc: Danielle Gosselin
Elizabeth Diller





TRACK ELEVATION (LOOKING NORTHWEST)

EMISSIONS ESTIMATE

Portable Equipment

Variables						NET			
						Limit			
Temperature	T	F	40	50	60	70	80	90	100
Temperature	T	R	499.67	509.67	519.67	529.67	539.67	549.67	559.67
Vapor Pressure	Pv	psia	0.193	0.406	0.619	0.87	1.218	1.682	2.32
Inputs									
Activity Rate	A	Gal/Car	30000	30000	30000	30000	30000	30000	30000
Rail Car/Wk		Cars/Wk	93	93	93	93	93	93	93
Rail Car/Yr		Cars/Yr	4836	4836	4836	4836	4836	4836	4836
Emission Recovery	ER		98.7	98.7	98.7	98.7	98.7	98.7	98.7
Saturation Factor	S		1	1	1	1	1	1	1
Molecular Weight	MW	lb/mole	46.07	46.07	46.07	46.07	46.07	46.07	46.07
Loading Loss Per 1000 Gal	LL	lb Ethanol/1000	0.2217228	0.4572705	0.683753	0.942866339	1.2955532	1.7565488	2.3795356
Error Factor			1.3	1.3	1.3	1.3	1.3	1.3	1.3
Results									
Emission/Car	E	lb eth/car	0.112	0.232	0.347	0.478	0.657	0.891	1.206
Emission/Year	Eyr	lb eth	544	1121	1676	2312	3177	4307	5834
Emission/Year	TPY	tons/year	0.27	0.56	0.84	1.16	1.59	2.15	2.92

93 Railcars per week equals only 1.16 tpy VOCs
using "portable equipment" using newly allowable 98.7% Emission Recovery Factor as per AP-42

MA. is classified as an area where "Attainment" for ozone has been achieved

Fire Safety Analysis Report
For
LP-Gas Storage Facilities
Based on the 2011 Edition of NFPA 58 *Liquefied Petroleum Gas Code*
First printing 2009

Origin and Development of the Fire Safety Analysis Manual

The requirement for a **Fire Safety Analysis** (FSA) was introduced in the 1976 edition of NFPA 58, along with the requirement for emergency shutoff valves at locations where hoses and swivel type piping were used (for connection to cargo tank vehicles and rail cars). A Fire Safety Analysis was required for new propane storage plants with capacities of more than 4,000 gallons located in “heavily populated or congested areas”.

This requirement was basically unchanged until the 2001 edition of NFPA 58, where the FSA was required for all propane storage plants with capacities of more than 4,000 gallons, with a three year period for existing facilities to be brought into compliance.

1 A general reference on hazard distance assessment models is: Lees, F.P. (Editor), “*Loss Prevention in the Process Industries*,” 2nd Edition, Vol 1, 2 & 3, Butterworth Heinemann Publishers, Oxford, England, 1996.

2 Raj, P.K., “*Exposure of a liquefied gas container to an external fire*,” *Journal of Hazardous Materials*, v 122, Issues 1-2, p 37-49, June 2005.

3 US EPA, “*Technical Guidance for Hazard Analysis*,” *Emergency Planning for Extremely Hazardous Substances*, EPA/FEMA/DOT, December 1987.

51 Eames Street, Wilmington, Massachusetts

The subject property 51 Eames Street is located in a industrial-business zone within the municipality of Wilmington, MA. This proposed propane bulk storage facility will be situated on land presently owned by **OLIN Corporation**.

At this time there is no propane storage facility on site, everything mentioned in this Fire Safety Analysis Report is in reference to a propane storage facility that may be constructed on this site. All construction activity related to the proposed propane storage facility will meet all codes as established by Federal and Local authorities and the 2011 edition of NFPA 58 "Liquified Petroleum Gas Codes".

For the purpose of this Fire Safety Analysis Report we are providing information for a propane storage facility utilizing **3 - 90,000 gallon water capacity** above ground liquid propane storage containers. These containers **will hold 80%** of their respective water capacity in liquid propane or **72,000 propane gallons** each with a **total capacity of 216,000 propane gallons**. The actual location of these propane storage containers on the property has not been determined as of this date and will be subject to proper property line set-backs.

For the purpose of this report all photographic pictures of propane storage containers, piping and associated valves and appurtenances depict the correct construction methods that are presently utilized in building new propane storage facilities. All photographs are to be considered as "similar to be built".

51 Eames Street is bordered by Eames Street on the front, the Boston and Maine Rail Road on the right side of the property, the city of Woburn, Massachusetts land fill site across the back of the property, and the Metropolitan Boston Transit Authority and Amtrak along the left side of the property.

Businesses in the general location of the proposed propane storage facility are as follows:

- Across from the Eames Street entrance to the property is the Lehigh Northeast Cement Company and the United Tool and Dye Company.
- On the right side of the property is an Industrial Park on Jewel Drive separated only by the Boston and Maine Railroad spur siding line. The businesses in this Industrial Park are:
 1. Janis Corporation
 2. Gatta Welding and Blacksmith
 3. Mallet Electric
 4. D & D Classics
 5. Cornoyer Painting
 6. PRB Construction Company
 7. B.J. Doyle Inc.
 8. Ciccarelli Landscaping

9. Pro Pipes LLC
10. Patriot Panel Homes
11. Arizona LLC
12. Kiley Corporation
13. CAMS Rubbish Containers
14. Concordia International Forwarding Corporation
15. Tropicana Corporation
16. Standard Electric Company
17. Champion Choice Company
18. JFC International
19. Stuffed Foods, LLC
20. Ryder Trucking
21. J C Floor Coverings
22. American Delivery and Installs
23. NCM Demolition and Remediation

None of the above listed businesses have a negative impact on this proposed propane storage site.

- Along the back line of the property are wooded areas and the City of Woburn, Massachusetts land fill that has been closed for many years.
- The entire left side of the property is bordered by the Metropolitan Boston Transit Authority's high speed commuter train lines and Amtrak. Any businesses located on the other side of this rail system have adequate separation distances from the subject property and pose no concerns related to this Fire Safety Analysis Report.

NOTE: All set back distances from the rail lines will be determined by the train speeds carried on the rail lines, the elevation of the property and/or rail lines, and other requirements to be determined by each individual railroad and will not be considered a part of this Fire Safety Analysis Report.

All proposed company owned and controlled buildings that are presently on site or may be constructed shall conform with all distance set-backs as listed in NFPA 58 Liquified Petroleum Gas Codes pertaining to points of fuel transfer. The storage and handling of liquid propane shall be conducted according to NFPA 58 flammable liquid separation distances. The pumps, valves and associated components of the propane portion of the facility shall be enclosed with a metal security fence and security gates.

With the proper separation of 250 feet or more from adjoining neighbor fuel transfer points, the risk factors associated with neighboring business establishments has been determined to be a non-issue for the purpose of this Fire Safety Analysis.

All areas of liquid propane transfer shall provide vehicle protection barriers and/or have guardrails installed.

There is no public water supply presently located “ON” the property for fire- fighting use, however the city of Wilmington Water and Sewer Division has a 6 inch main water line stubbed to the subject property capable of supplying water at the rate of 1,199 gallons per minute with a static pressure of 82 pounds per square inch (PSI) and open flow pressure of 58 pounds per square inch (PSI). These numbers will be represented further in this report and will indicate that multiple water stubs and hydrants will be needed to meet the water requirements on **form 8.3** on page 27 of this report.

I have used forms for this report as provided by the National Propane Gas Association, these forms show the current NFPA 58 requirements for your facility. The forms indicate the level of requirements for the construction of your proposed propane storage facility.

Included with this “FSA” are pictures of similar propane storage facilities showing flow control valve compliance plus supporting documents from the Wilmington, Massachusetts Fire Department.

The information gathered and compiled in this report was conducted by Propane Consultants, LLC at the request of **New England Transrail, L.L.C...** This report contains a true and accurate description of the proposed propane storage facility based on my propane and natural gas industry knowledge, questions asked, and data supplied by third parties. Propane Consultants, LLC is not liable for errors or omissions and/or any mis-use of this report.

This completed pre-construction Fire Safety Analysis Report is intended for the private use of **New England Transrail, L.L.C...** Any copies will need written permission from **New England Transrail, L.L.C...** A post construction Fire Safety Analysis Report must be completed and on file to verify “AS BUILT” codes compliance.

Completed May 9, 2013

Kenneth C. Matthews
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Raymond, Maine 04071-6104
207-272-4491
Propane@maine.rr.com
www.propaneconsultant.com

Form 4.1
Initial Data on the LP-Gas Facility

A	B	C
Item #	Information Item	Data
1	Name of the LP-Gas Facility Owner or Operator	New England Transrail, L.L.C.
2	Contact Name:	Robert W. Jones III
3	Contact Telephone & Fax Numbers	1-973-930-8041
4	Contact Email Address	Rjones1259@aol.com
5	Mailing Address	Street 1: 24 River Road
		Suite #17
		Clifton, New Jersey 07014

Fire Safety Analysis 2013

Form 4.2
Facility Storage Capacity

A	B	C	D
Item #	Individual Container Water Capacity (w.c.) (gallons)	Number of containers	Total Water Capacity (w.c.) of each container size (gallons)
1	500		
	1,000		
	2,000		
	4,000		
	10,000		
	18,000		
	30,000		
	60,000		
	Other:90,000	3	90,000
	Other:		
	Other:		
	Other:		
2	Aggregate Water Capacity⁴		270,000

- Notes:**
- (1) Column D = Column B x Column C.
 - (2) Parked bobtails, transports and tank cars should not be considered for aggregate capacity calculations.
 - (3) Do not consider containers that are not connected for use.
 - (4) For the purpose of this manual, "Aggregate Water Capacity" means any group of single ASME storage containers separated from each other by distances less than those stated in the aboveground containers column of Table 6.3.1.

Fire Safety Analysis 2013

☐ Existing Facility ☒ **Proposed Facility, To Be Built to NFPA 58 Edition 2011 Standards**

- a) Name of the Facility (if applicable) **New England Transrail, L.L.C.**
- b) Type of LP-Gas Facility ☐ Commercial ☐ Industrial ☒ **Bulk Plant**
- c) Facility is located in ☐ Rural Area, ☐ Suburban Area, ☒ **City Commercial Zone**
☒ **City Industrial Zone**
- d) Facility neighbors^s: ☐ Agri. fields ☒ **Commercial Bldgs.** ☐ Flammable Liquids Storage
(Check all that apply) ☒ **Industrial Activity (metal fabrication, cutting and welding, etc)**
☐ Manufacturing ☐ Others (explain)
- e) Geographic Location of Facility/Address: **51 Eames Street**
Wilmington, Massachusetts 01887
- f) Landmarks, if any: **Gps Longitude 71degrees 9'-19" W**
Gps Latitude 42 degrees 31'-46" N
- g) LP-Gas liquid supply by: ☐ Bobtail ☐ Truck Transport ☒ **Rail Tank Car**
(Check all that apply) ☐ Pipeline
- h) LP-Gas Distribution by: ☐ Bobtail ☒ **Truck Transport** ☐ Vapor Piping
(Check all that apply) ☐ Liquid Piping ☐ Dispensing or Vehicle Liquid fueling
- i) Number of Vehicle Entrances: ☐ One ☒ **Two** ☐ More than two
- j) Type of Access Roads to the Facility ☐ Rural ☒ **City or Town** ☒ **Highway**
(One check per line) Entrance 1 ☐ Dirt road ☐ Gravel road ☒ **Paved**
(One check per line) Entrance 2 ☐ Dirt road ☐ Gravel road ☒ **Paved**
- k) Staff presence ☐ Not staffed ☐ Only during transfer operations
☒ **Staffed always (24/7)** ☐ Only during business hours
☐ Other (Explain) _____
- l) Location and distances to Assembly, Educational or Institutional Occupancies surrounding the facility, if any, within 250 ft from the facility boundary in the direction of the assets.
None Noted or Recorded
- m) Overview plot plan of the facility attached? ☐ Yes ☒ **No**

Fire Safety Analysis 2013

Form 5.4

Compliance with Code Requirements for Appurtenances on Containers Having a Water Capacity Greater Than 4,000 Gallons Used in Bulk Plants and Industrial Plants

A	B	C	D		E	F	G
Container #	LP-Gas inlet to and outlet from the container**		Enter Configuration Number		Total Number of Product Control Appurtenances		NFPA 58 Section Reference (2011 edition)
					Required by NFPA 58 (applicable edition)	Installed on the container	
1	Vapor	Inlet	5-6	5-6A:2	1	1	See §5.7.4.2 and Table 5.7.4.2
		Outlet	5-6	5-6A:2	1	1	
	Liquid	Inlet	5-7	5-7A:1	1	1	
		Outlet	5-7	5-7A:1	1	1	
2	Vapor	Inlet	5-6	5-6A:2	1	1	
		Outlet	5-6	5-6A:2	1	1	
	Liquid	Inlet	5-7	5-7A:1	1	1	
		Outlet	5-7	5-7A:1	1	1	
3	Vapor	Inlet	5-6	5-6A:2	1	1	
		Outlet	5-6	5-6A:2	1	1	
	Liquid	Inlet	5-7	5-7A:1	1	1	
		Outlet	5-7	5-7A:1	1	1	
	Vapor	Inlet					
		Outlet					
	Liquid	Inlet					
		Outlet					

** If the container does not provide an opening for the specific function listed, enter 0 (zero) in columns E and F corresponding to that row.

If in Form 5.4 any one of the numbers in column F is less than the number in Column E of the corresponding row, these items must be addressed and brought into compliance with the specific edition of NFPA 58 that the facility was constructed to.

Fire Safety Analysis 2013

Figure 5- 6A: 2
Valve configuration for Vapor Inlet Tank # 1 & 2 & 3

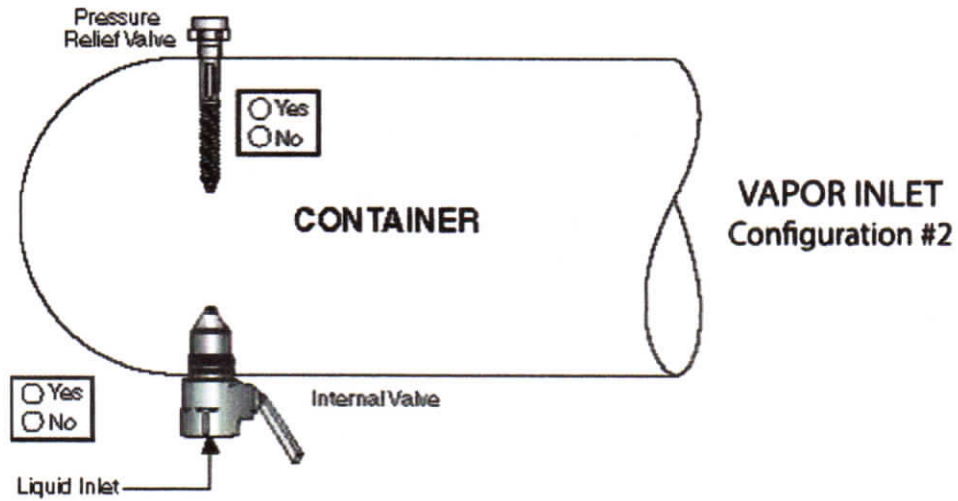
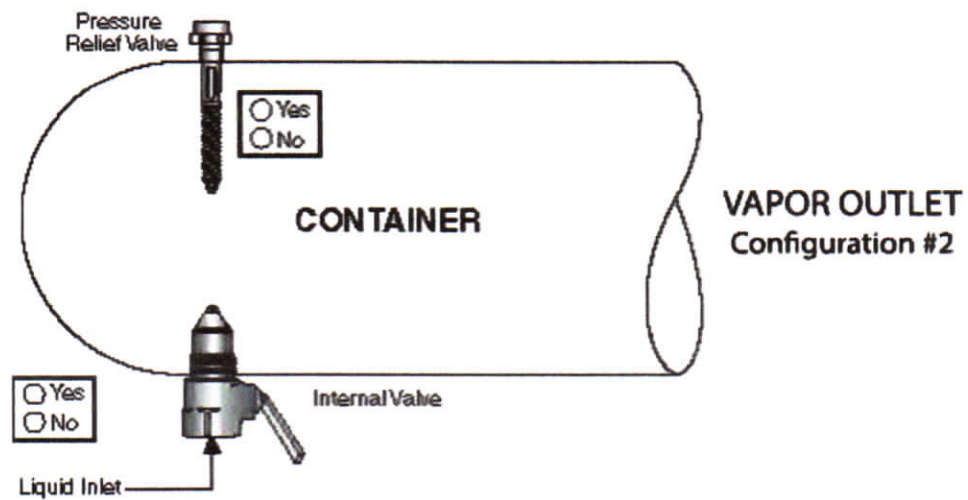


Figure 5- 6A: 2
Valve configuration for Vapor Outlet Tank # 1 & 2 & 3



Fire Safety Analysis 2013

Figure 5- 7A: 1
Valve Configuration Liquid inlet on Tank # 1 & 2 & 3

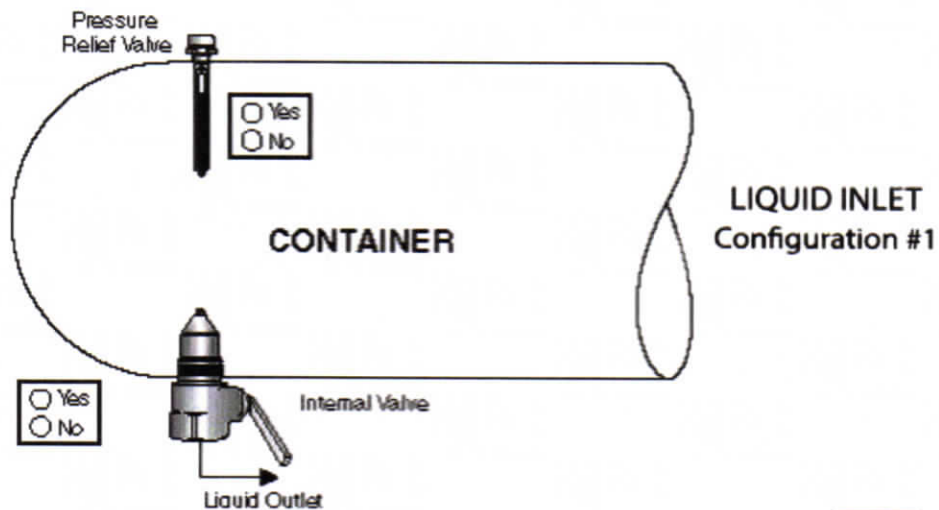
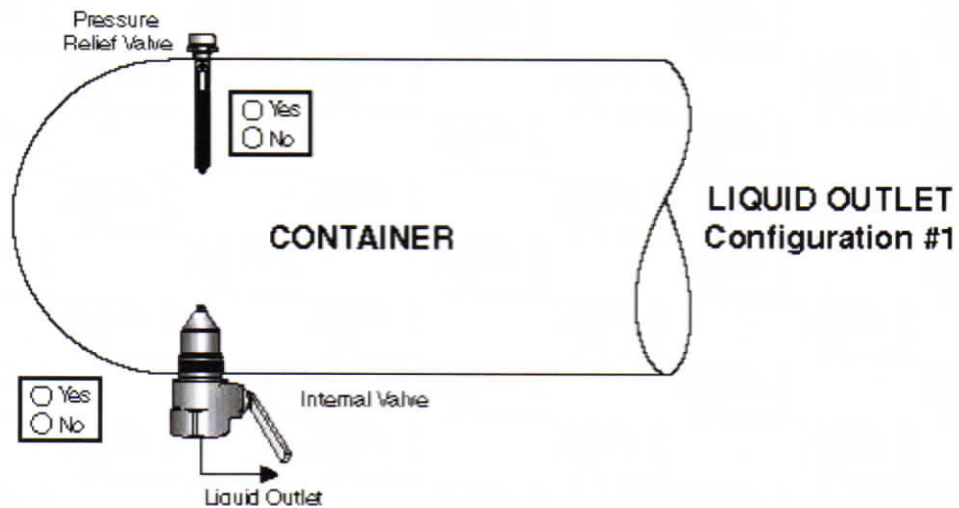


Figure 5- 7A: 1
Valve Configuration Liquid outlet on Tank # 1 & 2 & 3



Fire Safety Analysis 2013

Form 5.5
Requirements for Transfer Lines of 1½-inch Diameter or Larger,
Liquid-into-Containers

A	B	C	D	E	F
Item #	Appurtenance (Either No. 1 or No. 2)**	Appurtenance Provided with the Feature	Installed in the facility?		NFPA 58 Section Reference (2011 edition)
			Yes	No	
1	Emergency Shutoff Valve (ESV) (Ref § 6.12)	Installed within 20 ft. of lineal pipe from the nearest end of the hose or swivel-type connections.	√		6.12.2
		Automatic shutoff through thermal (fire) actuation with melting point of thermal element < 250 °F	√		6.12.6
		Temperature sensitive element (fusible link) installed within 5 ft from the nearest end of the hose or swivel type piping connected to liquid transfer line.	√		6.12.6
		Manual shutoff feature provided at ESV installed location.	√		6.12.10 (1)
		Manual shutoff device provided at a remote location, not less than 25 ft., and not more than 100 ft. from the ESV.	√		6.12.10 (2)
		An ESV is installed on each leg of a multi leg piping each of which is connected to a hose or a swivel type connection on one side and to a header of size 1½ inch in diameter or larger on the other side.	√		6.12.5 6.18.2.6 (1)
		Breakaway protection is provided such that in any pull-away break will occur on the hose or swivel-type connection side while retaining intact the valves and piping on the plant side.	√		6.12.8
2	Back flow Check Valve (BCK)**	Installed downstream of the hose or swivel-type connection	√		6.12.8
		BCK is designed for this specific application.	√		6.12.4
		A BCK is installed on each leg of a multi leg piping each of which is connected to a hose or a swivel type connection on one side and to a header of 1½ inch in diameter or larger on the other side.	√		6.12.5
		Breakaway protection is provided such that in any pull-away break will occur on the hose or swivel-type connection side while retaining intact the valves and piping on the plant side.	√		6.12.8

** In lieu of an emergency shutoff valve, the backflow check valve (BCK) is only permitted when flow is only into the container and shall have a metal-to-metal seat or a primary resilient seat with metal backup, not hinged with a combustible material (6.12.3, 6.12.4).

Fire Safety Analysis 2013

Form 5.6
Requirements for Transfer Lines of 1½-inch Diameter or Larger,
Liquid Withdrawal From Containers

A	B	C	D	E	F
Item #	Appurtenance	Appurtenance Provided with the Feature	Installed in the facility?		NFPA 58 Section Reference (2011 Edition)
			Yes	No	
1	Emergency Shutoff Valve (ESV) (Ref § 6.12.1)	Installed within 20 ft. of lineal pipe from the nearest end of the hose or swivel-type connections.	√		6.12.2
		Automatic shutoff through thermal (fire) actuation with melting point of thermal element < 250 °F.	√		6.12.6
		Temperature sensitive element installed within 5 ft from the nearest end of the hose or swivel type piping connected to liquid transfer line.	√		6.12.6
		Manual shutoff feature provided at ESV installed location.	√		6.12.10 (1)
		Manual shutoff device provided at a remote location, not less than 25 ft., and not more than 100 ft. from the ESV.	√		6.12.10 (2)
		An ESV is installed on each leg of a multi leg piping each of which is connected to a hose or a swivel type connection on one side and to a header of 1½ inch in diameter or larger on the other side.	√		6.12.5 6.18.2.6 (1)
		Breakaway protection is provided such that in any pull-away break will occur on the hose or swivel-type connection side while retaining intact the valves and piping on the plant side.	√		6.12.8
		Number of ESV's in liquid withdrawal service	9		

Form 5.7
Requirements for Vapor Transfer Lines 1¼-inch Diameter or Larger

A	B	C	D	E	F
Item #	Appurtenance	Appurtenance Provided with the Feature	Installed in the facility?		NFPA 58 Section Reference (2011 edition)
			Yes	No	
1	Emergency Shutoff Valve (ESV) (Ref § 6.12.1)	Installed within 20 ft. of lineal pipe from the nearest end of the hose or swivel-type connections.	√		6.12.2
		Automatic shutoff through thermal (fire) actuation with melting point of thermal element < 250 °F	√		6.12.6
		Temperature sensitive element installed within 5 ft from the nearest end of the hose or swivel type piping connected to liquid transfer line.	√		6.12.6
		Manual shutoff feature provided at ESV installed location.	√		6.12.10 (1)
		Manual shutoff device provided at a remote location, not less than 25 ft., and not more than 100 ft. from the ESV.	√		6.12.10 (2)
		An ESV is installed on each leg of a multi leg piping each of which is connected to a hose or a swivel type connection on one side and to a header of 1-1/4 inch in diameter or larger on the other side.	√		6.12.5 6.18.2.6 (1)
		Breakaway protection is provided such that in any pull-away break will occur on the hose or swivel-type connection side while retaining intact the valves and piping on the plant side.	√		6.12.8
2	Back flow Check Valve (BCK)**	Installed downstream of the hose or swivel-type connection	√		6.12.8
		BCK is designed for this specific application.	√		6.12.3 and 6.12.4
		A BCK is installed on each leg of a multi leg piping each of which is connected to a hose or a swivel type connection on one side and to a header of 1-1/4 inch in diameter or larger on the other side.	√		6.12.5
		Breakaway protection is provided such that in any pull-away break will occur on the hose or swivel-type connection side while retaining intact the valves and piping on the plant side.	√		6.12.8

** In lieu of an emergency shutoff valve, the backflow check valve (BCK) is only permitted when flow is only into the container and it shall have a metal-to-metal seat or a primary resilient seat with metal backup, not Hinged with a combustible material (6.12.3, 6.12.4).

Form 6.1

Evaluation of Physical Protection and Other Measures

A	B	C	D	E	F
#	Item	Features	Installed in the facility?		NFPA 58 Section Reference (2011 Edition)
			Yes	No	
1	Lighting [‡]	Provide lighting for nighttime operations to illuminate storage containers, container being loaded, control valves, and other equipment	√		6.18.5
2	Vehicle impact protection	Protection against vehicular (traffic) impacts on containers, transfer piping and other appurtenances is designed and provided commensurate with the size of vehicles and type of traffic in the facility. (Example protection systems include but not limited to (1) Guard rails, (2) Steel bollards or crash posts, (3) Raised sidewalks.	√		6.9.3.10 and 6.19.3.2
3	Protection against corrosion	Provide protection against corrosion where piping is in contact with supports or corrosion causing substances.	√		6.9.3.11
Complete only 4A or 4B					
4A	Perimeter Fence	Is an industrial type or chain link fence of at least 6 ft high or equivalent protection provided to enclose (all around) container appurtenances, pumping equipment, loading and unloading and container filling facilities?	√		6.18.4.2
		Are at least two means of emergency accesses (gates) from the enclosure provided? NOTE: Write "N.A." (not applicable) if (i) The area enclosed is less than 100 ft ² , or (ii) The point of transfer is within 3 ft of the gate, or containers are not filled within the enclosure	√		6.18.4.2 (A)
		Is a clearance of at least 3 feet all around to allow emergency access to the required means of egress been provided?	√		6.18.4.2 (B)
	Guard Service	If a guard service is provided, does this service cover the LP-Gas plant and are the guard personnel provided with appropriate LP-Gas related training, per section 4.4 of NFPA 58?	NA	NA	6.18.4.3
4B	Lock-in-Place devices	Are Lock-in-Place devices provided to prevent unauthorized use or operation of any container appurtenance, system valves, or equipment in lieu of the fence requirements above?	NA	NA	6.18.4.2 (C)

Note: Fill only items 1, 2, 3, and 4A or 4B. Indicate with "NA" when not filling the "Yes" or "No" column.

[‡] Indicate with "NA" if the facility is not operated at night.

Form 6.2
Assessment of Sources of Ignition and Adjacent Combustible Materials

A	B	C	D	E
#	Sources of Ignition and Requirements Pertaining to Adjacent Combustible Materials	Is the Facility compliant?		NFPA 58 Section Reference (2011 Edition)
		Yes	No	
1	Are combustible materials, weeds and tall grass not closer than 10 ft. from each container?	√		6.4.5.2
2	Is a distance at least 20 ft. provided between containers and tanks containing flammable liquids with flash point less than 200 °F (ex., gasoline, and diesel)?	√		6.4.5.5
3	Are electrical equipment and wiring installed per Code requirements?	√		6.22.2
4	Is open flame equipment located and used according to Code?	NA	NA	6.22.3.1
5	Are ignition control procedures and requirements during liquid transfer operations complied with.?	√		7.2.3.2
6	Is an approved, portable, dry chemical fire extinguisher of minimum capacity 18 Lbs. and having a B:C rating provided in the facility?	√		6.25.4.2
7	Is an approved, portable, dry chemical fire extinguisher of minimum capacity 18 Lbs. and having a B:C rating provided on each truck or trailer used to transport portable containers?	√		9.4.7
8	Is the prohibition on smoking within the facility premises strictly enforced?	√		7.2.3.2 (B) & 9.4.10

Note: Insert "NA" in both "Yes" and "No" columns of any items that are not applicable.

Fire Safety Analysis 2013

Form 6.3

Separation Distances from Containers to Buildings, Property Lines that can be built upon, Inter-container Distances, and Aboveground Flammable or Combustible Storage Tanks

A	B	C	D	E	F	G
#	Container Size Range in gal (W.C.)	Separation between a property line, important building or other property and the <u>nearest</u> container which is	Minimum Distance (ft)	Is the Facility compliant?		NFPA 58 Section Reference (2011 Edition)
				Yes	No	
1	501 through 2,000	Above Ground	25	√		6.3.1 and Table 6.3.1
		Underground or Mounded	10	NA	NA	
		Between containers	3	√		
2	2,001 through 30,000	Above Ground	50	NA	NA	
		Underground or Mounded	50	NA	NA	
		Between containers	5	NA	NA	
3	30,001 through 70,000	Above Ground	75	NA	NA	
		Underground or Mounded	50	NA	NA	
		Between containers	¼ sum of diameters of adjacent containers	NA	NA	
4	70,001 through 90,000	Above Ground	100	NA	NA	
		Underground or Mounded	50	NA	NA	
		Between containers	¼ sum of diameters of adjacent containers	√		
5	All sizes greater than 125 gal	Separation distance between a LP-Gas container and an above ground storage tank containing flammable or combustible liquids of flash points below 200 °F.	20	NA	NA	6.4.5.4 and 6.4.5.5

Note: If any of the container sizes indicated in the above form are not present in the facility, Enter "NA" in both Yes and No columns.

If the LP-Gas plant is provided with every one of the redundant and fail-safe product control-design equipment indicated in Form 5.8, then the minimum distance in column D of Form 6.3 can be reduced to 10 feet for underground and mounded containers of water capacity 2,001 gal to 30,000 gal.

Fire Safety Analysis 2013

Form 6.4

Separation Distances between Points of Transfer and other Exposures

A	B		C	D	E	F	G
#	Type of Exposure within or outside the facility boundary		Check if exposure is present	Minimum Distance (ft)	Is the Facility compliant?		NFPA 58 Section Reference (2008 Edition)
					Yes	No	
1	Buildings, mobile homes, recreational vehicles, and modular homes with fire-resistive walls			10	√		Section 6.5.3 Table 6.5.3
2	Buildings with other than fire resistive walls			25	√		
3	Building wall openings or pits at or below the level of the point of transfer			25	√		
4	Line of adjoining property that can be built upon			25	√		
5	Outdoor places of public assembly, including school yards, athletic fields, and playgrounds			50	√		
6	Public ways, including public streets, highways, thoroughfares, and sidewalks	From points of transfer in LP-Gas dispensing stations and at vehicle fuel dispensers.		10	√		
		From other points of transfer		25	√		
7	Driveways			5	√		
8	Mainline railroad track centerlines			25	√		
9	Containers other than those being filled			10	√		
10	Flammable and Class II combustible liquid dispensers and aboveground and underground containers			20	√		
11	Flammable and Class II combustible liquid dispensers and the fill connections of LPG containers			10	√		
12	LP-Gas dispensing device located close to a Class I liquid dispensing device.			10	√		6.24.4.3

NOTE: Place a checkmark in column C against an exposure that is present in or around the facility. Fill columns E or F for only those rows for which there is a checkmark in column C.

If the facility contains low emission transfer equipment (i.e., all equipment identified in Form 5.9 are installed and are in working order), then the minimum separation distances in column D of Form 6.4 can be reduced to one half of the indicated values.

Form 6.5

Special Protection Measures –Passive Systems

6.5 Vehicular Protection

In the event that an installation is located where an immediate threat due to vehicular traffic is present, a barrier or other suitable protection may be necessary.

A	B	C	D		E
#	Special Protection Option	Question	Is the Facility compliant?		NFPA 58 Section Reference (2011 Edition)
			Yes	No	
1	Container Insulation	Insulation provided on each of the containers?	NA	NA	6.25.5.1
		Insulation material complies with the requirements of section 6.25.5.1 of NFPA 58?	NA	NA	6.25.5.1 and 6.25.5.2
2	Mounding of containers	Each container in the facility is mounded?	NA	NA	6.25.5.3
		Mounding complies with each requirement under section 6.6.6.3 of NFPA 58.	NA	NA	6.25.5.3
3	Burying of containers	Each container in the facility is buried?	NA	NA	6.25.5.4
		Buried containers comply with each requirement under section 6.6.6.1 of NFPA 58.	NA	NA	6.6.6.1 & 6.25.5.4

Form 6.6
Special Protection Measures –Active Systems

#	Special Protection Option	Question	Is the Facility compliant?		NFPA 58 Section Reference (2011 Edition)
			Yes	No	
1	Water spray systems	Are fixed water spray systems, complying with NFPA 15 ¹ requirements, used for each container in the facility?	NA	NA	6.25.6.1
		Do fire responsive devices actuate water spray system automatically?	NA	NA	6.25.6.2
		Can the water spray systems be actuated manually also?	NA	NA	6.25.6.2
2	Monitor nozzle systems	Are the monitor nozzles located and arranged so that the water stream can wet the surfaces of all containers exposed to a fire?	NA	NA	6.25.6.3
		Can the water stream from a monitor nozzle reach and wet the entire surface of, at least, one half of a length from one end of each of the containers it is designed to protect?	NA	NA	6.25.6.3
		Do fixed monitor nozzles comply with NFPA 15 ¹ requirements?	NA	NA	6.25.6.1
		Do fire responsive devices actuate the monitor nozzles?	NA	NA	6.25.6.2
		Can the monitor nozzles can be actuated manually also?	NA	NA	6.23.6.2

1. Refer to Chapter 8 for a discussion on NFPA 15 *Standard for Water Spray Fixed Systems for Fire Protection*

Form 6.7
Protection Against Vehicular Impact

#	System Protected	Is physical protection provided?		Type of physical protection installed
		Yes	No	
1	Storage containers	√		Guardrail
2	Transfer stations	√		Guardrail
3	Entryway into Transfer stations	√		Fence with Gates

Fire Safety Analysis 2013

Table 7.1
Distances to Various Types of Propane Hazards Under Different Release Models**

Model #	Details of the Propane Release Model Releases from or due to		Vapor Dispersion Distance to LFL (ft)	Explosion Hazard Distance (ft)	Fire Ball Radiation Distance (ft)
1A	Bobtail hose failure. Release of the entire inventory in the hose, quickly.	1" ID x 150 ft hose length	250	110	50
1B		1" ID x 120 ft hose length	230	103	45
1C		1" ID x 75 ft hose length	190	90	40
2a	Release of the inventory in a transfer piping 1" x 30 ft + @ 20 gpm for 10 min., due to failed excess flow valve.		135	120	25
2b	Release of the inventory in a transfer piping 2" x 30 ft + @80 gpm for 10 mins.		230	252	48
2c	Release of the inventory in a transfer piping 2" x 80 ft. @ 70 gpm for 10 mins.		328	235	74
2d	Release of the inventory in a transfer piping 2.5" x 30 ft @80 gpm for 10 mins.		269	252	59
2e	Release of the inventory in a transfer piping 3" x 30 ft + @100 gpm for 10 mins.		312	287	69
2f	Release of the inventory in a transfer piping 3" x 18 ft + @100 gpm for 10 mins.		256	284	55
3	Release from the container pressure relief valve		No ignitable vapor concentration at ground level		
4	Release from a 1" ID x 150 ft transfer piping to a vaporizer and reduced flow from a partially open excess flow valve @ 20 gpm for 10 min.		250	120	50
5	Leak from a corrosion hole in a transfer pipe at a back pressure of 130 psig (corresponding to 80 °F) for 60 min. Hole size is 1/4" ID.		110	120	5
6	Release of the entire inventory in a 2" ID x 20 ft., transfer hose.		195	90	40
6a	Release of the entire inventory in a 2.5 inch dia. transfer hose x 16 ft. length		215	98	45
6b	Release of the entire inventory in a 3-inch dia. transfer hose x 12 ft. length		230	100	46
7	Transport hose blow down: Hose size 2" ID, 20 ft length release for 3min., from a Transport after the tank is filled.		25	30	<5
7a	Transport hose blow down: Hose size 2.5" ID, 16 ft length release for 3min., from a Transport after the tank is filled.		25	29	<5
7b	Transport hose blow down: Hose size 3" ID, 16 ft length release for 3min., from a Transport after the tank is filled.		31	36	<5

** Results from models described in Appendix B. The results are rounded to the nearest 5 feet.

Form 7.1
Types of Occupancies⁽¹⁾ Near or Surrounding the LP-Gas Facility

Type of Occupancies	Model # from Table 7.1	Hazard Distance ⁽²⁾ (feet)	Is Occupancy located within the hazard distance from the Facility?	
			Yes	No
Assembly Occupancies (Places of worship, Libraries, Theaters and Auditoriums, Food or Drink Bars, Sports Stadiums, Amusement Parks, Transportation Centers, etc. with 50 or more people).	1A	287		√
Institutional Occupancies (Elderly Persons Home or Nursing Home, Hospitals, Alcohol & Drug Rehabilitation Centers, Prisons)	1A	287		√
Educational Occupancies (Elementary Schools, Day Care facilities, etc).	1A	287		√

NOTES: (1) Different types of occupancies are defined in NFPA 5000

(2) Table 7.1 provides a number of scenarios that can result in propane release, and the resulting area exposed for different ignition mechanisms. Determine the scenarios that are applicable to the facility, for the quantities that can be released, and enter the greatest value from Table 7.1. Use the hose diameters and length that will be used at the facility if they differ from the ones in Table 7.1 and recalculate the hazard distances using a spreadsheet method that is available at npga.org. Some scenarios may not be applicable to an installation because of other mitigation measures implemented, such as a hose management procedure to minimize the possibility of hose failure.

Fire Safety Analysis 2013

Form 7.2
Exposure to LP-Gas Facility from External Hazards

A	B	C	D
Item #	Type of Neighboring Operation	Hazard exists to the LP-Gas Facility	
		Yes	No
1	Petroleum and other hazardous material storage, wholesale dispensing, etc.		√
2	Metal cutting, welding, and metal fabrication		√
3	Industrial Manufacturing that can pose external hazards		√
4	Ports, rail yards and trans-shipment terminals handling flammable and explosive materials.		√
5	Other operations that may pose hazards (gasoline and other hazardous material dispensing stations, fertilizer storage, etc).		√

NOTE: If a particular activity indicated in column B does not exist, fill both “Yes” and “No” columns with “NA.”

Where a “Yes” has been checked in either Form 7.1 or Form 7.2:

- 1) For an existing facility, communicate this information to local emergency responders for inclusion in their emergency planning.
- 2) For a proposed facility, implement the actions indicated in Chapter 9.

Form 8.1
Data on the Responding Fire Department

A	B		C
Item #	<u>Data Item</u>		Data Entry
1	Name of the Fire Department (FD).		Wilmington Fire Department
2A	Name of the person in the FD assisting with the data acquisition.		Edward Bradbury
2B	Position of the person in the FD assisting with the data acquisition.		Fire Chief
3A	Date on which FD data was collected.		May 6, 2013
3B	Name of the person collecting the data.		Kenneth Matthews
4	Number of firefighters on duty at any time.		9
5	Average number of firefighters available for response.		9
6A	Number of firefighters qualified to	"Firefighter I" level.	40
6B		"Firefighter II" level.	40
7A	Number of firefighters who would:	Respond on the first alarm to the facility.	9
7B		Respond on the first alarm and who are qualified to the operations level requirements of NFPA 472 or <u>similar</u> local requirements	9
7C		Respond on the first alarm with specific knowledge and training on the properties of LP-Gas and LP-Gas fires.	9
8A	Number of fire apparatus that have the capability to deploy a 125 gpm hose line supplied by onboard water for at least 4 minutes, and, which:	Are in service in the department.	5
8B		Would respond on a first alarm.	2

Fire Safety Analysis 2013

Form 8.2
Response Time data for the Fire Departments

A	B	C	D	E
Company or Department	Time in Minutes for			
	Alarm Receipt & Handling	Turnout	Travel	Total Time
Wilmington, MA FD	N/A	N/A	N/A	N/A

Note: Number in Column E = Sum of numbers from Columns B through D.

Information supplied by: Chief Edward Bradbury,
Wilmington, Massachusetts Fire Department

NOTE: *The 51 Eames Street site has been closed since 1986 and no information as to Response Times has been provided by Chief Bradbury it is my assumption that this data is no longer available from fire department and/or public records.*

Kenneth C. Matthews

Form 8.3

Water Flow Rate and Total Water Volume Required to Cool Containers Exposed to a Fire

A	B	C	D	E	F	G	H
Item #	ASME Container Size (gallons)	Total Surface Area of each Container ¹ (ft ²)	Surface Area of each container to be Cooled (ft ²)	Water flow rate required per container (gpm)	Number of containers of the size indicated [‡]	Total Water flow rate required (gpm)	Total volume of water required for 10 min (gal)
1	500	86	43	10.8			
	1,000	172	86	21.5			
	2,000	290	145	36.3			
	4,000	374	187	46.8			
	6,500	570	285	71.3			
	9,200	790	395	98.8			
	12,000	990	495	123.8			
	18,000	1,160	580	145.0			
	30,000	1,610	805	201.3			
	45,000	2,366	1,183	295.8			
	60,000	3,090	1,545	386.3			
	90,000	4,600	2,300	575.0	3	1,725.0	
	Other Size						
2a	Calculated water flow rate for container protection					1,725.0	
2b	Water flow rate rounded up to nearest multiple of 125					1,750.0	
3	Water for firefighter protection, if required					0	
4	Total water flow rate and volume					1,750.0	17,500.0

Note: Column D = (1/2) x Column C
Column E = 0.25 (gpm/ft²) x Column D ;
Column G = Column F x Column E
Column H = 10 x Column G
Line 2a, Column G and Column H are the sum of numbers in each row above line 2 of each column.
Line 4, Column G and Column H are the sum of numbers in rows 2b and 3.

[‡] Consider only 3 containers for water supply evaluations even if the number of containers in a group is more than 3. See Section 8.2.

¹ ASME container approximate dimensions

The total water requirement for the facility is indicated in item 4, column G (water flow rate) and column H (total water volume or quantity) of Form 8.3. If multiple groups of containers are present in the facility, repeat the calculations in Form 8.3 for each group of containers. The total water requirement for the facility is the largest value for any single group of containers.

Form 8.4 Evaluation of Water Availability in or Near the LP-Gas Facility

A	B	C	D		
Item #	Water from...	Available?	Quantitative information		
1	Public supply or from another piped-in supply through one or more fire hydrants in or near the facility	☒ Yes ☐ No	Hydrant data	Distance from Container(s) on which water will be applied (feet)	Available water flow rate from all hydrants ⁽¹⁾ (gpm)
			Hydrant 1	Jewell Dr. 400	1,199.0
			Hydrant 2		
			Hydrant 3		
2	A nearby static water source (stream, pond, lake, etc).	☐ Yes ☒ No	Distance to water source = _____ Feet Time to set up relay = _____ min. Rate of delivery = _____ gpm		
3	Only through mobile water tanker shuttle.	☐ Yes ☒ No	Time to set up shuttle = _____ min. Sustainable flow rate = _____ gpm		

(1) Obtain the available flow rate from the local municipal water authority or the entity that supplies water to the hydrant or conduct a test to determine total available flow rate.

- 1. For an existing facility, communicate this information to local responders for inclusion in their emergency planning.**
- 2. For a proposed new facility, refer to Chapter 9**

NOTE: Multiple fire hydrants are required to meet the minimum water requirements indicated on page 27.

Form 9.1

Analysis Summary on Product Control and Local Conditions of Hazard

A	B	C	D	E
Item #	CHAPTER Title	Section & Title	Reference FORM #	Number of "No" checked
1	Product Control Measures in Containers & Transfer Piping	5.1: Product Control in Containers	5.1 or 5.2 or 5.3 or 5.4 [§]	-0-
		5.2 Product Control in Transfer Piping	5.5	-0-
			5.6	-0-
			5.7	-0-
			5.8	-0-
			5.9	-0-
2	Analysis of Local Conditions of Hazard	6.1 Physical Protection Measures	6.1	-0-
		6.2 Ignition Source Control	6.2	-0-
		6.3.1 Separation distances; Container and outside exposures	6.3	-0-
		6.3.2 Separation distances; Transfer points and outside exposures	6.4	-0-
		6.4 Special Protection Measures	6.5	-0-
			6.6	-0-

§ The number of "No" for Forms from Chapter 5 is the difference between the required number of appurtenances according to NFPA 58-2008, and a lesser number found to be actually installed on the container or the transfer piping.

If, in any row of column E ("No") of Form 9.1, the entry number is greater than zero, the proposed LP-Gas facility is not in compliance with the requirements of NFPA 58-2008 for product control appurtenances or other safety measures. The design of the proposed facility must be modified to conform to the Code requirements. In addition, the following items should be noted.

- If there are any "No" checks in Form 6.3, then the separation distance requirements for containers are not satisfied. An option that may be considered is the reduction in separation distance to 10 feet for underground and mounded containers by providing "Redundant and Fail-Safe Product Control Measures." In this case, complete Form 9.4 below to ensure that each requirement of "Redundant and Fail-Safe Product Control Measures" is provided.
- If there are any "No" checks in Form 6.4, then the separation distance requirements for transfer points are not satisfied. In this case, relocate the transfer points so that the separation distances conform to the code requirements or provide the Low Emission Transfer Equipment. Complete Form 9.5 below and ensure that all requirements for Low Emission Transfer Equipment are fulfilled.

Form 9.2

Analysis Summary on Exposure from and to the LP-Gas Facility

A	B	C	D	E
Item #	CHAPTER Title	Section & Title	Reference FORM #	Number of "Yes" checked
1	Exposure to and from Other Properties	7.1 Exposure to off-site properties and persons from in-plant propane releases	7.1	-0-
		7.2 Exposure to propane facility from external events.	7.2	-0-

If the entry number in column E ("Yes"), Form 9.2 corresponding to Form 7.1 is greater than zero, consider one or more of the following design alternatives.

- 1 Consider moving the container or the transfer point to a different location, if possible and space exists, so that the property or the person is beyond the hazard distance.
- 2 Provide "Redundant and Fail-safe Product Control Measures". Complete Form 9.4 to ensure compliance.
- 3 Institute other technical measures such as installing gas and flame detectors (connected to facility shut down systems), sounding alarm outside facility premises, etc.
- 4 Institute administrative controls such as additional training for personnel, more frequent inspections of hoses and transfer piping, etc.

If the entry number in column E ("Yes"), Form 9.2 corresponding to Form 7.2 is greater than zero, consider one or more of the following design alternatives.

- 1 Implement procedures to monitor neighboring activity.
- 2 Install means in the adjacent plant to shut down the LP-Gas plant in case of an emergency in that plant.

Fire Safety Analysis 2013

Form 9.3
Analysis Summary on Fire Department Evaluations

A	B	C	D	E	F
Item #	CHAPTER Title	Section & Title	Reference FORM #	Number “zeros” entered in Column C, Lines 6 through 8 of Form 8.1	Number of “Yes” checked in Column C of Form 8.4
1	Fire department capability, adequacy of water supply and Emergency Planning	8.1 Data on the Fire Department	8.1	0	
2		8.2 Fire response water needs and availability	8.4		1

Fire Safety Analysis 2013

Fire Hydrant @ Jewell Drive

Data

Size of Water main: 16 inch (Estimated)

Size of Water Stub: *6 inch

Static Pressure: *82 PSI

Residual Pressure: *58 PSI

Gallons per Minute Flow: *1,199

***Information furnished by: Mr. Garland Hilliard
Director Environmental Remediation
Olin Corporation**

***April 17, 2013**

***May 2, 2013**

Fire Safety Analysis 2013

Tanks # 1, 2, 3
Liquid & Vapor Valves With “ESV’s”
“Similar to be built”



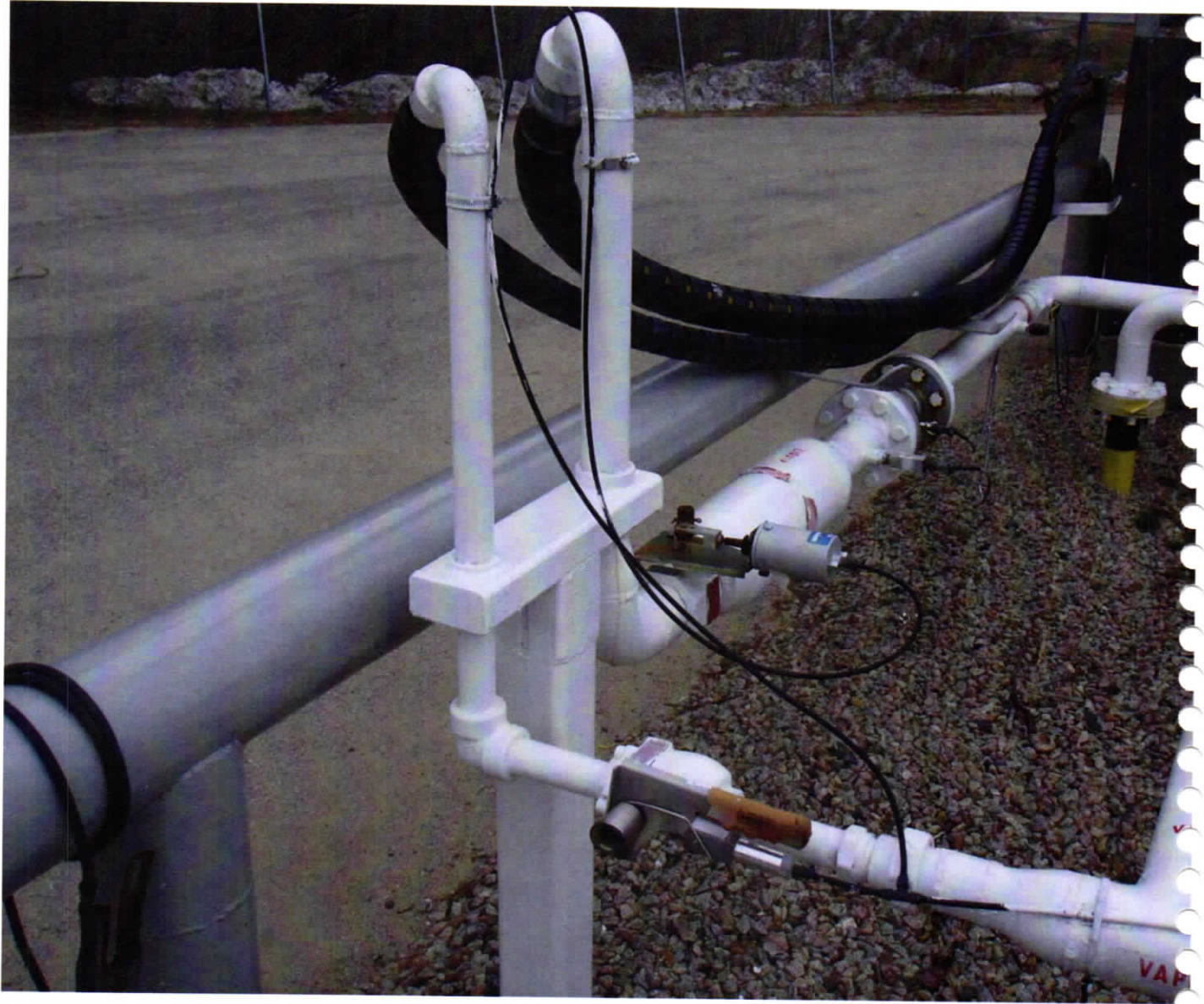
Fire Safety Analysis 2013

Tanks # 1, 2, 3
Liquid & Vapor Valves With “ESV’s”
“Similar to be built”



Fire Safety Analysis 2013

Transport Loading/Unloading Bulkhead # 1
With “ESV’s”
“Similar to be built”



Fire Safety Analysis 2013

Transport Loading/Unloading Bulkhead # 2
With “ESV’s”
“Similar to be built”



Fire Safety Analysis 2013

Transport Loading Liquid and Vapor Hoses # 1 Attached to Hose Storage Rack

"Similar to be built"



Fire Safety Analysis 2013

Transport Loading Liquid and Vapor Hoses # 2 Attached to Hose Storage Rack

"Similar to be built"



Fire Safety Analysis 2013

View from Transport Loading/Unloading Bulkheads To Propane Storage Containers

“Similar to be built”



Fire Safety Analysis 2013

Liquid Transfer Pumps For Loading Transports

"Similar to be built"



Fire Safety Analysis 2013

Small Methanol Injection System

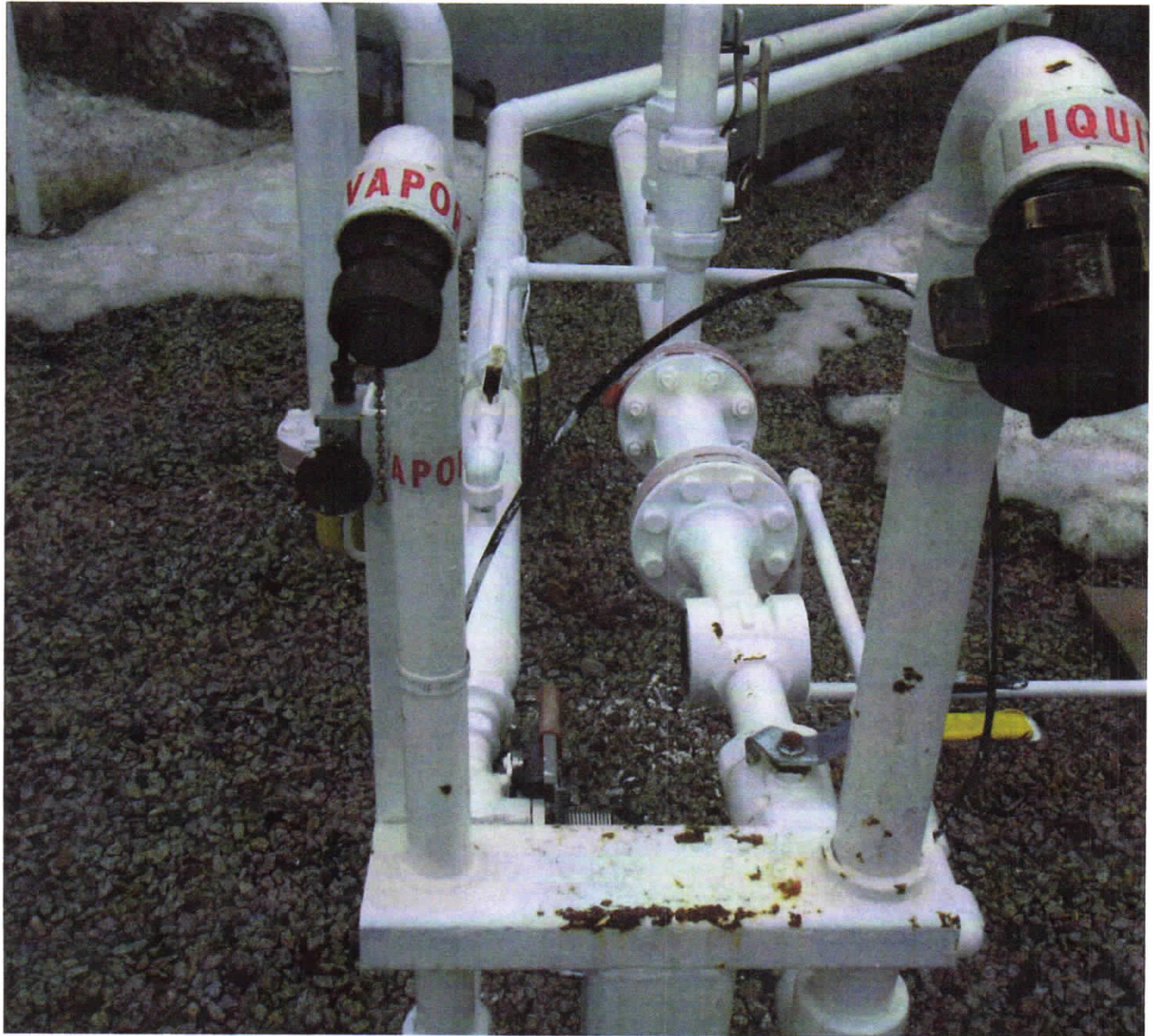
"Similar to be built"



Fire Safety Analysis 2013

Transport Unloading Bulkhead

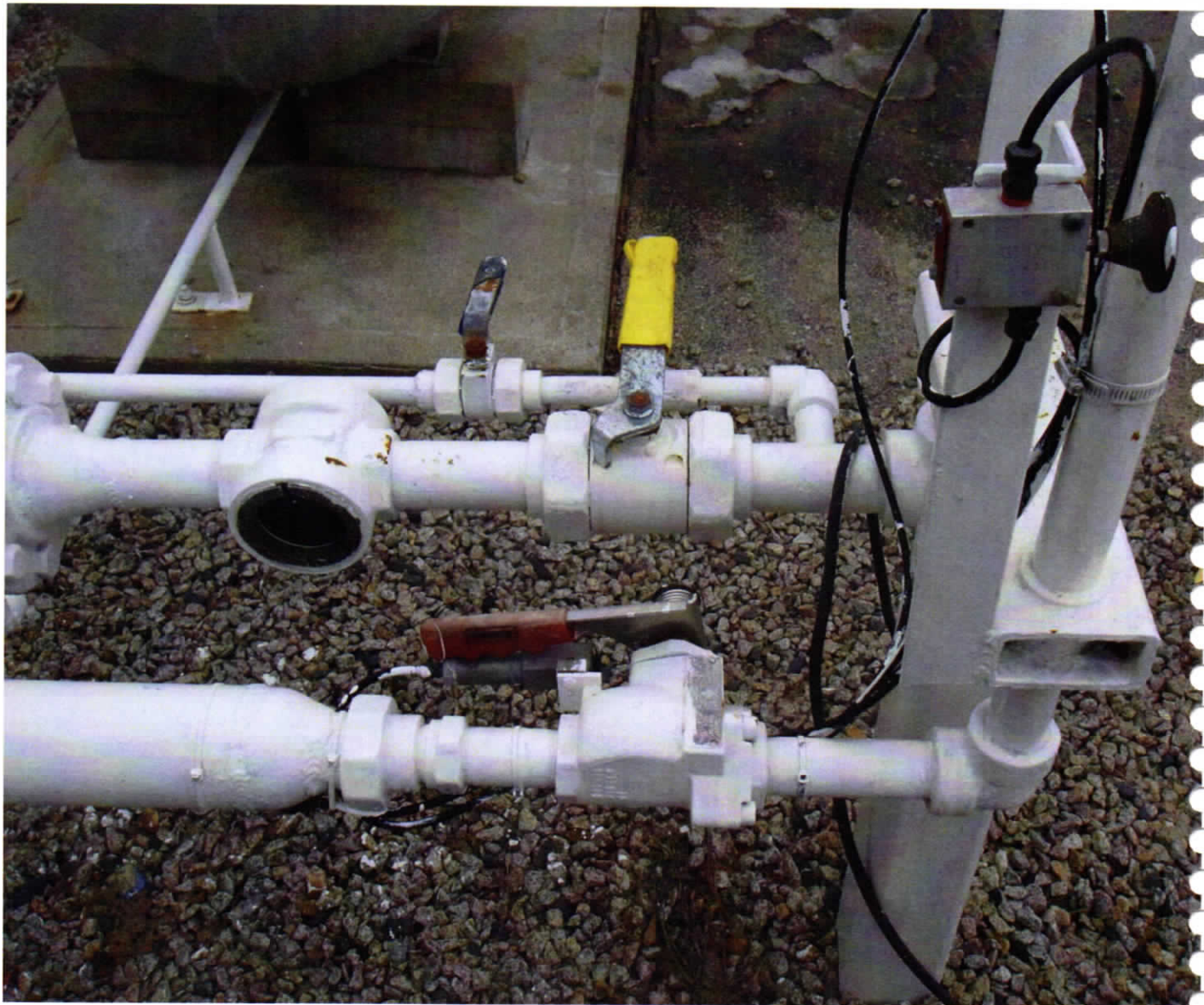
"Similar to be built"



Fire Safety Analysis 2013

Transport Unloading Bulkhead Sight Glass with Back Check Valve

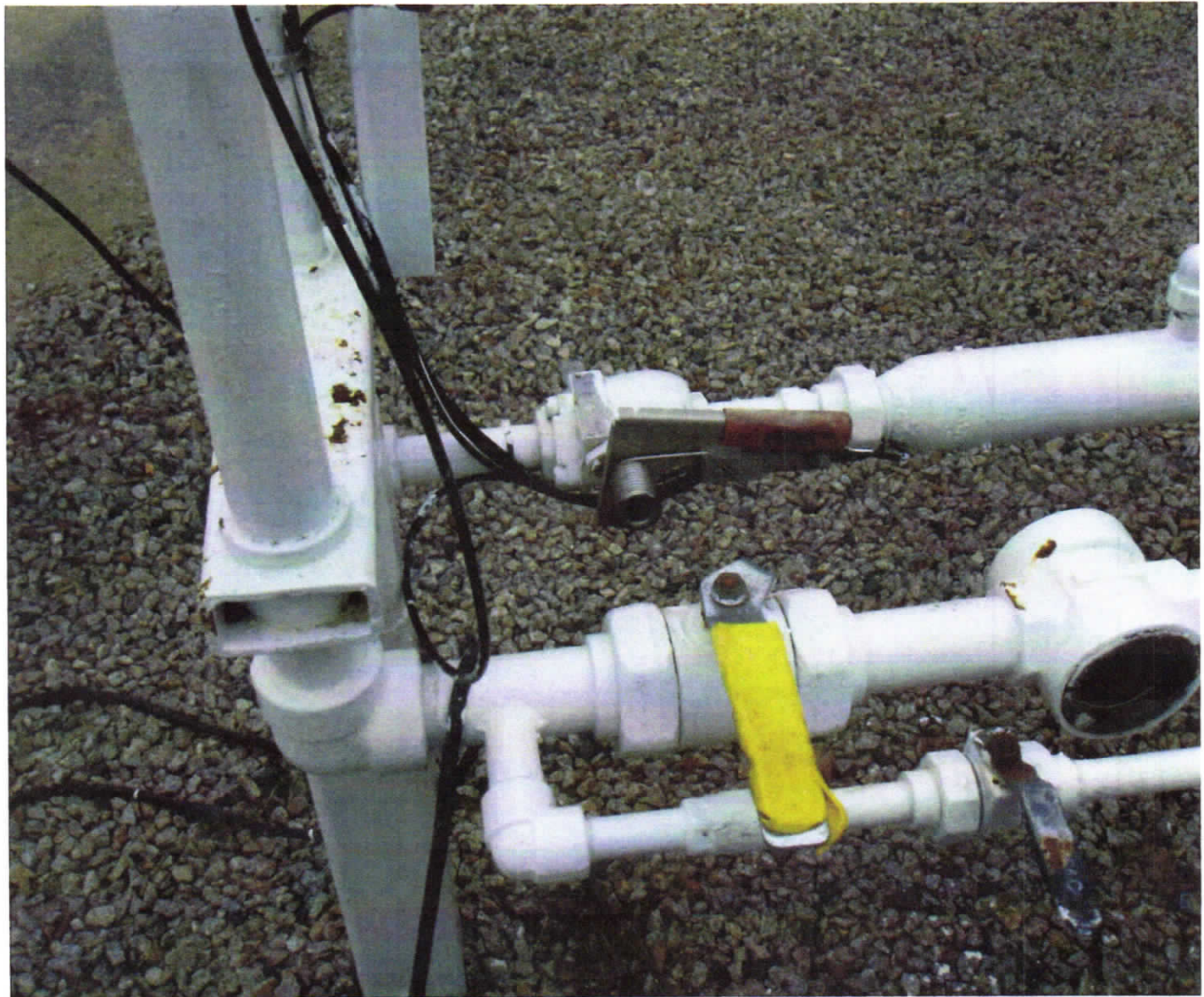
"Similar to be built"



Fire Safety Analysis 2013

Transport Unloading Bulkhead With “ESV”

“Similar to be built”



Fire Safety Analysis 2013

**18 # BC Fire Extinguisher on
Building Housing Nitrogen Cylinders
For “ESV” Activation**

“Similar to be built”



Fire Safety Analysis 2013

FIRE SAFETY ANALYSIS REPORT

Completed by:

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