

U.S. Department of Transportation  
Research and Special Programs Administration  
400 Seventh Street S.W.  
Washington, D.C. 20590

MAY 30 1997

Mr. Jon F. Jacquot  
Engineering Supervisor Public Service Commission  
The State of Wyoming  
Hansen Building, Suite 300  
2515 Warren Ave  
Cheyenne, WY 82002

Dear Mr. Jacquot:

As required by 49 U.S.C. 60118(d), your letter of April 18, 1997, forwarded a waiver of compliance from the requirements of 49 CFR § 193.2175 granted by the State of Wyoming Public Service Commission on March 6, 1997, to Lower Valley Power and Light, Inc. (Lower Valley), to construct two small-scale LNG facilities in Jackson and Afton, Wyoming. The waiver would allow Lower Valley to locate (1) two shop-fabricated LNG storage tanks, each with a capacity of approximately 17,100 gallons within a single class 2 impoundment system at Afton, and (2) three shop fabricated LNG storage tanks, each with a capacity of approximately 59,000 gallons within a single class 2 impoundment system at Jackson. Lower Valley proposed to locate the tanks within a single impoundment at Afton and Jackson in order to use land already owned by the company, thereby reducing installation and maintenance costs.

In accordance with Section 193.2181, each impounding system will have a volumetric capacity equal to 100% of the total capacity of all the tanks within the impounding system. In addition, the proposed impounding systems are designed to meet the "thermal radiation protection" siting requirements. Therefore, even if it is assumed that all tanks within the impounding system have failed and there is a fully-involved impounding area fire, the safety systems will be adequate to contain the situation.

The Commission granted Lower Valley's request for waiver from § 193.2175 subject to its commitment to meet all other requirements of Part 193, including installation of a system to detect and extinguish fires within the impoundment areas.

Section 193.2175 does permit an impounding system serving more than one LNG storage tank, as long as a means is provided to prevent low temperature or fire resulting from failure of any one of the storage tanks from causing any other storage tank to leak. Although, the code is aimed at large-scale LNG plants, and does not specifically address, with a few exceptions (e.g., seismic design and tank instrumentation), "shop fabricated" tanks of 70,000 gallons or less capacity, it applies to all LNG storage tanks. RSPA recognizes that LNG in small-scale plants is stored at higher pressures (typically 100 to 250 psig design pressure) and temperatures that are well above LNG's boiling point. Therefore, LNG released from a small-scale plant does not behave the same as a release from a large-scale plant. However, as explained in Lower Valley's application for waiver, shop-built tanks are less likely to fail under extreme conditions due to the inherent strength of the inner tank and due to the tank supports, which are constructed of cryogenically compatible materials.

Therefore, based on the reasons presented in your grant of waiver, the Research and Special Programs Administration does not object to the grant of waiver of those provisions of 49 CFR Part 193 as specified in the waiver request.

Sincerely,  
Richard B. Felder  
Associate Administrator  
for Pipeline Safety

Engineering Supervisor Public Service Commission  
The State of Wyoming  
Hansen Building, Suite 300  
2515 warren Ave  
Cheyenne, WY 82002

April 18, 1997

Mr. Richard Felder  
Associate Administrator for Pipeline Safety  
Research and Special Programs Administration  
U.S. Department of Transportation  
400 Seventh St., SW, Room 2335  
Washington, DC 20590

Re: PARTIAL WAIVER OF THE REQUIREMENTS OF 49 CFR 193.2175 FOR LOWER VALLEY POWER AND LIGHT, INC. ,  
WYO. P.S.C. DOCKET NO. 30018-GA-97-4

Dear Mr. Felder:

Please find enclosed the order of the Public Service Commission of Wyoming in the referenced matter. We are submitting the order to your agency for its review and action in accordance with 49 USC 60118(d).

The operator, Lower Valley Power and Light, Inc. requests action on this matter as soon as possible. Lower Valley wishes to construct the facilities and have them in service by the end of August 1997

If the Commission does not receive a response from your agency within sixty days of receipt of the order, we understand that Lower Valley will be free to proceed under the provision of the order.

If you have any questions regarding this matter, please contact Dick Valent at 307-777-5701 or myself at 307-777-5741. We will be happy to provide you wit

Very truly yours,  
Jon F. Jacquot  
Engineering Supervisor

**BEFORE THE PUBLIC SERVICE COMMISSION OF WYOMING**

IN THE MATTER OF THE APPLICATION OF )  
LOWER VALLEY POWER AND LIGHT FOR )  
AUTHORITY TO SEEK A PARTIAL WAIVER )  
OF 49 CFR 193 IN ORDER TO CONSTRUCT ) DOCKET NO. 30018-GA-97-4  
AND OPERATE PERMANENT LNG STORAGE )  
AND VAPORIZATION FACILITIES CONNECTED )  
TO THE COMPANY'S NATURAL GAS )  
DISTRIBUTION SYSTEMS )

**ORDER**  
**(Issued April 10, 1997)**

This matter is now before the Commission upon application of Lower Valley Power and Light, Inc., (hereinafter Lower Valley or the Company) for authority to have a partial waiver of the requirements of 49 CFR 193 as it relates to the Company's construction and operation of permanent liquified natural gas (LNG) storage and vaporization facilities.

The Commission, having reviewed the application and attachments and supplemental information provided, its files regarding Lower Valley, applicable Wyoming utility law, and otherwise being fully advised in the premises; FINDS and CONCLUDES:

1. Lower Valley is a public utility as defined in W.S. §§ 37-1-101, et seq., and as such, is subject to the jurisdiction of this Commission pursuant to W.S. § 37-2-112.
2. Lower Valley is proposing to construct two small-scale LNG facilities in Wyoming: one in Jackson and one in Afton. Both facilities are designed to operate as baseload satellite plants. LNG will not be produced at either site, but will be transported to the sites by tank trucks and transferred from the trucks to stationary storage tanks. LNG will be withdrawn from the tanks and passed through vaporizers to produce natural gas, which will then enter the gas distribution pipeline systems.
3. The LNG storage facility at Afton will consist of two shop fabricated storage tanks, each tank having a capacity of approximately 17,100 gallons. At Jackson, the LNG storage facility will consist of three shop fabricated tanks, each tank having a capacity of approximately 59,000 gallons. At each facility, all the LNG storage tanks will be located within a single Class 2 impounding system. In accordance with 49 CFR 193, each storage tank impounding system will have a volumetric capacity equal to 100% of the total capacity of all the tanks within the impounding system.
4. Lower Valley proposes to locate the tanks within a single impoundment at Afton and Jackson in order to use land already owned by the Company, thereby reducing installation costs. If the Company were to utilize separate impoundment areas for each tank as required by 49 CFR 193.2175, it would be necessary for it to purchase additional land, a potentially significant increase in the cost of the project given the value of land in the Jackson and Afton areas. In addition, there would be higher installation and maintenance costs because of the duplication of facilities required for each separate tank and impoundment.
5. The impoundments are designed to contain any leaks or fires that may result from an accident. By placing each tank within a single impoundment, there is a chance that the outer shell of another tank might experience localized failures, though due to the inherent strength of the inner tank, such a failure would not be likely to cause a catastrophic failure of the inner tank. Prolonged exposure to the heat from a pool or a torch fire might result in leakage of LNG from flange gaskets, valve body gaskets, valve stems or other similar sources. Each impoundment will be equipped with a foam fire extinguisher system that will activate when a fire occurs.
6. The proposed impounding systems are designed to contain the total volume of liquid in all the containers, assuming that they are all full. In addition, the proposed impounding systems meet the "thermal radiation protection" siting requirements so that even if it is assumed that all tanks within the impounding system have failed and there is a fully-involved impounding area fire, the safety systems will be adequate to contain the situation.
7. The Commission concludes that a partial waiver of the specific requirements of 49 CFR 193.2175 as it relates to the proposed impounding systems in Afton and Jackson is in the public interest. The public safety will not be endangered by the proposed system and the resulting benefits to the Company and its customers in terms of cost savings fully justifies the use of a single impoundment for all of the tanks.

IT IS THEREFORE ORDERED THAT:

1. Pursuant to open meeting action taken on March 6, 1997, the application of Lower Valley for authority to have a partial waiver of 49 CFR 193 as it relates to the Company's construction and operation of permanent LNG storage vaporization facilities in Afton and Jackson, Wyoming, is hereby approved only to the extent to which the proposed project conflicts with the provisions of 49 CFR 193.2175 regarding individual impoundment around each LNG storage tank. Lower Valley shall provide for a system to detect and extinguish any fires that may develop within the impoundment areas.

2. This Order will be effective sixty (60) days from the date it is entered unless an objection is entered by the Secretary of Transportation in accordance with 49 U.S.C. 60118(d).

MADE and ENTERED at Cheyenne, Wyoming, this 10<sup>th</sup> day of April, 1997.

PUBLIC SERVICE COMMISSION OF WYOMING  
Steve Ellenbecker, Chairman

Kristin H. Lee, Chairman

ATTEST:  
MICHAEL M. ROBINSON, Assistant Secretary

Lower Valley Power & Light, Inc.  
Lower Valley Power & Light, Inc.

APPLICATION FOR WAIVER     )  
OF 49 CFR 193                     )

APPLICATION FOR WAIVER

Lower Valley Power & Light, Inc. (LVP&L) hereby files with the Wyoming Public Service Commission, their Application for Partial Waiver of 49 CFR 193. In support of their application, LVP&L shows the following:

I. INTRODUCTION

LVP&L is proposing to construct two small-scale LNG facilities in Wyoming; one in Jackson and one in Afton. Both facilities are designed to operate as baseload satellite plants. LNG will not be produced at either site, but will be transported to the sites by tank trucks and transferred from the trucks to stationary storage tanks. LNG will be withdrawn from the tanks and passed through vaporizers to produce natural gas, which will then enter the gas distribution pipeline systems.

The LNG storage facility at Afton will consist of two shop fabricated storage tanks, each tank having a capacity of approximately 17,100 gallons. At Jackson, the LNG storage facility will consist of three shop fabricated storage tanks, each tank having a capacity of approximately 59,000 gallons. At each facility, all the LNG storage tanks will be located within a single Class 2 impounding system. In accordance with §193.2181(a), each storage tank impounding system will have a volumetric capacity equal to 100% of the total capacity of all tanks within the impounding system. However, proposed impounding arrangements might not be in strict conformance with a part of the requirements of §193.2175. Based on the discussion presented below, LVP&L is seeking a waiver of a portion of §193.2175.

II.

In order to provide Natural Gas service to its customers, LVP&L proposes to provide vaporized LNG at specific points on each of its distribution systems, one in Afton and one in Jackson, WY, through the use of permanent LNG storage and vaporization facilities. The LNG facilities would consist of an unloading pump station, LNG storage and vaporization system, an odorizer, a metering and regulating skid assembly, and associated piping. LVP&L would be responsible for the operation of the facilities. The site plan would be submitted for approval by the Wyoming Public Service Commission prior to the initiation of work at the site. If the waiver is granted, LVP&L will finalize arrangements to construct facilities to provide Natural Gas service through the use of vaporized LNG, in time for service for the 1997-98 heating season.

If the waiver is not granted, LVP&L will be forced to significantly postpone the start of Natural Gas Service to consumers in both areas. Further, LVP&L may be forced to consider relocation of the proposed sites and may incur significant additional costs of construction and land acquisition. This alternative is not preferable or in the best interest of LVP&L and its customers. The equipment needed to satisfy LVP&L's immediate needs has already been purchased and is available for installation and use in the coming heating season.

III.

REGULATORY BACKGROUND

The Notice of Proposed Rule making (NPRM) for Part 193 was published in the General Register, Vol. 44, No. 28, Thursday, February 8, 1979. At that time, several large-scale LNG plants were either being built or were in the planning/design stage. Public concerns regarding the safety of large LNG import terminals prompted the DOT's Materials Transportation Bureau (MTB) to propose federal requirements for LNG plants. The code proposed in the NPRM was aimed strictly at large-scale LNG plants, and did not even address the possibility of small-scale LNG plants, such as the facilities proposed for Jackson and Afton. This oversight was only partially addressed in the Final Rule (Federal Register, Vol. 45, No. 29, Monday, February 11, 1980).

In some cases, differences between large-scale and small-scale facilities are recognized in 49 CFR 193. For example,

some requirements that apply to LNG storage tanks are less stringent if the storage tank is "shop fabricated" and has a capacity of "70,000 gallons or less" (e. g., seismic design and tank instrumentation). Such relaxation of certain rules is based on the belief that, compared to field erected tanks, shop fabricated tanks are less likely to fail because they are assembled in a shop where strict quality control can be maintained and, being pressure vessels, shop fabricated tanks are more thoroughly tested than field erected tanks.

In other cases, differences between large-scale and small-scale facilities are not recognized in 49 CFR 193. For example, in large-scale plants; LNG is stored at approximately its boiling point temperature in low-pressure tanks (typically 2 psig design pressure). The LNG in small-scale plants is stored in pressure vessels (typically 100 to 250 psig design pressure) at a temperature well above its boiling point. As a result, if LNG is released from a small-scale plant, it does not behave the same as a release from a large-scale plant. Specifically, "warm," high pressure LNG will produce a high momentum aerosol jet when released to the atmosphere, and a significant percentage of the released liquid will vaporize before it can accumulate on the ground. Thus, impounding system requirements that might be appropriate for large-scale plants might be inappropriate for small-scale plants.

#### IV.

##### DISCUSSION OF WAIVER ISSUES

Each of the proposed facilities will have more than one LNG storage tank located within a single Class 2 impounding system (two tanks at Afton, three at Jackson.). In accordance with §193.2181(a), each storage tank impounding system has been designed to have a volumetric capacity equal to 100% of the total capacity of all tanks within the impounding system. However, the proposed impounding arrangements might not strictly meet the requirements of §193.2175, which reads (in part) as follows:

When an impounding system serves more than one LNG storage tank, a means must be provided to prevent low temperature fire resulting from leakage from any one of the storage tanks served causing any other storage tank to leak.

##### Failure Due to Low Temperature

With the proposed arrangement of LNG storage tallies, it would be possible for a release of LNG from one tank (call it Tank A) to impinge upon the outer shell or support structure of another tank (Tank B). With conventional large-capacity LNG storage tanks (double-walled, flat-bottomed, vertical cylindrical tanks with domed roofs, cryogenic inner tank, and carbon steel outer tank), such a situation has the potential to lead to a catastrophic result. The outer tank, being constructed of carbon steel, could fail as a result of low temperature embrittlement, and the loads imposed by its failure could cause the inner tank to fail, resulting in the sudden release of the tank's contents.

This scenario will not occur with typical small-capacity, shop-built tanks. With this type of storage tank, the inner tank is constructed as a pressure vessel and it can easily withstand a brittle failure of the other tank without collapsing or leaking. In addition, the tank supports will be constructed of cryogenically compatible materials that will not fail if they come into contact with LNG. Hence, the tanks are inherently protected from low-temperature-induced failures of the type considered in §193.2175.

##### Failure Due to Low Temperature

A release of LNG from any one of the tanks within a storage tank impounding system, if ignited, would create a torch fire, a pool fire, or both. Although the pool fire would be primarily limited to the area of the spill sump, heat from the fire could adversely affect other tanks within the impounding system. Under extreme conditions, the outer tank shell might experience localized failures, possibly resulting in an increase in the mechanical loads imposed on the inner tank. However, due to the inherent strength of the inner tank, the loads produced by such failures would not cause a catastrophic failure of the inner tank.

Prolonged exposure to the heat from a pool fire or torch fire might result in leakage of LNG from flange gaskets, valve body gaskets, valve stems, or other similar sources. Thus, the proposed impounding system would technically violate a portion of §193.2175, even though the impounding system would have ample volume to retain such releases.

NFPA 59A was recently revised and now includes a Chapter 10, which "provides requirements for installation, design, fabrication, and siting of LNG containers of 70,000 gal (265 m<sup>3</sup>) capacity and less." Paragraph 10-83 includes the requirements for impounding areas that serve more than one LNG "container" (storage tank).

For impounding areas serving more than one container without provision to prevent low- temperature or fire exposure resulting from the leakage from any one container served from causing subsequent leakage from any other container served, the volume within the diked area shall be the total volume of liquid in all containers served, assuming all containers are full. The proposed impounding systems for the LNG storage tanks at Afton and Jackson would meet this requirement of NFPA 59A.

In addition, the proposed impounding systems meet the "thermal radiation protection" siting requirements even if it is assumed that all tanks within the impounding system have failed and there is a fully-involved impounding area fire. Therefore, even if leakage from one tank results in a fire, which then causes one or more additional tanks to leak, the public will be adequately protected from the effects of the resultant impounding area fire. Thus, relaxation of the requirements of §193.2175 will not significantly reduce public safety.

V.  
REQUEST FOR WAIVER

Based on the rational presented above, we request a waiver from the provisions of §193.2175.

Because of the proximity of the 1997-1998 heating season, LVP&L requests expedited consideration of this Application for Waiver.

WHEREFORE, Lower Valley Power & Light, Inc. Requests:

1. Partial waiver of 49 CFR for permanent LNG Storage and Vaporization facilities utilized on LVP&L distribution systems commencing April, 1997.

Respectfully Submitted,  
LOWER VALLEY POWER & LIGHT, INC.  
Chad V. Jensen  
Assistant General Manager