

SPECIFICATIONS

AND

CONTRACT DOCUMENTS

FOR THE

CITY OF NORMAN

CNG FUELING STATION OPERATION AND MAINTENANCE SERVICES

JUNE 17, 2013



6/17/13

Bid Number 1314-03

CITY OF NORMAN
201 WEST GRAY
NORMAN, OKLAHOMA 73069
(405) 292-9709

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REQUEST FOR PROPOSAL

INVITATION TO BID NUMBER 1314-03

The City of Norman, Oklahoma, will receive sealed proposals in the office of the City Controller, Purchasing Division, City of Norman, P.O. Box 370, 210 West Gray, Norman, Oklahoma 73070, until 2:00 o'clock PM, CDT, July 11, 2013 for the following:

CNG FUELING STATION OPERATION AND MAINTENANCE SERVICES

Proposals will then be opened and read aloud.

The project consists of the following:

Provide qualified technician(s) for operation and maintenance services for the City's CNG Station. The required services and performance conditions are described in the Scope of Work. The CNG Slow Fill System and the CNG Quick Fill Station are both located at Goddard Avenue and Flood Avenue (Old State Highway 77) Norman, Cleveland County, Oklahoma. The CNG Public Quick Fill Station and Fleet Slow Fill System include both Electric and Natural Gas Drive Compressors (Package with Skids), Natural Gas Drive Genset with Transfer Switch, Storage Spheres, Fuel Dispensers, Dual Hose Slow Fill Dispensers, Defueling Dispenser, Natural Gas Inlet Dryer, Station Pressure Regulator and Piping, Process Air Compressor, Coalescing Filters, and PLC based slow fill submeters.

Bid information and specifications may be obtained at the Office of the City Fleet Manager located at 1301 Da Vinci, Norman, Oklahoma 73069. The City reserves the right to reject any and all proposals.

A mandatory pre-bid conference will be held on Thursday, June 27, 2013 at 1:30 PM, CDT, at the Norman Fleet Management Center at 1301 Da Vinci in Norman, OK.

All proposals must be marked with the following statement: "City of Norman CNG Professional Service Package"

Bids shall be made in accordance with the Notice to Bidders, Requirements for Bidders, Plans or Specifications and Bidders Proposal, which are on file and available for examination at the Office of the Purchasing Division.

All bids shall remain on file at least forty-eight (48) hours before a contract can be made and entered into thereon.

Bids received more than ninety-six (96) hours, excluding Saturdays, Sundays, and holidays, before the time set for opening of bids, as well as bids received after the time set for opening of bids will not be considered and will be returned unopened.

The City Council of the City of Norman reserves the right to reject any and all bids and to waive any or all formalities of the bidding process.

City of Norman

Advertise: Saturday, June 15, 2013 & Sunday, June 23 2013– Norman Transcript

BIDDER INFORMATION

This Professional Service package contract provides for the Service of a CNG Slow Fill System and a CNG Quick Fill Station, both located in the southwest quadrant of the Goddard Avenue and Flood Avenue (Old State Highway 77) intersection at the City of Norman Fleet Management Facility. The CNG Public Quick Fill Station and Fleet Slow Fill System contains Electric and Natural Gas Drive CNG Compressors (Package with Skids), Natural Gas Drive Genset with Transfer Switch, Storage Spheres, Fuel Dispensers, Dual Hose Slow Fill Dispensers, Natural Gas Inlet Dryer, Pressure Regulator and Piping, Process Air Compressor, Coalescing Filters, Stainless Steel Tubing and Fittings, De-Fueling Station, and PLC based Slow Fill Submeters for the City of Norman. The City will continue to operate and maintain the card reader system and the security camera and DVR system.

VENDOR LIST

Pressure Solutions, LLC

Attn: Marc Bumgardner
12 N.W. 4th Street
PO Box 1077
Tuttle, OK 73089-1077
Phone: (405) 381-4733
pressuresolutions@sbcglobal.net

Tulsa Gas Technologies

Attn: Tom Sewell
4809 S. 101st East Avenue
Tulsa, OK 74146
Phone: (918) 665-2641
Fax: (918) 665-2657
tsewell@tulsagastech.com

Preferred Service CNG, LLC

Attn: Richy Marson
245 N.W. 94th Street
Oklahoma City, OK 73114
Phone: (405) 406-5617
www.preferredservicecng.com

Petroleum Marketers Equipment Co.

Attn: Bryan Newcomb
2010 Exchange Ave.
Oklahoma City, OK 73108
Phone: (405) 235-4471
Fax: (405) 235-4150
bnewcomb@pmgroupcos.com

Hoidale Co., Inc.

Attn: Kevin Kalafut
6909 Martindale Rd.
Shawnee, KS 66218
Phone: (903) 438-1500
kalafut@hoidale.com

Great Plains Gas Compression, Inc.

Attn: Terry McBride
8218 A. Southwest 8th Street
Oklahoma City, OK 73128
Phone: (405) 789-9311
tmcbride@greatplainsgas.com

JW Power

Attn: Bob Steed
15201 N.W. 34th Street
Yukon, OK 73099
Phone: (405) 324-6677
Fax: (405) 324-5552
bsteed@jwenergy.com

Arrow Engine

Attn: Chad Speaks
1212 North Rockfod, Bldg #3
Tulsa, OK 74106
Phone: (918) 583-5711
Direct: (918) 699-2374
cspeaks@arrowengine.com

Zeit Energy

Attn: Patrick Zeiter
14160 North Dallas Pkwy, #607
Dallas, TX 75254
Phone (817) 223-1401
Patrick@zeitenergy.com

INSTRUCTIONS TO BIDDERS

EXAMINATION OF BIDDING DOCUMENTS. Each bidder by making his bid represents that he has read and understands the bidding documents. The bidder shall include in his bid prices any and all costs that may be necessary to complete the work in accordance with the requirements of the contract documents.

INTERPRETATION OF CONTRACT DOCUMENTS. Questions regarding documents, discrepancies, omissions, or intent of the specifications shall be submitted in writing to the Owner through the Engineer at least seven days prior to opening of bids to provide time for issuing and forwarding an addendum. Any interpretation of the contract documents will be made only by addendum duly issued or delivered by the Owner to each person receiving a set of documents. The Owner will not be responsible for any other explanations or interpretation of the contract documents.

QUALIFICATIONS OF BIDDERS. IN DETERMINING THE LOWEST RESPONSIBLE BID, THE FOLLOWING ELEMENTS WILL BE CONSIDERED: WHETHER THE BIDDER INVOLVED (A) MAINTAINS A PERMANENT PLACE OF BUSINESS; (B) HAS ADEQUATE PLANT EQUIPMENT TO DO THE WORK PROPERLY AND EXPEDITIOUSLY; (C) HAS A SUITABLE FINANCIAL STATUS TO MEET OBLIGATIONS INCIDENT TO THE WORK; AND (D) HAS APPROPRIATE TECHNICAL EXPERIENCE.

Requirements of Technician Individual or Company with Technicians:

1. Must be able to pass a pre-employment drug screen and participate in random drug testing program, plus pass City of Norman background check.
2. Must be a non-smoker.
3. Must be at least 21 years of age.
4. Must have a high school diploma or equivalent.
5. Must be able obtain the appropriate Driver license required for the fleet.
6. Must have 4 years professional automotive or mechanical experience, or can show reasonable capabilities to perform these duties.
7. Must have a full set of tools including diagnostic and specialty tools.
8. ASE Certified for Truck/Transit preferred.
9. Strong knowledge of Diagnostic software, or the ability to learn City of Norman System.
10. Ability to lead, work on his own, and the ability to acquire technical answers.
11. Troubleshooting abilities in Electrical components.
12. 24 hour shop; must be able to work a varied schedule and respond to call-outs within 2 hours.
13. Submit personnel list with resume(s) of proposed Technician(s).
14. Submit organizational chart. No Personnel changes are to be made without prior City approval.
15. Preference will be given to a dedicated technician vs. multiple technicians.

Responsibilities:

- a. Perform daily maintenance of site equipment, monitor pressures and temperatures, and maintain oil and fluid levels. Ensure general housekeeping of the CNG facilities.
- b. Perform routine scheduled and unscheduled hydraulic, mechanical and electrical maintenance on equipment installed at CNG stations.
- c. Ensure all equipment is in good operating condition and that all safety systems are in proper working condition.
- d. Maintain daily reports records.

**AGREEMENT FOR OPERATION AND MAINTENANCE
COMPRESSED NATURAL GAS FUELING STATION**

This agreement for Compressed Natural Gas Fueling Station Operation and Maintenance Services, dated for convenience, as of _____, is entered into by and between the City of Norman (City) and _____(Operator).

1. DEFINITIONS

The following terms used in this Agreement for Compressed Natural Gas Fueling Station Operation and Maintenance Services shall have the meanings set forth below, unless the contract and clearly indicates otherwise.

AdvertisementAll the legal publications pertaining to the work completed or under contract.

ANSIAmerican National Standards Institute.

A.S.T.M.The American Society for Testing Materials.

AwardThe decisions of the City to accept the proposal of the lowest and best Bidder for the work, subject to the execution and approval of a satisfactory Contract and the required bonds therefore, and to such other conditions as may be specified or otherwise required by law.

Bidder Any person or persons, partnership, company, firm or corporation acting directly or through a duly authorized representative submitting a proposal for the work contemplated.

Business Day. Means any calendar day except a Saturday, Sunday, and any day observed as a legal holiday by the City of Norman.

City City of Norman, Oklahoma, a Municipal Corporation, acting through its duly authorized assistants or agents.

City Attorney The City Attorney of the City of Norman, Oklahoma, or his duly authorized assistants or agents.

City Clerk The City Clerk of the City of Norman, Oklahoma, or her duly authorized assistants or agents.

City Manager The Manager of the City of Norman, Oklahoma.

City Controller The City Controller of the City of Norman, Oklahoma, or his duly authorized assistants or agents.

CNG Fueling Station or Station. Means the CNG (Slow Fill System and the Quick Fill Station) Fueling Station owned by the City and located at Goddard Avenue and Flood Avenue.

Council The Council of the City of Norman, Oklahoma.

Contract The written agreement covering the work. The Contract includes the Advertisement and Notice to Bidders, Proposal, Bonds, Specifications, including special provisions, plans or working drawings and any supplemental agreement pertaining to the work or materials therefore.

Contractor The person or persons, partnership, company, firm or corporation entering into Contract for the execution of the work, acting directly or through a duly authorized representative.

Engineer The City's Engineer of the City of Norman, Oklahoma, or his duly authorized agents, assistants, inspectors, superintendents.

Environmental Health & Safety Laws. Means and includes all federal, state, and local laws, statutes, ordinances, regulations, resolutions, decrees, and/or rules now or hereinafter in effect, as may be amended from time to time, and all implementing regulation, directives, orders, guidelines, and federal or state court decisions, interpreting, relating to, regulation or imposing liability (including, but not limited to, response, removal, remediation and damage costs) or standards of conduct of performance relating to

industrial hygiene, occupational, health, and/or safety conditions, environmental conditions, or exposure to, contamination by or clear-up of, any and all Hazardous Materials, including without limitation, all federal or state super lien or environmental clean-up statutes.

Furnish To supply.

Hazardous Materials. Means any and all(a) substances, products, by-products, waste, or other materials of any nature or kind whatsoever which is or becomes listed, regulated or addressed under any Environmental Laws, and (b) any materials, substances, products, by-products, waste, or other materials of any nature of kind whatsoever whose presence in and of itself or in combination with other materials, substances, products, by-products, waste, or other materials of any nature or kind whatsoever whose presence in and of itself or in combination with other materials, substances, products, by-products, or waste may give rise to liability under any environmental Law.

Mayor The Mayor of the City of Norman, Oklahoma.

O.D.O.T. The Oklahoma Department of Transportation.

Plan or Plans All of the drawings pertaining to the Contract and made a part thereof, including such supplementary drawings as the Engineer may issue from time to time, in order to elucidate other drawings or for the purpose of showing changes in the work as authorized under the Section "Changes and Alterations", or for showing details not shown thereon.

Proposal The written statement or statements duly filed with the Purchasing Agent of the person or persons, partnership, company, firm, or corporation proposing to do the work contemplated.

Proposal Form The approved form on which the formal bids for the work are to be prepared and submitted.

Proposal Guaranty The security, designated in the "Proposal Form" and in the "Advertisement", to be furnished by the Bidder as a guarantee of good faith to enter into Contract with the City and to execute the bonds for work contemplated after the work is awarded to him.

Provide To furnish and erect or install.

- Special Provisions The special clauses setting forth conditions or requirements peculiar to the specific project involved supplementing the Standard Specifications and taking precedent over any conditions or requirements of the Standard Specifications with which they are in conflict.
- Specifications The directions, provisions, and requirements Contained herein, together with the “Special Provisions” supplemental hereto, pertaining to the method and manner of performing the work or to the quantities or qualities of materials to be furnished under the Contract.
- The Work All work, including the furnishing of labor, materials, tools, equipment and incidentals, to be performed by the Contractor under terms of the Contract.
- Calendar Day A day of twenty-four hours measured from midnight to the next midnight shall constitute a calendar day.

2. TERM

General

The term of this agreement is for three (3) consecutive one (1) year terms, commencing at 12:00 A.M. on the Commencement date, subject to the earlier termination of this Agreement, unless the Agreement is extended in accordance with provisions. City reserves the right to extend the term for successive periods of one (1) year each for the next three (3) years, subject to the early termination of this Agreement by City. City shall provide Operator with no less than sixty (60) days' prior written notice of its intention to exercise its option to secure the CNG Fueling Station Operation and Maintenance Services from Operator during any extension period.

3. Termination

3.1 Termination for Convenience

City shall have the right to terminate this Agreement, without cause, by giving not less than thirty (30) Days written notice of termination.

3.2 Termination for Default

If operator fails to perform any of its material obligations under this Agreement, in addition to all other remedies provided by law, City may terminate this Agreement immediately upon written notice.

3.3 Termination Authority

The Director of Finance is empowered to terminate this Agreement on behalf of the City.

3.4 Consequences of Termination

In the event of termination for any reason under this Agreement, Operator shall deliver to City copies of all reports, documents, City-owned equipment and materials and other work performed by Operator. All fees collected by Operator are to be deposited to City's account per the terms and conditions wider this Agreement. Upon receipt thereof, City shall pay Operator for services performed and reimbursable expenses incurred to-the date of termination; provided, however, that City may with hold from such amounts as City may deem reasonably necessary to satisfy unresolved good faith disputes, pending resolution of such disputes.

4 CNG FUELING STATION SERVICES

Operator agrees to use reasonable efforts and to exercise the highest professional competence in operating and managing the CNG Fueling Station so as to provide the City and Public with the highest standard of professional, courteous, efficient and safe services. Operator shall furnish all labor, supervision, materials, supplies, equipment, transportation, tools, taxes, permits, insurance and services necessary to operate, manage and maintain the CNG Fueling Station.

4.1 Operation and Maintenance of CNG Fueling Station

a. Quality of Operator Services

The Operator shall provide all necessary professional services and qualified personnel to operate and maintain the Station in a manner that provides the highest quality, most cost effective, safe, durable and reliable of fueling station services.

4.2 Hours of Operation

The CNG Fueling Station shall be operated twenty-four (24) hours per day, seven (7) days per week, including holidays. The City, acting through the Fleet Management Superintendent, reserves the right to approve and change the hours of operation. The 24-hour operational day runs from 12:00am to 11:59 pm.

5. CNG Fueling Station Sign

In order to assist CNG Fueling Station users in locating the Station, Operator shall maintain the station sign, the location, size and wording of which shall be as specified from time to time by the Fleet Management Superintendent. The Operator shall also maintain the fuel price signage as directed by the City.

5.1 General Operating and Maintenance Services

In consideration for the Monthly Operation and Maintenance Fee to be paid by City under this Agreement, Operator shall provide the following operation and maintenance services in connection with the operation of the CNG Fueling Station both Quick and Slow Fill System.

a. Operate and maintain the CNG system in a cost-effective and efficient manner to meet or exceed all OEM standards and all design, performance and safety requirements of this Agreement.

b. Track station performance, address customer complaints, and provide the City with all necessary reports and data as specified herein.

- c. Make all necessary, modifications and repairs to the Station to maintain performance and safety standards subject to City procedures.**
- d. Train representatives of all Major fleets who use the CNG Fueling Station, in the proper procedures for fueling a vehicle.**
- e. Handle and report on all user and. customer complaints and correspondence.**
- f. Maintain compliance with all applicable laws, regulations and Codes, and comply with all applicable permit conditions.**
- g. Notify the City and respond in a timely manner and provide all appropriate corrective action to all notice of violations (NOVs) issued by any Federal, State or Regional agency.**

6. Minimum Operation and Maintenance Requirements

6.1 Operational Certification

Operator shall provide on a monthly basis or at other intervals required by the City certified documentation that all Station systems continue to meet all required OEM and operating performance standards. Operator shall identify each OEM.

7.1 Minimum Maintenance Services

In consideration for the Monthly Operation and Maintenance Fee to be paid by City of this Agreement, Operator will be responsible for all scheduled and preventative maintenance of the CNG Fueling Station. Operator's maintenance services shall include all requirements of the OEM, O & M manuals for the CNG Fueling Station. Operator's maintenance schedule shall be subject to review and approval by the Fleet Management Superintendent.

8.1 On Call Maintenance Services

In addition to the Minimum Maintenance Services provided above, Operator shall provide on call maintenance services for all elements of the CNG Fueling Station upon written authorization from the Fleet Management Superintendent or the Fleet Management Superintendent's designee. Any such on call services provided by Operator shall be charged at the labor rates.

9.1 Spare Parts

Operator shall maintain an inventory of City's full supply of spare parts integral to the operation and maintenance of the CNG Fueling Station and which shall be kept within the fenced CNG equipment area to deal with equipment

malfunctions. An alternative to on-site storage of spare parts is local storage at a nearby warehouse, provided the Operator can ensure quick delivery and response for any repairs. Parts used shall be quoted at a set percentage under list price to the City. Parts will be approved for use on the equipment prior to installation by the City Fleet Supt. or his staff.

10.1 Fuel Quality

Natural gas from the compressors and to the dispensers shall not contain more than 0.5 pounds of oil per million standard cubic feet (MMSCF) of gas, or more than 1.0 pounds of water per MMSCF (Dryer output).

11.1 Downtime/Disruption of Service

The Station is designed to be in full operation for 99% of the time. No more than 90 hours of down time in any given year will be allowed. Furthermore, down time during peak fueling will be limited to no more than 1 hour per occasion, and no more than 3 hours per occasion during non-peak fueling, but in no event shall the total down time exceed 90 hours in any given year. The City must also be notified 2 working days in advance of any planned disruption of services.

Operator's Disruption of Service Plan shall detail how Operator will deal with situations where equipment breakdowns result in the inability of the City and its fueling users to receive fuel and what measures the Operator will take to maintain the availability of fuel.

12.1 Emergency Repairs or Conditions

The Operator shall provide all necessary qualified personnel to respond and correct problems associated with all emergency services on a 24-hour, 7-day a week basis. Emergency telephones must be posted at visual locations on the Station, and the dial-in modern phones must be in proper operation continuously.

In the event of an emergency that pertains to any condition that results in an unsafe operation of the Station, the compressors, storage tanks and dispensers as a minimum must be shut down automatically, and the Operator shall respond immediately and notify the City Fleet Management Superintendent immediately. In the event the emergency shutdown ("ESD") buttons were activated, and fueling was terminated during peak fueling, the Operator must also respond immediately. In the event the condition is due to a fault in one of the Station compressors, such as a compressor failure or shutdown, the system must be properly maintained to automatically switch over to bypass, redundant or back-up systems. Under this scenario, the Operator must verify proper operation of all necessary back-up systems within one (1) hour of receipt of notice of the ESD. All other emergency repairs must be corrected within 2 hours of notification. The

Operator shall maintain records of all emergency responses, repairs, and provide the nature and status of these responses and repairs in a report format acceptable to the City. The Operator shall submit these reports with their monthly invoices or at other intervals mandated by the City.

In the event of power outages (City or local), the operator will manually switch on the power generator and activate the manual transfer switch.

13.1 Auxiliary Power Supply

The Operator shall operate, maintain and check fuel for the auxiliary power supply generator to provide back-up power to the CNG fueling station in the event of loss of commercial power. The Operator shall ensure that the engine is activated in the event of loss of power, and the NG compressor is operational to maintain station operation.

14.1 Inspections

Operator shall conduct routine physical inspection on all structural, mechanical, electrical, and utility services to the CNG Fueling Station. Operator's inspections shall also include assessment for fueling leaks, equipment failures, breaches in structural integrity, and System malfunction. In addition, the inspections shall include as a minimum, testing and calibrating of any gas detection systems, and the ESD system and fire extinguishers.

4. CNG FUELING STATION SERVICES

Each Operator may be required to show that former work performed by him has been handled in such manner that there are no just or proper claims pending against such work. No bidder will be acceptable if he is engaged on any other work, which impairs his ability to finance this contract or provide proper equipment for the proper execution of same. Each Operator shall demonstrate his ability by meeting all requirements herein stipulated, if asked for them.

AGREEMENT, BONDS, INSURANCE. The attention of Operator is specifically directed to the forms of agreement and bonds to be executed and the type of insurance to be taken out in the event an Operator award is made.

BID SUBMITTAL. Each Operator, properly signed, together with the Operator security shall be enclosed in a sealed envelope addressed and entitled as specified in the Invitation to Bid. All addenda issued shall be included with the documents at the time of bid submittal.

WITHDRAWAL OF BID. Any bid may be withdrawn at any time prior to the hour fixed in the Invitation to Bid for the opening of bids, provided that a request in writing, executed by the bidder, or his duly authorized representative, for the withdrawal of such bid is filed with the Owner prior to the time specified for opening of bids. The withdrawal of such bid will not prejudice the right of a bidder to file a new bid.

PENALTY FOR COLLUSION. If at any time it shall be found that the person, firm or corporation to whom the contract has been awarded has, in presenting any bid or bids, colluded with any other party or parties, then the contract so awarded shall be null and void, and the contractor and his sureties shall be liable to the Owner for all loss or damage which the Owner may suffer thereby, and the Owner may advertise for new bids for said work.

LICENSE. Each Operator shall possess State and local licenses as are required by law, and shall furnish satisfactory proof to the Owner upon request that the licenses are in effect during the entire period of the contract.

BID OPENING. Bids will be opened and recorded at the time and place indicated in the Invitation for Bids. Bidders or their agents are invited to be present.

AWARD OF CONTRACT. The award of any contract or contracts will be made to the most responsible bidder or bidders providing best value to the Owner. The Owner reserves the right to reject any or all bids, or to waive irregularities or informalities at its discretion.

It is anticipated that approval will be received within 30 days of opening of bids. In the event that the approvals are not received or the Owner cannot award or reject said proposals within 60 days from the date of opening of bids, bidders shall have the right to withdraw their bids on written notice to the Owner.

EFFECTIVE DATE OF AWARD. If a contract is awarded by the Owner, such award shall be effective when formal notice of such award, signed by the authorized representative of the Owner, has been delivered to the intended awardee, or mailed to him at the main business

address shown on his bid, by some office or agent of the Owner duly authorized to give such notice.

EXECUTION OF AGREEMENT. Copies of the agreement in the number stated in the form of agreement, shall be executed by the successful bidder, and returned, together with the required bonds and insurance, within 10 days from and after the date of the award of the contract. Effective date of bonds shall be the same or later than the date of the agreement.

FAILURE TO EXECUTE AGREEMENT AND FILE BONDS AND INSURANCE. Failure of a successful bidder to execute the agreement and file required bonds and insurance within the required time shall be just cause for the annulment of the award. On failure of a successful bidder to execute the agreement and file the required bonds and insurance within the required time, he shall forfeit his bid security as agreed herein before. Upon annulment of an award as aforesaid, the Owner may then award the contract to the next lowest responsible bidder.

CONTRACT PERIOD.

The contract period is for a three (3) year period of time commencing from the “Notice to Proceed.” This project is scheduled to be awarded after July 11, 2013. The term of this Agreement is for Three (3) one year terms, commencing at 12:00 A.M. on the Commencement Date, subject to the earlier termination of this Agreement by City. No provision is made for the automatic extension or renewal of the term.

Option to Extend Term.

City reserves the right to extend the term for successive periods of one (1) year each for no more than three (3) one-year terms, subject to the earlier termination of this Agreement by City. City shall provide Service Operator with no less than sixty (60) days’ prior written notice of its intent to exercise its option to secure the CNG Fueling Station Operation and Maintenance Service from Service Contractor during any extension period.

LIST NUMBER OF EMPLOYEES WORKING FOR CONTRACTOR:

LIST ALL EQUIPMENT TO BE USED ON THIS PROJECT: (PLEASE USE ATTACHMENT)

NUMBER OF YEARS IN BUSINESS AS A GENERAL CONTRACTOR ON PROJECTS SIMILAR TO THIS PROJECT:

**SECTION 1
QUALIFICATION STATEMENT OF BIDDERS**

SUBMITTED TO:

Engineering Department Reviewed by: _____ Date _____

Date Received: _____

SERVICE CONTRACTOR: _____

CIRCLE ONE: Sole Proprietor Partnership Corporation Joint Venture

NAME: _____ PARTNER: _____

ADDRESS: _____ ADDRESS: _____

CITY: _____ CITY: _____

PHONE: _____ PHONE: _____

PRINCIPAL PLACE OF BUSINESS: PRINCIPAL PLACE OF BUSINESS:

COUNTY _____ STATE ____ COUNTY _____ STATE ____

IF THE CONTRACTOR IS A CORPORATION, FILL OUT THE FOLLOWING:

STATE OF INCORPORATION:

LOCATION OF PRINCIPAL OFFICE:

CONTACT PERSONS AT OFFICE:

PERSON EXECUTING CONTRACTS ON BEHALF OF CORPORATION:

NAME: _____ ADDRESS: _____

TITLE: _____ CITY _____ STATE _____ ZIP _____

PHONE: _____

NAMES OF OFFICERS: (IF APPLICABLE)

LIST NUMBER OF EMPLOYEES WORKING FOR OPERATOR:

COMMENTS:

GREATEST NUMBER OF THIS TYPE of SERVICE OPERATOR IN EXCESS OF \$50,000.00 UNDER SERVICE AT ONE TIME IN COMPANY'S HISTORY:

GREATEST NUMBER OF THIS TYPE OF SERVICE CONTRACTS IN EXCESS OF \$75,000.00 UNDER SERVICE AT ONE TIME IN COMPANY'S HISTORY:

APPROXIMATE AVERAGE OF DOLLAR VOLUME OF INCOMPLETE WORK OUTSTANDING UNDER CONTRACT AT ANY ONE TIME:

LIST RECENTLY COMPLETED PROJECTS OF THE TYPE OF WORK QUALIFYING FOR OR SIMILAR WORK, PLUS THE FOLLOWING INFORMATION FOR EACH PROJECT:

PROJECT: _____

OWNER/ENGINEER: _____

YEAR BUILT: _____ CONTRACT PRICE: _____

CONTACT PERSON: _____ PHONE: _____

PROJECT: _____

OWNER/ENGINEER: _____

YEAR BUILT: _____ CONTRACT PRICE: _____

CONTACT PERSON: _____ PHONE: _____

PROJECT: _____

OWNER/ENGINEER: _____

YEAR BUILT: _____ CONTRACT PRICE: _____

CONTACT PERSON: _____ PHONE: _____

PROJECT: _____

OWNER/ENGINEER: _____

YEAR BUILT: _____ CONTRACT PRICE: _____

CONTACT PERSON: _____ PHONE: _____

(USE ATTACHMENTS IF NECESSARY)

LIST INCOMPLETE PROJECTS, PLUS THE FOLLOWING INFORMATION FOR EACH PROJECT LISTED:

PROJECT: _____

OWNER/ENGINEER: _____

YEAR BUILT: _____ CONTRACT PRICE: _____

CONTACT PERSON: _____ PHONE: _____

PROJECT: _____

OWNER/ENGINEER: _____

YEAR BUILT: _____ CONTRACT PRICE: _____

CONTACT PERSON: _____ PHONE: _____

PROJECT: _____

OWNER/ENGINEER: _____

YEAR BUILT: _____ CONTRACT PRICE: _____

CONTACT PERSON: _____ PHONE: _____

(USE ATTACHMENTS IF NECESSARY)

IF COMPANY IS UNDER NEW MANAGEMENT, PLEASE LIST NAMES OF STAFF AND QUALIFICATION AND/OR EXPERIENCE OF SAID PERSONS. (PLEASE USE ATTACHMENT.)

HAVE YOU OR ANY PRESENT PARTNER(S) OR OFFICER(S) FAILED TO COMPLETED A CONTRACT?_____ IF SO, NAME OF OWNER AND/OR SURETY:

CONTACT PERSON: _____ PHONE: _____

ARE THERE ANY UNSATISFIED DEMANDS UP ON YOU AS TO YOUR ACCOUNTS PAYABLE?

IF SO, GIVE NAMES, AMOUNTS, AND EXPLANATIONS, SURETY:

BANK REFERENCE: Bank:

Address: _____

City: _____ State: _____ Zip: _____

Contact Person: _____

Phone: _____

MUNICIPALITY REFERENCE: City:

Contact Person: _____ Position: _____

Address: _____ Phone: _____

OTHER CREDIT REFERENCES:

Name: _____ Name: _____

Address: _____ Address: _____

Phone: _____ Phone: _____

In compliance with Invitation to Bid for above mentioned types of projects, the undersigned is submitting the information as required with the understanding that the purpose is only to assist in determining the qualifications for this organization to perform the type and magnitude of work designated, and further, guarantee the truth and accuracy of all statements made, and will accept your determination of qualifications without prejudice. The surety herein named, any other bonding company, bank, sub- contractor, supplier, or any other person(s), firm(s) or corporation with whom I (we) have done business, or who have extended any credit to me (us) are hereby authorized to furnish you with any information you may request concerning performance on previous work and my (our) credit standing with any of them; and I (we) hereby release any and all such parties from any legal responsibility whatsoever on account of having furnished such information to you.

Signed: _____ Title _____

Company: _____ Date: _____

COPY TO LOCAL UNDERWRITING OFFICE OF PROPOSED SURETY

Name: _____ Phone: _____

Address: _____ City: _____ State: _____

Bid Proposal Form

**CITY OF NORMAN
INFORMATION FOR BIDDERS**

All bid documents must be submitted in a sealed envelope, addressed to City Controller, City of Norman, P.O. Box 370, 210 West Gray, Norman, Oklahoma 73070, until 2:00 O'clock PM, CDT, July 11, 2013 for the following:

CNG FUELING STATION OPERATION AND MAINTENANCE SERVICES

Each sealed envelope containing bid documents must be plainly marked on the outside as "Bid for Operation and Maintenance Services" and the envelope should bear on the outside the name of the Bidder and his address. If forwarded by mail, the sealed envelope containing the Bid must be enclosed in another envelope addressed to City Controller, City of Norman, P.O. Box 370, 210 West Gray, Norman, Oklahoma 73070.

All Bids must be made on the required Bid form. All blank spaces for bid prices must be filled in with ink or typewritten (N/B if no bid) and the Bid form must be completed and executed when submitted.

The Owner may waive any formalities or minor defects or reject any and all Bids. Any Bid may be withdrawn prior to the scheduled time for the opening of Bids or authorized postponement thereof.

City of Norman reserves the right to evaluate all bids, to reject any or all bids and re-bid at a later date. City of Norman may waive any irregularities in the bid or negotiate variances from specifications, and make awards that are in their best interest. City of Norman will have final decisions in all matters regarding acceptance of bids and issuance of awards.

A mandatory pre-bid conference will be held on June 27, 2013 at 1:30 PM, CDT, at the Norman Fleet Management Center at 1301 Da Vinci in Norman, OK.

All bids will be considered at the regular scheduled bid Opening on July 11, 2013 at 2:00 O'clock, PM, CDT, in the Office of City Controller, City of Norman, 210 West Gray, Norman, Oklahoma 73070 and read aloud for Services for said CNG Fueling Station. The Public is invited to attend.

Bid Sheet Continued (page 2)

**CNG Fueling Station Operation and Maintenance Service
2351 Goddard Avenue
Norman, Oklahoma**

BID		
TERM (Initial 3 Years of Agreement)	MONTHLY COST	TOTAL ANNUAL AMOUNT
8/01/13 – 7/31/16	*	

***Flat monthly fee as stated above is based on CNG Fueling Station dispensing 2 MMCF in a given Anniversary Year. Monthly fees for fuel dispensed in any given Anniversary Year exceeding 2 MMCF will be adjusted per the table below. Unless otherwise agreed between the parties, monthly payments during each Anniversary Year shall be based upon the assumption that annual usage will not exceed 2 MMCF. In the first invoice following the beginning of each new Anniversary Year, in the event actual cubic feet dispensed in the immediate past Anniversary Year exceeds 2 MMCF, the monthly payments made in the immediately past Anniversary Year shall be reconciled to reflect actual CF dispensed.**

Annual CF	2 MM	2.1 MM	2.25 MM	2.5 MM	2.75 MM	3 MM
Monthly MMCF	M.Usage	M.Usage	M.Usage	M.Usage	M.Usage	M.Usage
Monthly Fee	Bid x 1	Bid x 1.05	Bid x 1.125	Bid x 1.25	Bid x 1.375	Bid x 1.5

M.Usage = Meter Usage

OR

Annual MGGE	1MGGE	1.1MGGE	1.25 MGGE	1.5GGE	1.75MGGE	2.0MGGE
Monthly MGGE	Bid x 1	Bid x 1.05	Bid x 1.125	Bid x 1.25	Bid x 1.375	Bid x 1.5
Monthly Fee						

The Monthly Operation and Maintenance Fee shall be a uniform payment throughout the year and shall be subject to negotiation after each Option Year.

Call outs and Emergency Maintenance Charges*

*A two (2) hour minimum labor charge shall apply on all service visits with no repeat call outs on unrepaired problems.

Where additional services are authorized by the Fleet Management Superintendent under this Agreement, unless otherwise agreed by Operator and City, such additional services shall be provided at the below labor rates:

EMPLOYEE CATEGORY	STRAIGHT TIME HOURLY RATE	OVERTIME HOURLY RATE	WEEKEND/HOLIDAY HOURLY RATE
Technician			
Laborer			

Operator shall not sub contract any of its rights or obligation under this Agreement without the prior written consent of the Fleet Management Superintendent.

The daily cleanup, servicing and pickup, etc. of the public access portion of the station may be arranged with a community organization like boy scouts, girl scouts, 4-H Club, etc.

Parts & Materials not provided by City will be reimbursed at a set percentage under list price. The Operator will provide parts and materials at _____% under list price as stated on the materials ticket.

TOTAL (Annual Cost) _____
(Numbers)

(Use Words) (Dollars)

SUBMITTED ON _____ 2013

Service Bidder

By: _____

Name: _____

Address: _____

Telephone No: _____

Fax: _____

ATTEST:

Bid Proposal Form
Base Bid

Name and Address of Bidder:

—

Contact Person: _____ Telephone No.

Note: Failure to bid both the Base Bid and all Labor Rates Bid constitutes rejection of this Bid.

Owner reserves the right to award all or any part of the Bid items determined to be in their best interest.

The City has the right to override this agreement and perform Operation and Maintenance functions with City Employees. A 30 day notice will be given when this occurs. The Operator will need to provide independent access to the SCADA System (not thru City of Norman's network) at their expense.

C O N T R A C T

THIS CONTRACT made and entered into this day of _____, 2013, by and between _____ as Party of the First Part, hereinafter designated as the CONTRACTOR, and the City of Norman, a municipal corporation, hereinafter designated as the CITY, Party of the Second Part.

W I T N E S S E T H

WHEREAS, the CITY has caused to be prepared in accordance with law, specifications, and other bidding documents for the work hereinafter described and has approved and adopted all of said bidding documents, and has caused Notice to Bidders to be given and advertised as required by law, and has received sealed proposals for the furnishing of all labor and materials for the following projects:

as outlined and set out in the bidding documents and in accordance with the terms and provisions of said CONTRACT; and,

WHEREAS, the CONTRACTOR in response to said Notice to Bidders, has submitted to the CITY on the manner and at the time specified, a sealed proposal in accordance with the terms of this Contract; and,

WHEREAS, the CITY, in the manner provided by law, has publicly opened, examined, and canvassed the proposals submitted and has determined and declared the above-named CONTRACTOR to be the lowest and best Bidder on the above-prepared project, and has duly awarded this CONTRACT to said CONTRACTOR, for the sum named in the proposal, to wit:

(WRITTEN DOLLARS):

(NUMERALS) (\$ _____).

NOW, THEREFORE, for and in consideration of the mutual agreements and covenants herein contained, the parties to this CONTRACT have agreed, and hereby agree, as follows:

1) The CONTRACTOR shall, in a good and first-class, workman-like manner at his own cost and expense, furnish all labor, materials, tools, and equipment required to perform and complete said work in strict accordance with this CONTRACT and the following CONTRACT Documents: The Bid Notice published in the Norman Transcript, the Notice to Bidders, Instructions to Bidders, the Contractor's Bid or Proposal, the Construction Drawings, Specifications, Provisions, and Bonds thereto, all of which documents are on file in the Office of the Purchasing Agent of the City of Norman, and are made a part of this CONTRACT as fully as if the same were set out at length.

2) The CITY shall make payments as stipulated in the contract documents to the CONTRACTOR in the following manner: On or about the first day of each month, the

project engineer, or other appropriate person, will make accurate estimates of the value, based on CONTRACT prices, or work done, and materials incorporated in the work and of materials suitably stored at the site thereof during the preceding calendar month. The CONTRACTOR shall furnish to the project engineer, or other appropriate person, such detailed information as he may request to aid him as a guide in the preparation of the monthly estimates.

Each monthly estimate for payment must contain or have attached an affidavit in accordance with the Constitution of the State of Oklahoma, Title 74, Section 3109-3110, and Title 62, Section 310.9.

On completion of the work, but prior to the acceptance thereof by the CITY, it shall be the duty of the project engineer, or other appropriate person, to determine that said work has been completely and fully performed in accordance with said CONTRACT Documents; and upon making such determinations said official shall make his final certificate to the CITY.

3) It is further agreed that the CONTRACTOR will commence said work within 10 days following receipt of a NOTICE-TO-PROCEED, and prosecute the same vigorously and continuously.

**City of Norman
Purchasing Division
P.O. Box 370
Norman, OK 73070**

A F F I D A V I T

State of _____ PO No. _____
County of _____ Invoice No. _____
Amount \$ _____

In accordance with the Constitution of the State of Oklahoma Title 74, Section 3109-3110, and Title 62, Section 310.9, this form must be completed and Submitted before any invoice over \$12,500.00 can be processed for payment.

The undersigned CONTRACTOR, of lawful age, being duly sworn, on oath says that this invoice or claim is true and correct and that (s)he is authorized to submit the invoice pursuant to an approved Contract. Affidavit further states that the work as shown by this invoice has been completed in accordance with the plans, specifications furnished the Affidavit. Affidavit further states that (s)he has made no payment, given, or donated or agreed to pay, give or donate, either directly or indirectly, to any elected official, officer or employee of the City of Norman, or money or any other thing of value to obtain payment of the invoice or procure award of this Contract order pursuant to which an invoice is submitted.

Company Name

By: Architect, Contractor, Supplier, Engineer or Supervisory

Official
Subscribed and sworn to before me this _____ day of _____, 20_____.

Notary Public
(or officer having power to administer oaths)

My Commission Expires:

102.04 - PREPARATION OF PROPOSAL

The Bidder shall submit his proposal in duplicate on the forms furnished by the City. All blank spaces in the proposal forms shall be correctly filled in and the Bidder shall state the prices, written in ink, both in words and numerals, for which he proposes to do the work contemplated or furnish the materials required.

Such prices shall be written distinctly legible. In case of conflict between words and numerals, the words will govern. If the proposal is submitted by an individual, his name must be signed by him or his duly authorized agent and his post office address given. If the proposal is submitted by a firm or partnership, the name and post office address of each member must be given and the proposal signed by a member of the firm or partnership as a person duly authorized.

If the proposal is made by a company or corporation, the company or corporate name and the state under the laws of which said company or corporation is chartered and the business address must be given and the proposal signed by an official or agent duly authorized. Powers of Attorney, authorizing agents or others to sign proposals must be properly certified and must be in writing and on file with the City Clerk or submitted with the proposal.

102.05 - PROPOSAL AFFIDAVIT

Each proposal or copy thereof shall be accompanied by a sworn statement in writing that the person signing the proposal executed said proposal in behalf of the Bidder therein named and that he had lawful authority to do so and that the said Bidder has not directly or indirectly entered into any agreement, express or implied, with any other Bidder or Bidders having for its object the controlling of the amount of such bid or any bids, the limiting of the bids or bidders, the parceling or farming out to any Bidder or the subject matter of the bid or the profits thereof, and that he has not and will not divulge said sealed bid to any person whatever except those having a partnership or other financial interest with him in said bid, until after the said sealed bids are opened.

102.06 - PROPOSAL GUARANTY

Proposals will not be considered unless the original filed with the Purchasing Agent is accompanied by a Bidder's bond, or certified or cashier's check in the required amount, made payable to the "City of Norman." The check shall be in the amount as designated in the Advertisement. The Proposal Guaranty is required as evidence of good faith and as a guarantee that, if awarded the Contract, the Bidder will execute the Contract and furnish the required bonds within the required time.

102.07 - FILING OF PROPOSALS

No proposals will be considered by the City unless they are filed in a sealed envelope, with the Purchasing Agent at his office at 201 West Gray Street, Building C, Norman, Oklahoma, within the time limit for receiving proposals, as stated in the Advertisement. The proposal shall be plainly marked on the envelope with the word "Proposal" and the name of the project.

102.08 - WITHDRAWAL OF PROPOSALS

Permission will not be granted to withdraw or modify any proposal after it has been filed and before the time set for opening proposals. Request for non-consideration of proposals must be made in writing, addressed to the City Council, and filed with the Purchasing Agent before the time set for opening proposals. After other proposals are opened and read, the proposal for which withdrawal is properly requested will be returned unopened.

102.09 - OPENING OF PROPOSALS

The proposals filed with the Purchasing Agent will be opened at the time stated in the Advertisement and shall thereafter remain on file in the Office of the Purchasing Agent two (2) days before any Contract will be entered into, based on such proposals.

Bidders are invited to attend the opening of the proposals.

102.10 - IRREGULAR PROPOSALS

Proposals will be considered irregular if they show any omissions, alteration of forms, additions or conditions not called for, unauthorized alternate bids or irregularities of any kind. However, the City reserves the right to waive technicalities as to changes, alterations or reservations and make the award in the best interest of the City.

102.11 - REJECTION OF PROPOSALS/BIDS

The City reserves the right to reject any or all proposals/bids, and all proposals/bids submitted are subject to this reservation. Proposals/bids may be rejected for any of the following specific reasons:

- (a) Proposals/bids received after time limit for receiving proposals/bids as stated in the Advertisement.
- (b) Proposal/bid prices obviously unbalanced.
- (c) Summation of proposal/bid prices on any one project above the Engineer's estimate of cost for such project.
- (d) Proposals/bids containing any irregularities.
- (e) Proposals/bids received more than ninety six (96) hours, excluding Saturday, Sunday and Holidays, before the time set for the opening of bids.

102.12 - DISQUALIFICATION OF BIDDERS

Bidders will be disqualified and their proposals not considered for any of the following specific reasons:

- (a) Where more than one proposal for an individual, firm, partnership or corporation is filed under the same or different names and where such proposals are not identical in every respect.
- (b) Reasonable grounds for believing that any Bidder is interested in more than one proposal for the work contemplated or materials to be furnished.
- (c) Reason for believing that collusion exists among the Bidders.
- (d) The Bidder being in arrears on any existing Contracts, interested in any litigation against the City, or having default on a previous Contract.
- (e) Lack of competency, as revealed by the financial statement, experience and equipment questionnaires, etc.
- (f) Uncompleted work, in the judgment of the City, will hinder or prevent the prompt completion of additional work, if awarded.

GENERAL PROVISIONS
SECTION 103
AWARD AND EXECUTION OF CONTRACT

103.02 - AWARD OF CONTRACT

The City reserves the right to withhold the award of the Contract for a reasonable period of time from the date of opening the proposals and no award will be made until the necessary investigations are made as to the responsibility of the low Bidder. No Contract will be awarded until at least 14 days after opening the proposals. The awarding of the Contract shall give the Bidder no right of action or claim against the City upon such Contract until the execution of the Contract shall have been completed and the Contract delivered to the Contractor. The Council reserves the right to award all or any portion of the work.

103.03 - RETURN OF PROPOSAL GUARANTY

As soon as the proposal prices have been compared, the City may, at its discretion, return the proposal guaranties accompanying those proposals which, in its judgment, would not be considered in making the award. After the award is made, only the successful Bidder's check will be retained until the required Contract and Bonds have been executed, after which it will be returned to the Bidder. Should the awarding of the Contract be delayed more than thirty (30) days, all Bidders' checks will be returned, unless such delay is from causes beyond the control of the City, and, in such event, the proposal and Bidder's check, of any Bidder, will be returned at the Bidder's option.

103.04 - SURETY BONDS

With the execution and delivery of the Contract, the Contractor shall furnish and file with the City in the amounts required, the following surety bonds:

- (a) A good and sufficient Performance Bond in an amount equal to one hundred (100%) percent of the approximate total amount of the Contract, guaranteeing the full and faithful execution of the work and performance of the Contract and for the protection of the City and all property owners interested against
- (b) any damage by reason of negligence of the Contractor, or the improper execution of the work of the use of inferior materials.
- (b) A good and sufficient Statutory Bond in an amount equal to one hundred (100%) percent of the approximate total amount of the Contract, guaranteeing payment for all labor, materials, and equipment used in the construction of the improvements.
- (c) A good and sufficient Maintenance Bond in an amount equal to one hundred (100%) percent of the total amount of the Contract, guaranteeing the maintenance in good condition of such improvement for a period to one (1) year from and after the time of

the completion and acceptance by the City of said improvements.

No Surety will be accepted who is now in default or delinquent on any bond or who is interested in any litigation against the City. All bonds shall be made on forms furnished by the City and shall be executed by surety companies licensed to do business in the State of Oklahoma and acceptable to the City. Each bond shall be executed by the Contractor and the Surety. Should any Surety on the Contract be determined unsatisfactory at any time by the City, notice will be given to the Contractor to that effect, and the Contractor shall forthwith substitute a new Surety or Sureties satisfactory to the City. No payment will be made under the Contract until the new Surety or Sureties, as required, have qualified and been accepted by the City. The Contract shall not be operative nor shall any payments be due until approval of the bonds has been made to the City.

All Bonds shall be in the forms prescribed by Law or Regulation or by the Contract Documents and be executed by such sureties as are named in the current list of "Companies on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of the authority to act.

103.05 - EXECUTION OF CONTRACT

The person or persons, partnership, company, firm, or corporation to whom the Contract is to be awarded, shall sign the necessary agreements entering into the required Contract with the City and execute and deliver the required bonds.

No Contract shall be binding on the City until it has been approved by the City Attorney, executed by the City, and delivered to the Contractor.

103.06 - FAILURE TO EXECUTE CONTRACT

Upon failure of the Bidder to execute the required bonds or to sign the required Contract after the Contract is transmitted to the Contractor, he will be considered to have abandoned his proposal. By reason of the uncertainty of market prices of the materials and labor and it being impracticable and extremely difficult to fix the amount of damages to which the City would be put by reasons of said Bidder's failure to execute said Bonds and Contract, the proposal guaranty accompanying the proposal shall be the agreed amount of damages which the City will suffer by reason of such failure on the part of the Bidder and shall thereupon be retained by the City as liquidated damages. The filing of a proposal will be considered as an acceptance of this provision.

103.07 - COOPERATION OF CONTRACTOR

Three sets of specifications will be furnished the Contractor as follows: One office copy, one for the Field Superintendent, and one copy for job use

103.08 - STORAGE OF MATERIALS

Materials shall be stored so as to insure the preservation of their quality and fitness for the work. When directed by the Engineer they shall be placed on wooden platforms or other hard, clean surfaces and not on the ground, and shall be placed under cover when directed. Stored materials shall be located so as to facilitate prompt inspection.

103.09 - INSPECTION

The Contractor shall furnish the Engineer with every reasonable facility for ascertaining whether or not the work as performed is in accordance with the requirements and intent of the specifications.

106.01 - PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE

a. Contractor's Insurance. The Contractor and/or Subcontractor shall maintain during the life of this contract such Public Liability and Property Damage Insurance as will protect him from claims for damages for bodily injury, including accidental death, as well as from claims from property damages which may arise from operations under this contract whether such operations be by himself or by his subcontractor or by anyone directly or indirectly employed by either of them and the amounts of such insurance shall be as follows:

1. Bodily Injury Liability in the amount of not less than \$1,000,000.00 for injuries including accidental death, to any one person, and subject to the same limit for each person, in an amount not less than \$1,000,000.00 for one accident.
2. Property Damage Liability. Limits shall be carried in the amounts of not less than \$100,000.00 for any one accident and an aggregate limit of \$300,000.00.

a. Owner's Insurance.

b. Contractor shall provide Owner's Protective Liability Insurance with this City as the name insured, and the architects/engineers as additional insured, to protect the City and architects/engineers against claims arising out of operations of Contractors and other independent Contractors, as well as omissions of supervisory acts of the City and architects/engineers in connection with the performance of the contract covered by these specifications in the following minimum amounts:

1. Bodily Injury Liability in the amount of not less than \$1,000,000 for injuries including accidental death, to any one person, and subject to the same limit for each person, in an amount not less than \$1,000,000 for one accident.
2. Property Damage Liability. Limits shall be carried in the amounts of not less than \$100,000.00 for any one accident and an aggregate limit of \$300,000.00.

- c. Comprehensive Automotive Liability. This insurance shall cover owner, hired and other non-owned automobiles and shall protect the contractor from claims for bodily injury or property damage which may arise from the use of motor vehicles engaged in various operations under this contract. The automobile insurance shall provide minimum limits of liability for bodily injury of \$1,000,000.00 for each person and \$1,000,000.00 each occurrence and \$500,000.00 of property damage each occurrence.
- d. The policies of insurance shall be executed by an insurance or indemnity carrier authorized to do business in the State of Oklahoma.
- e. Before awarding a contract the City will be furnished a binder or certificate of insurance showing the coverage to be in effect.

106.02 - COMPREHENSIVE GENERAL LIABILITY INSURANCE

The Contractor shall procure and maintain during the Life of this Project Comprehensive General Liability Insurance to protect from claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees including claims insured by personal injury during liability coverage and from claims for injury or destruction of tangible property including loss of use resulting there from any and all of which may arise out of or as a result from the Contractor's operations under the Contract whether such operations be by himself or by any Sub-Contractor or anyone directly or indirectly employed by any of them or for whose acts any of them may be legally liable Such insurance shall include coverage for:

- A. Operation and Premises
- B. Independent Contractor Protective Liability
- C. Contractual Liability
- D. Explosion, Collapse, or Underground Damage

The limits of Liability for property damage including accidental death shall be \$1,000,000.00 per occurrence and a total limit of \$1,000,000.00 for all completed Operations - Products bodily injury claims during a single policy year. The limits of liability for property damage shall be \$1,000,000.00 per occurrence and \$1,000,000.00 aggregate limit individually each for operations, Independent Contractor Protective, and Contractual for each project, and \$1,000,000.00 aggregate limit for Completed Operation - Product damage during a single policy year.

106.02 - PROOF AND CARRIAGE OF INSURANCE

The Contractor shall furnish the City with satisfactory proof of carriage of the insurance required.

106.03 - LIENS

Neither the final payment or any part of the retained percentage shall become due until the

Contractor, if required, shall deliver to the City a completed release of all liens arising out of this Contract, or receipts in full in lieu thereof, and, if required, in either case, an affidavit that so far as he has knowledge or information the releases and receipts include all labor and material for which a lien would be filed; but the Contractor may, if any sub-contractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the City, to indemnify him against any lien. If any lien remains unsatisfied after all payments are made, the Contractor shall refund to the City all Moines that the latter may be compelled to pay in discharging such a lien, including all costs and a reasonable attorney's fees.

106.04 - TRANSPORTATION TAX

Under provisions of Section 3475 (b) of the Internal Revenue Code, as amended, the State of Oklahoma, its agencies and political subdivisions are exempt from payment of the three per centum (3%) transportation tax levied by Subsection (a) of Section 3475, in either of the following cases:

- (a) When the property (equipment, goods, materials, etc.) is consigned to the State, its agencies, or political subdivisions, or,
- (d) When such property is consigned to the State, its agency, or political subdivision in care of the Contractor.

106.22 - TRANSPORTATION TAX (continued)

It is the policy of the City to take advantage of the savings afforded by the above-mentioned exemption. To this end, the Contractor agrees to comply with the following:

"In determining cost of material and computing freight charges, do not include 3% Federal Transportation of Property Tax. Section 3475 (b) of the Internal Revenue Code, as amended, exempts the City from this tax. The successful Bidder will be furnished an appropriate exemption certificate form by the contracting authority, and will be authorized to have all shipments of construction materials and equipment entering into this Contract consigned to the City in care of himself, thereby enabling him to take advantage of the above-mentioned exemption."

NOTE: Said exemption will not apply to shipments of fuel, lubricants, spare parts, or items of construction equipment belonging to the Contractor which will not become the property of the City.

107.01 - DAY'S WORK: WORKING HOURS

Work shall be done only during regular and commonly accepted and prescribed working hours. No work shall be done nights, Saturdays, Sundays, or regular holidays unless a special order or permit is given by the Engineer to do so. Eight (8) hours shall constitute a day's work and the Contractor shall observe all State laws and City ordinances governing hours of work.

107.02 - TIME OF COMMENCEMENT AND COMPLETION

The Contractor shall commence work within the time specified in the Contract and the rate of progress shall be such that the whole work will be performed and the premises cleaned up in accordance with the Contract, Plans, and Specifications within the time limit, where such time is stated in the Contract, unless an extension of time be made in the manner hereinafter specified.

SECTION 01020 – Code of Practice for CNG Compressor Refueling Stations:

On Site Storage and Location of Equipment

1 Scope

- 1.1** The object of the code is to provide planning information, procedures, standards and guidance, for the establishment of a CNG compressor and refueling station.
- 1.2** The current NFPA-52 guidelines for Compressed Natural Gas Vehicular Fuel Systems Code is published by the National Fire Prevention Association and applies to all the design and installation requirements of CNG refueling facilities. The code specifies requirements for pressure vessel design and construction, location and installation of tanks, cylinders and regulating equipment, pressure relief devices, CNG transfer, pressure gauges, high pressure piping system, and vehicle refueling operation.

2 Reference

The reference documents as listed in the last part of this standard contain provisions which, through reference in this text, constitute provisions of this Standard. For dated references, where there are subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the referenced documents. For undated references, the latest edition of the publication referred to applies.

3 Definitions

For the purpose of this standard, the following definitions shall apply:

3.1

Bulk tank

3.1.1

mobile bulk tank

tanks which are designed, fabricated, constructed, and tested in accordance to ASME Code and installed on a vehicle

3.1.2

stationary bulk tank

tanks which are designed, fabricated, constructed, and tested in accordance to ASME Code

3.2 compressed natural gas (CNG)

a compressed gaseous fuel composed predominantly of methane (CH₄)

3.3 cylinder

a pressure vessel with a water capacity not exceeding 66 gallons for the storage of CNG

3.4 cylinder filling area

an area specifically allocated for the filling and storage of CNG not permanently mounted on a motor vehicle. This may include the following types of cylinder applications:

- a) Single or portable containers; and
- b) Multi-cylinder containers.

3.5 emergency shut-off-valve

a quick action valve which operates from fully open to fully closed in less than one complete turn

3.6 fire resistance rating (FRR)

The time duration that a material or construction can withstand the effect of a standard fire test, continues to perform its structural function and does not permit the spread of fire. Where a period of time is used in conjunction with the abbreviation FRR it is required that the element of structure referred to shall have a fire resistance rating of not less than the period stated

3.7 gas cylinder truck system (Mother-daughter system)

A multi-cylinder or tank fixture permanently mounted on a special truck carriage and essentially used for the transportation of CNG to other refueling stations

3.8 gas storage unit

a group of gas cylinders contained within a length of 18 ft., a height of 5 ft. and width of 3.5 ft. in the case of vertical cylinders, or length of 18 ft., height of 6 ft. and width of one cylinder up to 6.5 ft. in the case of horizontal cylinders. Whichever arrangement is used they shall be linked by piping to form a single gas storage unit

3.9 gas storage unit isolation valve

a quick action valve for stopping gas flow from a particular gas storage unit and is capable of being locked off

3.10 master shut-off valve

a quick action valve for stopping gas flow which operates from fully open to fully closed in less than one turn and is capable of being locked off

3.11 maximum permissible pressure

the pressure developed by the contents of a cylinder or tank at the pressure reference temperature for those contents taking into account the intended charging pressure at 59°F for CNG

3.12 non-return valve (Check valve)

a valve which permits fuel flow in one direction only

3.13 pressure

gauge pressure in Psi (pounds per square inch)

3.14 protected work

protected work means:

- a) any dwelling house, or any place of worship, public building, university, college, school, hospital, public institution, court, theatre, or other building in which persons are accustomed to assemble
- b) any factory, workshop, office, store, warehouse, shop, or other building where persons are regularly employed for the purpose of any trade or business, and any other building which a licensing authority may consider it of sufficient importance or value to warrant protection
- c) any wooden decked wharf (not being a wharf specifically designed for the transfer of dangerous goods), public railway (not being a siding), or timber yard, and any place where it is customary for ships to berth, moor, or lie, but does not include a small office or other building connected with the storage or use of dangerous goods on premises in which such storage or use is a major function

3.15 public place

a place (other than a protected work) which is freely open to and frequented by the public, and includes a place where a section of the public may be permitted to assemble; but does not include any public place (being private property) where access to dangerous goods is, in effect, controlled by the licensee

3.16 reference temperature for developed pressure

The temperature at which the developed pressure is to be determined

3.17 snubber

a component which performs the function of a gas shock absorber normally achieved by an arrangement of suitable gas restriction orifices

3.18 regulatory agency

the Government Department or Agency responsible for the respective areas of responsibility

3.19 S.T.P.

standard temperature and pressure

3.20 vehicle refueling nozzle

the standard filling system refueling device fitted at the end of the refueling hose suitable for coupling to the vehicle refueling valve fitting

3.21 vehicle refueling nozzle shut-off valve

a quick action valve for stopping gas flow which operates from fully open to fully close in less than one turn and has the facility for venting residual high pressure gas in the refueling line after completion of the vehicle refueling operation

3.22 zone 1

an area within which any flammable or explosive substance, whether gas, vapor, or volatile liquid, is processed, handled or stored, and where, during normal operations an explosive or ignitable concentration is likely to occur in sufficient quantity to produce a hazard

3.23 zone 2

an area within which any flammable or explosive substance, whether gas, vapor or volatile liquid, although processed or stored, is so well under conditions of control that the production (or release) of an explosive or ignitable concentration in sufficient quantity to constitute a hazard is only likely under abnormal conditions

4 Pressure vessel design and construction

4.1 Design specifications

4.1.1 Each cylinders shall be designed, fabricated and tested in accordance with DOT 3AA, AS B 114, BS 5045: Part 1, or other equivalent internationally accepted standards as may be qualified by the DOE.

4.1.2 Bulk storage tanks shall be designed, fabricated and tested in accordance with the PSME Code or ASME Code if provision is not covered or other approved relevant standards.

4.2 Design pressure

Cylinders and bulk tanks shall be of a design adequate to withstand the maximum permissible pressure which could be attained by the contents due to climatic conditions. For this purpose the reference temperature for developed pressure of CNG is taken to be 120°F. The developed pressure of CNG at 120°F must not exceed 80% of the hydrostatic test pressure.

NOTE: The pressure in a CNG cylinder or tank depends on the gas composition, the temperature and pressure at which it was filled, and on the temperature which it reaches.

4.3 Cylinder neck threads

Each cylinder shall be provided with tapered thread gas inlet valve as specified in BS 341: Part 1:1991.

4.4 Corrosion protection

4.4.1 Pressure vessels which are made of materials that are subjected to corrosion by atmospheric conditions, and which are not provided with an allowance for external corrosion by a suitable increase in design thickness, shall be protected by coating or other equivalent means necessary to prevent corrosion

4.4.2 The users attention is drawn to the importance of avoiding corrosion which can otherwise limit the working life of the cylinders and affect the fatigue characteristics in serious cases. The implementation of good periodic preventive maintenance in anti-corrosion procedures is strongly recommended.

4.5 Marking and labeling

4.5.1 On each cylinder the manufacturer shall provide clear permanent markings not less than $\frac{1}{4}$ inch high. Marking shall be made either by labels incorporated into resin coatings, labels attached by adhesive, low stress stamps used on the thickened ends of type CNG.1 and CNG.2 designs, or any combination of the above. Adhesive labels and their application shall be in accordance with ISO 7225, or an equivalent acceptable standard.

4.5.2 Each cylinder complying with this International Standard shall be marked as follows:

- a) The words "CNG ONLY";
- b) The words "DO NOT USE AFTER XX/XXXX", where XX/XXXX identifies the month and year of expiration.
The period between the dispatch date and the expiration date shall not exceed the specified service life. The expiration date may be applied to the cylinder at the time of dispatch, provided that the cylinders have been stored in a dry location without internal pressure;
- c) Manufacturers' identification;
- d) Cylinder identification (a serial number unique for every
- e) Working pressure (Mpsi) at temperature;
- f) Reference to compliance standard, along with cylinder type and certification registration number (if applicable);
- g) The words "Use only a manufacturer-approved PRD";
- h) When labels are used, a unique identification number and the manufacturer's identification stamped on an exposed metal surface to permit tracing in the event that the label is destroyed;
- i) Date of manufacture (month and year);
- j) Fire protection;
- k) Tare mass of empty cylinder in lbs.;
- l) Authorized body or inspector's mark;

- m) Water capacity in gallons;
- n) Test pressure in Psi;
- o) Any additional markings as required by the regulatory agency.

4.5.3 The markings shall be placed in the listed sequence but the specific arrangement may be varied to match the space available. An acceptable example is:

CNG ONLY

DO NOT USE AFTER 07/2050

Manufacturer/Identification number

5.5Mpsi/120 °F

ISO 11439:2000 CNG-2(registration no.)

“Use only manufacturer-approved PRD”

Manufacture date 07/2010

Fire Protection: 20-BC type

Tare mass: 110 lbs

Water capacity: 10 gal

Test pressure: 6.5Mpsi

4.6 Inspection and testing

4.6.1 Every cylinder and tank shall be inspected and tested after manufacture and then at periods as specified in accordance with the relevant NFPA-52 standard.

4.6.2 Inspections and tests shall be in accordance with the requirements laid down in the specification in accordance with the relevant NFPA-52 standard.

4.6.3 The periodic inspections and tests shall be conducted by the owners and records of such inspections and tests shall be made available for examination by the appropriate regulatory agency.

4.7 Scrapping

Any cylinder or tank that fails to pass the tests specified in 4.6 shall be rendered unserviceable by flattening.

5 Location and installation

5.1 General requirements

5.1.1 The site of a proposed CNG refueling station shall comply with the planning requirements of the appropriate Regulatory Agency.

5.1.2 The gas storage system may be provided by an arrangement of linked multiple gas cylinders or by bulk storage tanks. Either type of installation shall be

approved by the appropriate Regulatory Agency. Annex B provides guidance for calculating the total gas storage.

5.1.3 Tanks, cylinders, and regulating equipment used with natural gas storage and for dispensing installations shall be located outdoors unless otherwise specifically approved by the appropriate Regulatory Agency.

5.1.4 CNG odorization

CNG shall be odorized by the addition of a suitable warning agent of such character that it is detectable by a distinct odor, which indicates the presence of gas down to one-fifth of the lower explosive limit and above.

5.1.5 Noise

The noise level emitted by the CNG refueling equipment at the vicinity of the station shall comply with the requirements of the appropriate Regulatory Agencies.

5.2 Safety distances

5.2.1 Cylinders

Each individual cylinder used for storage of dispensing natural gas shall be located with respect to the nearest building or boundary of site, compressor equipment, or other source of ignition in accordance with Table 1 and Figures 1, 2, 3, 4, 6, 7 and 8.

5.2.1.1 Safety distances between opening or windows in walls in any building or structure on the CNG refueling station and cylinder or tanks shall comply with column (b) in Table 1.

5.2.1.2 No storage cylinders shall be located less than 10 ft from the nearest street line or pedestrian walkway or other public place or protected works and shall also be located 50 ft. from the nearest rail of any railroad main track unless separated therefrom by a 4hr FRR wall as approved by the appropriate Regulatory Agency.

5.2.1.3 Banks of four cascades shall be separated by not less than 6.5 ft.

5.2.2 Bulk storage tanks

Bulk storage tanks shall not be located less than 16.5 ft. from walkways or protected works unless separated therefrom by a 4hr FRR wall.

5.2.3 Cylinder filling areas

5.2.3.1 Where cylinder filling areas are required, they shall be specially allocated on the site, and protected from damage or unauthorized entry by means of a rugged

steel mesh fence with secured access. The fence shall be at least 4 ft. high and 4 ft. away from the cylinder banks. Cylinder filling areas may be protected from the effects of the weather by a roof or canopy. Such a roof if provided shall be designed to facilitate the dispersion of free or escaped gas and shall not permit gas to be trapped.

Table 1 - Safety distances from buildings and boundaries to gas storage unit
(For conditions applying to electrical equipment refer to Clause 9)

Total capacity of gas storage units^a (a)	Minimum distance (b) ft.	Minimum on site distance between gas storage units and a 4 hr FRR concrete or masonry wall^b (c) in.
Up to 38,800ft ³ (Up to 1,200 gal)	8.0	40 in.
38,800 ft ³ to 86,500 ft ³ (1,200 gal to 2,600 gal)	13.0	40 in.
86,500 ft ³ to 865,000 ft ³ (2,600 gal to 26,000 gal)	33.0	65 in.
<p>^a Gas capacity is in cubic feet at standard temperature (59/F) and pressure (atmosphere) where stored at 3.5Mpsi or in gallons (L) water capacity of cylinders or tank.</p> <p>^b A wall constructed of brickwork, masonry or concrete 8" thick or reinforced 6" thick, is deemed to have a four hour fire resistance rating (4hr FRR).</p>		

A warning sign with the words "STOP MOTOR", "NO SMOKING", "FLAMMABLE GAS" shall be posted at dispensing stations and compressor areas. The location of signs shall be determined by local conditions, but the lettering shall be large enough to be visible and legible from each point

5.2.3.2 Where a cylinder filling area is located within 10 ft. from a gas storage unit, boundary of site, public place or protected works, a 4hr FRR wall shall be located between the cylinder filling area and the above mentioned location. Such a wall shall have a minimum height of 6.5 ft. and a length equal to the protected elevation of the cylinder filling area plus 6.5 ft.

When located on the site boundary the wall shall have a height equal to any roof or canopy line installed over the cylinder filling area.

5.2.3.3 A cylinder filling area shall not be located inside a building, for this purpose the structure mentioned in 5.2.3.1 is not considered as a building. Refer to definitions in clause 3 for cylinder filling area.

5.2.4 CNG dispensing point

5.2.4.1 The CNG dispensing point shall be located such that vehicles being served do not project onto a public place. CNG shall not be dispensed to a vehicle standing on a public place.

5.2.4.2. The CNG dispensing point shall not be closer than 8 ft. to the nearest cylinder in the CNG cylinder storage bank. Vehicles shall not be permitted closer than 6.5 ft. to the nearest cylinder in the CNG cylinder storage bank. This is preferably controlled by the provision of a 8" high curb.

5.2.4.3 A CNG dispensing point shall not be closer than 10 ft. from any source of ignition or closer than 6.5 ft. from any opening into a building unless separated therefrom by a 1hr FRR wall.

5.2.4.4 A CNG dispenser shall not be closer than 10 ft. from a petrol or liquid fuel dispenser unless the petrol or liquid fuel dispensers are intrinsically safe for Zone 2. A twin hose CNG dispenser may be installed.

5.2.4.5 A combined CNG and petrol or other liquid fuel dispensers could be installed provided that the dispenser wiring is intrinsically safe for Zone 1 (see Figure 9).

5.2.5 Hazardous area delineation for compressor and storage cascade

The delineation of hazardous area for compressor, storage cascade and dispenser are described in clause 8 and illustrated in Figures 6, 7, 8 and 9.

5.2.6 Storage location

If the CNG storage facility is adjacent to an existing petrol or liquid fuel dispensing facility the two must be separated by a minimum distance of 16 ft.

5.2.7 Bulk storage tanks

The location of bulk storage tanks shall comply with the safety distances specified for cylinders (see 5.2.1)

5.3 Static gas storage system and arrangements

5.3.1 Cylinders

For ready access and to ensure that all cylinder fittings are easily accessible, multiple cylinder units which comprise a static CNG storage facility and are stored in a vertical position shall be limited to a width of 3.5 ft., a length of 18 ft. and a height of 5 ft. above floor level. Each such storage unit shall be separated from other units by a distance of 6.5 ft.

Safety distances, refueling arrangements and a typical vertical cylinder CNG storage facility are shown in Figure 1.

5.3.2 In the case of static storage facilities in which cylinders are in a horizontal position each storage unit shall be limited to a height of 6 ft., a length of 18 ft. and a width equal to the length of one cylinder up to 6.5 ft. To ensure ready access all cylinder fittings should be arranged to face one direction in each unit. Each such storage unit shall be separated from other units by a distance of not less than 6.5 ft.. Where horizontal storage units are sited parallel to each other, cylinder fittings should be arranged so that they do not face cylinder fittings of other units. Safety distances, refueling arrangements and a typical horizontal cylinder CNG storage facility are shown in Figures 2 and 3.

5.3.3 Cylinders installed horizontally shall be separated from one another in each storage unit by a distance of not less than 1 inch. Their cylinder valves should be on the same side opposite to the refueling point and arranged so that any gas escapement discharge upwards and clear from cylinders above. Valves, manifolds and piping from these shall be provided with protection against damage from vehicles, maintenance gears or movement of equipment.

5.3.4 The distance between each area of storage cylinders shall be 6.5 ft. The CNG storage unit could be adjacent to an existing petrol or liquid fuel dispensing facility in which case the two shall be separated by a distance of 16 ft. minimum (See Figures 1, 2 and 3).

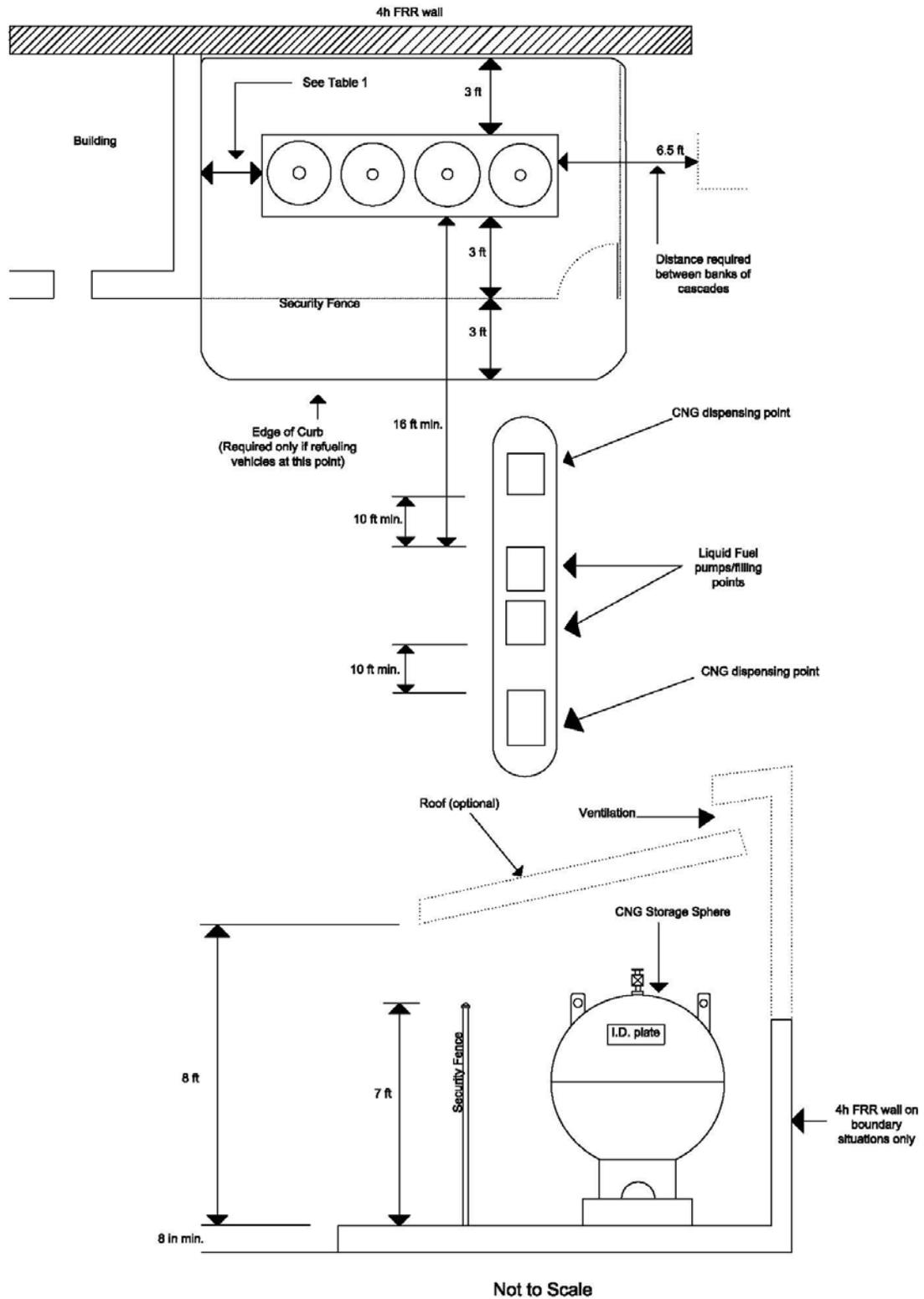
5.3.5 Cylinders and bulk storage units shall be installed on a firm, compacted, well-drained foundation. This foundation may be in the form of a plinth with the raised edge at 6.5 ft. from the front sides of the cylinder storage unit forming a curb up to which vehicles would be permitted.

5.3.6 Aboveground storage shall be protected from damage or unauthorized interference by means of a rugged mesh steel fence or equivalent fitted to surround the storage area at 4 ft. from the cylinder banks. Aboveground storage units shall be protected from impact of maneuvering trucks, trailers and other vehicles where such impact is likely or probable, by a suitable curb, or fences, or posts and railings.

5.3.7 Gas storage facilities may be protected from the effects of the weather by a

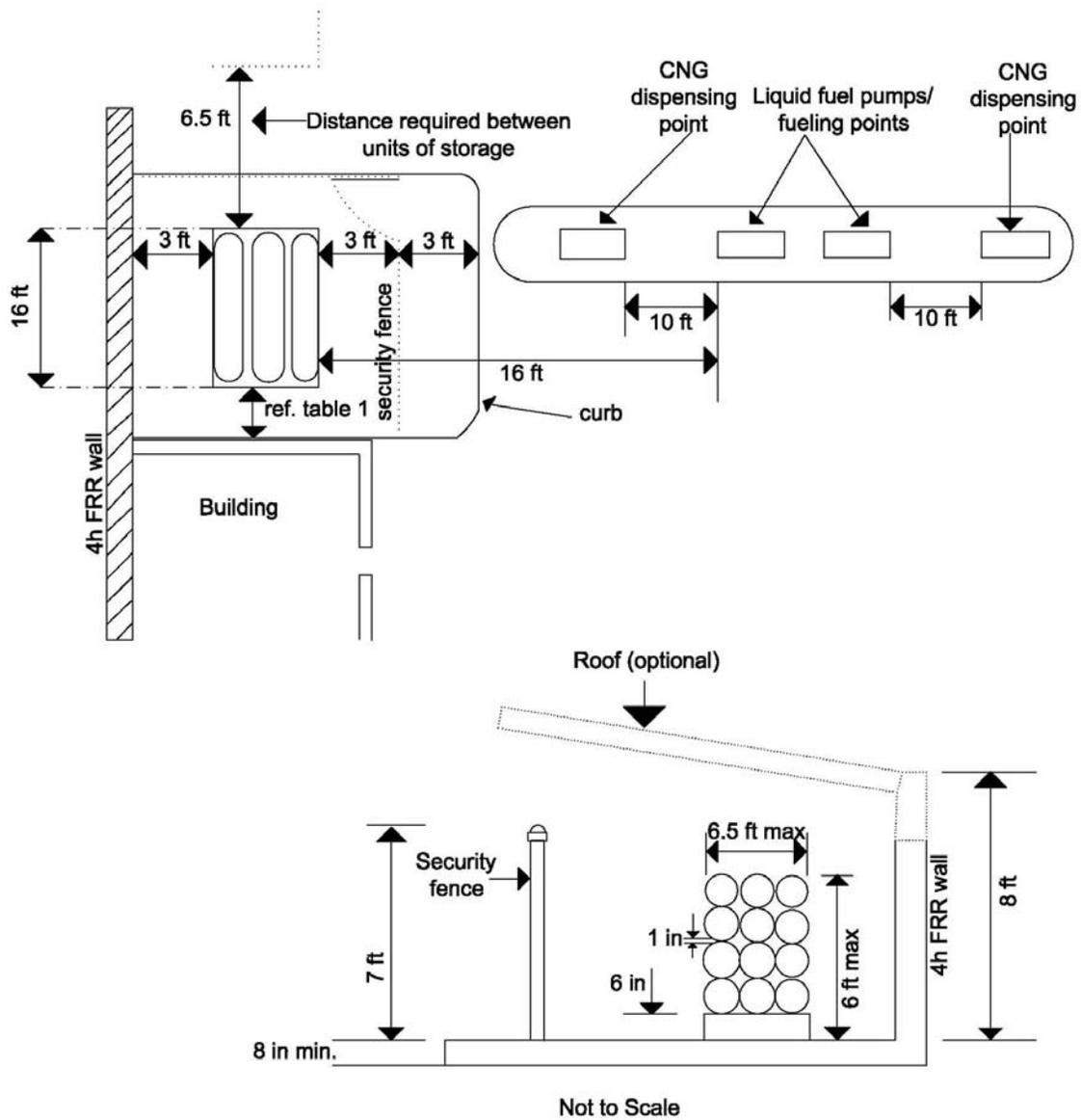
roof or canopy. Such a roof, if provided, shall be designed to facilitate the dispersion of vented or escaped gas, and shall not permit gas to be trapped.

5.3.8 If bulk storage tanks are to be used the appropriate Regulatory Agency shall be consulted for approval of layout arrangements.



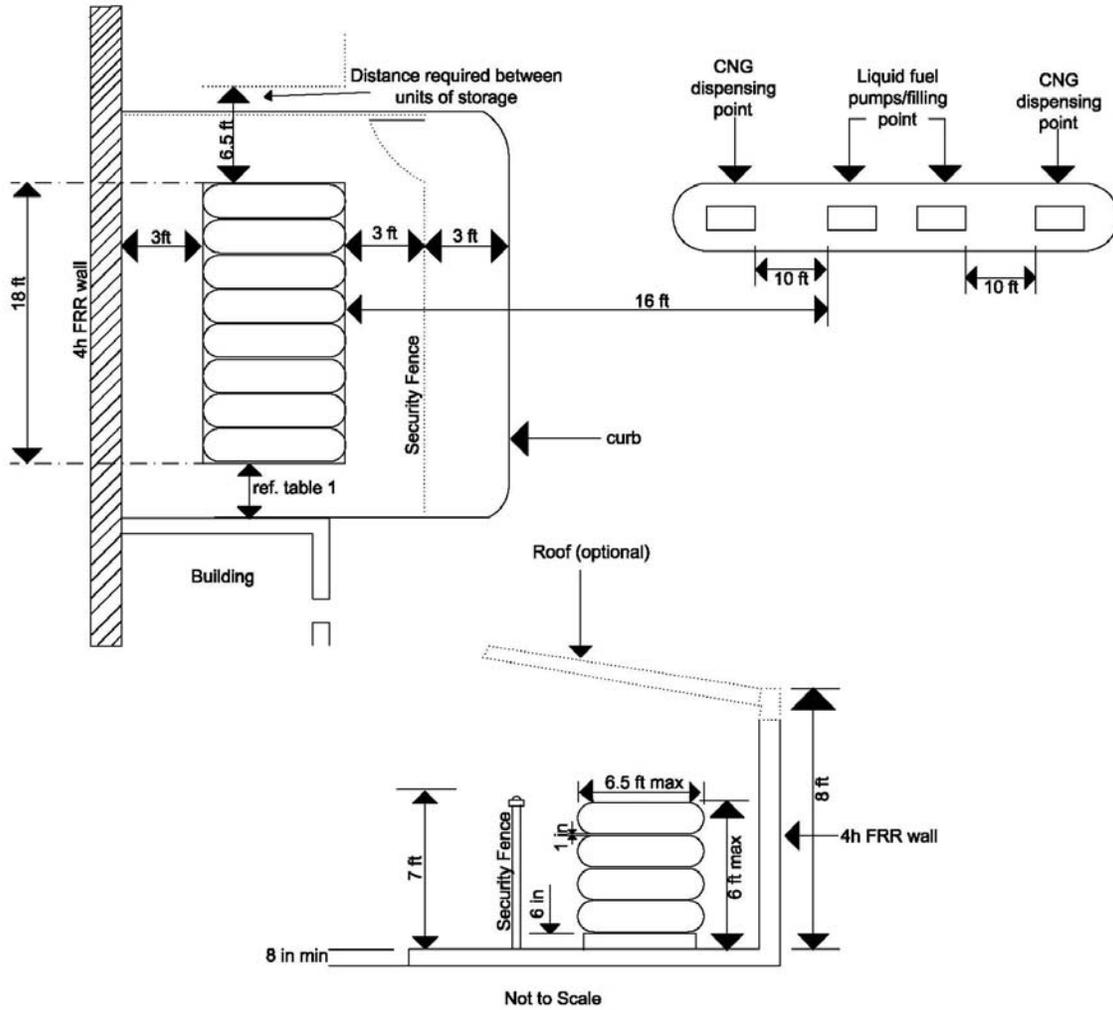
NOTE: For dispenser distance less than 10 ft refer to 5.2.4.5

Figure 1 - Typical or specimen layout of vertical cylinder CNG storage units: Safety distances in a public refueling station



Note: For dispenser distance less than 10 ft refer to 5.2.4.5

Figure 2 - Typical or specimen layout of horizontal cylinder CNG storage units: Safety distances in a public refueling station



Note: For dispenser distance less than 10 ft refer to 5.2.4.5

Figure 3 - Typical or specimen layout of horizontal cylinder CNG storage units: Safety distances in a public refueling station

6 Pressure relief devices

6.1 General requirements

6.1.1 Each cylinder or bulk tank used for the storage of CNG shall be equipped with an approved pressure relieving device and an approved isolating valve which shall be readily accessible when installed in the gas storage unit. The isolating valve shall not be capable of closing off the pressure relieving device.

6.1.2 If at all practicable, relief devices should have their outlets arranged or angled such that in the event of a high pressure gas escape, there should be no direct impingement on operators or persons in the close vicinity of the gas storage unit enclosure.

6.2 Safety relief devices for cylinder storage units

6.2.1 Piping and gas storage systems shall be protected against over pressure by safety relief devices. The devices installed to protect the storage systems shall have sufficient capacity and shall be set to open at a pressure not exceeding 20% above the maximum allowable working pressure of the system or the pressure which produces a hoop stress of 75% of the specified minimum yield strength, whichever is lower.

6.2.2 Safety relief devices may consist of one of the following:

a) Burst disc assembly

An over pressure device, set at not exceeding 20%, above the maximum allowable working pressure of the cylinder. In addition to the disc the discharge is made through fixed directional orifices.

b) Relief valve

Mechanical pressure relief valve which opens at a predetermined pressure.

6.2.3 Pressure relief devices for natural gas service shall not be fitted with lifting devices. If installed externally, means shall be provided for sealing to prevent tampering by unauthorized persons. If at any time it is necessary to break such a seal, the valve shall be removed from service until it has been reset and sealed. Any adjustments necessary to natural gas safety relief valves shall be made by the manufacturer or other companies having competent personnel and adequate facilities for the repair, adjustment and testing of such valves. The organization making such adjustments shall attach a permanent tag marked with the setting, capacity and date. All safety relief devices shall be tested at least annually and maintained in proper operating condition.

6.2.4 If pressure regulators are used, a safety relief device shall be provided on the low pressure side of each final stage regulator, and on the low pressure side of all other regulators unless the piping or fittings, or both, from the low pressure side of such regulators to the high pressure side of the next stage regulation are suitable for full tank pressure.

6.2.5 The minimum required rate of discharge of the safety relief for CNG storage units shall be at least equal to any input from the system, whether being stored or compressed.

6.2.6 All safety relief devices shall be approved by the appropriate Regulatory Authority.

6.2.7 Each safety relief device shall be clearly marked by its manufacturer with the pressure at which it is set to start to discharge and the discharge capacity in cubic feet per minute.

6.2.8 No shut-off valves shall be installed between the safety relief device and the gas storage unit or bulk tank without written permission from the appropriate Regulatory Authority, except that a shut-off valve may be used on multiple valve installations where the arrangement of the valves will provide full required flow through the safety relief devices at all times. The opening or connection between the gas storage unit and safety relief device or devices shall have at least the combined areas of all connected safety relief device inlets.

6.2.9 Safety relief devices shall be so arranged that they will have an unobstructed full size discharge to a safe place, and shall be so arranged that escaping gas will not impinge on the vessel, valves or fittings, or vent under eaves of buildings.

6.2.10 Except for safety valves that are integral with service valves, safety relief devices on tanks and cylinders shall be installed in a vertical position and shall be fitted with suitable raincaps.

6.2.11 All natural gas devices not otherwise specifically provided for, shall be constructed and installed to provide a safety equivalent to that required for other parts of the system.

7 CNG transfer

7.1 Equipment

7.1.1 All devices which are used in natural gas installations shall be of a type and construction suitable for their intended use. The appropriate Regulatory Agency may approve or accept devices or package units upon satisfactory evidence that they are designed and constructed for safe operation in natural gas service.

7.1.2 All CNG dispensers used for selling CNG to public and industries shall be inspected, calibrated and approved annually or within such an interval prescribed by the appropriate Regulatory Agency.

7.2 Valves

7.2.1 A minimum of four shut-off valves shall be fitted between the gas storage unit and the vehicle refueling filling nozzle except in those cases quoted in note of 7.2.4.

7.2.2 Gas storage unit isolation valve

Each gas storage unit shall have an approved quick action gas storage isolation valve installed in the steel supply pipe immediately adjacent to its gas storage unit to enable shut-off and isolation of individual unit. These valves will be within the security fence enclosure (see Figure 5).

7.2.3 Master shut-off valve

A master shut-off valve shall be installed in the steel outlet pipe outside, but immediately adjacent to, the gas storage unit. This valve shall be capable of being locked off but not capable of being locked on. The valve shall be outside the security fence that surrounds the gas storage unit. The function of this valve is to isolate all downstream equipment from the gas storage unit (see Figure 5).

7.2.4 Dispenser isolation shut-off valve

An isolation shut-off valve shall be installed on the inlet steel pipe of the dispenser. This valve shall be located immediately before the dispenser and shall be accessible to the maintenance personnel (see Figure 5).

Note: In those refueling stations where vehicle CNG refueling is carried out only immediately adjacent to the gas storage unit, the master shut-off valve is acceptable as the dispenser isolation shut-off valve (see clause 7.2.3).

7.2.5 Dispenser filling shut-off valve

A filling shut-off valve shall be installed on the steel outlet pipe and shall be in a readily accessible position to the vehicle refueller. This valve shall be shut-off when the refueling point is unused. The valve may be mechanically or electronically controlled (see Figure 5).

7.2.6 Dispenser emergency shut-off valve

A quick action emergency shut-off valve shall be installed on the steel outlet pipe and shall be in a readily accessible position to the vehicle refueller (see Figure 5).

7.2.7 Vehicle refueling shut-off valve

A vehicle refueling shut-off valve shall be installed for each flexible vehicle refueling hose. This vehicle refueling shut-off valve will control the refueling of vehicles with CNG and shall have facilities for venting to allow for the bleeding of residual high pressure gas in the refueling line after vehicle refueling (see Figure 5).

7.2.8 All valves shall be suitable for the full range of pressure and temperature to which they may be subjected. The manufacturer shall stamp or otherwise permanently mark the valve body to indicate the service ratings. Other piping components such as strainers, snubbers and expansion joints shall also be similarly marked. All shutoff valves shall be distinctly marked for easy recognition with a permanently affixed legible sign. The valves or valve labels should clearly indicate the direction of closing. For a typical arrangement of these valves see Figure 5.

7.2.9 It is recommended that bleed connections are designed into transfer systems to permit depressurizing any CNG supply line before dismantling for servicing.

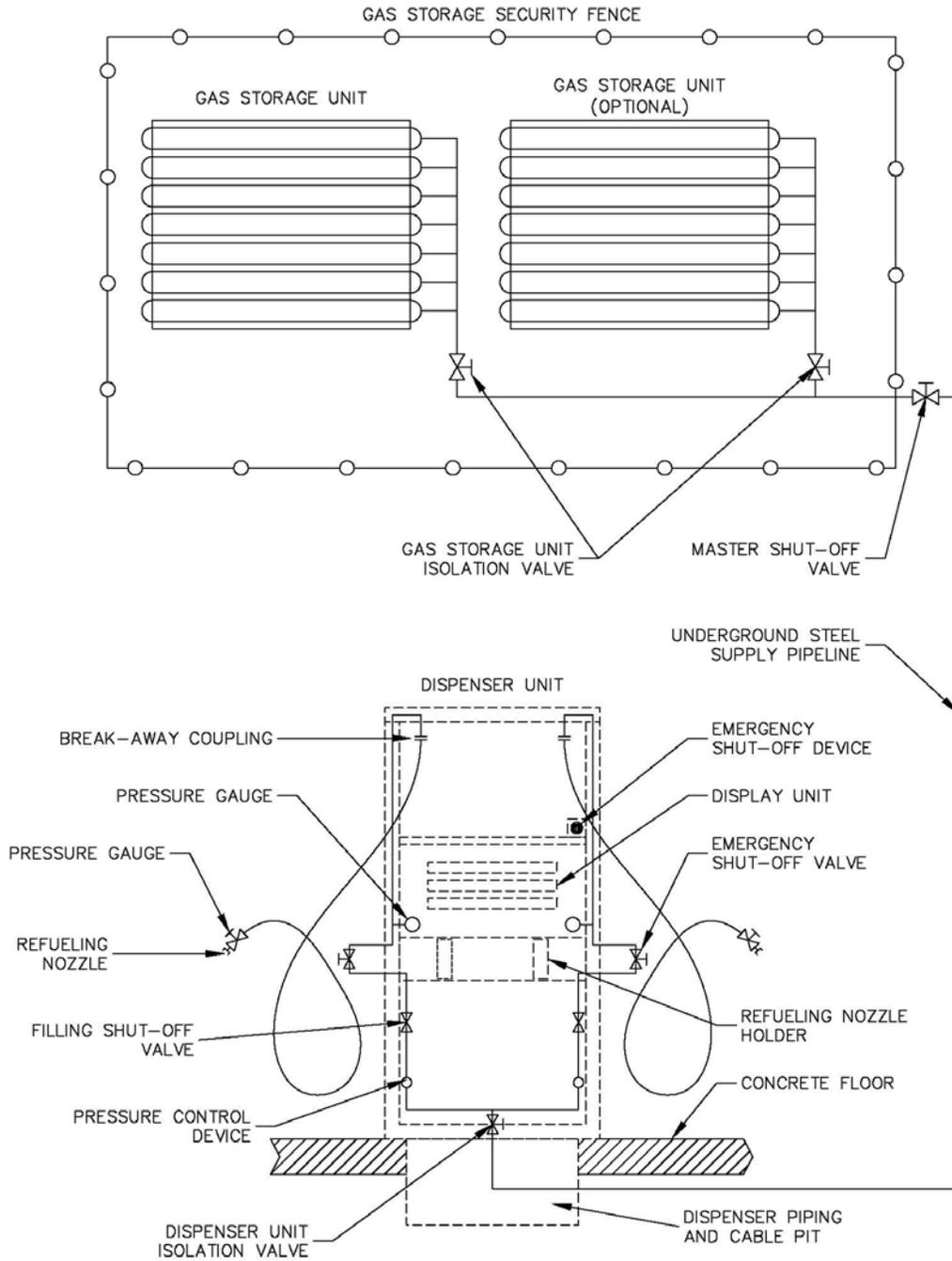


Figure 5 - Schematic diagram showing shut-off valve locations

7.3 Rigid piping

7.3.1 Design

All pipes shall be designed to comply with ASME B31 .8 or other relevant codes which is approved by the appropriate Regulatory Agency.

All tubing, fittings and other piping components between the gas storage unit and the emergency and isolating shut-off valve shall be designed for the full range of pressures, temperatures and loadings to which they may be subjected to.

All material used, including gaskets and packing, shall be compatible with natural gas and its service conditions.

7.3.2 Installation

All piping and tubing shall be run as directly as practicable with adequate provisions for expansion, contraction, jarring, vibration and settling. Exterior piping may be either buried or installed aboveground and shall be well supported and protected against mechanical and corrosive damage. Where overhead piping crosses the vehicle access way, it shall be at least 16 ft. aboveground. In the case of buried pipes on site the minimum burial depth is to be 18 inches, but consideration must be given to local conditions and traffic patterns over these including settlement effects and physical damage from fill materials.

7.3.3 All welded piping shall be fabricated and tested in accordance with ASME B31 .8. The welding joint or piping connection shall comply with the requirements of the appropriate Regulatory Agency.

7.3.4 All welds in pipelines shall be carried out only by a qualified welder. Alternative methods of jointing shall be approved by the appropriate Regulatory Agency.

7.3.5 Testing

All piping, tubing and hoses, and hose assemblies shall be tested after assembly to a pressure equal to that of the safety relief device setting and proved to be free of leaks. It is recommended that this test should initially be carried out with water or inert gas in accordance with relevant procedure to 1.5 times of the pipeline working pressure. This test shall be witnessed by the appropriate Regulatory Agency. It is imperative that safety precautions appropriate to the pressurizing agent being used should be rigidly applied.

7.3.6 Rigid pipelines shall be continuous between their respective components and free of connections. Any concession from this requirement shall be subjected to the approval of the appropriate Regulatory Agency.

7.4 Flexible hose

7.4.1 Flexible hose shall only be used downstream of the emergency and isolation shutoff valve.

7.4.2 The flexible hose shall be of, or lined with, materials that are resistant to corrosion and to the actions of natural gas and shall be approved by the appropriate Regulatory Agency.

7.4.3 The flexible hose shall be suitable for the most severe pressure and temperature service conditions expected with a burst pressure of at least four times the maximum working pressure (see 10.4).

7.4.4 Connections for flexible hose shall be designed with a burst pressure of at least four times the most severe pressure and temperature conditions expected. The components of the flexible hose shall be tested after assembly and prior to use to at least two times the working pressure.

7.4.5 All hoses shall be examined visually and checked for leaks after installation at such intervals as are necessary by the owner to the requirements of the appropriate Regulatory Authority to assure that they are safe for use. In no case shall such examination interval exceed one year. Hose shall be tested for leaks with soap suds or equivalent at least annually and any leakage shall be reason for rejection. This test shall be recorded and the record shall be available to the appropriate Regulatory Agency.

7.4.6 Flexible hose shall be distinctly marked either by the manufacturers permanently attached tag or by distinct markings indicating the manufacturer's name or trademark, working pressure and suitability for use with CNG.

7.5 Safety devices

7.5.1 The fill line on a storage container shall be equipped with a backflow check valve to prevent discharge of natural gas from the container in case of the rupture of line, hose, or fittings.

7.5.2 A manually operated shutoff valve shall be installed in a manifold as close to a container or group of containers as practical. This valve shall be located downstream of the backflow check valve as specified in 7.5.1.

7.5.3 Where excess-flow check valves are used, the closing flow shall be less than the flow rating of the piping system that would result from a pipeline rupture between the excess-flow valve and the equipment downstream of the excess-flow check valve.

7.5.4 Gas piping from an outdoor compressor or storage system into a building shall be provided with shutoff valves located outside the building.

7.5.5 A breakaway coupling shall be installed on the dispenser flexible refueling hose (see Figure 5). This coupling shall automatically close and isolate the gas flow whenever the hose is disengaged from the dispenser.

The coupling shall disengage in the event that the refueling hose is pulled by force such as a vehicle driving away with the refueling hose nozzle still attached to the vehicle.

7.5.6 Emergency shut-off device (ESD) switches

ESD switches shall be installed at the refueling station such that when activated shall:

- a) shut off power supply and gas supply to the CNG compressor;
- b) deactivate the dispenser; and
- c) isolate the CNG compressor and the dispenser unit by closing the self-closing valve
(electronically or pneumatically controlled).

ESD switches shall be visible, easily accessible and located:

- a) within 10 ft. of the CNG compressor;
- b) within 10 ft. of the dispensing point; and
- c) in the sales counter or kiosk.

Control circuit shall be arranged such that when any of the ESD switches is activated, the system shall remain off until manually activated or reset after a safe situation is restored.

8 Pressure gauges

Every CNG storage unit including each cylinders manifold or bulk storage tank shall be provided with a suitable pressure gauge. The pressure gauge shall communicate directly with the tank or storage unit system. The pressure gauge shall have a dial graduated to read approximately double the operating pressure, but in no case less than 1.2 times the pressure at which the pressure relief valve is set to function. Pressure gauges shall be checked and calibrated every three years or as and when required by the appropriate Regulatory Agency.

9 Electrical equipment and wiring

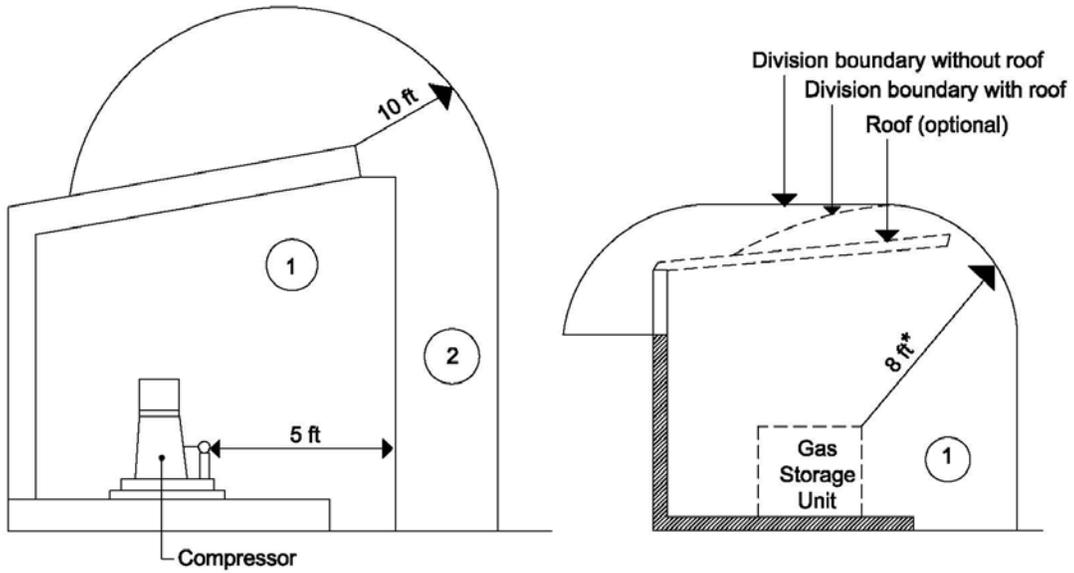
9.1.1 All electrical wiring and equipment shall be in accordance with the current National Electrical Code, except that electrical equipment located within the hazardous areas Zones 1 and 2 shall comply with the requirements of:

- BS 4683 Electrical apparatus for explosive atmospheres: Parts 1, 2, and 4.
BS 229 Flameproof enclosure of electrical apparatus.

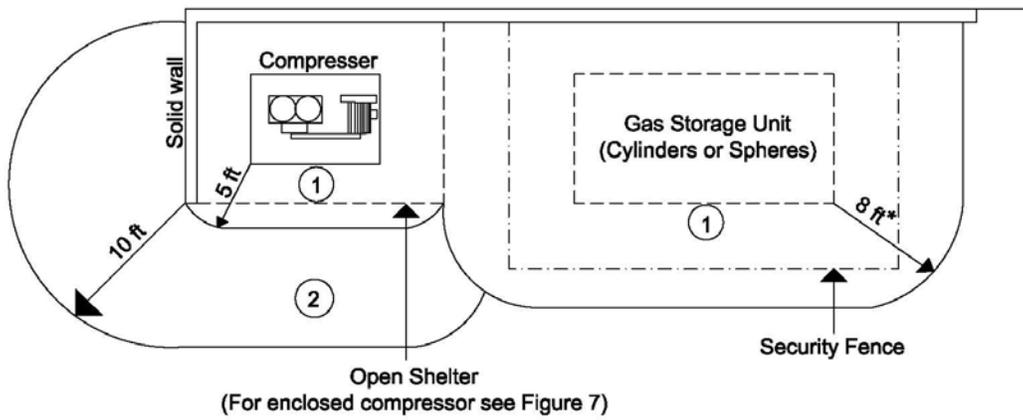
BS 4137 A guide to the selection of electrical equipment for use in Zone 2 areas.

(See Figures 6, 7, 8 and 9 for hazardous area delineations Zone 1 and 2).

9.1.2 Any building encroaching on the hazardous area containing non-flameproof or non-intrinsically safe electrical apparatus, shall be constructed of impervious materials and located such that the gas path to any opening is equal to or greater than that specified for hazardous area delineation.



*For gas storage units up to 1000 gal capacity
 For gas storage volumes greater than this, see Table 1

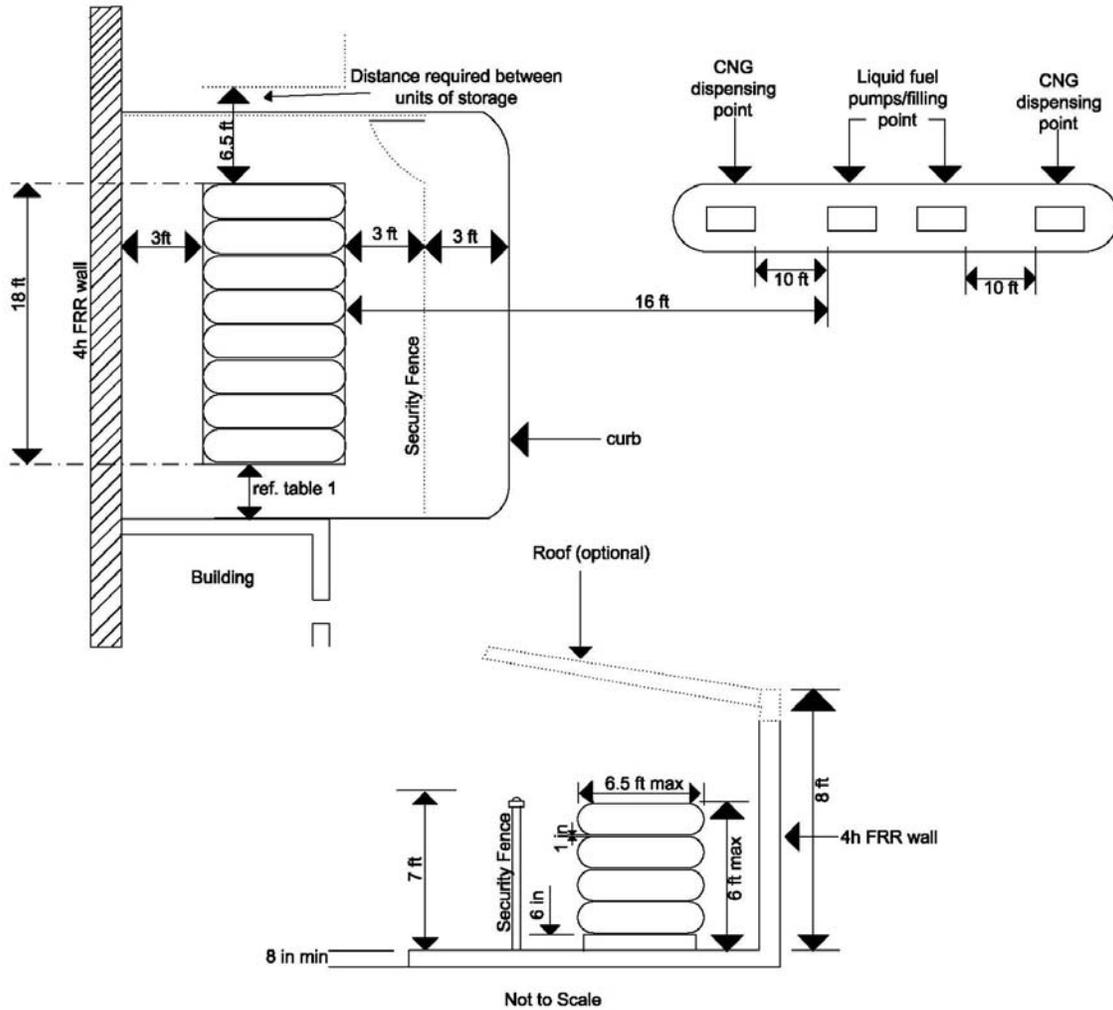


Plan

- ① Hazardous area - Zone 1
- ② Hazardous area - Zone 2

Not to Scale

Figure 6 - Hazardous area delineation for public refueling stations



Note: For dispenser distance less than 10 ft refer to 5.2.4.5

Figure 3 - Typical or specimen layout of horizontal cylinder CNG storage units: Safety distances in a public refueling station

6 Pressure relief devices

6.1 General requirements

6.1.1 Each cylinder or bulk tank used for the storage of CNG shall be equipped with an approved pressure relieving device and an approved isolating valve which shall be readily accessible when installed in the gas storage unit. The isolating valve shall not be capable of closing off the pressure relieving device.

6.1.2 If at all practicable, relief devices should have their outlets arranged or angled such that in the event of a high pressure gas escape, there should be no direct impingement on operators or persons in the close vicinity of the gas storage unit enclosure.

6.2 Safety relief devices for cylinder storage units

6.2.1 Piping and gas storage systems shall be protected against over pressure by safety relief devices. The devices installed to protect the storage systems shall have sufficient capacity and shall be set to open at a pressure not exceeding 20% above the maximum allowable working pressure of the system or the pressure which produces a hoop stress of 75% of the specified minimum yield strength, whichever is lower.

6.2.2 Safety relief devices may consist of one of the following:

a) Burst disc assembly

An over pressure device, set at not exceeding 20%, above the maximum allowable working pressure of the cylinder. In addition to the disc the discharge is made through fixed directional orifices.

b) Relief valve

Mechanical pressure relief valve which opens at a predetermined pressure.

6.2.3 Pressure relief devices for natural gas service shall not be fitted with lifting devices. If installed externally, means shall be provided for sealing to prevent tampering by unauthorized persons. If at any time it is necessary to break such a seal, the valve shall be removed from service until it has been reset and sealed. Any adjustments necessary to natural gas safety relief valves shall be made by the manufacturer or other companies having competent personnel and adequate facilities for the repair, adjustment and testing of such valves. The organization making such adjustments shall attach a permanent tag marked with the setting, capacity and date. All safety relief devices shall be tested at least annually and maintained in proper operating condition.

6.2.4 If pressure regulators are used, a safety relief device shall be provided on the low pressure side of each final stage regulator, and on the low pressure side of all other regulators unless the piping or fittings, or both, from the low pressure side of such regulators to the high pressure side of the next stage regulation are suitable for full tank pressure.

6.2.5 The minimum required rate of discharge of the safety relief for CNG storage units shall be at least equal to any input from the system, whether being stored or compressed.

6.2.6 All safety relief devices shall be approved by the appropriate Regulatory Authority.

6.2.7 Each safety relief device shall be clearly marked by its manufacturer with the pressure at which it is set to start to discharge and the discharge capacity in cubic feet per minute.

6.2.8 No shut-off valves shall be installed between the safety relief device and the gas storage unit or bulk tank without written permission from the appropriate Regulatory Authority, except that a shut-off valve may be used on multiple valve installations where the arrangement of the valves will provide full required flow through the safety relief devices at all times. The opening or connection between the gas storage unit and safety relief device or devices shall have at least the combined areas of all connected safety relief device inlets.

6.2.9 Safety relief devices shall be so arranged that they will have an unobstructed full size discharge to a safe place, and shall be so arranged that escaping gas will not impinge on the vessel, valves or fittings, or vent under eaves of buildings.

6.2.10 Except for safety valves that are integral with service valves, safety relief devices on tanks and cylinders shall be installed in a vertical position and shall be fitted with suitable raincaps.

6.2.11 All natural gas devices not otherwise specifically provided for, shall be constructed and installed to provide a safety equivalent to that required for other parts of the system.

7 CNG transfer

7.1 Equipment

7.1.1 All devices which are used in natural gas installations shall be of a type and construction suitable for their intended use. The appropriate Regulatory Agency may approve or accept devices or package units upon satisfactory evidence that they are designed and constructed for safe operation in natural gas service.

7.1.2 All CNG dispensers used for selling CNG to public and industries shall be inspected, calibrated and approved annually or withing such an interval prescribed by the appropriate Regulatory Agency.

7.2 Valves

7.2.1 A minimum of four shut-off valves shall be fitted between the gas storage unit and the vehicle refueling filling nozzle except in those cases quoted in note of 7.2.4.

7.2.2 Gas storage unit isolation valve

Each gas storage unit shall have an approved quick action gas storage isolation valve installed in the steel supply pipe immediately adjacent to its gas storage unit to enable shut-off and isolation of individual unit. These valves will be within the security fence enclosure (see Figure 5).

7.2.3 Master shut-off valve

A master shut-off valve shall be installed in the steel outlet pipe outside, but immediately adjacent to, the gas storage unit. This valve shall be capable of being locked off but not capable of being locked on. The valve shall be outside the security fence that surrounds the gas storage unit. The function of this valve is to isolate all downstream equipment from the gas storage unit (see Figure 5).

7.2.4 Dispenser isolation shut-off valve

An isolation shut-off valve shall be installed on the inlet steel pipe of the dispenser. This valve shall be located immediately before the dispenser and shall be accessible to the maintenance personnel (see Figure 5).

Note: In those refueling stations where vehicle CNG refueling is carried out only immediately adjacent to the gas storage unit, the master shut-off valve is acceptable as the dispenser isolation shut-off valve (see clause 7.2.3).

7.2.5 Dispenser filling shut-off valve

A filling shut-off valve shall be installed on the steel outlet pipe and shall be in a readily accessible position to the vehicle refueller. This valve shall be shut-off when the refueling point is unused. The valve may be mechanically or electronically controlled (see Figure 5).

7.2.6 Dispenser emergency shut-off valve

A quick action emergency shut-off valve shall be installed on the steel outlet pipe and shall be in a readily accessible position to the vehicle refueler (see Figure 5).

7.2.7 Vehicle refueling shut-off valve

A vehicle refueling shut-off valve shall be installed for each flexible vehicle refueling hose. This vehicle refueling shut-off valve will control the refueling of vehicles with CNG and shall have facilities for venting to allow for the bleeding of residual high pressure gas in the refueling line after vehicle refueling (see Figure 5).

7.2.8 All valves shall be suitable for the full range of pressure and temperature to which they may be subjected. The manufacturer shall stamp or otherwise permanently mark the valve body to indicate the service ratings. Other piping components such as strainers, snubbers and expansion joints shall also be similarly marked. All shutoff valves shall be distinctly marked for easy recognition with a permanently affixed legible sign. The valves or valve labels should clearly indicate the direction of closing. For a typical arrangement of these valves see Figure 5.

7.2.9 It is recommended that bleed connections are designed into transfer systems to permit depressurizing any CNG supply line before dismantling for servicing.

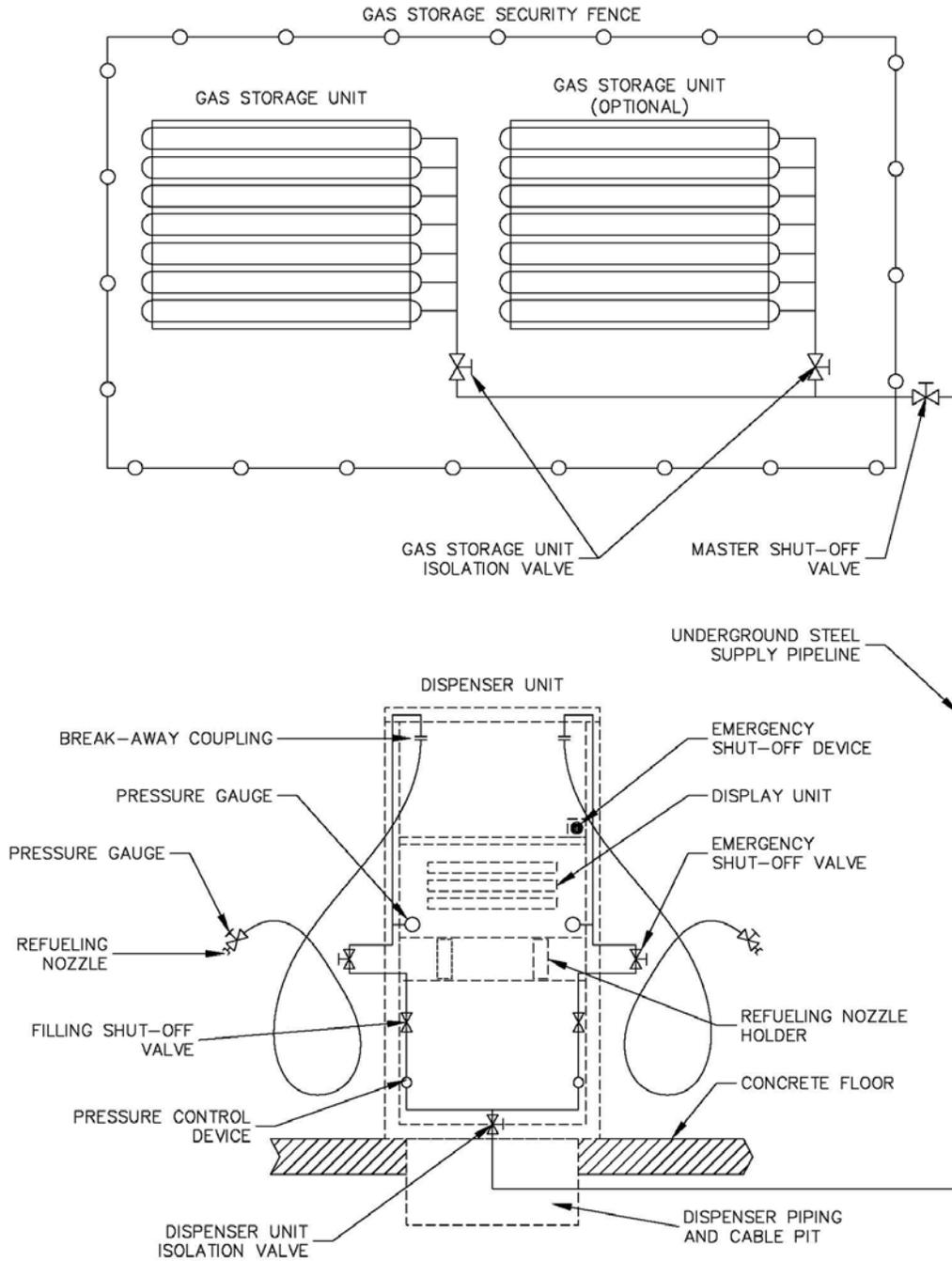


Figure 5 - Schematic diagram showing shut-off valve locations

7.3 Rigid piping

7.3.1 Design

All pipes shall be designed to comply with ASME B31 .8 or other relevant codes which is approved by the appropriate Regulatory Agency.

All tubing, fittings and other piping components between the gas storage unit and the emergency and isolating shut-off valve shall be designed for the full range of pressures, temperatures and loadings to which they may be subjected to.

All material used, including gaskets and packing, shall be compatible with natural gas and its service conditions.

7.3.2 Installation

All piping and tubing shall be run as directly as practicable with adequate provisions for expansion, contraction, jarring, vibration and settling. Exterior piping may be either buried or installed aboveground and shall be well supported and protected against mechanical and corrosive damage. Where overhead piping crosses the vehicle access way, it shall be at least 16 ft. aboveground. In the case of buried pipes on site the minimum burial depth is to be 18 inches, but consideration must be given to local conditions and traffic patterns over these including settlement effects and physical damage from fill materials.

7.3.3 All welded piping shall be fabricated and tested in accordance with ASME B31 .8. The welding joint or piping connection shall comply with the requirements of the appropriate Regulatory Agency.

7.3.4 All welds in pipelines shall be carried out only by a qualified welder. Alternative methods of jointing shall be approved by the appropriate Regulatory Agency.

7.3.5 Testing

All piping, tubing and hoses, and hose assemblies shall be tested after assembly to a pressure equal to that of the safety relief device setting and proved to be free of leaks. It is recommended that this test should initially be carried out with water or inert gas in accordance with relevant procedure to 1.5 times of the pipeline working pressure. This test shall be witnessed by the appropriate Regulatory Agency. It is imperative that safety precautions appropriate to the pressurizing agent being used should be rigidly applied.

7.3.6 Rigid pipelines shall be continuous between their respective components and free of connections. Any concession from this requirement shall be subjected to the approval of the appropriate Regulatory Agency.

7.4 Flexible hose

7.4.1 Flexible hose shall only be used downstream of the emergency and isolation shutoff valve.

7.4.2 The flexible hose shall be of, or lined with, materials that are resistant to corrosion and to the actions of natural gas and shall be approved by the appropriate Regulatory Agency.

7.4.3 The flexible hose shall be suitable for the most severe pressure and temperature service conditions expected with a burst pressure of at least four times the maximum working pressure (see 10.4).

7.4.4 Connections for flexible hose shall be designed with a burst pressure of at least four times the most severe pressure and temperature conditions expected. The components of the flexible hose shall be tested after assembly and prior to use to at least two times the working pressure.

7.4.5 All hoses shall be examined visually and checked for leaks after installation at such intervals as are necessary by the owner to the requirements of the appropriate Regulatory Authority to assure that they are safe for use. In no case shall such examination interval exceed one year. Hose shall be tested for leaks with soap suds or equivalent at least annually and any leakage shall be reason for rejection. This test shall be recorded and the record shall be available to the appropriate Regulatory Agency.

7.4.6 Flexible hose shall be distinctly marked either by the manufacturers permanently attached tag or by distinct markings indicating the manufacturer's name or trademark, working pressure and suitability for use with CNG.

7.5 Safety devices

7.5.1 The fill line on a storage container shall be equipped with a backflow check valve to prevent discharge of natural gas from the container in case of the rupture of line, hose, or fittings.

7.5.2 A manually operated shutoff valve shall be installed in a manifold as close to a container or group of containers as practical. This valve shall be located downstream of the backflow check valve as specified in 7.5.1.

7.5.3 Where excess-flow check valves are used, the closing flow shall be less than the flow rating of the piping system that would result from a pipeline rupture between the excess-flow valve and the equipment downstream of the excess-flow check valve.

7.5.4 Gas piping from an outdoor compressor or storage system into a building shall be provided with shutoff valves located outside the building.

7.5.5 A breakaway coupling shall be installed on the dispenser flexible refueling hose (see Figure 5). This coupling shall automatically close and isolate the gas flow whenever the hose is disengaged from the dispenser. The coupling shall disengage in the event that the refueling hose is pulled by force such as a vehicle driving away with the refueling hose nozzle still attached to the vehicle.

7.5.6 Emergency shut-off device (ESD) switches

ESD switches shall be installed at the refueling station such that when activated shall:

- a) shut off power supply and gas supply to the CNG compressor;
- b) deactivate the dispenser; and
- c) isolate the CNG compressor and the dispenser unit by closing the self-closing valve(electronically or pneumatically controlled).

ESD switches shall be visible, easily accessible and located:

- a) within 10 ft. of the CNG compressor;
- b) within 10 ft. of the dispensing point; and
- c) in the sales counter or kiosk.

Control circuit shall be arranged such that when any of the ESD switches is activated, the system shall remain off until manually activated or reset after a safe situation is restored.

8 Pressure gauges

Every CNG storage unit including each cylinders manifold or bulk storage tank shall be provided with a suitable pressure gauge. The pressure gauge shall communicate directly with the tank or storage unit system. The pressure gauge shall have a dial graduated to read approximately double the operating pressure, but in no case less than 1.2 times the pressure at which the pressure relief valve is set to function. Pressure gauges shall be checked and calibrated every three years or as and when required by the appropriate Regulatory Agency.

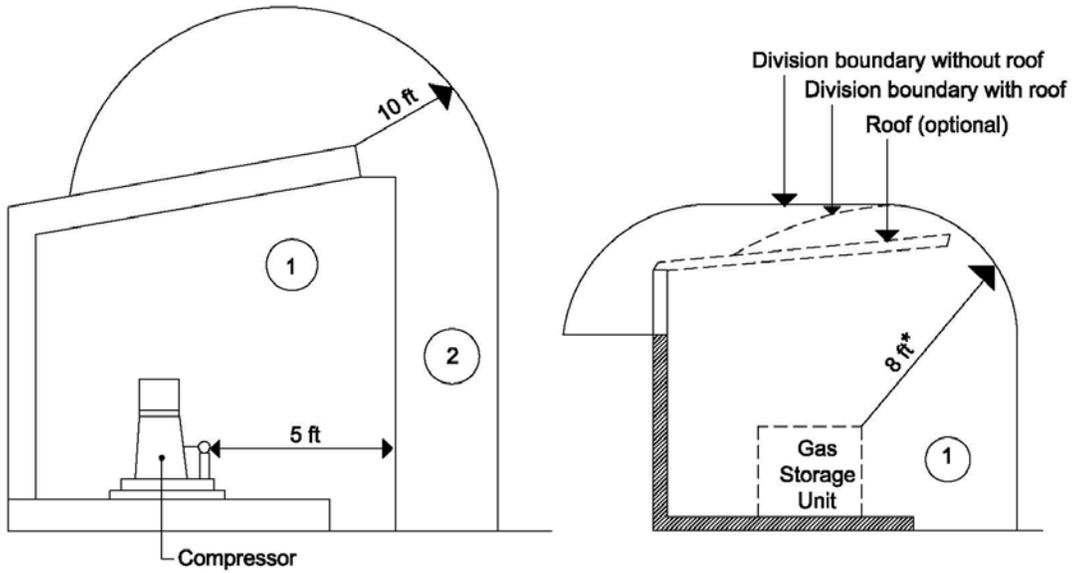
9 Electrical equipment and wiring

9.1.1 All electrical wiring and equipment shall be in accordance with the current National Electrical Code, except that electrical equipment located within the hazardous areas Zones 1 and 2 shall comply with the requirements of:
BS 4683 Electrical apparatus for explosive atmospheres: Parts 1, 2, and 4.

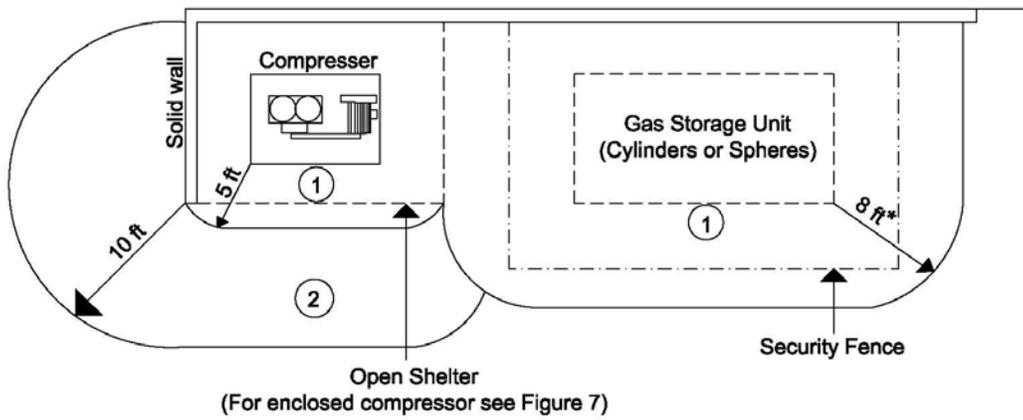
BS 229 Flameproof enclosure of electrical apparatus.
BS 4137 A guide to the selection of electrical equipment for use in Zone 2 areas.

(See Figures 6, 7, 8 and 9 for hazardous area delineations Zone 1 and 2).

9.1.2 Any building encroaching on the hazardous area containing non-flameproof or non-intrinsically safe electrical apparatus, shall be constructed of impervious materials and located such that the gas path to any opening is equal to or greater than that specified for hazardous area delineation.



*For gas storage units up to 1000 gal capacity
 For gas storage volumes greater than this, see Table 1



Plan

- ① Hazardous area - Zone 1
- ② Hazardous area - Zone 2

Not to Scale

Figure 6 - Hazardous area delineation for public refueling stations

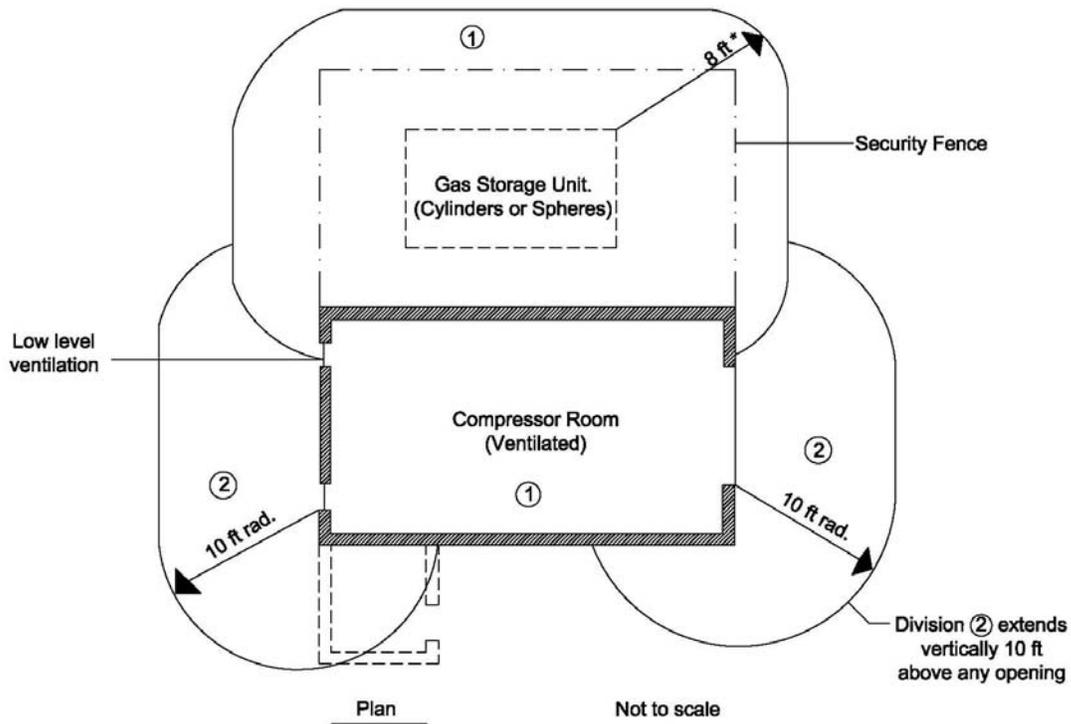
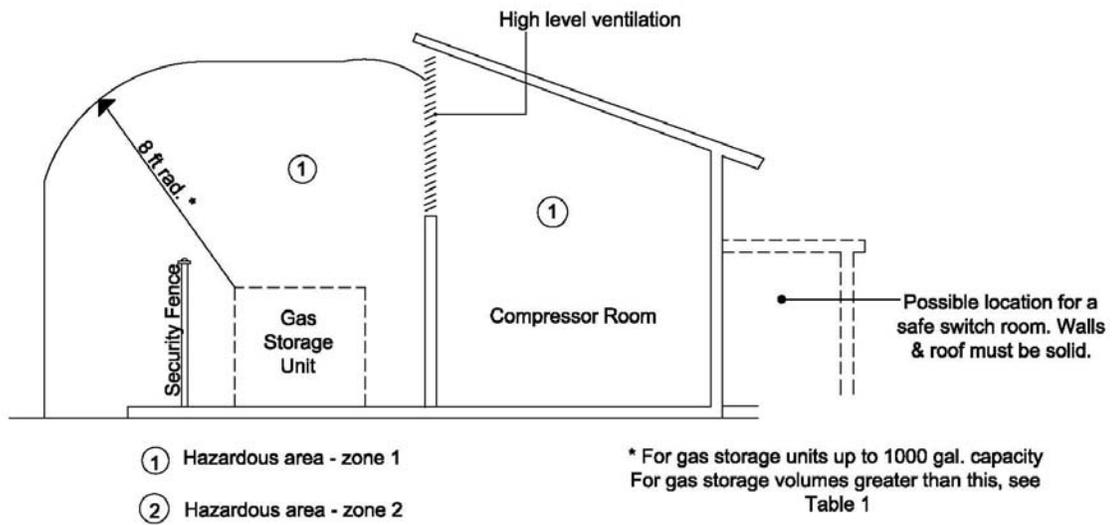
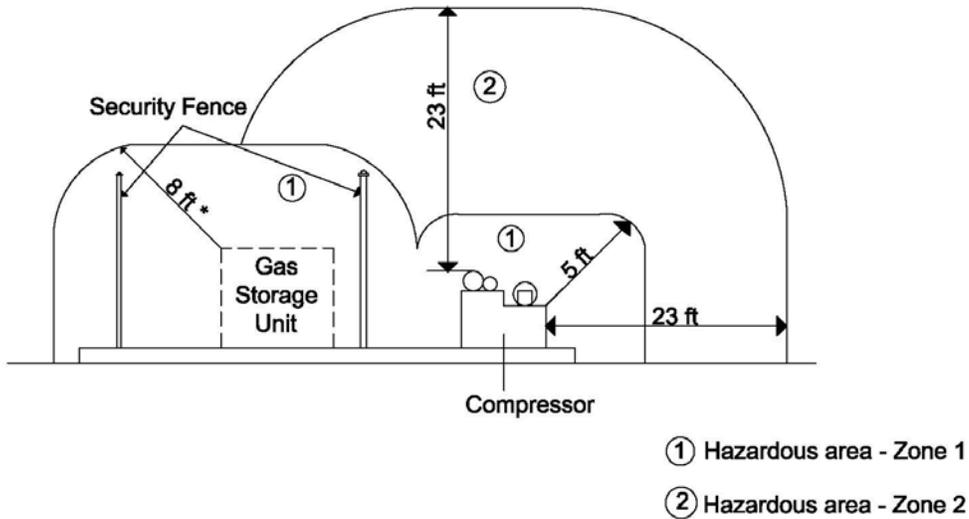
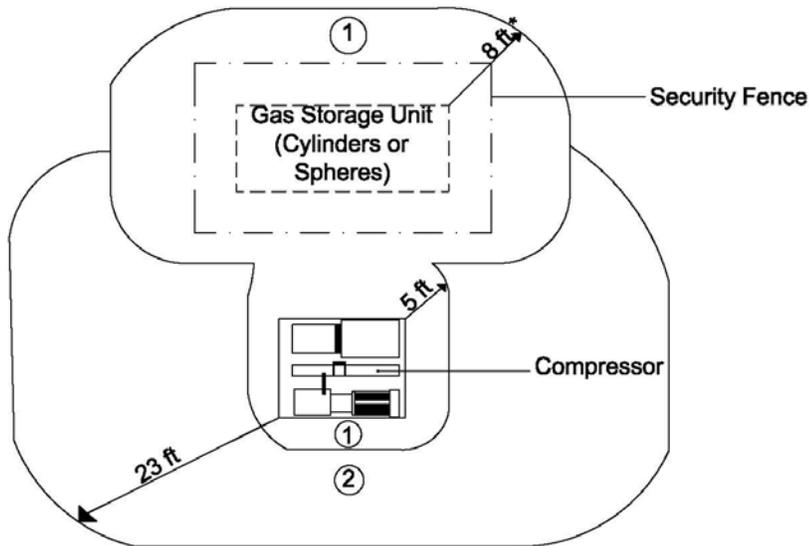


Figure 7 - Hazardous area delineation (enclosed compressor) for public refueling stations



*For gas storage units up to 1000 gal. capacity
For gas storage volumes greater than this, see Table 1

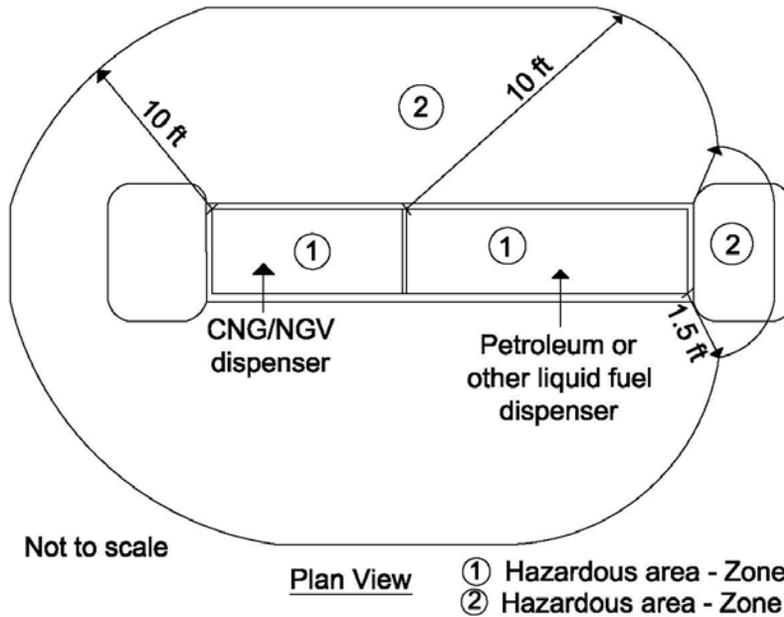
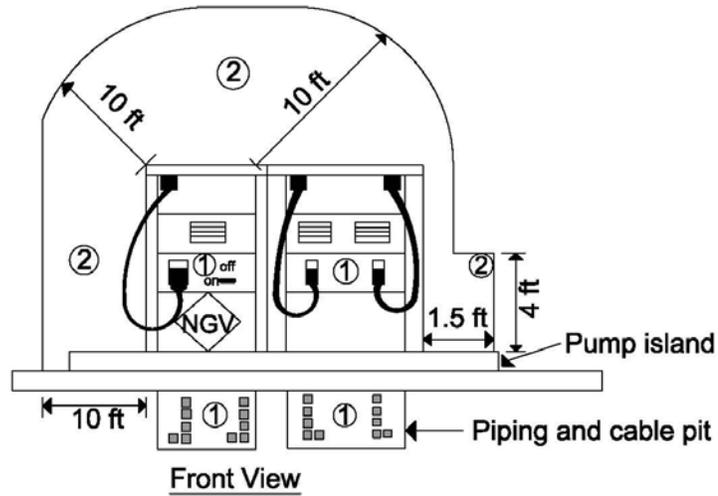


Plan

Not to scale

Note: A shelter over equipment having not more than three walls may be classified as an outdoor location, provided that all walls and roof apex have ventilation openings.

**Figure 8 - Hazardous delineation (outdoor installation)
for public refueling stations**



Note: Zone 2 delineation for petrol and other liquid dispenser is calculated 18 inch horizontally in all direction from Zone 1 up to a vertical height of 4 ft.

Figure 9 - Hazardous area delineation for dispenser at public refueling stations

10 Operation

10.1 The vehicle refueling hose shall be adequately supported to prevent abrasion and kinks, and the hose assembly shall facilitate easy withdrawal for use. The hose assembly shall not come into contact with the ground unless protected from abrasion and damages. This may be achieved by using an overhead hose assembly supported from the dispenser.

10.2 No natural gas shall be vented to the atmosphere unless the vent is led to a safe point of discharge.

10.3 A sign shall be displayed adjacent to the filling point which shall indicate that no smoking or open flame is permitted. This sign shall be easily read from a distance of 33 ft..

10.4 The maximum allowable filling pressure for vehicle CNG cylinders is 3.6Mpsi at 59°F, or its equivalent volume at another temperature, provided it does not exceed the design pressure of the vehicle CNG cylinder. There shall be a pressure controlling device fitted to achieve this.

10.5 All refueling nozzles used for vehicle refueling shall be of a common type. The refueling nozzle shall be compatible to the vehicle refueling valve fitting. The nozzle shall be approved by the appropriate Regulatory Authorities.

10.6 Except for control and indicating devices that are also designed for natural gas shall not be used to operate any device or equipment designed to be operated with compressed air which exhausts to the atmosphere. Natural gas vapor shall not be released into the air except as referenced in this code.

10.7 Designers and operators of CNG filling stations should seek the advice of the Bureau of Fire Protection (BFP) or Fire Marshall with respect to suitable fire protection systems including extinguishers and alarm systems.

10.8 It is in the interests of refueling station operators to establish a contact with their nearest BFP fire station and to offer them inspection facilities so that in the event of emergencies the BFP fire station will know the layout of equipment, whereabouts of keys, and access arrangements applicable to the station.

10.9 The refueling guidelines for CNG is described in Annex A.

Annex A (informative)

Refueling guidelines

A.1 Filling procedure

- a) Remove the dust cover cap from the vehicle refueling valve fitting (receptacle).
- b) Connect the dispenser refueling hose nozzle to the vehicle receptacle.
- c) Open the vehicle refueling valve at the nozzle.
- d) Open the dispenser filling shut-off valve to allow CNG to transfer from the storage cylinders to the vehicle cylinder.
- e) Close the dispenser filling shut-off valve upon completion of filling.
- f) Close the vehicle refueling valve at the nozzle to allow for CNG venting from the nozzle through the venting hose.
- g) Disconnect the dispensing hose refueling nozzle from the vehicle receptacle.
- h) Return the nozzle to its correct position on the dispenser.
- i) Re-cap the dust cover of the vehicle receptacle.

A.2 Safety precautions

Ensure that:

- a) there is no smoking or open flames within the refueling area;
- b) all vehicle ignition, electrical system, radio and cellular phone (including shortwave communication equipment) are switched off;
- c) the vehicle hand brake is firmly applied and for automatic transmission vehicles are parked in parking or in gear 'P' position;
- d) there are no obvious gas leaks in the vehicle CNG system before commencing refueling;
- e) the vehicle receptacle is in good condition (such as receptacle O ring in place) and matches the dispenser nozzle;
- f) the cylinder is within the periodic test life and the system complies with this standard and any statutory requirements, including inspection certification;
- g) the vehicle is not left unattended at any time during filling operations except in the case of trickle fill;
- h) there is no gas leak in the vehicle and dispenser during and after refueling; and
- i) the nozzle is fully disconnected and returned to its correct position on the dispenser before driving away;
- j) a portable fire extinguisher having a rating of not less than 20-B:C shall be provided at the dispensing area.

A.3 Others

- a) Filling instructions should be posted at a conspicuous place and easily understood.
- b) Emergency shut-off device (ESD) should be clearly labelled and readily accessible to the refueller.
- c) Refueler should know how to activate the ESD in the case of emergency.

Annex B (informative)

Calculations of total gas storage

B.1 The figures given in this Annex are for guidance only and merely indicate the fundamentals involved in making an elementary calculation for a first approximation of the gas storage requirements. They are not to be taken as specific.

B.2 Estimate the number of vehicles per day (x) that the station is likely to refuel with CNG. Estimate the average number of cubic feet of CNG (y) that is to be required for each vehicle refueled (average uplift per vehicle). Proceed as follows:

- a) From the product (x) times (y) calculate the total of cubic feet of gas required by the station per day to meet the estimated demand.
- b) Divide answer (a) by the numbers of hours per day that the station is to be operated.
- c) From (b) obtain the cubic feet of gas required per hour. This will be the average only.
- d) Estimate the peak demand (e) assuming that each vehicle will require 6 minutes for a refuel.
- e) From (d) knowing that 10 vehicles per hour maximum can be refueled from each separate dispensing point calculate the number of CNG dispensing points required on the station.
- f) Multiply answer (c) by 1 ½ which will then give 1 ½ times the average cubic feet demand per hour for the station.
- g) Take answer (f) and compare this with the peak demand answer (d).
- h) Decide from (g) the cubic feet of CNG that the station will economically require per hour and then calculate gas storage cylinders required assuming that 40% of the CNG only can be recovered from the cascade.
- i) If a booster compressor is fitted between the cylinder storage unit and the dispensing point then the 40% recoverable from the unit can be disregarded and the calculation for storage can be made assuming the whole (100%) can be recovered.

B.3 Note on methods of storage usage

B.3.1 As the filling pressure of gas to vehicles will be approximately 3.6Mpsi and the maximum pressure in the storage system 5.5Mpsi, it follows that the minimum storage pressure of 3.6Mpsi must be available at any refueling time. Any drop below this figure in the delivery cylinder or tank would be unacceptable for satisfactory service unless a booster pump is fitted between this and the dispensing point.

B.3.2 To make the most efficient use of the gas storage depending on the size and peak demand of the system, it may be necessary to arrange for a number of cylinders to be held at high pressure (well above 3.6Mpsi) while allowing other groups of cylinders to fall below vehicle maximum delivery pressure. By man folding these groups of cylinders point until the vehicle cylinder is filled to match, the operator will then switch to the next group manifold with medium pressure and thirdly to the high pressure for topping off at 3.6 Mpsi.

B.3.3 Such a system might have three or more pressure stages but will involve the operator in an increase of refueling time required unless an automatic switching device is fitted.

B.3.4 A typical or specimen storage system using manifold groups of cylinders is shown in Figure B.1 The figures given are for explanation of a system only and may be a typical situation in a gas storage unit during the course of an operation. They are not to be taken as requirements.

B.3.5 It is possible to arrange for a small compressor and large gas storage unit or a larger compressor and smaller gas storage unit. The decision will rest with the pattern of refueling demand expected and with the timing and frequency of peak conditions. The compressor must be capable of meeting the estimated total uplift per day with some reserve and its output arranged to cover peak conditions through storage flexibility. It is essential to request the compressor specification delivery volumes per hour at the required pressure for CNG at its specific compressibility factor before making a decision on size requirements.

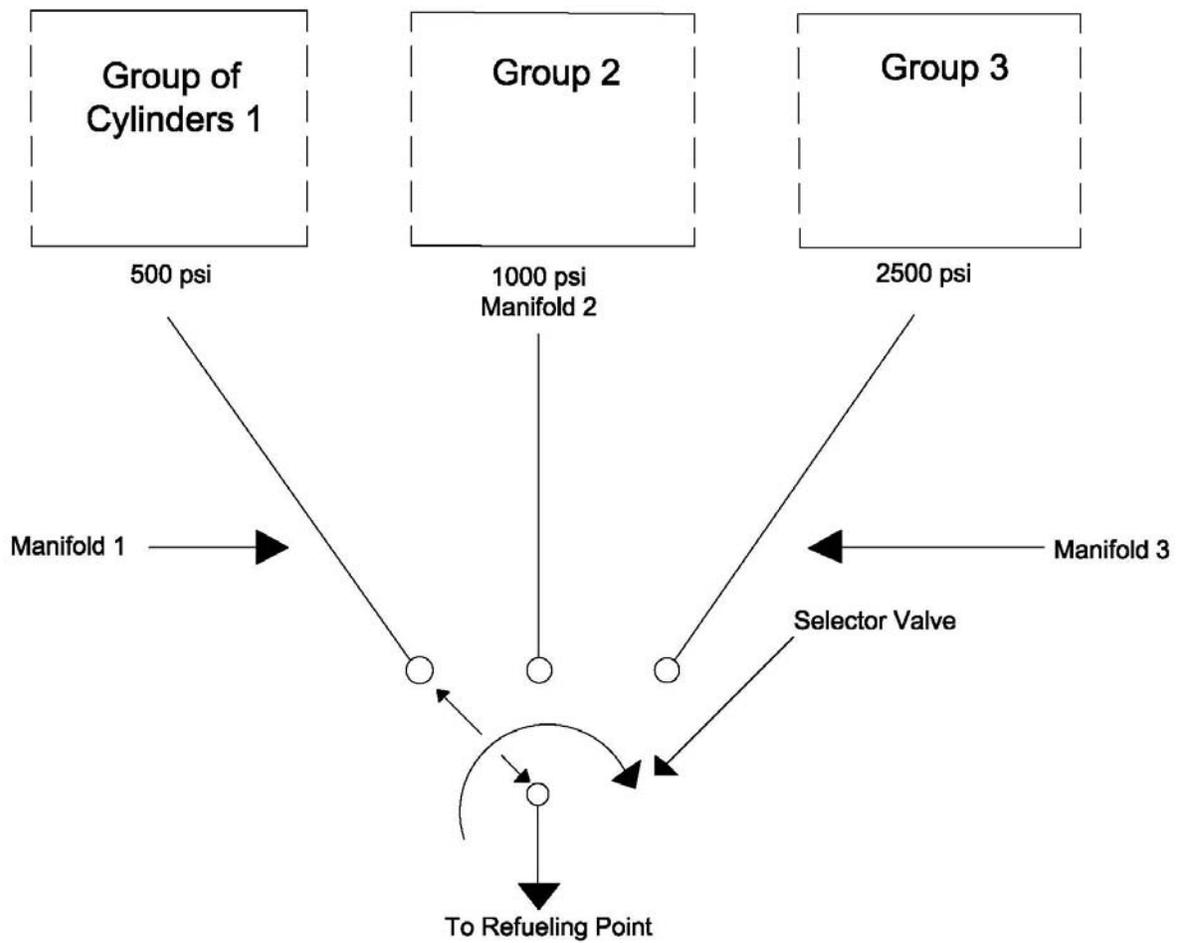


Figure B.1 - A typical or specimen storage system using a group of manifold cylinders

References

The following standards through reference to this test form part of this National Standard. At the time of publication of this standard, the editions indicated were valid.

MS 1204: 2001	Code of Practice for CNG Compressor Refueling Stations: On Site Storage and Location of Equipment
AS B114: 1960	Alloy steel cylinders for the storage and transport of permanent gases and high pressure liquefiable gases.
BS 229: 1957	Flame proof enclosure of electrical apparatus.
BS 341: Part 1: 1991	Transportable gas container valves Part1: Specification for industrial valves for working pressures up to and including 300 bar
BS 4137: 1967	Guides to the selection of electrical equipment for use in the Zone 2 areas.
BS 4683:	Electrical apparatus for explosive atmospheres. Part 1: 1971 Part 2: 1971 Part 4: 1973
B 5045: Part 1: 1982	Transportable gas containers: Part 1: Seamless gas containers above 0.5 litre water capacity.
ASME Code	Boiler and pressure vessel code, Section VIII: Unfired pressure vessels.
ASME B31.8:1995 Edition	Gas transmission and distribution piping systems.
DOT 3AA	Seamless steel cylinders.
NFPA 52: 1995	Standard for Compressed Natural Gas (CNG) Vehicular Fuel
IFC 2208 &3003	Natural Gas Vehicle and infrastructure Codes and Standard Citation Edition Systems

HAZARDOUS MATERIALS

In addition to complying with the provisions set forth earlier in proposed contract, Operator agrees to the following provisions:

1. Notification of Release.

Operator shall be solely and fully responsible for notifying the appropriate public agencies of any Hazardous Material release which is caused by or results from the activities of Operator, Operator's officers, agents, employees, contractors, permittees or invitees on the Yard. Operator shall immediately notify City of any Hazardous Material release which occurs on the yard and is caused by the results from the activities of Operator. Operator's officers, agents, employees, contractors, permittees or invitees, regardless of whether the release is in a quality that would otherwise be reportable to a public agency.

2. Liability.

Operator shall be solely and fully responsible and liable for:

(a) any use of Hazardous Materials on the City, by operator, Operator's officers, agents, employees, contractors, permittees or invitees;

(b) any Hazardous Material Release which is caused by or results from the activities of Operator, Operator's officers, agents, employees, contractors, permittees or invitees on the Yard;

3. Prevention of Release.

Operator shall take all necessary precautions to prevent its activities from causing any Hazardous Material release to occur on the City, including, but not limited to any release into soil, groundwater, or the City's sewage or storm drainage system.

4. Obligation to Investigate and Remediate.

Operator, at Operator's sole cost and expense, shall promptly investigate and remediate, in accordance with requirements of all applicable Environmental Laws any release or danger of release of Hazardous Material on the yard, including, but not limited to, into soil or groundwater, or the City's sewage or storm drainage system, which, was caused, or results, in whole or in part from the activities of Operator. Operator's officers, agents, employees, contractors, permittees or invitees;

In addition to all other rights and remedies of City here under, if Operator does not promptly commence, and diligently pursue to remediate, any such release, or danger of release, of Hazardous Materials, City, in its discretion, may pay, to have same remediated and Operator shall reimburse City within fifteen (15) business days of City's demand for payment. The failure to commence remediation and provide City with a schedule for diligent completion of the remediation within thirty (30) days after discovery of such release, or danger of release, of Hazardous Material shall constitute prima Facie evidence of failure to promptly commence remediation. The demand for payment by City shall be prima face evidence that the expense incurred was necessary and reasonable and that such expense was incurred by City on behalf of Operator.

5. Indemnification.

Operator shall defend, indemnify and hold City harmless from and against all loss, damage, liability (including all foreseeable and unforeseeable consequential damages) and expense (including, without limitation, the cost of any required cleanup and remediation of the Hazardous Materials) which City may sustain as a result of:

(a) any use of Hazardous Materials on the yard, by Operator, Operator's officers, agents, employees, contractors, permittees or invitees.

(b) any Hazardous Material release on the City, including, but not limited to any release into soil or groundwater, or the City's sewage or storm drainage system, which is caused by or results from the activities of Operator, Operator's officers, agents, employees, contractors, permittees or invitees.

6. Release of Claims Against City.

Operator releases, acquits and forever discharges City from any and all Claims, actions, causes of action, demands, rights, damages, costs, including but not limited to loss of use, lost profits, or expenses, which Operator may now have, or which may hereafter accrue on account of or in any way growing out of all known and unknown, foreseen, and unforeseen bodily and personal injuries and property damage, and the consequences thereof resulting or arising out of the presence or cleanup of any Hazardous Material on the Yard. This release shall not apply to any claims for contribution that Operator may have against City in the event that Operator incurs any cost in undertaking any cleanup of Hazardous Material from the Yard, ordered by a governmental agency, to the extent that the cleanup order and costs result from a release of Hazardous Material for which Operator is not responsible and liable under this understands and agrees that Operator is hereby waiving all such rights

7. (a) Cessation of Activities.

Operator shall cease its activities on the Yard, to the extent requested by City, if City determines, in its sole discretion, that such cessation is necessary to investigate, cure or remediate any release of Hazardous Materials. Operator shall not recommence its activities on the Yard, until notified by City that such release or danger of release of Hazardous Material has been investigated, cured and remediated in a manner satisfactory to the City.

(b) Abatement of Fees and Charges on Yard.

Operator shall not be charged fees or charges for use of the Yard, to the extent that City requests Operator to cease activities on that portion of the City due to City's efforts to investigate, cure or remediate contamination, unless the release is one for which Operator is responsible under this Agreement.

8. Records and Inspections.

(a) Operator shall maintain, during the term of this Agreement and for a period of not less than four (4) years after the expiration or termination of this Agreement, or for any longer period of time required by any applicable law, regulation, policy, order or decree, separate and

accurate daily records pertaining to the use, handling and disposal of any Hazardous Material(s) by Operator, Operator's officers, agents, employees, contractors, permittees or invitees on or from the City.

(b) Upon request by City, Operator should furnish City with such daily records, and such other documentation or reports as Director, from time to time, and at any time during the term of this Agreement, may reasonably require pertaining to the use, handling and disposal of any Hazardous Material(s) by Operator, Operator's officers, agents, employees, contractors, permittees or invitees on or from the Yard.

(c) After the expiration of four (4) years following the Termination of this Agreement, Operator may destroy the records pertaining to the use, handling and disposal of any Hazardous Material(s) by Operator, Operator's officers, agents, employees, contractors, permittees or invitees on or from the Yard, provided, however, that Operator should notify City no later than sixty (60) days prior to any proposed destruction of any of said records and should upon request by City within thirty days (30) days after such notice is received, deliver copies of said records to City.

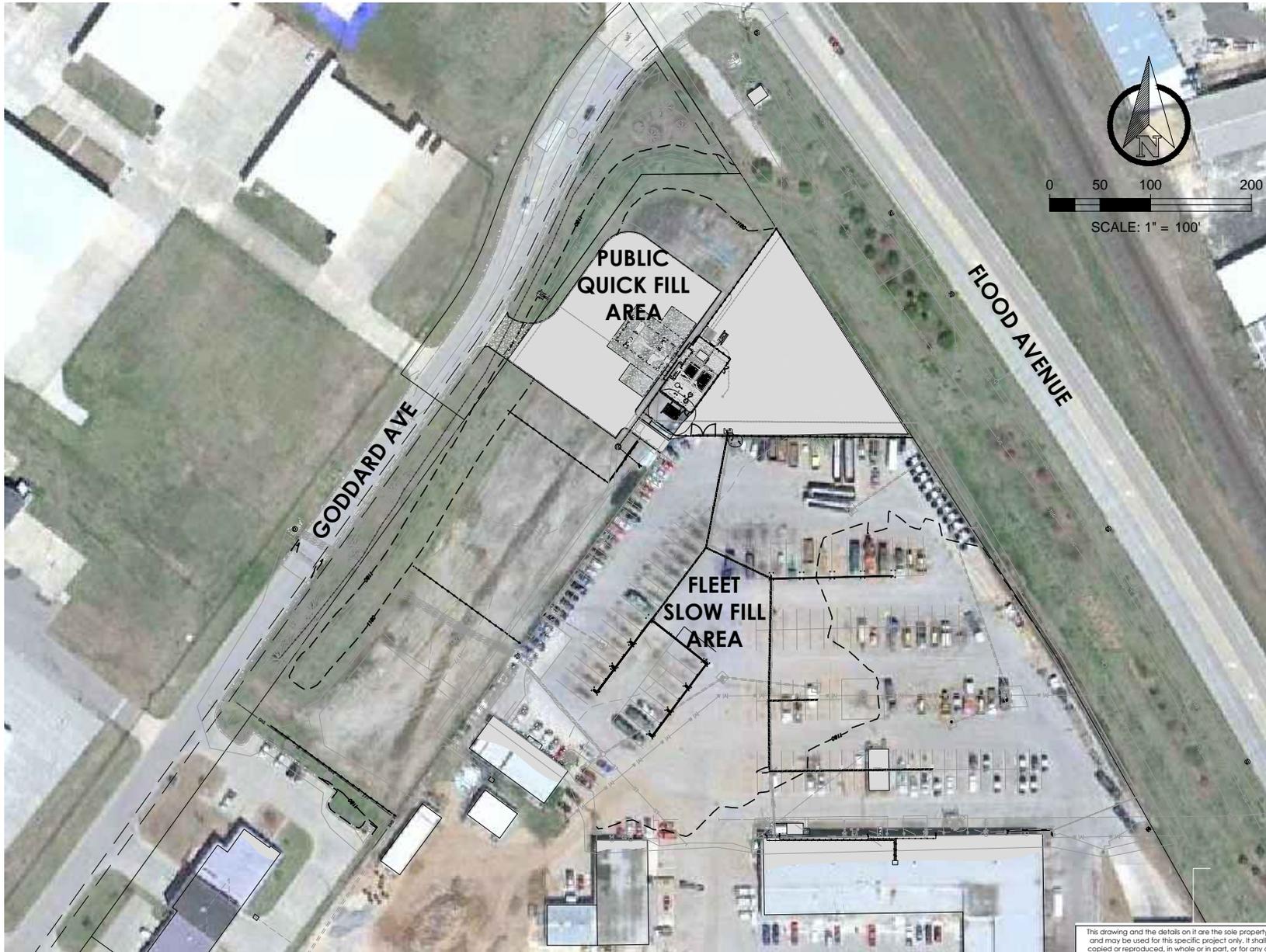
9. No Third Party Beneficiaries

Nothing contained in this Exhibit should be construed as conferring any benefit on any person not a party to this Agreement, nor as creating any right in any person not a party to this Agreement to enforcement of any obligation created under this Agreement.

10. Survival of Obligations

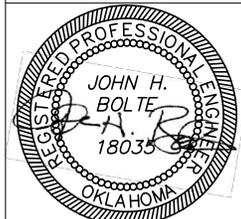
Operator's obligations under this Agreement shall survive the expiration or earlier revocation or suspension of this Agreement.

Diagram of CNG Station



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SMALL ARROW ENGINEERING, LLC.
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 5937



1/10/12
 JOHN H. BOLTE - PROFESSIONAL ENGINEER
 MO LIC E22511 OK LIC 18035
 KS LIC 14094 AZ LIC 37701

FLEET SF CNG STATION EXPANSION
 CITY OF NORMAN
 2351 GODDARD AVENUE
 NORMAN, CLEVELAND COUNTY, OK
 OVERALL SITE PLAN

SURVEY BY: LEMKE PROJECT #: 111156
 DRAWN BY: TED DATE: 1/10/12
 CHECKED BY: JHB SCALE: N.T.S.
 PROJECT: CNG SF EXPANSION
 SHEET DESC: SITE PLAN
 SHEET: 1 OF: 1

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GENERAL MAINTENANCE SCHEDULE

Following is a list of different operation that will need to be performed on a given time schedule. The Operator shall make up a schedule of proposed maintenance and operation which the operator plans to perform and give a copy to the City Fleet Manager. The proposed maintenance plan may need to be expanded to cover equipment not listed or added in the future.

Maintenance Plan

1.1 EQUIPMENT NEEDING DAILY, WEEKLY, MONTHLY MAINTENANCE

- A. Natural Gas Dryer
- B. Compressor Skid Enclosure (may be more than one)
- C. Priority Control System (directs CNG flow into storage)
- D. High-Pressure Storage (composed of a number of ASME vessels)
- E. CNG Dispenser (more than one)
- F. Air Compressor (operating source for ESD/pneumatic valves)
- G. Natural Gas Dryer (dry gas for air compressor)
- H. Natural Gas Engine

1.2 EQUIPMENT SPECIFIC MAINTENANCE (as a minimum)

(Consult individual equipment manufacturer/equipment packager for specific maintenance/repair not listed here)

- A. Natural Gas Dryer
 - 1. Record particle and coalescing filter pressure drop (indication of when to change the filter elements)
 - 2. Record dew point of discharge gas (indication of when to regenerate desiccant bed)
 - 3. Record frequency of regeneration of desiccant tower (removes moisture from dryer desiccant so proper dew point of the discharge natural gas can be maintained. More frequent regeneration is an indication of either increased moisture coming from the gas supplier or degradation of the desiccant material indicating a possible need to replace the desiccant material)

4. Disposal of liquid affluent from regeneration cycle (requires a hazard materials hauler)
5. Clean heat exchanger and regeneration system (helps ensure heat dissipation during regeneration cycle)
6. Record maximum temperature of regeneration heat cycle and ensure that it complies with manufacturers' requirements (if the regeneration temperature is out of range, the desiccant material may not be dry enough or may have experienced an over-heating condition, either of which are not good for the desiccant and could lead to premature replacement)
7. Check the certification date on each pressure relief valve (PRV). Make sure the certification date is within CAL OSHA\NFPA 52 requirements. Cal OSHA requires PRVs on the natural gas dryer to be recertified every 3 years. The 2006 and 2010 versions of NFPA 52 specify 3 year recertification.

B. Compressor Skid Enclosure

1. Record compressor suction, inter-stage and final discharge temperatures and pressures. (compare temperatures and pressures with those found on the compressor run sheet provided by the compressor manufacturer)

Note: All temperatures and pressures should be taken after at least 30 minutes of fully loaded compressor operation at maximum discharge pressure. Temperature and pressure readings should be taken at the same time of day and under the same operating conditions every time they are taken and recorded.

2. Temperatures and pressures from 1 above should be printed in an electronic spread sheet and compared daily with those found on the compressor run sheet. Variations should be communicated to facility maintenance manager as they occur. (these temperature and pressure variations from the compressor run sheet are an indication of compressor valve, ring, or other component pending failure)
3. Drain all coalescing filter housings and blow-down tank. Record the quantity of oil removed from the filter housings and blow-down tank.
4. Check oil level in the compressor crankcase and cylinder lubricator reservoir (if there is one) in accordance with manufacturers' requirements.

Add oil as needed to manufacturers' specification level. Record the quantity of oil added to the Compressor crankcase and/or cylinder lubricator reservoir.

5. Check for compressor oil discoloration. Appearance and color provide an easy means to detect changes that have taken place in compressor lubrication oil. These changes include contamination with other oils, water contamination (often evidenced by haziness/cloudiness when in excess of 200 PPM depending on oil type) and oxidation (darkening of the oil). The oil should be clear and bright with no visible water (haze or layered) or sediment. Comparing the oil's color to new, unused Oil is useful in the examination process.
6. Check and clean compressor intercooler. It is important that the intercooler be kept clean to allow maximum cooling of the inter-stage gas. The intercooler is usually designed to cool the inter-stage gas to no more than 200F above ambient temperature.
7. Perform a coupling alignment check on the compressor and electric motor. The proper alignment between the compressor and the electric drive motor is critical to minimize bearing wear, vibration, and keep the electric demand and kilowatt-hour energy charges as low as possible. Generally, the first sign of misalignment is an increase in electric demand and kilowatt-hour charges and possible vibration.
8. Check the certification date on each pressure relief valve. Make sure the certification date is within Cal OSHA/NFPA 52 requirements. Cal OSHA requires the PRVs associated with the blow-down tank(s) are to be recertified every 12 months. All other PRVs within the compressor enclosure are to be recertified every 3 years. The 2006 and 2010 versions of NFPA 52 specify 3 year re-certification.
9. Check the methane detector mounted on the ceiling of the compressor skid enclosure. The methane detector should be checked and calibrated at least every 12 months.

C. Priority Control System

1. Check pressure being delivered to each bank (vessel) of high-pressure storage.
2. Check the pressure at which the compressor is

to come on and whether a vehicle or a bank (vessel) is triggering the compressor to come an. (Verify that the source and set pressure for the compressor to start is proper for the stated design.)

D. High-Pressure Storage (made up of individual ASME high-pressure vessels)

1. Record actual pressure in each bank (vessel) of high-pressure storage.
2. Drain each high-pressure storage vessel. Record the quantity of Oil drained from all vessels. (This is an indication of possible Oil carry over and possibly the need for additional coalescing filtration before the compressed gas reaches high-pressure storage.)
3. Check the certification date on each pressure relief valve (PRV). Make sure the certification date is within Cal OSHNNFPA 52 requirements. Cal OSHA requires that the PRVs protecting the individual storage vessels must be recertified every 12 months. The 2006 and 2010 versions of NFPA 52 specify 3 year re-certification

E. CNG Dispenser (more than one)

1. Check hoses, in-line breakaways and nozzles for any damage or anything that would make them unsafe.
2. Perform an electric conductivity test on each plastic dispenser hose. While high- pressure natural gas is passing through a very small orifice, like the inside the fueling nozzle, an electric charge is created.

This electric charge is sent to ground through the dispenser hose. As long as the hose is electrically conductive, there is no static charge build-up and fuel transfer is performed safely. If the dispenser hose fails the electric conductivity test, the hose is considered to be unsafe and must be replaced.

3. Check the heat-of-compression temperature compensation system for each dispenser hose. (This involves fueling an NGV and checking the actual pressure dispensed and the temperature of the filled cylinder.)
4. Drain the coalescing filter system for each dispenser and record the quantity removed. (There should never be any liquid oil in the dispenser

coalescing filter (Parker Grade 4) housing. If liquid oil is present, then oil is being delivered to each vehicle being fueled.)

5. Check the certification date on each pressure relief valve (PRV). Make sure the certification date is within Cal OSHN NFPA 52 requirements. Cal OSHA requires that each dispenser hose PRV be recertified every 3 years. The 2006 and 2010 versions of NFPA 52 specify 3 year re-certification.

F. Air Compressor (operating source for ESD/pneumatic valves)

1. Check the discharge pressure from the air compressor to confirm that the pressure is adequate to operate all pneumatic valves connected to the compressed air system.
2. Drain any water that accumulates in the air compressor filter housing. This filter helps keep liquid water out of the compressed air System
3. Check and maintain the 011 level in the air compressor crankcase to the manufacturers recommended level.
4. Check the air receiver and fittings for any leaks
5. Drain and change the 011 and air filters based on the presents of a red indicator light indicating that these filter need to be changed.

1.3 General Fueling Station Maintenance

A. Inspect and activate the ESD system. The ESD system should be tested no less than every quarter. It is very important that the ESD system operate properly. This is the main safety system in the fueling station and when activated shuts off the supply of natural gas to the compression and dispensing systems.

B. Inspect all fire extinguishers. Eire extinguishers are required by NFPA 52 and are intended to be used to suppress a fire. Fire extinguishers should be tested and re-certified every 12 months. However, no employee or customer should be expected to operate a fire extinguisher without proper training in how to safely fight a natural gas fire.

C. Inspection of underground welded steel pipe. If there is any underground welded steel pipe within the CNG fueling station. It must be protected by a cathode protection system. This cathode protection system should be checked every year by a trained corrosion technician.

OPERATION AND MAINTENANCE PLAN

A. Establish an Operations and Maintenance (O&M) Plan:

1. Safety concerns for the station users, City personnel and the general public
2. Customer Service through enhanced reliability
3. Environmental and Regulatory Agency Compliance
4. Control the Cost of Operating the Station
5. Protect the long term investment in Capital Equipment
6. Provide training for first time users

The goals of the maintenance plan for a CNG fueling station are to Manage Maintenance Activities, Monitor System Operation, and provide Emergency Fueling Support.

B. Levels for maintenance on CNG station equipment.

1. Proactive
 - a. Data Collection
 - b. Monitoring/Modem System with analog instrumentation on key parameters
 - c. Preventative
 - d. Outside Maintenance Contract
2. Planned
 - a. Daily/Weekly/Monthly/Quarterly/Yearly
 - b. Waste Collection
 - c. Customer Feedback Opportunity
 - d. Safety Inspections
3. Emergency
 - a. Must be minimized
 - b. First out PLC or alarm system
 - c. Spare parts and backup fuel supply
 - d. Negotiate hourly rate
4. Main Motor Section Procedures
 - a. Insure the main motor is from any remote or on-skid starting energy source before beginning any maintenance activity
 - b. Observe all appropriate confined entry & Lock-Out Tag-Out procedures
 1. Listen for any out of the ordinary noised.
 2. Motor mounting inspection
 3. Bearing lubrication

5. Cooler Section Procedures

a. Insure cooler is isolated from any remote or on-skid starting energy source or compressor process system pressure before beginning any maintenance activity

b. Observe all appropriate confined entry & Lock-Out Tag-Out procedures.

1. Check for abnormal noises and vibration.
2. Check for leaks
3. Check bearings
4. Lubricate bearings
5. Inspect cooler louvers and actuating arms
6. Inspect cooler belts and sheaves
7. Check fins for cleanliness
8. Inspect fan and hub

6. Components Section Procedures

Insure motors are isolated from any remote or on-skid starting energy source and the compressor process system pressure is relieved before beginning any maintenance activities.

1. Visually and audibly check the complete unit for oil, air and gas leaks.
2. Drain oil from blow-down tank.
3. Drain oil from cylinder packing vent blow-case.
4. Check oil day tank level
5. Review the alarm and shutdown screen on the unit and or site control/safety panel(s)
6. Inspect all piping, flanges, & supports
7. Check electrical conduits
8. Check all Pressure Relief valves
9. Inspect pre-lube pump
10. Inspect lube oil heater
11. Coalescing Filters
12. Check safety shutdowns
13. Methane detector sensor calibration

OPERATION AND MAINTENANCE TASK SCHEDULE

CNG Fueling Station Inspection, Maintenance and Safety
CNG Fueling Station Inspection Schedule and Minimum Service

DAILY CHECKS

Facility:

Check and monitor equipment, including but not limited to compressors, motors, dryers, storage vessels, and dispersers, for the following:

Physical damage	Abnormal noises
Mechanical failures	Unusual vibrations
Fluid leaks	Unusual odors
Gas leaks	Unusual appearance

Compressor Equipment:

Check oil level in All Compressors
Drain inlet scrubber
Check the hydraulic oil level
Check for any oil or gas leaks inside the compressor skids
Listen for any unusual sounds.
Inspect all pressure gauges to ensure all are in proper working condition.

Dispenser:

Inspect the hoses for abrasions of punctures
Inspect the quick connects
Inspect the three-way valves
Inspect the proximity switch
Inspect the pressure gauge
Check to see that the service valve remains open
Smell and listen for leaks

Fill out Daily Inspection Log. Submit 1 copy of each day by the end of the month.

WEEKLY CHECKS

Facility:

Check proper operation of equipment, including but not limited to compressors, motors, dryers, storage vessels, valve sequencing, dispensers, card reader, gates, fencing and Systems.

Compressor Equipment:

Log equipment operating hours

Check pressures and temperatures on compressor (all stages)

Check equipment oil & fluid levels, as applicable

Check instrument set points

Dryer Skid:

Check pressure drop across dryer

Dispensers:

Clean dispensers

Check the receipt printers

Control Panels:

Check for alarm conditions.

Drain the liquid off of the air Compressor.

Storage and Buffer Vessels:

Open the drain valves on the buffer vessel and the storage vessel and drain any liquids.

**Fill out Weekly Inspection Log and the Compressor Inspection Log.
Submit one (1) Copy of each week at the end of the month.**

MONTHLY MAINTENANCE REQUIREMENTS

Facility:

Confirm proper operation of emergency Shutdown safety device.

Compressor Equipment:

Log equipment operating hours:

Check compressor pressures and temperatures at all stages and compare with design/operating parameters. Check electric motors for heat, noise and vibration.

Visually inspect all equipment and piping for problems.

Change particle filters and final coalesce filters.

Change hydraulic oil filters. Manually dump all scrubbers.

Check all shutdowns.

Check intensifier stroke length.

Change Compressor oil filter.

Clean cooling fins and check fan, and cooling pump.

Dispensers:

Inspect operation and safety of dispensing units.

Inspect and maintain dispensers.

Check control systems and card readers.

Dryer Sid:

Change the dryer discharge particle filter.

Check the dryer desiccant level and add tablets if needed.

Fill out and submit two (2) copies of the Monthly Inspection Log, the Compressor Inspection Log, and Safety Audit Log.

Six (6) Months Maintenance Requirements

Facility:

Check condition of all signage.

Compressor Equipment:

Log equipment operating hours.

Check Compressor pressures and temperatures at all stages and compare with design/operating parameters.

Change particle filters and final coalescer filters.

Change hydraulic oil.

Check Compressor inlet and discharge gas valves.

Pull Intensifier valves and inserts, clean and replace as needed.

Calibrate thermocouples and transducers.

Check all shutdowns.

Change Compressor oil filters and oil.

Check all equipment mounting bolts, and piping and tubing clamps to ensure all are tight and proper torque.

Clean accumulated dirt from electric motor frame and air passages.

Control Panels:

Check all electrical connections in panel.

Dryer Skid:

Change the dryer discharge particle filter.

Check the dryer desiccant level and all tablets if needed.

Dispensers:

Check dispenser meter calibration.

Fire Extinguishers:

Pressure and visibility (clean glass)

Fill out and submit two (2) copies of the six (6) month Inspection Log, the Compressor Log and the Safety Audit Log.

Most Critical Maintenance Tools

1. Digital Tachometer
2. Digital Touch or IR Thermometer
3. Methane Gas Detector
4. Portable Cellular Telephone
5. Pager
6. Accelerometer/Vibration Monitor
7. Odorometer
8. DBA Noise Meter
9. Torque Wrench
10. Lap Top Computer (For Use On PLCs)
11. Multi Metter (Volt Meter)
12. Set of Electrical Plans
13. Land Line Telephone (Check Telephone Line to Station)
14. 24 Bolt Power Supply (110 Volts to 24 Volts)
15. Megohm Meter (dispenser hose conductivity check)
16. Eye and Ear Protection
17. Natural Gas Vehicle (Test Dispenser/Temperature Compensation)

Required Spare Parts Inventory to be maintained for the City of Norman

1. Suction, Discharge, and Dispenser coalescing filters (6 month supply)
2. Drive belts (one complete set per compressor and prime mover)
3. Starter Electronics for motors
4. One complete set of safety relief valves (tested/certified and sealed)
5. One Complete set of dispenser hoses and breakaways (both types)
(Truck, car, Dispensers, Defueling Dispenser, slow fill post dispenser.
6. One complete set of fuses
7. One of each type of intrinsic barrier (if used in the station)
8. One of each kind of dispenser nozzle(s)
9. One of each type of actuator and ball valve.
10. Set of inter-stage gauges.
11. One spare solenoid coil (each type)
12. One set of O-rings (all required)

13. PLC Parts (Complete PLC)
14. Spare Boards For Card Reader
15. Spare Pressure Transducers
16. Spare RTDs
17. Bonded Power Band Set - For Belt Drive Compressors (IR)
18. Compressor parts
 - a. One complete valve Kit
 - b. Two complete sets of valve internals
 - c. Two complete sets of rings and rod seals
 - d. Two complete sets of compressor gaskets and seals (including valve gaskets)
 - e. One lubricator pump internals
 - f. One Lubricator pump
 - g. One each pressure and temperature switch or transducer
 - h. Two months supply of crankcase and lubricator oil, make sure to mark oils (engine vs. compressor)
 - i. Check valves
19. Other parts as required by the compressor manufacturer/station packager

GAS DRYER

Task	Frequency
Record	
Visual and Leak Detection	Weekly
Dryer Readings (inlet and Outlet Pressure)	Monthly
Resistance Measurements on Heaters	Monthly
Drying Temperature (Should Not Exceed 400 Degrees F)	Monthly
Routine PM	
Check Valves and Electrical Connectors	Monthly
Check Dryer Control Panel and Remote Alarms	Quarterly
Check Particulate Filters (Pressure Drop)	Quarterly
Measure Dew-Point at Outlet of Dryer	Quarterly
Verify Proper Operation of Valves and Alarms	6 Months
Depressurize Dryer and Check for Water in Castings	Yearly
Inspect/Clean External Surfaces of Heat Exchanger	Yearly
Calibration of Dew-Point Probe (if Dryer Has Monitor)	Yearly
Test/Re-Certify PRDs	3 Years
Replacement	
Check/Replace Battery	Yearly
Change Filters (Coalescing d& Particulate)	Pressure Drop
Change Desiccant (High Moisture)**	Yearly
Change Desiccant (Low Moisture)**	5 Years
Replace/Re-Certify PRDs	3 Years

NFPA 52 2010 states that pressure relief devices (PRDs) shall be tested at least Every 3 Years

OSHA requires a documented maintenance program sufficient to assure PRD performance.

Cal OSHA requires all pressure storage vessel PRDs be tested at least annually.

(This includes all ASME vessels in the Station used for storage of compressed Natural gas and does not include the dryer, compressor or dispenser.)

**Desiccant Change is Driven by Dew Point & Differential Pressure

COMPRESSOR

1. Mechanical Configurations

- Radial Type
- Radial Crosshead Type
- Vertical Crosshead Type
- Horizontal Crosshead Type

2. Lubrication Systems

- Crankcase
- Cylinder

3. Lubrication Types

- Fully-Lubricated
- Mini-Lubricated
- Non-Lubricated
- Oil-Free

COMPRESSOR

Task	Frequency
Record	
Suction and Discharge Pressure	Daily
Discharge Temperature	Daily
Routine PM	
Check/Fill Crankcase Oil	Daily
Check and Correct Any Gas or Oil Leaks	Daily
Check Lubricators (Rate and Condition)	Daily
Check Compressor Vent Recovery System (Blow-Down Tank)	Quarterly
Check Control Panel	Quarterly
Check Safety Shutdowns	Quarterly
Check Valves for Excessive Noise	Quarterly
Check Torque on Mounting Bolts	2 years
Clean Exterior of Inter-stage Cooler	Quarterly
Clean Exterior of After-Cooler	Quarterly
Check Oil Level Switch	500 Hours
Clean Cylinder Cooling Fins	500 Hours
Replacement	
Check/Replace Coalescing Filters	Pres. Drop
Check Drive Belts	Quarterly
Test//Change Crankcase Oil	500 Hours
Inspect/Replace 3 rd and 4 th Stage Valves	Pres./Temp.
Inspect/Replace 1 st and 2 nd Stage Valves	Pres./Temp.

COMPRESSOR ACCESSORIES

Task	Frequency
Record	
Operating Pressures and Temperatures	Daily
Check Lubricator Bock Cycle Pin for Movement	Daily
Check Lubricator Box Oil Level	Daily
Listen for Unusual Noises or Vibrations	Daily
Drain Blow-down Tank	Weekly
Check all Package Bolts for Correct Torque	2 Years
Check Fire Extinguisher (Date)	Monthly
Check Coalescing & Particulate Filters	Quarterly
Check Temperature Switch Gauge	Quarterly
Check Shutdown Set Points	Yearly
Check/Calibrate all Temp. & Press. Gauge	Yearly
Check and Confirm Safety Shutdown Functions	Yearly
Check Coupling Alignment or Soft Foot	2 years
Suction/Discharge Filter Inspection	2000 Hours
Test/Re-Certify PRDs	3 years
Replacement	
Change Coalescing Filter Elements	Pres. Drop
Drain and Replace Lubricator Box Oil	2000 Hours
Replace/Re-Certify PRDs	3 Years

NFPA 52 2010 states that pressure relief devices (PRDs) shall be tested at least Every 3 years.

OSHAA requires a documented maintenance program sufficient to assure PRD performance.

Cal OSHA requires all pressure storage vessel PRDs be tested at least annually (This includes all ASME vessels in the station used for storage of compressed Natural gas and does not include the dryer, compressor or dispenser).

NATURAL GAS ENGINE

Task	Frequency
Routine PM	
Check Liquid Level in Cooling System	Daily
Check Crankcase Oil Level	Daily
Check Bearing Lubrication	Daily
Check Belts for Tightness	Monthly
Inspect Fan Belts	Yearly
Inspect Air Starting Motor	Yearly
Inspect Clutch (if one present)	Yearly
Drain and Clean Cooling System	Yearly
Clean and Tighten Battery Terminals	Yearly
Adjust Magneto Contact Points	Yearly
Lubricate Main Shaft Bearing and Pilot Bearing Ftgs	125 Hours
Check Alternator Belts	250 Hours
Check Air Cleaner Elements	250 Hours
Inspect Engine Protective Devices	250 Hours
Add Coolant Conditioner	250 Hours
Check/Adjust Clutch (if one present)	250 Hours
Lubricate Governor and Tachometer	250 Hours
Perform Valve Lash Adjustment	500 Hours
Lubricate Fan Bearing	500 Hours
Wash Crankcase Breather	500 Hours
Check/Inspect Shut-Offs	1000 Hours
Lubricate Tachometer Drive Fitting	1000 Hours
Check Rotation of Valves	2000 Hours
Inspect Gauges/Sensors	2000 Hours
Lubricate Electric Set Bearing Fittings	4000 Hours
Inspect Cylinder Heads	8000 Hours
Inspect/Repair Turbocharger	8000 Hours

NATURAL GAS ENGINE (CONTINUED)

Task	Frequency
Replacement	
Change Radiator Coolant	Yearly
Change Alternator Belts	2 Yearly
Change Oil Filter	250 Hours
Change Crankcase Oil or Conduct Oil Sample	250 Hours
Change Air Cleaner Element	250 Hours
Check/Change Spark Plugs	2000 Hours
Inspect/Replace Water Pump	4000 Hours
Inspect/Replace Electric Starter	4000 Hours
Inspect/Replace Alternator	4000 Hours
Inspect/Replace Aux. Water Pump	6000 Hours
Inspect/Replace Governor and/or Magneto	10000 Hours
Inspect/Replace Batteries	18000 Hours
Inspect/Replace Oil Cooler	20000 Hours
Inspect/ Replace After-Cooler	20000 Hours
Inspect/Replace Fan Drive	20000 Hours

CNG Station Maintenance Log

Date _____

Site Description:

Station # _____
Customer _____
Compressor Type _____ # of Stages _____ Inlet Pressure _____
System Type Fast Fill _____ Time Fill _____ (check one or both)
Cardreader? _____ Motorized _____ Non motorized _____
Storage Type ASME _____ DOT _____ Spheres _____ Maint Time _____
Dispenser Type Krause _____ Cherco _____ Wilson _____ Other _____ 1 Hose _____ 2 Hose _____
Dehydrator Type Swing Tower _____ Regenerative _____ Other _____
Maintenance associated with any of the above _____

List brand, maintenance required, time involved for the following:

Motor Starter _____
Micro Motion _____
ESD Panel _____
Auto Dialer _____
Fire Suppression System _____
Priority/Sequential Panel _____
ITT switch change over from ASCO _____

Filtration: Coalescing _____
Particulate _____
Heat Exchanger: Intercooler _____ Water Cooled _____

Briefly describe additional maintenance tasks performed and time spent on each component.

Briefly describe repairs done and time & materials associated with each repair _____

Travel time to this site? _____ Lodging required? _____ If so, cost? _____

Additional notes (system performance, reliability, improvements recommended, safety)

CNG PERIODIC MAINTENANCE CHECKLIST

COMPRESSOR #1	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
CHECK OIL LEVEL					
QUARTS OF OIL ADDED					
DRAIN FILTERS					
CHECK PRESSURES					
STAGE #1					
STAGE #2					
STAGE #3					
STAGE #4					
CHECK TEMPERATURES					
STAGE #1					
STAGE #2					
STAGE #3					
STAGE #4					
RECORD HOURS					
OIL PRESSURE					
CHECK FOR OIL LEAKS					
CHECK FOR CYCLING					

COMPRESSOR #2	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
CHECK OIL LEVEL					
QUARTS OF OIL ADDED					
DRAIN FILTERS					
CHECK PRESSURES					
STAGE #1					
STAGE #2					
STAGE #3					
STAGE #4					
CHECK TEMPERATURES					
STAGE #1					
STAGE #2					
STAGE #3					
STAGE #4					
RECORD HOURS					
OIL PRESSURE					
CHECK FOR OIL LEAKS					
CHECK FOR CYCLING					

GENERAL	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
LISTEN FOR UNUSUAL NOISES					
CHECK CARD READER					
CHECK REFERENCE PRESSURE					
DISPENSER					
PRIORITY					
SEQUENTIAL					
SLOW FILL					

IF APPLICABLE	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
CHECK AIR COMPRESSOR					
DRAIN AIR RECEIVER					
CHECK FOR ALARMS					

CNG Station Maintenance: History and Field Inspection Form

Instruction: Use during site assessment for documentation and job cost estimating purposes

Dehydrator	Customer	Site Name (City and County)

Dehydrator Type:	
Location/Description	

Dehydrator Class	
Suction ()	Discharge ()

Field Inspection:

(√ and indicate what needs maintenance)

	Comments
() Alarm	Check for Proper Operation
() Dewpoint at Dehydrator	
Dewpoint Upstream of Deh.	_____ F
Dewpoint Downstream of Deh.	_____ F
() Differential Pressure on Pre and/or After Filter	

Equipment Can Be Worked on Safely	Yes () No ()
--	----------------

Maintenance Direct Cost Calculation

Number of Mandays
 Material (\$)
 Outside Services/Contracts
 Employee Expenses (\$)
 Travel Time (Manhours)
 Vehicle Equipment (\$)
Note Fastest Response Time Possible

	Cost
(√) Reg Hours <input type="text"/> x 1.5 <input type="text"/> x 2 <input type="text"/>	
<input type="text"/> Hours (given site location)	

Activity No.: 3083 TOTAL Direct Cost

--

GM No.: GM _____

CNG Maintenance Supervisor: _____
 Inspection Date: _____

CNG Station Maintenance: History and Field Inspection Form

Instruction: Use during site assessment for documentation and job cost estimating purposes

Compressor

Customer

**Site Name
(City and County)**

History: Compressor

Location/Description

Manufacturer	Serial Number	Year	Model

Compressor Drive	Voltage	HP	RPM	Drive Type
Electric () Engine ()				Direct () Belt ()

# of Stages	Cooling	Lubricators		Portable
	Water () Air ()	Yes () No ()		Yes () No ()

Current Compressor Hours	Owner's Manual Available
	Yes () No ()

Field Inspection: Compressor

Date of Last Maintenance/Remarks

(√ and indicate what needs maintenance)

Comments

() Oiling System	
() All Relief Valves	Leaks? Yes () No ()
	Broken Seal Wires? Yes () No ()
() Discharge Check Valves	
() All Compressor Belts	
() Compressor Mounting Bolts	
() Exhaust Fan Blades	Cracks? Yes () No ()
() Crank Case Oil Level	Desired at _____ gal
() Crankcase Oil Pressure	_____ psi
() All Gauges	() Zero () MidSpan () FullSpan
() Compressor Discharge Temp	At _____ psi
() Pressures of All Stages	At _____ psi
() Compressor Alarms	
() Radiator Air Flow	Restriction?
() Visual Condition	

Equipment Can Be Worked on Safely Yes () No ()

Maintenance Direct Cost Calculation

Number of Mandays
Material (\$)
Outside Services/Contracts
Employee Expenses (\$)
Travel Time (Manhours)
Vehicle Equipment (\$)
Note Fastest Response Time Possible

Comments	Cost
(√) Reg Hours <input type="text"/> x 1.5 <input type="text"/> x 2 <input type="text"/>	
<input type="text"/> Hours (given site location)	

GM No.: GM _____

Activity No.: 3083

TOTAL Direct Cost

CNG Maintenance Supervisor: _____

Inspection Date: _____

CNG Station Maintenance: History and Field Inspection Form

Instruction: Use during site assessment for documentation and job cost estimating purposes

Dispenser	Customer	Site Name (City and County)

Dispenser Type:	
Location/Description	

Hoses			# of Bottles
Type	Number	Length (inches)	

Regulators			
Type	Number	Manufacturer	Model

Field Inspection:

(√ and indicate what needs maintenance)

	Comments			
() Fill and Reference Pressure	Hose #1		Hose #2	
	As Found	As Left	As Found	As Left
	_____ psi	_____ psi	_____ psi	_____ psi
Reference Pressure	_____ psi	_____ psi	_____ psi	_____ psi
() Sequencing Pressure	Hose #1		Hose #2	
	Low to Mid Bank	_____ psi	_____ psi	_____ psi
	Mid to High Bank	_____ psi	_____ psi	_____ psi
() MicroMotion	Reset to Zero			
() MicroMotion for Proper Operation				
() Breakaways				
() Continuity of Hoses	Worn? Yes () No () Frayed? Yes () No ()			
() All Gauges	() Zero () MidSpan () FullSpan			

Equipment Can Be Worked on Safely	Yes () No ()
--	----------------

Maintenance Direct Cost Calculation

Number of Mandays _____
 Material (\$) _____
 Outside Services/Contracts _____
 Employee Expenses (\$) _____
 Travel Time (Manhours) _____
 Vehicle Equipment (\$) _____
 Note Fastest Response Time Possible

Comments	Cost
(√) Reg Hours <input type="text"/> x 1.5 <input type="text"/> x 2 <input type="text"/>	

GM No.: GM _____	Activity No.: 3083	TOTAL Direct Cost	
-------------------------	---------------------------	--------------------------	--

CNG Maintenance Supervisor: _____
 Inspection Date: _____

CNG Station Maintenance: History and Field Inspection Form

Instruction: Use during site assessment for documentation and job cost estimating purposes

ESD System

Customer	Site Name (City and County)

Emergency Shutdown Device (ESD) Type:	
Location/Description	

Diagnostic Review						
Action >>>	Compressor Shuts Off	Warning Beacon Flashes	Gas Lines Valve Closed	Gas Supply Compressor Valve Closed	Alarm At Security Monitoring	Autodialer Activates
Sensor	<i>Indicate (√) in the appropriate matrix box when "action" occurred</i>					
High Temp Sensor						
Emergency Button						
Compressor Malfunction						
Manual Shutdown						
Gas Detection						
Line Disruption						
Dispenser Tilt						

Field Inspection:

(√ and indicate what needs maintenance)

	Comments

Equipment Can Be Worked on Safely	Yes () No ()
--	----------------

Maintenance Direct Cost Calculation

Number of Mandays
 Material (\$)
 Outside Services/Contracts
 Employee Expenses (\$)
 Travel Time (Manhours)
 Vehicle Equipment (\$)
Note Fastest Response Time Possible

Comments	Cost
(√) Reg Hours <input type="text"/> x 1.5 <input type="text"/> x 2 <input type="text"/>	
<input type="text"/> Hours (given site location)	

GM No.: GM _____

Activity No.: 3083

TOTAL Direct Cost

--

CNG Maintenance Supervisor: _____
 Inspection Date: _____

CNG Station Maintenance: History and Field Inspection Form

Instruction: Use during site assessment for documentation and job cost estimating purposes

Card Reader

Customer	Site Name (City and County)

Car Reader Type:	
Location/Description	

Manufacturer	Serial Number	Year	Model
Standalone	Satellite	Intrinsically Safe	Motorized
Yes () No ()	Yes () No ()	Yes () No ()	Yes () No ()
Transaction Printer	Receipt Printer	Display	Line Conditioner
Yes () No ()	Yes () No ()	Yes () No ()	Yes () No ()
Modem Line	Key Pad		
Yes () No ()	Yes () No ()		

Printer Type	Owner's Manual Available
	Yes () No ()

Field Inspection:

(√ and indicate what needs maintenance)

Comments

<input type="checkbox"/> Low Memory Batteries (Red Light)	Change if necessary	
<input type="checkbox"/> Magnetic Reading Head	Run Cleaning Card through	
<input type="checkbox"/> Proper Operation of Unit		
<input type="checkbox"/> Emergency Telephone	Check for proper operation	
<input type="checkbox"/> Verify Therm Readings on Dispenser Match Printer	Hose #1	Hose #2
Dispenser	_____ therms	_____ therms
Printer	_____ therms	_____ therms

Equipment Can Be Worked on Safely Yes () No ()

Maintenance Direct Cost Calculation	Comments	Cost
Number of Mandays	(√) Reg Hours <input type="text"/> x 1.5 <input type="text"/> x 2 <input type="text"/>	
Material (\$)		
Outside Services/Contracts		
Employee Expenses (\$)		
Travel Time (Manhours)		
Vehicle Equipment (\$)		
Note Fastest Response Time Possible	<input type="text"/> Hours (given site location)	

GM No.: GM _____	Activity No.: 3083	TOTAL Direct Cost	
-------------------------	---------------------------	--------------------------	--

CNG Maintenance Supervisor: _____
 Inspection Date: _____

CNG Station Maintenance: History and Field Inspection Form

Instruction: Use during site assessment for documentation and job cost estimating purposes

Panel(s)	Customer	Site Name (City and County)

Panel Type:	Tube Trailer Electronics Panel
Location/Description	

# of Pneumatic Switches	# of Booster Pumps	# of Fuses

PLC Data			
Modem	Manufacturer	ESD Button	
Yes () No ()		Yes ()	No ()

Field Inspection:

(√ and indicate what needs maintenance)

	Comments
<input type="checkbox"/> Totalizer	
<input type="checkbox"/> Flow Switch	
<input type="checkbox"/> Cabinet Interlock Shutdown	
<input type="checkbox"/> PLC	
<input type="checkbox"/> Panel Purge Regulator	
<input type="checkbox"/> Relays	
<input type="checkbox"/> Delta "P" Gauge	
<input type="checkbox"/> Dispenser Fill	
<input type="checkbox"/> Valves	
<input type="checkbox"/> Flow Meter	
<input type="checkbox"/> Flow Transmitter	
<input type="checkbox"/> Gauges	
<input type="checkbox"/> Booster Pump	
<input type="checkbox"/> Fuses	

Equipment Can Be Worked on Safely	Yes () No ()
--	----------------

Maintenance Direct Cost Calculation

Number of Mandays
 Material (\$)
 Outside Services/Contracts
 Employee Expenses (\$)
 Travel Time (Manhours)
 Vehicle Equipment (\$)
Note Fastest Response Time Possible

Comments	Cost
(√) Reg Hours <input type="text"/> x 1.5 <input type="text"/> x 2 <input type="text"/>	
<input type="text"/> Hours (given site location)	

GM No.: GM _____

Activity No.: 3083

TOTAL Direct Cost

--

CNG Maintenance Supervisor: _____

Inspection Date: _____

CNG STATION FIVE DATE MAINTENANCE REPORT TWO COMPRESSOR

STATION: _____

Date					
Put station in bypass					
K101					
Hours					
Lubricator time-drops/min 1					
Lubricator time-drops/min 2					
Lubricator time-drops/min 3					
Lubricator time-drops/min 4					
Check air compressor					
Drain condensate					
Check air system for leaks					
Check suction valve operation					
Check blowdown valve operation					
Check discharge check valves					
Check all compressor couplings					
Check all drive belts					
Check all mounting bolts					
Check for cracks in cooling fan					
Check for flow in heat exch					
Check crankcase oil level					
Check packing vents low A					
Check packing vents low B					
Check packing vents high A					
Check packing vents high B					
Check oil pressure	Psi	Psi	Psi	Psi	Psi
1st stage discharge temp	° F	° F	° F	° F	° F
2nd stage discharge temp	° F	° F	° F	° F	° F
3rd stage discharge temp	° F	° F	° F	° F	° F
4th stage discharge temp	° F	° F	° F	° F	° F
Water jacket temp	° F	° F	° F	° F	° F
1st stage pressure	Psi	Psi	Psi	Psi	Psi
2nd stage pressure	Psi	Psi	Psi	Psi	Psi
3rd stage pressure	Psi	Psi	Psi	Psi	Psi
4th stage pressure	Psi	Psi	Psi	Psi	Psi
CLOCK COMPRESSOR	SCFM	SCFM	SCFM	SCFM	SCFM
ALARMS					
Check lamps					
Low suction pressure					
High suction pressure					
Low oil pressure					
Low lube oil flow					
Low crankcase oil level					
Vibration					
High Discharge press. Stage 1					
High Discharge press. Stage 2					
High Discharge press. Stage 3					
High Discharge press. Stage 4					
High Temp. Stage 1					
High Temp. Stage 2					
High Temp. Stage 3					
High Temp. Stage 4					

K201 hours						
Lubricator time-drops/min 1						
Lubricator time-drops/min 2						
Lubricator time-drops/min 3						
Lubricator time-drops/min 4						
Check air compressor						
Drain condensate						
Check air system for leaks						
Check suction valve operation						
Check blowdown valve operation						
Check discharge check valve						
Check all compressor couplings						
Check for flow in heat exchanger						
Check for cracks in cooling fan						
Check all drive belts						
Check all mounting bolts						
Check crankcase oil level						
Check packing vents low A						
Check packing vents low B						
Check packing vents high A						
Check packing vents high B						
Check oil pressure	Psi	Psi	Psi	Psi	Psi	Psi
1st stage discharge temp	°F	°F	°F	°F	°F	°F
2nd stage discharge temp	°F	°F	°F	°F	°F	°F
3rd stage discharge temp	°F	°F	°F	°F	°F	°F
4th stage discharge temp	°F	°F	°F	°F	°F	°F
Water jacket temp	°F	°F	°F	°F	°F	°F
1st stage pressure	Psi	Psi	Psi	Psi	Psi	Psi
2nd stage pressure	Psi	Psi	Psi	Psi	Psi	Psi
3rd stage pressure	Psi	Psi	Psi	Psi	Psi	Psi
4th stage pressure	Psi	Psi	Psi	Psi	Psi	Psi
CLOCK COMPRESSOR	SCFM	SCFM	SCFM	SCFM	SCFM	SCFM
ALARMS						
Check lamps						
Low suction pressure						
High suction pressure						
Low oil pressure						
Low lube oil flow						
Low crankcase oil level						
Vibration						
High Discharge press. Stage 1						
High Discharge press. Stage 2						
High Discharge press. Stage 3						
High Discharge press. Stage 4						
High Temp. Stage 1						
High Temp. Stage 2						
High Temp. Stage 3						
High Temp. Stage 4						
ESD						
Verify comp. shut down						
Verify ESD valves close						
Check alarm lights						
Check beacon						
Check horn						
Check ESD reset						

Check fire shutdown					
Check compressor malfunction					
Check nitrogen bottle pressure	Psi	Psi	Psi	Psi	Psi
Check fire system set point	Psi	Psi	Psi	Psi	Psi
TECH 21					
Check tech 21 for prop operation					
Check batteries					
Clean card reader					
Check emergency telephone					
DISPENSER					
Check continuity of hoses					
Check for leaks					
Zero Micro Motions					
Ambient temp					
HOSE 1					
Dispenser therms					
Fill pressure as found	Psi	Psi	Psi	Psi	Psi
Fill pressure as left	Psi	Psi	Psi	Psi	Psi
Reference pressure as found	Psi	Psi	Psi	Psi	Psi
Reference pressure as left	Psi	Psi	Psi	Psi	Psi
HOSE 2					
Dispenser therms					
Printer therms					
Fill pressure as found	Psi	Psi	Psi	Psi	Psi
Fill pressure as left	Psi	Psi	Psi	Psi	Psi
HOSE 3					
Dispenser therms					
Printer therms					
Fill pressure as found	Psi	Psi	Psi	Psi	Psi
Fill pressure as left	Psi	Psi	Psi	Psi	Psi
Reference pressure as found	Psi	Psi	Psi	Psi	Psi
Reference pressure as left	Psi	Psi	Psi	Psi	Psi
HOSE 4					
Dispenser therms					
Printer therms					
Fill pressure as found	Psi	Psi	Psi	Psi	Psi
Fill pressure as left	Psi	Psi	Psi	Psi	Psi
VESSELS AND FILTERS					
Drain ASME vessels					
Check relief's for leaks					
Check relief's for broken wires					
Drain recovery vessel					
Check recovery vessel reg.					
Drain coalescing filters					
PRIORITY SEQUENCING					
Check storage fill					
Priority (fast fill) ref. press.					
Priority (storage fill) ref. press.					
Slow fill					
Tube trailer					
Quick change bottle rack					
DEHYDRATOR					
Upstream dewpoint					
Downstream dewpoint					
Check filter differential					
Drain condensate					
Check for alarms					

MOTOR every 6 months					
K101					
Check all lug temps					
Chk phase A running amps					
Chk phase B running amps					
Chk phase C running amps					
K201					
Check all lug temps					
Chk phase A running amps					
Chk phase B running amps					
Chk phase C running amps					

CNG FUELING STATION INSPECTION, MAINTENANCE AND SAFETY

WEEKLY COMPRESSOR INSPECTION LOG

COMPRESSOR INSPECTION LOG

DATE:					
TIME:					

Ambient Temperature/Weather Conditions:

Hour Meter Reading :	Ariel Compressor:	Hydraulic Intensifier:		
Skid 1				
Skid 2				
Booster Skid				

Parameter:	Pressures			Temperatures		
	Skid 1	Skid 2	Booster Skid	Skid 1	Skid 2	Booster Skid
Station Inlet						
1st Stage Discharge						
2nd Stage Discharge						
3rd Stage Discharge						
4th Stage Discharge						
5th Stage Discharge						
Storage						
Buffer						

Miscellaneous Notes:

Item	Follow - up Action Required

**CNG FUELING STATION INSPECTION, MAINTENANCE AND SAFETY
EXAMPLE REPAIR LOG**

Date: _____

Time _____

Ambient Temperature/Weather Conditions: _____

Repair to: (Circle One)

- | | |
|---------------------------|-------------------------|
| Gas Dryer | Station Controller |
| CNG Compressor | Valve Sequencing Panel |
| Ground Storage | Dispenser 1 |
| Air Compressor | Dispenser 2 |
| Instruments & Controls | Dispenser 3 |
| Noise Attention Enclosure | Dispenser 4 |
| Card Reader | Dispenser 5 |
| Auxiliary Power Supply | Dispenser 6 |
| Gas Detection System | Fire Protection Systems |

Regularly Scheduled Maintenance—Specify:

Or Specify Nature of Problem if Unscheduled:

Is this a Warranty Repair: Yes ____ No ____

Summary of Action Taken (use more sheets if necessary):

Technician's Name: _____ **Signature:** _____

CNG Station Log--Daily Inspection

Address: _____

General Data:

Date: _____ (YY/MM/DD)

Time Data Collected: _____ (HH:MM)

Ambient Temperature: _____ F

Weather

Conditions: _____

Compressor/Dryer Data:

Hours: _____ RPM: _____

Parameter	Pressure (psig)	Temperature (F)
Station Inlet		
Compressor Suction		
1st Stage Discharge		
2nd Stage Discharge		
3rd Stage Discharge		
4th Stage Discharge		

Note: All operating data must be obtained with the station operating at a minimum of 4000 psig and at maximum sustainable temperature and after a minimum of 30 minutes of loaded compressor operation.

Station Inspection:

Inspection Item	OK or Comment-Record Quantities	Inspection Item	OK or Comment-Record Quantities
Gas Dryer Dew-point? (F)		Storage Pressure Low Bank (F)	
Operating on Left or Right Tower?		Storage Pressure Medium Bank (F)	
Drain Dryer Reservoir		Storage Pressure High Bank (F)	
CNG Compressor Faults?		Drain Storage	
CNG Compressor Crankcase oil Level		Hose 1 Fill Pressure (psig)	
CNG Compressor Lubricator oil Level		Hose 2 Fill Pressure (psig)	
CNG Compressor Gas Leaks		Hose 3 Fill Pressure (psig)	
CNG Compressor/Engine/Turbo Coolant		Hose 4 Fill Pressure (psig)	
CNG Compressor/Fan/Engine Drive Belts		Check Dispenser Hoses/Nozzles	
Drain Compressor Reservoirs		Drain Dispenser Filters	
Engine Oil Level		Air Compressor Oil Level	
Engine Oil Pressure (psig)		Air System Pressure	
Engine Oil Temperature (F)		Drain Air Dryer Reservoir	
Engine Jacket Coolant Temperature (F)		Air Dryer on Left or Right Chamber?	
Engine Turbo Coolant Temperature (F)		Check Station For Leaks	

Note: Record quantities of oil added and quantities of condensate recovered.

Follow Up Required:

Item	Action Required

Comments or Notes:

Technician: Print Name: _____

Signature: _____

Scheduled Maintenance/Repair

The following form represents a log to be completed for scheduled or unscheduled maintenance on a CNG station.

CNG Station Log--Maintenance/Repair Record

Address:

General Data:

Date: _____ (YY/MM/DD)

Time Data Collected: _____ (HH:MM)

Ambient Temperature: _____ F

Weather

Conditions: _____

Repair to: (Circle One)

Gas Dryer

CNG Compressor

Gas Engine

Storage

Air Compressor

Air Dryer

Station Controller

Priority-Sequencing Panel

Dispenser Hose 1

Dispenser Hose 2

Dispenser Hose 3

Dispenser Hose 4

Regularly Scheduled Maintenance--Specify:

Or, Specify Nature of Problem if Unscheduled:

Is this a Warranty Repair? Yes _____ No _____

Summary of Action Taken:

Summary of Parts and Labor:

Item #	Part Description	Part #	Quantity
1			
2			

3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
Labor	Regular Time (Hours)		
Labor	Premium Time (Hours)		
Mileage	(Miles)		

Have You: (Initial)

- Re-torque all Bolts? _____
- Rotated the compressor by hand 3 revolutions? _____
- Purged all air from the system? _____
- Re-tightened all drive belts? _____
- Replaced all Guards? _____
- Restored all valves to their operating condition? _____
- Restored power and reset all controls? _____
- Run up the Compressor or Tested the dispenser? _____
- Checked the System for Leaks? _____
- Closed and locked all doors and gates? _____
- Reported the station operational? _____

Run Test Subsequent to Repair or Maintenance Work:

Hours: _____ RPM: _____

Parameter	Pressure (psig)	Temperature (F)
Station Inlet		
Compressor Suction		
1st Stage Discharge		
2nd Stage Discharge		
3rd Stage Discharge		
4th Stage Discharge		
Gas Engine Oil		
Gas Engine Coolant		
Gas Engine Turbo Coolant		

Note: All operating data must be obtained with the station operating at a minimum of 4000 psig and at maximum sustainable temperature and after a minimum of 30 minutes of loaded compressor operation.

Technician: Print Name: _____

Signature: _____