

THE PORT AUTHORITY OF NY & NJ

PROCUREMENT DEPARTMENT
2 MONTGOMERY STREET, 3RD FL.
JERSEY CITY, NJ 07302

INVITATION FOR BID/PUBLIC BID OPENING
BID INFORMATION

ISSUED DATE: 11/25/14

**TITLE: MAINTENANCE, MONITORING AND OPERATION OF
UNDERGROUND STORAGE TANKS AND OIL/WATER
SEPARATORS AT NEWARK LIBERTY INTERNATIONAL
AND TETERBORO AIRPORTS**

BID NO.: 40593

**SUBMIT SEALED BIDS BEFORE THE DUE DATE AND TIME TO THE ABOVE ADDRESS
WHERE THEY WILL BE PUBLICLY OPENED AND READ**

FACILITY INSPECTION: DECEMBER 9, 2014 TIME: 10:00 AM

BID DUE DATE: DECEMBER 22, 2014 TIME: 11:00 AM

**BUYER NAME: EMILY BAXTER PHONE NO.: (201) 395-3421
EMAIL: ebaxter@panynj.gov**

BIDDER INFORMATION
(TO BE COMPLETED BY THE BIDDER)
(PLEASE PRINT)

(NAME OF BIDDING ENTITY)

(ADDRESS)

(CITY, STATE AND ZIP CODE)

(REPRESENTATIVE TO CONTACT-NAME & TITLE (TELEPHONE)

(FEDERAL TAX I.D. NO.) (FAX NO.)

BUSINESS CORPORATION PARTNERSHIP INDIVIDUAL

OTHER (SPECIFY): _____

INVITATION FOR BID

- COVER PAGE: BID AND BIDDER INFORMATION
- PART I – STANDARD INFORMATION FOR BIDDERS
- PART II – CONTRACT SPECIFIC INFORMATION FOR BIDDERS
- PART III – CONTRACT SPECIFIC TERMS AND CONDITIONS
- PART IV – SIGNATURE SHEET, NAME AND RESIDENCE OF PRINCIPALS AND PRICING SHEET(S)
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PART I - STANDARD INFORMATION FOR BIDDERS

1. General Information: The Port Authority of New York and New Jersey

The Port Authority of New York and New Jersey (the “Port Authority” or the “Authority”) is an agency of the States of New York and New Jersey, created and existing by virtue of the Compact of April 30, 1921, made by and between the two States, and thereafter consented to by the Congress of the United States. It is charged with providing transportation, terminals and other facilities of trade and commerce within the Port District. The Port District comprises an area of about 1,500 square miles in both States, centering about New York Harbor. The Port District includes the Cities of New York and Yonkers in New York State, and the cities of Newark, Jersey City, Bayonne, Hoboken and Elizabeth in the State of New Jersey, and over 200 other municipalities, including all or part of seventeen counties, in the two States. The Port Authority manages and/or operates all of the region’s major commercial airports (Newark Liberty International, John F. Kennedy International, Teterboro, LaGuardia, Atlantic City International, and Stewart International Airports), marine terminals in both New Jersey and New York (Port Newark and Elizabeth, Howland Hook and Brooklyn Piers); and its interstate tunnels and bridges (the Lincoln and Holland Tunnels; the George Washington, Bayonne, and Goethals Bridges; and the Outerbridge Crossing), which are vital “Gateways to the Nation.”

In addition, the Port Authority operates the Port Authority Bus Terminal in Manhattan, the largest facility of its kind in the world, and the George Washington Bridge and Journal Square Transportation Center bus stations. A key link in interstate commuter travel, the Port Authority also operates the Port Authority Trans-Hudson Corporation (PATH), a rapid rail transit system linking Newark, and the Jersey City and Hoboken waterfronts, with midtown and downtown Manhattan. A number of other key properties are managed by the agency including but not limited to a large satellite communications facility (the Teleport) in Staten Island, and a resource recovery co-generation plant in Newark. Prior to September 11, 2001, the Port Authority’s headquarters were located in the World Trade Center, and that complex is still owned and being partially redeveloped by the Authority.

2. Form and Submission of Bid

The Bidder shall review carefully every provision of this document, provide all the information required, and sign and return one entire copy to the Port Authority in accordance with the instructions on the Cover Sheet and Part II – Contract Specific Information for Bidders. The Bidder should retain one complete duplicate copy for its own use. The “Signature Sheet” contained herein must be completed and signed by the Bidder. The Pricing Sheet(s) contained herein must also be completed. The Bid shall be sealed in the enclosed self-addressed envelope conspicuously marked with the Bidder’s name, address, and Vendor Number, if available. In addition, the outside of the package must clearly state the Bid Title, the Bid Collective Number and the Bid Due Date. Failure to properly label submissions may cause a delay in identification, misdirection or disqualification of the submissions. In submitting this bid, the Bidder offers to assume the

obligations and liabilities imposed upon it herein and expressly makes the representations and warranties required in this document.

All Bids must be received by the bid custodian on or before the due date and time specified on the cover page, at which time they will be publicly opened and read. Bids are only accepted Monday through Friday, excluding Port Authority holidays, between the hours of 8:00 a.m. and 5:00 p.m., via (1) regular mail, (2) express delivery service (e.g. UPS), or (3) hand delivery. If your Bid is to be hand-delivered by messenger or you are planning to attend the formal bid opening, please note that only individuals with valid photo identification will be permitted access to the Port Authority's offices. Individuals without valid identification shall be turned away and their packages not accepted. Bids that are not received by the bid custodian by the scheduled bid opening date will be considered late.

3. Vendor Profile

To ensure maximum opportunities, it is vitally important that Bidders keep their vendor profiles up to date with an appropriate e-mail address, as this will enable their firm to receive timely notice of advertisements, reminders, solicitations and addenda. Bidders may update their vendor profile or register as a Port Authority Vendor by accessing the online registration system at <https://panynjprocure.com/VenLogon.asp>.

4. Acknowledgment of Addenda

If any Addenda are posted or sent as part of this Bid, the Bidder shall complete, sign and include with its Bid the addenda form(s). In the event any Bidder fails to conform to these instructions, its Bid will nevertheless be construed as though the Addenda had been acknowledged.

If the Bidder downloaded this solicitation document, it is the responsibility of the Bidder to periodically check the Port Authority website at <http://www.panynj.gov/business-opportunities/bid-proposal-advertisements.html> and download any addenda that might have been issued in connection with this solicitation.

5. Firm Offer

The Bidder offers to provide the Port Authority of New York and New Jersey the services and to perform all Work in connection therewith required under this Contract, all as specified by the terms and conditions of the Contract, based on the Pricing Sheets provided herein.

EXCEPTIONS TAKEN OR CONDITIONS IMPOSED BY A BIDDER TO ANY PORTION OF THE CONTRACT DOCUMENTS WILL RESULT IN REJECTION OF THE BID.

6. Acceptance or Rejection of Bids

The acceptance of a Bid will be by a written notice signed by an authorized representative on behalf of the Authority. No other act of the Port Authority, its Commissioners, officers, agents or employees shall constitute acceptance of a Bid. The

Port Authority reserves the unqualified right, in its sole and absolute discretion, to reject any or all Bids or to accept any Bid, which in its judgment will best serve the public interest and to waive defects in any Bid. No rights accrue to any Bidder unless and until its Bid is accepted.

7. Bidder's Questions

Any questions by prospective Bidders concerning the Work to be performed or the terms and conditions of the Contract may be addressed to the Contracts Specialist listed on the Cover Sheet of this document. The Contracts Specialist is only authorized to direct the attention of prospective Bidders to the portions of the Contract. No employee of the Port Authority is authorized to interpret any portion of the Contract or to give information in addition to that contained in the Contract. When Contract interpretation or additional information as to the Contract requirements is deemed necessary by the Port Authority, it will be communicated to all Bidders by written addenda issued under the name of the Assistant Director, Commodities & Services Division, Procurement Department of the Port Authority and may be posted on the Port Authority website. Addenda shall be considered part of the Contract.

8. Additional Information To and From Bidders

Should the Authority require additional information from the Bidder in connection with its bid, such information shall be submitted within the time frame specified by the Port Authority.

If the Bidder is a corporation, a statement of the names and residences of its officers should be submitted on the Name and Residence of Principals Sheet, directly following the Signature Sheet.

9. Union Jurisdiction

All prospective Bidders are advised to ascertain whether any union now represented or not represented at the Facility will claim jurisdiction over any aspect of the operations to be performed hereunder and their attention is directed to the paragraph entitled "Harmony" in the Standard Contract Terms and Conditions.

10. Assessment of Bid Requirements

The Bidder should carefully examine and study the entire contents of these bid documents and shall make its own determinations as to the services and materials to be supplied and all other things required to be done by the Contractor.

11. Bidder's Prerequisites

Only Bids from Bidders that can satisfactorily demonstrate meeting the prerequisites specified within Part II hereof at the time of bid submission will be considered. By furnishing this document to the Bidder, the Port Authority has not made a determination that the Bidder has met the prerequisites or has otherwise been deemed qualified to perform the services. A determination that a Bidder has met the prerequisites is no assurance that it will be deemed qualified in connection with other bid requirements included herein.

12. Qualification Information

The Port Authority may give oral or written notice to the Bidder to furnish the Port Authority with information and to meet with designated representatives of the Port Authority relating to the Bidder's qualifications and ability to fulfill the Contractor's obligations hereunder. The requested information shall be submitted no later than three (3) days after said notice unless otherwise indicated. Matters upon which the Port Authority may inquire may include, but may not be limited to, the following:

a. The Bidder may be required to demonstrate that it is financially capable of performing this Contract, and the determination of the Bidder's financial qualifications will be made by the Port Authority in its sole discretion. The Bidder shall submit such financial and other relevant information as may be required by the Port Authority from time to time including, but not limited to, the following:

1. (i) Certified financial statements, including applicable notes, reflecting the Bidder's assets, liabilities, net worth, revenues, expenses, profit or loss and cash flow for the most recent calendar year or the Bidder's most recent fiscal year.

(ii) Where the certified financial statements set forth in (i) above are not available, then either reviewed or compiled statements from an independent accountant setting forth the aforementioned information shall be provided.

(iii) Where neither certified financial statements nor financial statements from an independent accountant are available, as set forth in (i) and (ii) above, then financial statements containing such information prepared directly by the Bidder may be submitted; such financial statements, however, must be accompanied by a signed copy of the Bidder's most recent Federal income tax return and a statement in writing from the Bidder, signed by an executive officer or their authorized designee, that such statements accurately reflect the present financial condition of the Bidder.

Where the statements submitted pursuant to subparagraphs (i), (ii) or (iii) are dated prior to forty-five (45) days before the bid opening, then the Bidder shall submit a statement in writing, signed by an executive officer of the Bidder or their designee, that the present financial condition of the Bidder is at least as good as that shown on the statements submitted.

2. Bidder's statement of work on hand, including any work on which a bid has been submitted, and containing a description of the work, the annual dollar value, the location by city and state, the current percentage of completion, the expected date for completion, and the name of an individual most familiar with the Bidder's work on these jobs.

3. The name and address of the Bidder's banking institution, chief banking representative handling the Bidder's account, the Bidder's Federal Employer Identification Number (i.e., the number assigned to firms by the Federal Government for tax purposes), the Bidder's Dun and Bradstreet number, if any,

the name of any other credit service to which the Bidder has furnished information, and the number, if any, assigned by such service to the Bidder's account.

- b. Information relating to the Bidder's Prerequisites, if any, as set forth in this document.
- c. If the Bidder is a corporation: (1) a copy of its Certificate of Incorporation and, if applicable, all Amendments thereto with a written declaration signed by the Secretary of the Corporation with the corporate seal affixed thereto, stating that the copy furnished is a true copy of the Certificate of Incorporation and any such Amendments as of the date of the opening of the bid and (2) if the Bidder is not incorporated under the laws of the state in which the service is to be performed, a certificate from the Secretary of State of said state evidencing the Bidder's legal qualification to do business in that state.
- d. A statement setting forth the names of those personnel to be in overall charge of the service and those who would be exclusively assigned to supervise the service and their specific roles therein, setting forth as to each the number of years of experience and in which functions and capacities each would serve.
- e. Information to supplement any statement submitted in accordance with the Standard Contract Terms and Conditions entitled "Contractor's Integrity Provisions."
- f. In the event that the Bidder's performance on a current or past Port Authority or Port Authority Trans-Hudson Corporation (PATH) contract or contracts has been rated less than satisfactory, the Manager, Purchasing Services Division, may give oral or written notice to the Bidder to furnish information demonstrating to the satisfaction of such Manager that, notwithstanding such rating, such performance was in fact satisfactory or that the circumstances which gave rise to such unsatisfactory rating have changed or will not apply to performance of this Contract, and that such performance will be satisfactory.
- g. The Bidder recognizes that it may be required to demonstrate to the satisfaction of the Port Authority that it in fact can perform the services as called for in this Contract and that it may be required to substantiate the warranties and representations set forth herein and the statements and assurances it may be required to give.

Neither the giving of any of the aforesaid notices to a Bidder, the submission of materials by a Bidder, any meeting which the Bidder may have with the Port Authority, nor anything stated by the Port Authority in any such meeting shall be construed or alleged to be construed as an acceptance of said Bidder's Bid. Nothing stated in any such meeting shall be deemed to release any Bidder from its offer as contained in the bid documents.

13. Contractor's Integrity Provisions

By submitting a Bid, Bidders shall be deemed to have made the certifications contained in the clauses entitled "Certification of No Investigation (criminal or civil anti-trust), Indictment, Conviction, Debarment, Suspension, Disqualification and Disclosure of Other Information," and "Non-Collusive Bidding, and Code of Ethics Certification, Certification of No Solicitation Based On Commission, Percentage, Brokerage, Contingent or Other Fees" contained within the Standard Terms and Conditions within these bid documents. If the Bidder is unable to make the certifications contained therein the Bidder shall submit a statement with its Bid explaining why any such certification(s)

cannot be made. Such a submission shall be submitted in a separate envelope along with your Bid, clearly marked "CERTIFICATION STATEMENT."

14. Facility Inspection

Details regarding the Facility inspection for all parties interested in submitting a bid are stipulated in Part II hereof. All Bidders must present company identification and photo identification for access to the Facility.

15. Available Documents - General

Certain documents, listed in Part II hereof, will be made available for reference and examination by Bidders either at the Facility Inspection, or during regular business hours. Arrangements to review these documents at a time other than the Facility Inspection may be made by contacting the person listed in Part II as the contact for the Facility Inspection.

These documents were not prepared for the purpose of providing information for Bidders upon this Contract but they were prepared for other purposes, such as for other contracts or for design purposes for this or other contracts, and they do not form a part of this Contract. The Port Authority makes no representation or guarantee as to, and shall not be responsible for, their accuracy, completeness or pertinence, and, in addition, shall not be responsible for the inferences or conclusions to be drawn there from.

16. Pre-award Meeting

The lowest qualified Bidder may be called for a pre-award meeting prior to award of the Contract.

17. Price Preference

A price preference may be available for Minority/Women Business Enterprises (M/WBEs) or Small Business Enterprises (SBEs) as set forth in the Standard Contract Terms and Conditions.

18. M/WBE Subcontracting Provisions

The Port Authority has a long-standing practice of making its business opportunities available to Minority Business Enterprises (MBEs) and Women-Owned Businesses (WBEs) and has taken affirmative steps to encourage such firms to seek business opportunities with the Port Authority. The successful Bidder will use good faith efforts to provide for meaningful participation by the Port Authority certified M/WBEs as defined in this document, in the purchasing and subcontracting opportunities associated with this contract, including purchase of equipment, supplies and labor services.

Minority Business Enterprise (MBE) - means a business entity which is at least fifty one percent (51%) owned and controlled by one or more members of one or more minority groups, or, in the case of a publicly held corporation, at least fifty one percent (51%) of the stock of which is owned by one or more minority groups, and whose management and daily business operations are controlled by one or more such individuals who are citizens or permanent resident aliens.

"Minority Group" means any of the following racial or ethnic groups:

- (a) Black persons having origins in any of the Black African racial groups not of Hispanic origin;
- (b) Hispanic persons of Mexican, Puerto Rican, Dominican, Cuban, Central or South American culture or origin, regardless of race;
- (c) Asian and Pacific Islander persons having origins in any of the original peoples of the Far East, Southeast Asia, The Indian Subcontinent, or the Pacific Islands;
- (d) Native American or Alaskan native persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification.

Women-Owned Business Enterprise (WBE) - means a business enterprise which is at least fifty one percent (51%) owned by one or more women, or, in the case of a publicly held corporation, at least fifty one percent (51%) of the stock of which is owned by one or more women and whose management and daily business operations are controlled by one or more women who are citizens or permanent or resident aliens.

Good faith efforts to include participation by M/WBEs shall include, but not be limited to the following:

- 1) Dividing the services and materials to be procured into small portions where feasible;
- 2) Giving reasonable advance notice of specific subcontracting and purchasing opportunities to such firms as may be appropriate;
- 3) Soliciting services and materials from M/WBEs, which are certified by the Port Authority;
- 4) Ensuring that provision is made for timely progress payments to the M/WBEs and;
- 5) Observance of reasonable commercial standards of fair dealing in the respective trade or business.

Bidders are directed to use form PA3749B as the recording mechanism for the M/WBE participation Plan, which may be downloaded at <http://www.panynj.gov/business-opportunities/become-vendor.html>

The M/WBE Plan submitted by the Contractor to the Port Authority shall contain, at a minimum, the following:

- Identification of M/WBE's: Provide the names and addresses of all M/WBEs included in the Plan. If none are identified, describe the process for selecting participant firms in order to achieve the good faith goals under this Contract.
- Level of Participation: Indicate the percentage of M/WBE participation expected to be achieved with the arrangement described in the Plan.
- Scope of Work: Describe the specific scope of work the M/WBE's will perform.

- Previous M/WBE Participation: Describe any previous or current M/WBE participation, which the Bidder has utilized in the performance of its contracts.

All M/WBE subcontractors listed on the M/WBE Participation Plan must be certified by the Port Authority in order for the Contractor to receive credit toward the M/WBE goals set forth in this Contract. Please go to www.panynj.gov/supplierdiversity to search for M/WBEs by a particular commodity or service. The Port Authority makes no representation as to the financial responsibility of such firms or their ability to perform Work under this Contract.

Bidders shall include their M/WBE Participation Plan with their Bids, to be reviewed and approved by the Authority's Office of Business Diversity and Civil Rights (OBDCR).

If the Contractor wishes to subcontract a portion of the Work through a firm not listed in the Directory, but which the Contractor believes should be eligible because it is (1) an M/WBE, as defined above and (2) competent to perform portions of the Work, the Contractor shall submit an M/WBE Uniform Certification Application to the Port Authority of New York and New Jersey, Office of Business Diversity and Civil Rights (OBDCR), 233 Park Avenue South, 4th Floor, New York, NY 10003. The application is available online at www.panynj.gov/supplierdiversity. In addition, to update your certification file and to advise OBDCR of changes to any information, please email these changes to certhelp@panynj.gov. Credit toward applicable goals will be granted only to Port Authority certified vendors. For more information about M/WBE Programs, call (212) 435-7888.

19. Certification of Recycled Materials

Bidders are requested to submit, with their bid, a written certification entitled "Certified Environmentally Preferable Products / Practices" attached hereto as "Attachment I-A", attesting that the products or items offered by the Bidder contain the minimum percentage of post-consumer recovered material in accordance with the most recent guidelines issued by the United States Environmental Protection Agency (EPA), or, for commodities not so covered, the minimum percentage of post-consumer recovered materials established by other applicable regulatory agencies. The data submitted by the Bidder in Attachment I-A is being solicited for informational purposes only.

Recycling Definitions:

For purposes of this numbered section, the following definitions shall apply:

- a. "Recovered Material" means any waste material or by-product that has been recovered or diverted from solid waste, excluding those materials and by-products generated from, and commonly reused within, an original manufacturing process.
- b. "Post-consumer Material" means any material or finished product that has served its intended use and has been discarded for disposal or recovery having completed its life as a consumer item. "Post-consumer material" is included in the broader category of "Recovered Material".
- c. "Pre-consumer Material" means any material or by-product generated after the manufacture of a product but before the product reaches the consumer,

such as damaged or obsolete products. Pre-consumer Material does not include mill and manufacturing trim, scrap, or broken material that is generated at a manufacturing site and commonly reused on-site in the same or another manufacturing process.

d. "Recycled Product" means a product that contains the highest amount of post-consumer material practicable, or when post-consumer material is impracticable for a specific type of product, contains substantial amounts of Pre-consumer Material.

e. "Recyclable Product" means the ability of a product and its packaging to be reused, reconditioned for use, or recycled through existing recycling collection programs.

f. "Waste Reducing Product" means any product that will result in less waste generated due to its use rather than another product designed to serve the same function with an greater waste generation rate. This shall include, but not be limited to, those products that can be reused, refilled or have a longer life expectancy and contain a lesser amount of toxic constituents.

20. City Payroll Tax

Bidders should be aware of the payroll tax imposed by the:

- a. City of Newark, New Jersey for services performed in Newark, New Jersey;
- b. City of New York, New York for services performed in New York, New York; and
- c. City of Yonkers, New York for services performed in Yonkers, New York.

These taxes, if applicable, are the sole responsibility of the Contractor. Bidders should consult their tax advisors as to the effect, if any, of these taxes. The Port Authority provides this notice for informational purposes only and is not responsible for either the imposition or administration of such taxes. The Port Authority exemption set forth in the Paragraph headed "Sales or Compensating Use Taxes", in the Standard Contract Terms and Conditions included herein, does not apply to these taxes.

21. Additional Bidder Information

Prospective Bidders are advised that additional vendor information, including but not limited to, forms, documents and other information, including protest procedures, may be found on the Port Authority website at: <http://www.panynj.gov/business-opportunities/become-vendor.html>

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PART II - CONTRACT SPECIFIC INFORMATION FOR BIDDERS

The following information may be referred to in other parts hereof, or further detailed in other parts hereof, if applicable.

1. Service(s) Required

Provide maintenance, monitoring, management, and operation of underground storage tanks and oil/water separators.

2. Location(s) Services Required

Newark Liberty International Airport and Teterboro Airport, as more fully described in the definition of "Facility" in the Specifications.

3. Expected Date of Commencement of Contract

On or about February 15, 2015

4. Contract Type

Lump Sum and Unit Price

5. Duration of Contract

Three (3) years to expire on or about February 14, 2018

6. Extension Period

120-day Extension Period applicable

7. Facility Inspection

Date and Time: December 9, 2014 at 10 a.m.

A Facility Inspection will be held at 80 Brewster Rd, Newark Liberty International Airport (EWR), Newark, NJ 07114. Please contact Jonathan Chewey at 973-961-6099 to confirm attendance and/or receive travel directions.

8. Specific Bidder's Prerequisites

- a. The Bidder shall have had at least three (3) years of continuous experience immediately prior to the date of submission of its bid in the management and operation of company that provides service to underground storage tanks and during that time shall have actually engaged in providing said or such services to commercial or industrial accounts under contract. The Bidder may fulfill this prerequisite if the Bidder can demonstrate to the satisfaction of the Port Authority that the persons or entities owning and controlling the Bidder have had a cumulative total of at least three (3) years of experience immediately prior to the date of the submission of its bid in the management and operation of a business actually engaged in providing these services to commercial or industrial accounts under contract during that time, or have owned and controlled other entities which have actually engaged in providing the above described services during that time period.

- b. During the time period stated in (a) above, the Bidder, or persons or entities owning and controlling the Bidder, shall have performed or be performing under at least one contract requiring similar services of similar scope to those required under this Contract.
- c. The Bidder shall have earned in its last fiscal year, or the last complete calendar year immediately preceding the opening of its bid, a minimum of five hundred thousand dollars (\$500,000) annual gross income from the type of service required under this Contract.
- d. In the event a bid is submitted by a joint venture the foregoing prerequisites will be considered with respect to such Bid as follows: The prerequisite in subparagraph (a) and (b) above, will be considered satisfied if the joint venture itself, or any of its participants individually, can meet the requirements. The prerequisite in subparagraph (c) above, will be considered satisfied if the gross income of the joint venture itself meets the prerequisite or if the gross income of the participants in the joint venture cumulatively meets the prerequisite. If a joint venture which has not been established as a distinct legal entity submits a bid, it and all participants in the joint venture shall be bound jointly and severally and each such participant in the joint venture shall execute the bid and do each act and thing required by this Invitation for Bid. On the original bid and wherever else the Bidder's name would appear, the name of the joint venture Bidder should appear if the joint venture is a distinct legal entity. If the Bidder is a common law joint venture, the names of all participants should be listed followed by the words "acting jointly and severally". All joint venture Bidders must provide documentation of their legal status.
- e. The Bidder shall have at the time of bid a current and valid entire underground storage tank (UST) system installer certification issued by the New Jersey Department of Environmental Protection (NJDEP).

Proof that the above prerequisites are met should be submitted with the bid.

9. Available Documents

The following documents will be made available for reference and examination at the facility inspection:

Maintenance, Monitoring and Operation of Underground Storage Tanks and Oil/Water Separators at Newark Liberty International Airport; Bid 16303; Contract #4600008967; Purchase Order # 4500063025.

These documents were not prepared for the purpose of providing information for Bidders upon the present Contract but they were prepared for other purposes, such as for other contracts or for design purposes for this or other contracts, and they do not form a part of this Contract. The Port Authority/PATH makes no representation or guarantee as to, and shall not be responsible for their accuracy, completeness or pertinence, and, in addition, shall not be responsible for the conclusions to be drawn therefrom. They are made available to the Bidders merely for the purpose of

providing them with such information as is in the possession of the Port Authority/PATH, whether or not such information may be accurate, complete or pertinent or of any value to the bidders.

10. Contractor Staff Background Screening

The Contractor awarded this contract may be required to have its staff, and any subcontractor's staff working under this Contract, authorize the Authority or its designee to perform background checks. Such authorization shall be in a form acceptable to the Authority. The Contractor (and subcontractor) may also be required to use an organization designated by the Authority to perform the background checks. The cost for said background checks for staff that pass and are granted a credential shall be reimbursable to the Contractor (and its subcontractors) as an out-of-pocket expense. The cost for background checks for staff that are rejected for a credential for any reason are not reimbursable.

As of January 29, 2007, the Secure Worker Access Consortium (S.W.A.C.) is the only Port Authority approved provider to be used to conduct background screening, except as otherwise required by federal law and/or regulation. Information about S.W.A.C., instructions, corporate enrollment, online applications, and location of processing centers can be found at <http://www.secureworker.com>, or S.W.A.C. may be contacted directly at (877)522-7922.

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PART III – CONTRACT SPECIFIC TERMS AND CONDITIONS

1. General Agreement

Subject to all of the terms and conditions of this Contract, the undersigned (hereinafter called the “Contractor”) hereby offers and agrees to provide all the necessary supervision, personnel, equipment, materials and all other things necessary to perform the Work required by this Contract as specified in Part II, and fully set forth in Part V, (the “Specifications,”) at the location(s) listed in Part II and fully set forth in the Specifications, and do all other things necessary or proper therefor or incidental thereto, all in strict accordance with the provisions of the Contract Documents and any future changes therein; and the Contractor further agrees to assume and perform all other duties and obligations imposed upon it by this Contract.

In addition, all things not expressly mentioned in the Specifications but involved in the carrying out of their intent and in the complete and proper execution of the matters referred to in and required by this Contract are required by the Specifications, and the Contractor shall perform the same as though they were specifically delineated, described and mentioned therein.

2. Duration

- a) The initial term of this Contract (hereinafter called the “Base Term”) shall commence on or about the date specified in Part II hereof, on the specific date set forth in the Port Authority’s written notice of bid acceptance (hereinafter called the “Commencement Date”), and unless otherwise terminated, revoked or extended in accordance with the provisions hereof, shall expire as specified in Part II hereof (hereinafter called the “Expiration Date”).
- b) Unless specified as not applicable to this Contract in Part II hereof, the Port Authority shall have the absolute right to extend the Base Term for an additional period of up to one hundred and twenty (120) days subsequent to the Expiration Date of the Base Term, or the Expiration Date of the final exercised Option Period (hereinafter called the “Extension Period”), subject to the same terms and conditions as the previous contract period. The prices quoted by the Contractor for the previous contract period shall remain in effect during this Extension Period without adjustment. If it so elects to extend this Contract, the Port Authority will advise the Contractor, in writing, that the term is so extended, and stipulate the length of the extended term, at least thirty (30) days prior to the expiration date of the previous contract period.

3. Payment

Subject to the provisions of this Contract, the Port Authority agrees to pay to the Contractor and the Contractor agrees to accept from the Port Authority as full and complete consideration for the performance of all its obligations under this Contract and as sole compensation for the Work performed by the Contractor hereunder, a compensation calculated from the actual quantities of services performed and the respective prices inserted by the Contractor in the Pricing Sheet(s), forming a part of

this Contract, exclusive of compensation under the clause hereof entitled “Extra Work”. The manner of submission of all bills for payment to the Contractor by the Port Authority for Services rendered under this Contract shall be subject to the approval of the Manager in all respects, including, but not limited to, format, breakdown of items presented and verifying records. All computations made by the Contractor and all billing and billing procedures shall be done in conformance with the following procedures:

- a) Payment shall be made in accordance with the prices for the applicable service (during the applicable Contract year) as they appear on the Pricing Sheet(s), as the same may be adjusted from time to time as specified herein, minus any deductions for services not performed and/or any liquidated damages to which the invoice may be subject and/or any adjustments as may be required pursuant to increases and decreases in areas or frequencies, if applicable. All Work must be completed within the time frames specified or as designated by the Manager
- b) The Contractor shall submit to the Manager by the fifth (5th) day of each month following the month of commencement of this Contract and on or by the fifth day of each month thereafter (including the month following the termination, revocation or expiration of this Contract) a complete and correct invoice for the Work performed during the preceding month accompanied by such information as may be required by the Manager for verification. The invoice must show the Contractor's Federal Tax Identification Number. Payment will be made within thirty (30) days of Port Authority verification of the invoice.
- c) No certificate, payment, acceptance of any Work or any other act or omission of any representative of the Port Authority shall operate to release the Contractor from any obligation under or upon this Contract, or to stop the Port Authority from showing at any time that such certificate, payment, acceptance, act or omission was incorrect or to preclude the Port Authority from recovering any monies paid in excess of those lawfully due and any damage sustained by the Port Authority.
- d) In the event an audit of received invoices should indicate that the correct sum due the Contractor for the relevant billing period is less than the amount actually paid by the Port Authority, the Contractor shall pay to the Port Authority the difference promptly upon receipt of the Port Authority’s statement thereof. The Port Authority may, however, in its discretion elect to deduct said sum or sums from any subsequent monthly payments payable to the Contractor hereunder.

“Final Payment”, as the term is used throughout this Contract, shall mean the final payment made for services rendered in the last month of the Base Term or any extended term. However should this Contract be terminated for any reason prior to the last month of the Base Term or any extended term, then Final Payment shall be the payment made for services rendered in the month during which such termination becomes effective. The Contractor’s acceptance of Final Payment shall act as a full and complete release to the Port Authority of all claims of and of all liability to the Contractor for all things done or furnished in connection with this Contract and for every act and neglect of the Port Authority and others relating to or arising out of this

Contract, including claims arising out of breach of contract and claims based on claims of third persons. No payment, however, final or otherwise shall operate to release the Contractor from any obligations in connection with this Contract.

4. Liquidated Damages

- a) The Contractor's obligations for the performance and completion of the Work within the time or times provided for in this Contract are of the essence of this Contract. In the event that the Contractor fails to satisfactorily perform all or any part of the Work required hereunder in accordance with the requirements set forth in the Specifications (as the same may be modified in accordance with provisions set forth elsewhere herein) then, inasmuch as the damage and loss to the Port Authority for such failure to perform includes items of loss whose amount will be incapable or very difficult of accurate estimation, the damages for such failure to perform shall be liquidated as follows:
 - i. If during any designated time period the Contractor fails to perform any or any part of any of the Services specified in the Contract Specifications (as they may, as hereinafter provided, be revised) satisfactorily or on time, the compensation payable by the Port Authority to the Contractor for that designated time period shall be reduced by an amount equal to the cumulative total of two hundred percent (200%) of the applicable lump sum price for every Service that was not performed satisfactorily or on time.
 - ii. In the event a Contractor's employee fails to wear a full uniform or ID as required hereunder, the payment by the Port Authority to the Contractor shall be reduced by fifty dollars (\$50) per day for each day such Contractor's employee fails to wear said uniform or ID.
 - iii. In the event a Contractor's employee fails to wear and have operational a cellular phone as required hereunder, the payment by the Port Authority to the Contractor shall be reduced by fifty dollars (\$50) per day for each day such Contractor's employee fails to wear and have operational said cellular phone.
 - iv. If the Contractor fails to respond to an emergency within the response time required by the Specifications, then the amount payable to the Contractor under this Contract shall be reduced by one hundred dollars (\$100) per hour for each hour, or part thereof, past the response time that the Contractor fails to provide the required Service.
 - v. If the Contractor fails to provide a cost estimate for Extra Work within ten (10) business days of receiving the request from the Manager, pursuant to Section 7 of Part III herein, the payment by the Port Authority to the Contractor shall be reduced by fifty dollars (\$50) per day for each day that the Contractor fails to provide the required cost estimate.

- b) The Manager shall determine whether the Contractor has performed in a satisfactory manner and their determination shall be final, binding and conclusive upon the Contractor.
- c) Failure of the Manager or the Port Authority to impose liquidated damages shall not be deemed Port Authority acceptance of unsatisfactory performance or a failure to perform on the part of the Contractor or a waiver of its remedies hereunder.

5. Insurance Procured by the Contractor

The Contractor shall take out, maintain, and pay the premiums on Commercial General Liability Insurance, including but not limited to premises-operations, products-completed operations, and independent contractors coverage, with contractual liability language covering the obligations assumed by the Contractor under this Contract and, if vehicles are to be used to carry out the performance of this Contract, then the Contractor shall also take out, maintain, and pay the premiums on Automobile Liability Insurance covering owned, non-owned, and hired autos in the following minimum limits:

Commercial General Liability Insurance - \$25 million combined single limit per occurrence for bodily injury and property damage liability.

Automobile Liability Insurance - \$25 million combined single limit per accident for bodily injury and property damage liability.

Environmental Liability Insurance:

The Contractor shall procure and maintain in force an Environmental Liability Insurance Policy covering the Contractor's pollution legal liability, including cleanup, with limits not less than \$5,000,000 per occurrence for bodily injury and property damage tailored to the specific exposures as they relate to the Work of this Contract.

Such policy and any certificate of insurance submitted hereunder in relation to such policy shall (I) be expressly endorsed for each Authority facility under this Contract and each transfer location, travel route and material disposition location selected by the Contractor, (II) state that claims disputes and coverage shall be litigated in United States courts having jurisdiction, and not be limited to arbitration, and (III) acknowledge the Contractor's disclosure to the insurance carrier that the material may be considered a hazardous substance/waste under applicable law including, but not limited to, RCRA and/or CERCLA and/or the Toxic Substance Control Act (TSCA). It should be noted that the substances may be considered "hazardous" under CERCLA, but not necessarily "hazardous" under RCRA and that such materials if RCRA "hazardous" would require a manifest and disposal certificate under RCRA at a Subtitle C hazardous waste disposal facility. A copy of this Contract, including all schedules and documents attached hereto, shall be provided to the insurance carrier.

In addition, the liability policy (ies) shall name The Port Authority of New York & New Jersey, its related entities, their commissioners, directors, officers, partners, employees and agents as additional insured, including but not limited to premises-operations, products-completed operations on the Commercial General Liability Policy. Moreover, the Commercial General Liability Policy shall not contain any provisions for exclusions from liability other than provisions for exclusion from liability forming part of the most up to date ISO form or its equivalent unendorsed Commercial General Liability Policy. The liability policy (ies) and certificate of insurance shall contain separation of insured conditions and severability of interests clauses for all policies. These insurance requirements shall be in effect for the duration of the contract to include any warrantee /guarantee period and any maintenance period . An act or omission of one of the insureds shall not reduce or void coverage to the other insureds. Furthermore, the Contractor’s insurance shall be primary insurance as respects to the above additional insureds. Any insurance or self-insurance maintained by the above additional insureds shall not contribute to any loss or claim

The certificate of insurance and liability policy (ies) must contain the following endorsement for the above liability coverages:

“The insurer(s) shall not, without obtaining the express advance written permission from the General Counsel of the Port Authority, raise any defense involving in any way the jurisdiction of the Tribunal over the person of the Port Authority, the immunity of the Port Authority, its Commissioners, officers, agents or employees, the governmental nature of the Port Authority, or the provisions of any statutes respecting suits against the Port Authority.”

The Contractor shall also take out, maintain, and pay premiums on **Workers’ Compensation Insurance** in accordance with the requirements of law in the state(s) where work will take place, and Employer’s Liability Insurance with limits of not less than \$1 million each accident.

Each policy above shall contain a provision that the policy may not be canceled, terminated, or modified without thirty (30) days’ prior written notice to the Port Authority of NY and NJ, Att: Facility Contract Administrator, at the location where the work will take place and to the General Manager, Risk Financing.

The Port Authority may at any time during the term of this agreement change or modify the limits and coverages of insurance. Should the modification or change results in an additional premium, The General Manager, Risk Financing for the Port Authority may consider such cost as an out-of-pocket expense.

Within five (5) days after the award of this agreement or contract and prior to the start of work, the Contractor must submit an original certificate of insurance, to the Port

Authority of NY and NJ, Facility Contract Administrator, at the location where the work will take place. This certificate of insurance MUST show evidence of the above insurance policy (ies), stating the agreement/contract number prior to the start of work. The General Manager, Risk Financing must approve the certificate(s) of insurance before any work can begin. Upon request by the Port Authority, the Contractor shall furnish to the General Manager, Risk Financing, a certified copy of each policy, including the premiums.

If at any time the above liability insurance should be canceled, terminated, or modified so that the insurance is not in effect as above required, then, if the Manager shall so direct, the Contractor shall suspend performance of the contract at the premises. If the contract is so suspended, no extension of time shall be due on account thereof. If the contract is not suspended (whether or not because of omission of the Manager to order suspension), then the Authority may, at its option, obtain insurance affording coverage equal to the above required, the cost of such insurance to be payable by the Contractor to the Port Authority.

Renewal certificates of insurance or policies shall be delivered to the Facility Contractor Administrator, Port Authority at least fifteen (15) days prior to the expiration date of each expiring policy. The General Manager, Risk Financing must approve the renewal certificate(s) of insurance before work can resume on the facility. If at any time any of the certificates or policies shall become unsatisfactory to the Port Authority, the Contractor shall promptly obtain a new and satisfactory certificate and policy.

The requirements for insurance procured by the Contractor shall not in any way be construed as a limitation on the nature or extent of the contractual obligations assumed by the Contractor under this contract. The insurance requirements are not a representation by the Authority as to the adequacy of the insurance to protect the Contractor against the obligations imposed on them by law or by this or any other Contract. [CITS#4582N]

6. Increase and Decrease in Areas or Frequencies

The Manager shall have the right, at any time and from time to time in their sole discretion, to increase or decrease the frequencies of all or any part of the services required hereunder and/or to add areas not described herein in the Specifications or remove areas or parts of areas which are hereunder so described. In the event the Manager decides to change any frequencies or areas such change shall be by written notice not less than forty-eight (48) hours, said changes to be effective upon the date specified in said notice.

In the event of an increase or decrease in areas or frequencies, the Contractor's compensation will be adjusted to reflect such change in areas or frequencies utilizing the applicable Unit Price for such services (for the applicable Contract year) as set forth on the Pricing Sheet(s).

Where no specific Unit Price has been quoted for the type of services to be increased or decreased, the Manager shall have the right to negotiate the compensation to reflect such change, whether an increase or decrease in areas or frequencies, which, in the opinion of the Manager, are necessary to complete the work, by multiplying the increased or decreased amount by the negotiated rate.

In the event of a decrease, the Contractor shall not be entitled to compensation for Work not performed.

No such change in areas or frequencies will be implemented which results in a total increase or decrease in compensation that is greater than fifty percent (50%) of the Total Estimated Contract Price for the Base Term or, if changes are to be implemented during an Option Period, fifty percent (50%) for that Option Period.

Any increases in frequencies or areas shall not constitute Extra Work and, as such, shall not be limited by the Extra Work provisions of this Contract Extra Work

7. Extra Work

The Contractor is required to provide separate materials, supplies, equipment and personnel for Extra Work when such is deemed necessary by the Manager. "Extra Work" as used herein shall be defined as work which differs from that expressly or impliedly required by the Specifications in their present form. Total Extra Work performed by the Contractor shall not exceed six percent (6%) of the Total Estimated Contract Price of this Contract for the entire Term of this Contract including extensions thereof, or six percent (6%) of the Total Estimated Contract Price of each Section if this Contract is awarded by separate Sections.

An increase in area or frequency does not constitute Extra Work, but shall be compensable based on the prices in the Pricing Sheet(s) and the paragraph herein titled "Increase or Decrease in Areas or Frequencies".

From time to time, the Contractor will be required to provide a cost estimate to the Manager, for approval, prior to performing extra work. The Contractor will be compensated for providing this estimate pursuant to the following paragraphs. The estimate must be provided to the Manager within ten (10) business days from receiving the request from the Manager.

The Contractor is required to perform Extra Work pursuant to a written order of the Manager expressly recognizing such work as Extra Work. If Lump Sum or Unit Price compensation cannot be agreed upon by the parties in writing prior to the start of Work, the Contractor shall perform such Extra Work and the Contractor's compensation shall be increased by the sum of the following amounts and such amounts only: (1) the actual net cost, in money, of the labor, and material, required for such Extra Work; (2) ten percent (10%) of the amount under (1) above; (3) such rental as the Manager deems reasonable for plant and equipment (other than small tools) required for such Extra Work; (4) if the Extra Work is performed by a subcontractor, an additional five percent (5%) of the sum of the amounts under (1) through (3) above. Three bids must be solicited for all subcontracting during extra work.

As used in this numbered clause (and in this clause only):

“Labor” means laborers, mechanics, and other employees below the rank of supervisor, directly employed at the Site of the Work subject to the Manager or their designee’s authority to determine what employees of any category are “required for Extra Work” and as to the portion of their time allotted to Extra Work; and “cost of labor” means the wages actually paid to and received by such employees plus a proper proportion of (a) vacation allowances and union dues and assessments which the employer actually pays pursuant to contractual obligation upon the basis of such wages, and (b) taxes actually paid by the employer pursuant to law upon the basis of such wages and workers’ compensation premiums paid pursuant to law.

“Employees” as used above means only the employees of one employer.

“Net Cost” shall be the Contractor’s actual cost after deducting all permitted cash and trade discounts, rebates, allowances, credits, sales taxes, commissions, and refunds (whether or not any or all of the same shall have been taken by the Contractor) of all parts and materials purchased by the Contractor solely for the use in performing its obligation hereunder provided, where such purchase has received the prior written approval of the Manager as required herein. The Contractor shall promptly furnish to the Manager such bills of sale and other instruments as the Manager may require, executed, acknowledged and delivered, assuring to the Manager title to such materials, supplies, equipment, parts, and tools free of encumbrances.

“Materials” means temporary and consumable materials as well as permanent materials; and “cost of materials” means the price (including taxes actually paid by the Contractor pursuant to law upon the basis of such materials) for which such materials are sold for cash by the manufacturers or producers thereof, or by regular dealers therein, whether or not such materials are purchased directly from the manufacturer, producer or dealer (or if the Contractor is the manufacturer or producer thereof, the reasonable cost to the Contractor of the manufacture and production), plus the reasonable cost of delivering such materials to the Site of the Work in the event that the price paid to the manufacturer, producer or dealer does not include delivery and in case of temporary materials, less their salvage value, if any.

The Manager shall have the authority to decide all questions in connection with the Extra Work. The exercise by the Manager of the powers and authorities vested in him/her by this section shall be binding and final upon the Port Authority and the Contractor.

The Contractor shall submit all reports, records and receipts as are requested by the Manager so as to enable him/her to ascertain the time expended in the performance of the Extra Work, the quantity of labor and materials used therein and the cost of said labor and materials to the Contractor.

The provisions of this Contract relating generally to Work and its performance shall apply without exception to any Extra Work required and to the performance thereof. Moreover, the provisions of the Specifications relating generally to the Work and its performance shall also apply to any Extra Work required and to the performance thereof, except to the extent that a written order in connection with any particular item of Extra Work may expressly provide otherwise.

If the Contractor deems work to be Extra Work, the Contractor shall give written notice to the Manager within twenty-four (24) hours of performing the work that it so

considers as Extra Work, and failure of the Contractor to provide said notice shall be a waiver of any claim to an increase in compensation for such work and a conclusive and binding determination that it is not Extra Work.

The Contractor shall supply the equipment and personnel required by the Manager within twenty-four (24) hours following the receipt of written or verbal notice from the Manager in the case of an emergency as determined by the Manager. Where oral notification is provided hereunder, the Manager shall thereafter confirm the same in writing.

All Extra Work shall be billed to the Port Authority on a separate invoice on a monthly basis.

PART IV – SIGNATURE SHEET, NAME AND RESIDENCE OF PRINCIPALS SHEET AND PRICING SHEET(S), TABLE OF CONTENTS

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PART IV – SIGNATURE SHEET, NAME AND RESIDENCE OF PRINCIPALS SHEET AND PRICING SHEET(S)

1. SIGNATURE SHEET

OFFER: The undersigned offers and agrees to furnish to the Port Authority of New York and New Jersey the services and/or materials in compliance with all terms, conditions, specifications and addenda of the Contract. Signature also certifies understanding and compliance with the certification requirements of the standard terms and conditions as contained in the Standard Contract Terms and Conditions. This offer shall be irrevocable for 120 days after the date on which the Port Authority opens this bid.

ONLY THE COMPANY NAMED AS THE BIDDING ENTITY BELOW WILL RECEIVE PAYMENT. THIS MUST BE THE SAME NAMED COMPANY AS INDICATED ON THE COVER SHEET

Bidding Entity _____

Bidder's Address _____

City, State, Zip _____

Telephone No. _____ FAX _____

Email _____ EIN# _____

SIGNATURE _____ Date _____

Print Name and Title _____

ACKNOWLEDGEMENT:

STATE OF: _____

COUNTY OF: _____

On this ___ day of _____, 20___, personally came before me, _____, who duly sworn by me, did depose that (s)he has knowledge of the matters herein stated and they are in all respects true and that (s)he has been authorized to execute the foregoing offer and statement of irrevocability on behalf of said corporation, partnership or firm.

Notary Public

NOTE: If a joint venture is bidding, duplicate this Signature Sheet and have each party to the joint venture sign separately and affix to the back of this Signature Sheet.

Bidder attention is called to the certification requirements contained in the Standard Contract Terms and Conditions, Part III. Indicate below if a signed, explanatory statement in connection with this section is attached hereto.

If certified by the Port Authority as an SBE or MWBE: _____ (indicate which one and date).

2. NAME AND RESIDENCE OF PRINCIPALS SHEET

Names and Residence of Principals of Bidder. If general or limited partner, or individual, so indicate.

NAME	TITLE	ADDRESS OF RESIDENCE (Do not give business address)
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3. PRICING SHEET(S)

Entry of Prices

- a. The prices quoted shall be written in figures, in ink (preferably in black ink) where required in the spaces provided on the Pricing Sheet(s) attached hereto and made a part hereof.
- b. All Bidders are asked to ensure that all charges quoted for similar operations in the Contract are consistent.
- c. Prices must be submitted for each Item required on the Pricing Sheet(s). Bidders are advised that the Items on the Pricing Sheet(s) correspond to the required services set forth in the Specifications hereunder.
- d. Bidders must insert all figures as required and verify all computations for accuracy. The Port Authority in its sole judgment reserves the right to: (1) reject Bids without checking them for mathematical errors or omissions, (2) reject Bids that contain or appear to contain errors or omissions, and (3) supply corrections to Bids that contain or appear to contain mathematical errors and omissions, and in this case the Port Authority reserves the right to recompute the Estimated Annual Contract Price based upon the Unit Prices inserted by the Bidder, which amount shall govern in all cases.
- e. In the event that a Bidder quotes an amount in the Estimated Annual Contract Price column but omits a Unit Price quotation for that amount in the space provided, the Port Authority reserves the right to compute and insert the appropriate Unit Price.
- f. The Estimated Three (3) Year Contract Price is solely for the purpose of facilitating the comparisons of Bids. Compensation shall be in accordance with the section of this Contract entitled "Payment".

PRICING SHEET

FIRST YEAR

Newark Liberty International Airport Compliance and Maintenance Tasks

FIRST YEAR

Item

I. Building 1

	Annual		Estimated		Est. Annual
A. <u>Compliance Tasks</u>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Annual Lump Sum Price	\$ _____	x	1	=	\$ _____

	Monthly		Estimated		
B. <u>Maintenance Tasks</u>	<u>Lump Sum Price</u>		<u>Quantity</u>	=	\$ _____
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____

Oil/Water Separator
Empty, scrub down and thoroughly
clean interior surfaces

	Annual		Estimated		
Annual Lump Sum Price	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	\$ _____
	\$ _____	x	1	=	\$ _____

II. Building 11

	Monthly		Estimated		Est. Annual
A. <u>Compliance Tasks</u>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____

	Monthly		Estimated		
B. <u>Maintenance Tasks</u>	<u>Lump Sum Price</u>		<u>Quantity</u>	=	\$ _____
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____

Oil/Water Separator with Grit Chamber and Lift Station
Empty, scrub down and
thoroughly clean interior
surfaces

			Estimated		
Biannual Lump Sum Price	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	\$ _____
	\$ _____	x	2	=	\$ _____

PRICING SHEET
FIRST YEAR

Newark Liberty International Airport Compliance and Maintenance Tasks

III. Building 14

	Monthly		Estimated		Est. Annual
<i>A. <u>Compliance Tasks</u></i>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Monthly Lump Sum Price	\$_____	x	12	=	\$_____
	Monthly		Estimated		
<i>B. <u>Maintenance Tasks</u></i>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$_____	x	12	=	\$_____
Oil/Water Separator Empty, scrub down and thoroughly clean interior surfaces	Annual <u>Lump Sum Price</u>		Estimated <u>Quantity</u>		
Annual Lump Sum Price	\$_____	x	1	=	\$_____
Tightness test for one 20,000 gallon Heating Oil UST System	Annual <u>Lump Sum Price</u>		Estimated <u>Quantity</u>		
Annual Lump Sum Price	\$_____	x	1	=	\$_____

IV. Building 46

	Monthly		Estimated		Est. Annual
<i>A. <u>Compliance Tasks</u></i>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Monthly Lump Sum Price	\$_____	x	12	=	\$_____
	Monthly		Estimated		
<i>B. <u>Maintenance Tasks</u></i>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$_____	x	12	=	\$_____
Tightness test for two 60,000 gallon Heating Oil UST Systems	Annual <u>Lump Sum Price</u>		Estimated <u>Quantity</u>		
Annual Lump Sum Price	\$_____	x	1	=	\$_____

PRICING SHEET
FIRST YEAR

Newark Liberty International Airport Compliance and Maintenance Tasks

V. Building 60

	Monthly		Estimated		Est. Annual
A. <u>Compliance Tasks</u>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____

	Monthly		Estimated		
B. <u>Maintenance Tasks</u>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____

Oil/Water Separator and Two Chamber Sand Interceptor
Empty, scrub down and
thoroughly clean interior
surfaces

	Annual		Estimated		
	<u>Lump Sum Price</u>		<u>Quantity</u>		
Annual Lump Sum Price	\$ _____	x	1	=	\$ _____

VI. Building 76

	Monthly		Estimated		Est. Annual
A. <u>Compliance Tasks</u>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____

	Monthly		Estimated		
B. <u>Maintenance Tasks</u>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____

VII. Building 79

	Annual		Estimated		Est. Annual
A. <u>Compliance Tasks</u>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Annual Lump Sum Price	\$ _____	x	1	=	\$ _____

	Monthly		Estimated		
B. <u>Maintenance Tasks</u>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____

Highland Tank Oil/Water Separator 550 gallons and
Two Chamber Sand Interceptor
Empty, scrub down and
thoroughly clean interior surfaces

	Annual		Estimated		
	<u>Lump Sum Price</u>		<u>Quantity</u>		
Biannual Lump Sum Price	\$ _____	x	2	=	\$ _____

PRICING SHEET
FIRST YEAR

Newark Liberty International Airport Compliance and Maintenance Tasks

Highland Tank Oil/Water Separator 1000 gallons
Empty, scrub down and
thoroughly clean interior surfaces

Annual Lump Sum Price	<u>Annual Lump Sum Price</u>	x	<u>Estimated Quantity</u>	=	\$ _____
	\$ _____		1		

Monthly Lump Sum Price	<u>Monthly Lump Sum Price</u>	x	<u>Estimated Quantity</u>	=	\$ _____
	\$ _____		12		

VIII. Building 113

<i>A. <u>Compliance Tasks</u></i>	<u>Monthly Lump Sum Price</u>	x	<u>Estimated Quantity</u>	=	<u>Est. Annual Contract Price Per Item</u>
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____

<i>B. <u>Maintenance Tasks</u></i>	<u>Monthly Lump Sum Price</u>	x	<u>Estimated Quantity</u>	=	\$ _____
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____

IX. Building 115

<i>A. <u>Compliance Tasks</u></i>	<u>Monthly Lump Sum Price</u>	x	<u>Estimated Quantity</u>	=	<u>Est. Annual Contract Price Per Item</u>
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____

<i>B. <u>Maintenance Tasks</u></i>	<u>Monthly Lump Sum Price</u>	x	<u>Estimated Quantity</u>	=	\$ _____
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____

X. Parking Lots P-1 and P-3

<i>A. <u>Maintenance Tasks</u></i>	<u>Annual Lump Sum Price</u>	x	<u>Estimated Quantity</u>	=	<u>Est. Annual Contract Price Per Item</u>
Annual Lump Sum Price	\$ _____	x	1	=	\$ _____

PRICING SHEET

FIRST YEAR

Teterboro Airport Compliance and Maintenance Tasks

FIRST YEAR

I. Building 73

	Monthly		Estimated		Est. Annual
<i>A Maintenance Tasks</i>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____
Highland Tank Oil/Water Separator 550 gallons Empty, scrub down and thoroughly clean interior surfaces	Annual <u>Lump Sum Price</u>		Estimated <u>Quantity</u>		
Annual Lump Sum Price	\$ _____	x	1	=	\$ _____
Highland Tank Oil/Water Separator 550 gallons Demolition	Annual <u>Lump Sum Price</u>		Estimated <u>Quantity</u>		
Lump Sum Price	\$ _____	x	1	=	\$ _____
Highland Tank Oil/Water Separator 550 gallons Inspection	Annual <u>Lump Sum Price</u>		Estimated <u>Quantity</u>		
Lump Sum Price	\$ _____	x	1	=	\$ _____
Highland Tank Oil/Water Separator 550 gallons Installation	Annual <u>Lump Sum Price</u>		Estimated <u>Quantity</u>		
Lump Sum Price	\$ _____	x	1	=	\$ _____
Highland Tank Oil/Water Separator 1000 gallons Empty, scrub down and thoroughly clean interior surfaces	Annual <u>Lump Sum Price</u>		Estimated <u>Quantity</u>		
Annual Lump Sum Price	\$ _____	x	1	=	\$ _____
Highland Tank Oil/Water Separator 355 gallons and Sand Interceptor Empty, scrub down and thoroughly clean interior surfaces	Annual <u>Lump Sum Price</u>		Estimated <u>Quantity</u>		
Annual Lump Sum Price	\$ _____	x	1	=	\$ _____

Total Yearly Estimated Contract Price

Non-Hazardous Waste Disposal Price Per Gallon

Truck Wash System Clean out Unit Price	<u>Unit Price</u> \$ _____	x	Estimated <u>Quantity</u> 15,000 gallons=	=	\$ _____
Oil Water Separator Clean out Unit Price	<u>Unit Price</u> \$ _____	x	Estimated <u>Quantity</u> 15,000 gallons=	=	\$ _____
Storm Water Collection System Clean out Unit Price	<u>Unit Price</u> \$ _____	x	Estimated <u>Quantity</u> 20,000 gallons=	=	\$ _____

Service Work Hourly Price (Hourly Prices for work not part of the Monthly, Annual or other Lump Sum Prices specified herein, see Part V Section 2)

Hourly Unit Price (Service Work performed by Technician)	Hourly <u>Unit Price</u> \$ _____	x	Estimated <u>Quantity</u> 75	=	Est. Annual Contract Price <u>Per Item</u> \$ _____
Hourly Unit Price (Service Work performed by other than Technician)	Hourly <u>Unit Price</u> \$ _____	x	Estimated <u>Quantity</u> 75	=	Est. Annual Contract Price <u>Per Item</u> \$ _____

Estimated Contract Price First-Year \$ _____

PRICING SHEET
SECOND YEAR

Newark Liberty International Airport Compliance and Maintenance Tasks

SECOND YEAR

Item

I. Building 1

	Annual		Estimated		Est. Annual
A. <u>Compliance Tasks</u>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Annual Lump Sum Price	\$_____	x	1	=	\$_____
	Monthly		Estimated		
B. <u>Maintenance Tasks</u>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$_____	x	12	=	\$_____
Oil/Water Separator Empty, scrub down and thoroughly clean interior surfaces	Annual		Estimated		
	<u>Lump Sum Price</u>		<u>Quantity</u>		
Annual Lump Sum Price	\$_____	x	1	=	\$_____

II. Building 11

	Monthly		Estimated		Est. Annual
A. <u>Compliance Tasks</u>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Monthly Lump Sum Price	\$_____	x	12	=	\$_____
	Monthly		Estimated		
B. <u>Maintenance Tasks</u>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$_____	x	12	=	\$_____
Oil/Water Separator with Grit Chamber and Lift Station Empty, scrub down and thoroughly clean interior surfaces			Estimated		
	<u>Lump Sum Price</u>		<u>Quantity</u>		
Biannual Lump Sum Price	\$_____	x	2	=	\$_____

PRICING SHEET
SECOND YEAR

Newark Liberty International Airport Compliance and Maintenance Tasks

III. Building 14

	Monthly		Estimated		Est. Annual
<i>A. <u>Compliance Tasks</u></i>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Monthly Lump Sum Price	\$_____	x	12	=	\$_____
	Monthly		Estimated		
<i>B. <u>Maintenance Tasks</u></i>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$_____	x	12	=	\$_____
Oil/Water Separator Empty, scrub down and thoroughly clean interior surfaces	Annual		Estimated		
	<u>Lump Sum Price</u>		<u>Quantity</u>		
Annual Lump Sum Price	\$_____	x	1	=	\$_____

IV. Building 46

	Monthly		Estimated		Est. Annual
<i>A. <u>Compliance Tasks</u></i>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Monthly Lump Sum Price	\$_____	x	12	=	\$_____
	Monthly		Estimated		
<i>B. <u>Maintenance Tasks</u></i>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$_____	x	12	=	\$_____

V. Building 60

	Monthly		Estimated		Est. Annual
<i>A. <u>Compliance Tasks</u></i>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Monthly Lump Sum Price	\$_____	x	12	=	\$_____
	Monthly		Estimated		
<i>B. <u>Maintenance Tasks</u></i>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$_____	x	12	=	\$_____
Oil/Water Separator and Two Chamber Sand Interceptor Empty, scrub down and thoroughly clean interior surfaces	Annual		Estimated		
	<u>Lump Sum Price</u>		<u>Quantity</u>		
Annual Lump Sum Price	\$_____	x	1	=	\$_____

PRICING SHEET
SECOND YEAR

Newark Liberty International Airport Compliance and Maintenance Tasks

VI. Building 76

	Monthly		Estimated		Est. Annual
<i>A. Compliance Tasks</i>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Monthly Lump Sum Price	\$_____	x	12	=	\$_____
	Monthly		Estimated		
<i>B. Maintenance Tasks</i>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$_____	x	12	=	\$_____

VII. Building 79

	Annual		Estimated		Est. Annual
<i>A. Compliance Tasks</i>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Annual Lump Sum Price	\$_____	x	1	=	\$_____
	Monthly		Estimated		
<i>B. Maintenance Tasks</i>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$_____	x	12	=	\$_____
Highland Tank Oil/Water Separator 550 gallons and Two Chamber Sand Interceptor					
Empty, scrub down and			Estimated		
thoroughly clean interior surfaces	<u>Lump Sum Price</u>		<u>Quantity</u>		
Biannual Lump Sum Price	\$_____	x	2	=	\$_____
Highland Tank Oil/Water Separator 1000 gallons					
Empty, scrub down and	Annual		Estimated		
thoroughly clean interior surfaces	<u>Lump Sum Price</u>		<u>Quantity</u>		
Annual Lump Sum Price	\$_____	x	1	=	\$_____
	Monthly		Estimated		
Truck Washing System	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$_____	x	12	=	\$_____

PRICING SHEET
SECOND YEAR

Newark Liberty International Airport Compliance and Maintenance Tasks

VIII. Building 113

	Monthly		Estimated		Est. Annual Contract Price
<i>A. <u>Compliance Tasks</u></i>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Per Item</u>
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____
<hr/>					
	Monthly		Estimated		
<i>B. <u>Maintenance Tasks</u></i>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____

IX. Building 115

	Monthly		Estimated		Est. Annual Contract Price
<i>A. <u>Compliance Tasks</u></i>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Per Item</u>
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____
<hr/>					
	Monthly		Estimated		
<i>B. <u>Maintenance Tasks</u></i>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____

X. Parking Lots P-1 and P-3

	Annual		Estimated		Est. Annual Contract Price
<i>A. <u>Maintenance Tasks</u></i>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Per Item</u>
Annual Lump Sum Price	\$ _____	x	1	=	\$ _____

PRICING SHEET
SECOND YEAR

Teterboro Airport Compliance and Maintenance Tasks

SECOND YEAR

I. Building 73

	Monthly		Estimated		Est. Annual
<i>A. Maintenance Tasks</i>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____

Highland Tank Oil/Water Separator 550 gallons
Empty, scrub down and
thoroughly clean interior surfaces

	Annual		Estimated		
	<u>Lump Sum Price</u>		<u>Quantity</u>	=	
Annual Lump Sum Price	\$ _____	x	1	=	\$ _____

Highland Tank Oil/Water Separator 1000 gallons
Empty, scrub down and
thoroughly clean interior surfaces

	Annual		Estimated		
	<u>Lump Sum Price</u>		<u>Quantity</u>	=	
Annual Lump Sum Price	\$ _____	x	1	=	\$ _____

Highland Tank Oil/Water Separator 355 gallons and Sand Interceptor
Empty, scrub down and
thoroughly clean interior surfaces

	Annual		Estimated		
	<u>Lump Sum Price</u>		<u>Quantity</u>	=	
Annual Lump Sum Price	\$ _____	x	1	=	\$ _____

PRICING SHEET

SECOND YEAR

Total Yearly Estimated Contract Price

Non-Hazardous Waste Disposal Price Per Gallon

Truck Wash System Clean out Unit Price	<u>Unit Price</u> \$ _____	x	Estimated <u>Quantity</u> 15,000-gallons=	=	\$ _____
Oil Water Separator Clean out Unit Price	<u>Unit Price</u> \$ _____	x	Estimated <u>Quantity</u> 15,000-gallons=	=	\$ _____
Storm Water Collection System Clean out Unit Price	<u>Unit Price</u> \$ _____	x	Estimated <u>Quantity</u> 20,000-gallons=	=	\$ _____

Service Work Hourly Price (Hourly Prices for work not part of the Monthly, Annual or other Lump Sum Prices specified herein, see Part V Section 2)

Hourly Unit Price (Service Work performed by Technician)	Hourly <u>Unit Price</u> \$ _____	x	Estimated <u>Quantity</u> 75	=	Est. Annual Contract Price <u>Per Item</u> \$ _____
Hourly Unit Price (Service Work performed by other than Technician)	Hourly <u>Unit Price</u> \$ _____	x	Estimated <u>Quantity</u> 75	=	Est. Annual Contract Price <u>Per Item</u> \$ _____

Estimated Contract Price Second-Year \$ _____

PRICING SHEET

THIRD YEAR

Newark Liberty International Airport Compliance and Maintenance
Tasks

THIRD YEAR

Item

I. Building 1

	Annual		Estimated		Est. Annual
A. <u>Compliance Tasks</u>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	Contract Price
Annual Lump Sum Price	\$ _____	x	1	=	<u>Per Item</u>
					\$ _____
	Monthly		Estimated		
B. <u>Maintenance Tasks</u>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____
Oil/Water Separator Empty, scrub down and thoroughly clean interior surfaces	Annual		Estimated		
	<u>Lump Sum Price</u>		<u>Quantity</u>		
Annual Lump Sum Price	\$ _____	x	1	=	\$ _____

II. Building 11

	Monthly		Estimated		Est. Annual
A. <u>Compliance Tasks</u>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	Contract Price
Monthly Lump Sum Price	\$ _____	x	12	=	<u>Per Item</u>
					\$ _____
	Monthly		Estimated		
B. <u>Maintenance Tasks</u>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____
Oil/Water Separator with Grit Chamber and Lift Station Empty, scrub down and thoroughly clean interior surfaces			Estimated		
	<u>Lump Sum Price</u>		<u>Quantity</u>		
Biannual Lump Sum Price	\$ _____	x	2	=	\$ _____

PRICING SHEET
THIRD YEAR

Newark Liberty International Airport Compliance and Maintenance
Tasks

III. Building 14

	Monthly		Estimated		Est. Annual
<i>A. Compliance Tasks</i>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____
	Monthly		Estimated		
<i>B. Maintenance Tasks</i>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____
Oil/Water Separator Empty, scrub down and thoroughly clean interior surfaces	Annual		Estimated		
Annual Lump Sum Price	<u>Lump Sum Price</u>		<u>Quantity</u>		
	\$ _____	x	1	=	\$ _____

IV. Building 46

	Monthly		Estimated		Est. Annual
<i>A. Compliance Tasks</i>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____
	Monthly		Estimated		
<i>B. Maintenance Tasks</i>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____

V. Building 60

	Monthly		Estimated		Est. Annual
<i>A. Compliance Tasks</i>	<u>Lump Sum Price</u>		<u>Quantity</u>		<u>Contract Price</u>
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____
	Monthly		Estimated		
<i>B. Maintenance Tasks</i>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____
Oil/Water Separator and Two Chamber Sand Interceptor Empty, scrub down and thoroughly clean interior surfaces	Annual		Estimated		
Annual Lump Sum Price	<u>Lump Sum Price</u>		<u>Quantity</u>		
	\$ _____	x	1	=	\$ _____

PRICING SHEET
THIRD YEAR

Newark Liberty International Airport Compliance and Maintenance
Tasks

VI. Building 76

	Monthly		Estimated		Est. Annual
<i>A. Compliance Tasks</i>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Monthly Lump Sum Price	\$_____	x	12	=	\$_____
	Monthly		Estimated		
<i>B. Maintenance Tasks</i>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$_____	x	12	=	\$_____

VII. Building 79

	Annual		Estimated		Est. Annual
<i>A. Compliance Tasks</i>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Annual Lump Sum Price	\$_____	x	1	=	\$_____
	Monthly		Estimated		
<i>B. Maintenance Tasks</i>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$_____	x	12	=	\$_____
Highland Tank Oil/Water Separator 550 gallons and Two Chamber Sand Interceptor					
Empty, scrub down and			Estimated		
thoroughly clean interior surfaces	<u>Lump Sum Price</u>		<u>Quantity</u>		
Biannual Lump Sum Price	\$_____	x	2	=	\$_____
Highland Tank Oil/Water Separator 1000 gallons					
Empty, scrub down and			Estimated		
thoroughly clean interior surfaces	<u>Lump Sum Price</u>		<u>Quantity</u>		
Annual Lump Sum Price	\$_____	x	1	=	\$_____
	Monthly		Estimated		
Truck Washing System	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$_____	x	12	=	\$_____

PRICING SHEET
THIRD YEAR

Newark Liberty International Airport Compliance and Maintenance
Tasks

VIII. Building 113

	Monthly		Estimated		Est. Annual
<i>A. <u>Compliance Tasks</u></i>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Monthly Lump Sum Price	\$_____	x	12	=	\$_____

	Monthly		Estimated		
<i>B. <u>Maintenance Tasks</u></i>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$_____	x	12	=	\$_____

IX. Building 115

	Monthly		Estimated		Est. Annual
<i>A. <u>Compliance Tasks</u></i>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Monthly Lump Sum Price	\$_____	x	12	=	\$_____

	Monthly		Estimated		
<i>B. <u>Maintenance Tasks</u></i>	<u>Lump Sum Price</u>		<u>Quantity</u>		
Monthly Lump Sum Price	\$_____	x	12	=	\$_____

X. Parking Lots P-1 and P-3

	Annual		Estimated		Est. Annual
<i>A. <u>Maintenance Tasks</u></i>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Annual Lump Sum Price	\$_____	x	1	=	\$_____

PRICING SHEET

THIRD YEAR

Teterboro Airport Compliance and Maintenance Tasks

(See Attachment A – pages 22 for description of routines)

THIRD YEAR

I. Building 73

	Monthly		Estimated		Est. Annual
<i>A. Maintenance Tasks</i>	<u>Lump Sum Price</u>	x	<u>Quantity</u>	=	<u>Contract Price</u>
Monthly Lump Sum Price	\$ _____	x	12	=	\$ _____
Highland Tank Oil/Water Separator 550 gallons Empty, scrub down and thoroughly clean interior surfaces	Annual <u>Lump Sum Price</u>		Estimated <u>Quantity</u>		
Annual Lump Sum Price	\$ _____	x	1	=	\$ _____
Highland Tank Oil/Water Separator 1,000 gallons Empty, scrub down and thoroughly clean interior surfaces	Annual <u>Lump Sum Price</u>		Estimated <u>Quantity</u>		
Annual Lump Sum Price	\$ _____	x	1	=	\$ _____
Highland Tank Oil/Water Separator 355 gallons and Sand Interceptor Empty, scrub down and thoroughly clean interior surfaces	Annual <u>Lump Sum Price</u>		Estimated <u>Quantity</u>		
Annual Lump Sum Price	\$ _____	x	1	=	\$ _____

PRICING SHEET

THIRD YEAR

Yearly Estimated Contract Price and Contract Price

Non-Hazardous Waste Disposal Price Per Gallon

Truck Wash System Clean out	<u>Unit Price</u>		Estimated	
Unit Price	\$ _____	x	<u>Quantity</u>	
			15,000 gallons=	\$ _____

Oil Water Separator Clean out	<u>Unit Price</u>		Estimated	
Unit Price	\$ _____	x	<u>Quantity</u>	
			15,000 gallons=	\$ _____

Storm Water Collection System Clean out	<u>Unit Price</u>		Estimated	
Unit Price	\$ _____	x	<u>Quantity</u>	
			20,000 gallons=	\$ _____

Service Work Hourly Price (Hourly Prices for work not part of the Monthly, Annual or other Lump Sum Prices specified herein, see Part V Section 2)

Hourly Unit Price (Service Work performed by Technician)	Hourly <u>Unit Price</u>		Estimated <u>Quantity</u>	=	Est. Annual Contract Price <u>Per Item</u>
	\$ _____	x	75	=	\$ _____

Hourly Unit Price (Service Work performed by other than Technician)	Hourly <u>Unit Price</u>		Estimated <u>Quantity</u>	=	Est. Annual Contract Price <u>Per Item</u>
	\$ _____	x	75	=	\$ _____

Estimated Contract Price Third-Year \$ _____

PRICING SHEET
MATERIALS

Material Purchases (i.e., Replacement Parts etc.)

The Bidder shall insert a percentage to be added/subtracted (Bidder shall circle the + or -) to the Net Cost of materials, parts and components. This percentage shall be firm for the duration of the Contract.

\$30,000 x +/- _____% = \$_____ + \$30,000 = \$_____ (Estimated Three-Year Price)

PRICING SHEET
SUMMARY SHEET

Estimated Contract Price First Year \$ _____

Estimated Contract Price Second Year \$ _____

Estimated Contract Price Third Year \$ _____

Estimated Three-Year Contract Price Materials \$ _____

Estimated Three-Year Contract Price - \$ _____

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PART V – SPECIFICATIONS, TABLE OF CONTENTS..... 1

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Attachment A – Drawings
Attachment B – Permint-Required Confined Space Program

PART V – SPECIFICATIONS

1. Specific Definitions

To avoid undue repetition, the following terms, as used in this Contract, shall be construed as follows:

“Facility” shall mean Newark Liberty International Airport located in Newark, New Jersey and Teterboro Airport located in Teterboro, New Jersey.

2. Work Required by the Specifications

The Contractor shall inspect, maintain, repair and support all Underground Storage Tank(s) (UST) systems, aboveground storage tank systems, storm system structures and the oil/water separators serving Buildings 1, 11, 14, 46, 60, 76, 79, 113, 115, Parking Lots P-1 and P-3 and Terminal B FIS at Newark Liberty International Airport and serving Building 73 at Teterboro Airport in accordance with applicable New Jersey Department of Environmental Protection (NJDEP) regulations and Port Authority standards set forth herein. These Specifications detail the Contractor’s minimum responsibilities for performing environmental compliance and maintenance. When the Contractor is requested by the Manager to perform maintenance in addition to the specific maintenance items listed in section 12 of this part, the compensation to the Contractor hereunder will be pursuant to the applicable Service Work Hourly Price listed in Part IV (Pricing Sheet). The cost of all materials, equipment and supplies for maintenance not listed in section 12 shall be pursuant to the mark-up percentage listed in the Materials Purchases section of Part IV (Pricing Sheet). Material purchases in excess of One Thousand Dollars (\$1,000) require three price quotes.

3. Cellular Telephones

All employees of the Contractor performing the required services hereunder shall be required to wear, and have operational, a cellular phone at all times while conducting duties at the Facility. The Contractor shall provide these phone numbers to the Manager.

4. Supplies Provided by the Port Authority

The Manager will supply the Contractor with all reasonable required amounts of water from such existing specific water system outlet and supplies as the Manager selects without cost to the Contractor for the water it consumes. All water shall be carefully conserved and protected from contamination through the use of approved backflow devices or air gaps.

The Manager will provide the Contractor with the sampling device to measure sediment within Stormceptor STC systems. The Contractor shall return the sampling device to the Manager in the same condition it was provided to the Contractor.

5. Personnel Requirements

The Contractor shall provide, at all times, at least one (1) Technician with at least three (3) years of continuous work experience as a Technician performing UST maintenance and monitoring work as described in these Specifications. The Technician must possess a valid NJDEP entire UST system installer certification. The Contractor shall be required to submit proof of such experience as indicated to the Manager.

6. Approval of Equipment, Materials and Supplies

Safety Data Sheets for any products used by the Contractor at the Facility must be submitted to the Manager for approval prior to their use.

7. Employee Uniforms, ID and Appearance

The Contractor shall provide a full uniform to each of its employees providing services under this Contract. Uniforms shall consist of shirt, pants and jacket bearing the Contractor's name and also a photo ID identifying the name of the employee and Contractor.

8. Scheduling of Work

All work on site must be scheduled in writing one (1) week in advance with the Manager, with the exception of an emergency as determined by the Manager. The Contractor shall perform services in response to an emergency hereunder within forty-eight (48) hours of notification by the Manager.

9. Performance Tracking, Notification, and Reporting

The Facility uses a web-based computerized database and notification program for performance tracking and notification. The Contractor shall be provided with the necessary training on the computer system and will be provided with a user name and password for access to the computer program. The Contractor shall be responsible for data entry documenting all compliance and maintenance activities upon completion of the Work. Data entry documentation shall be completed no later than seven calendar days from the completion of the task. The computer program will automatically notify the Manager upon completion of data entry and will present such data for the Manager's review and acceptance. Data entry documentation shall serve as task completion notification only. The Contractor shall be responsible for documenting all compliance and maintenance tasks required for satisfying the compliance regulations stated below and for satisfying the equipment manufacturer's service and maintenance instructions. On a monthly basis, the Contractor shall provide printed records of all completed tasks with supporting documentation, including but not limited to, employee timecards for all compliance and maintenance tasks not listed in this attachment, and receipts with manufacturer's identification for all purchases of equipment necessary to perform work only under this Contract.

The computer program will notify both the Contractor and the Manager prior to the action date for all compliance and maintenance tasks. Action dates are indicated herein and have been set based on the frequency of service and weekday work schedule. The Contractor shall provide written notification of any proposed time extensions at least two weeks prior to action date for review and approval by the Manager.

10. Waste Disposal and Cleaning

The Contractor is responsible for the transportation and disposal of all existing liquid and waste materials and any waste materials generated by the Contractor's activities, including, but not limited to: cleaning activities from the oil/water separators, Stormceptor STC systems storm pit drains, UST spill containment boxes and piping sumps and storm diverting chambers. All waste materials shall be assumed to be non-hazardous for bidding purposes.

The Manager shall provide testing records for all waste prior to disposal. The Contractor's removal of any waste materials deemed hazardous by the Port Authority would be compensated per Extra Work.

The Contractor shall fill the oil/water separators, Stormceptor STC systems and oil interceptor included in this Contract with water to the required operating levels in accordance with the manufacturer's instructions after performing cleaning activities. The Manager will supply the water source. The Contractor shall supply hoses, couplings, fittings and other appurtenances as required to provide 40 maximum horizontal linear feet extension from the water source to the structure to be filled. The Contractor shall pump out clean water from the Stormceptors into the adjacent peripheral ditch as directed by the Manager.

11. Safety Equipment

The Contractor shall provide all required equipment in compliance with the requirements of the Port Authority Newark Liberty International Airport Permit-Required Confined Space Program (Attachment B), when entry into confined spaces is anticipated and/or required. This equipment must include independent ventilation devices as described in section 11.4 of the aforementioned document.

12. Compliance and Maintenance Tasks

The compliance and maintenance tasks listed below shall represent the minimum level of work to be performed under this Contract. The Contractor shall be responsible for immediately reporting equipment that is defective or in need of repair to the Manager. Information reported shall include the building and tank number, equipment in question and nature of the problem.

Task descriptions provide the identification and nature of the task to be performed. Contractor shall be responsible for performing the compliance tasks in accordance with the regulations defined in the New Jersey Administrative Code and the equipment manufacturer's recommendations. All records, papers, certifications of repairs and additional work manifests and information shall be retained by the Contractor and shall be provided to the Manager on a monthly basis. Annual Stage II Vapor Recovery systems testing results shall be provided to the Manager following completion of the testing procedures.

Frequencies of tasks shall be:

- a) Once - To be conducted only once under the duration of this Contract, the Manager shall advise when required.
- b) Every 30 calendar days - To be conducted at or prior to every 30 calendar days from the previous action.
- c) Monthly - To be conducted at or prior to one month from the previous action.
- d) Quarterly - To be conducted at or prior to a date three months from the previous action.
- e) Biannually - To be conducted at or prior to a date 182 and 365 calendar days from the previous action.

f) Annually - To be conducted at or prior to a date 365 calendar days from the previous action.

Newark Liberty International Airport System Descriptions:

Building 1

- 1) Oil Water Separator
 - a) Capacity: 2,000 gallons
 - b) Contents: Oil/Water
 - c) Configuration: Fiberglass Coated Steel, Double Wall
 - d) Status: In Service

- 2) Tank 1-1
 - a) Capacity: 10,000 gallons
 - b) Content: Unleaded Gasoline
 - c) Configuration: Fiberglass, Double Wall
 - d) Status: In Service

- 3) Tank 1-2
 - a) Capacity: 10,000 gallons
 - b) Content: Unleaded Gasoline
 - c) Configuration: Fiberglass, Double Wall
 - d) Status: In Service

Building 11

- 1) Tank 11-1
 - a) Capacity: 1,000 gallons
 - b) Contents: Waste Oil
 - c) Configuration: Fiberglass Reinforced Plastic, Double Wall
 - d) Status: In Service

- 2) Oil Water Separator with grit chamber and lift station
 - a) Capacity: 550 gallons
 - b) Contents: Oil/Water
 - c) Configuration: Fiberglass Coated Steel, Double Wall
 - d) Status: Under Construction, see drawings P004 and P005

Building 14

- 1) Tank 14-1
 - a) Capacity: 20,000 gallons
 - b) Contents: Med. Diesel Fuel #2
 - c) Configuration: Internally Coated Steel, Single Wall
 - d) Status: In Service

- 2) Oil/Water Separator
 - a) Capacity: 2,000 gallons
 - b) Contents: Oil/Water

- c) Configuration: Urethane Coated Steel, Double Wall
- d) Status: In Service

Building 46

- 1) Tank 46-1
 - a) Capacity: 60,000 gallons
 - b) Contents: Diesel Fuel
 - c) Configuration: Steel, Single Wall
 - d) Status: In Service
- 2) Tank 46-2
 - a) Capacity: 60,000 gallons
 - b) Contents: Diesel Fuel
 - c) Configuration: Steel, Single Wall
 - d) Status: In Service

Building 60

- 1) Oil Water Separator
 - a) Capacity: 1,000 gallons
 - b) Contents: Oil/Water
 - c) Configuration: Fiberglass Reinforced Plastic, Double Wall
 - d) Status: In Service
- 2) Two-Chamber Sand Interceptor
 - a) Capacity: 1,350 / 950 gallons
 - b) Contents: Oil/Water/Sand
 - c) Configuration: Concrete
 - d) Status: In Service
- 3) Tank 60-1
 - a) Capacity: 1,000 gallons
 - b) Contents: Diesel Fuel
 - c) Configuration: Urethane Coated Steel, Double Wall
 - d) Status: In Service
- 4) Tank 60-2
 - a) Capacity: 1,000 gallons
 - b) Contents: Diesel Fuel
 - c) Configuration: Urethane Coated Steel, Double Wall
 - d) Status: In Service

Building 76

- 1) Tank 76-1
 - a) Capacity: 5,000 gallons
 - b) Contents: Diesel Fuel #2
 - c) Configuration: Urethane Coated Steel, Double Wall

d) Status: In Service

Building 79

- 1) Oil Water Separator
 - a) Capacity: 1,000 gallons
 - b) Contents: Oil/Water
 - c) Configuration: Fiberglass Coated Steel, Double Wall
 - d) Status: In Service

- 2) Oil Water Separator
 - a) Capacity: 550 gallons
 - b) Contents: Oil/Water
 - c) Configuration: Fiberglass Coated Steel, Double Wall
 - d) Status: In Service

- 3) Two-Chamber Sand Interceptor
 - a) Capacity: 75 / 150 gallons
 - b) Contents: Oil/Water/Sand
 - c) Status: In Service

- 4) Two-Chamber Sand Interceptor
 - a) Capacity: 150 / 250 gallons
 - b) Contents: Oil/Water/Sand
 - c) Status: In Service

- 5) Deicing Storage Tanks (2 vertical tanks)
 - a) Capacity: 30,000 gallons each
 - b) Contents: Potassium Acetate
 - c) Configuration: Single Wall Steel within Concrete Containment Dike
 - d) Status: In Service

- 6) Wet Pump Chamber for Truck Washing System
 - a) Capacity: 1,700 gallons
 - b) Contents: Water/Sand
 - c) Status: In Service

- 7) Grit Collecting Catch Basin for Truck Washing System #1
 - a) Capacity: 75 gallons
 - b) Contents: Water/Sand
 - c) Status: In Service

- 8) Grit Collecting Catch Basins (7 total) for Truck Washing System #2 through #8
 - a) Capacity: 50 gallons each
 - b) Contents: Water/Sand
 - c) Status: In Service

- 9) Truck Washing Solids Collection Pad
 - a) Size: 1,280 Square Feet
 - b) Contents: Water/Sand
 - c) Configuration: Concrete
 - d) Status: In Service

- 10) Tank 79-2
 - a) Capacity: 10,000 gallons
 - b) Content: Unleaded Gasoline
 - c) Configuration: Fiberglass Coated Steel, Double Wall
 - d) Status: In Service

- 11) Tank 79-3
 - a) Capacity: 10,000 gallons
 - b) Content: Unleaded Gasoline
 - c) Configuration: Fiberglass Coated Steel, Double Wall
 - d) Status: In Service

Building 113

- 1) Tank 113A
 - a) Capacity: 2,000 gallons
 - b) Contents: Med. Diesel Fuel #2
 - c) Configuration: Fiberglass Coated Steel, Double Wall
 - d) Status: In Service

Building 115

- 1) Tank 115A
 - a) Capacity: 2,000 gallons
 - b) Contents: Med. Diesel Fuel #2
 - c) Configuration: Fiberglass Coated Steel, Double Wall
 - d) Status: In Service

Parking Lots P-1 and P-3

- 1) Stormceptor STC#1
 - a) Capacity: 13,500 gallons
 - b) Contents: Oil/Water/Sand
 - c) Configuration: Concrete
 - d) Status: In Service

- 2) Stormceptor STC#2
 - a) Capacity: 13,500 gallons
 - b) Contents: Oil/Water/Sand
 - c) Configuration: Concrete
 - d) Status: In Service

- 3) Stormceptor STC#3-1
 - a) Capacity: 13,500 gallons

- b) Contents: Oil/Water/Sand
 - c) Configuration: Concrete
 - d) Status: In Service
- 4) Stormceptor STC#3-2
- a) Capacity: 9,400 gallons
 - b) Content: Oil/Water/Sand
 - c) Configuration: Concrete
 - d) Status: In Service
- 5) Stormceptor STC#4
- a) Capacity: 9,400 gallons
 - b) Content: Oil/Water/Sand
 - c) Configuration: Concrete
 - d) Status: In Service

All Stormceptors are comprised of two structures in series; the volume shown is the combined volume for the two structures.

Terminal B FIS

- 1) Oil Interceptor
- a) Capacity: 45 gallons
 - b) Contents: Oil/Water
 - c) Configuration: Single Wall Steel
 - d) Status: In Service

Teterboro Airport System Descriptions:

Building 73

- 1) Oil Water Separator
- a) Capacity: 550 gallons
 - b) Contents: Oil/Water
 - c) Configuration: Fiberglass Coated Steel, Double Wall
 - d) Status: In Service
- 2) Oil Water Separator with Sand Interceptor Chamber
- a) Capacity: 355 gallons
 - b) Contents: Oil/Water/Sand
 - c) Configuration: Fiberglass Coated Steel, Double Wall
 - d) Status: In Service
- 3) Oil Water Separator
- a) Capacity: 1,000 gallons
 - b) Contents: Oil/Water
 - c) Configuration: Fiberglass Coated Steel, Double Wall
 - d) Status: In Service

Newark Liberty International Airport Compliance and Maintenance Tasks:

I. <i>Building 1</i>		
A.	<u>Compliance Tasks</u>	<u>Frequency of Service</u>
1)	Conduct Static Pressure Performance Test on Stage II vapor recovery system for two unleaded gasoline USTs, as per N.J.A.C. 7:27-16.3(i)(1)(i), or as may be revised.	Annually
2)	Conduct Pressure Vacuum Valve Test on Stage II vapor recovery system for two unleaded gasoline USTs, as per N.J.A.C. 7:27-16.3(i)(1)(i), or as may be revised.	Annually
3)	Conduct Air to Liquid Volume Ratio Test on Stage II vapor recovery system for two unleaded gasoline USTs, as per N.J.A.C. 7:27-16.3(i)(1)(i), or as may be revised.	Annually
4)	Conduct Dynamic Backpressure Performance Test on Stage II vapor recovery system for two unleaded gasoline USTs, as per N.J.A.C. 7:27-16.3(i)(1)(i), or as may be revised.	Once
B.	<u>Maintenance Tasks</u>	<u>Frequency of Service</u>
	<u>Oil/Water Separator</u>	
	➤ <i>Highland Tank HTG1 Leak Detection and High Oil Level Panel</i>	
1)	Press Alarm/Test Button to verify power, warning and alarm indicators light and audible alarm sounds operational.	Every 30 calendar days
2)	Verify battery back up in Console is working.	Annually
3)	Visually inspect level sensor, interstitial sensor, and all cables, for signs of cracking or damage.	Biannually
4)	Clean and test leak sensor and high level probe.	Annually
	➤ <i>Oil/Water Separator</i>	
1)	Empty, scrub down and thoroughly clean interior surfaces.	Annually
II. <i>Building 11</i>		
A.	<u>Compliance Tasks</u>	<u>Frequency of Service</u>
1)	Provide certification that the liquid alarm for tank interstitial probe was not activated and is	Every 30 calendar days

operating properly as per N.J.A.C. 7:14B-6.5(a) 7, or as may be revised.

- | | |
|---|------------------------|
| 2) Visually inspect spill containment box and piping sumps. PA will properly dispose of any accumulation of debris and/or liquid, as per N.J.A.C. 7:14B-5.1(d) 2, or as may be revised. | Every 30 calendar days |
| 3) Provide certification that the liquid alarm for piping sump probe was not activated and is operating properly, as per N.J.A.C. 7:14B-6.5(a) 7, or as may be revised. | Every 30 calendar days |
| 4) Provide certification that the liquid alarm for tank interstitial probe was not activated and is operating properly, as per N.J.A.C. 7:14B-6.5(a)7, or as may be revised. | Every 30 calendar days |
| 5) Visually inspect fill port product color marking to ensure it is clearly marked and not faded, as per N.J.A.C. 7:14B-5.8, or as may be revised. | Every 30 calendar days |
| 6) Print out, date and sign UST compliance summary report, as per N.J.A.C. 7:14B-6.7(e), or as may be revised. | Every 30 calendar days |

B. Maintenance Tasks

Frequency of Service

Waste Oil Tank

➤ *Pneumercator TMS 2000 Leak and Level Panel*

- | | |
|---|------------------------|
| 1) Run keypad self diagnostic command. | Every 30 calendar days |
| 2) Check printer for paper and ink cartridge. | Every 30 calendar days |
| 3) Print out of check system inventory and verify actual inventory. | Every 30 calendar days |
| 4) Verify battery back up in console is working. | Annually |
| 5) Visually inspect level sensor, interstitial sensor, piping sensor and all cables, for signs of cracking or damage. | Biannually |
| 6) Test sensors. | Annually |

Oil/Water Separator

Frequency of Service

➤ *Pneumercator LC 1001 High Level Alarm*

- 1) Press Alarm/Test Button to verify power, warning and alarm indicators light and audible alarm sounds operational. Every 30 calendar days
- 2) Clean and test high level probe. Annually

➤ *Duplex Submersible Pumps and Control Panel*

- 1) Press Alarm/Test Button to verify power, warning and alarm indicators light and audible alarm sounds operational . Every 30 calendar days
- 2) Verify battery backup in console is working. Annually
- 3) Visually inspect level sensor, interstitial sensor and all cables, for signs of cracking or damage. Biannually
- 4) Clean and test leak sensor and high level probe. Annually
- 5) Test float switch operation for both pumps. Once
- 6) Remove each submersible pump and clean debris from casing and impeller. Once

➤ *Oil/Water Separator, Grit Chamber and Pump Chamber*

- 1) Empty, scrub down and thoroughly clean interior surfaces. Biannually

III. *Building 14*

A. *Compliance Tasks*

Frequency of Service

- 1) Visually inspect spill containment box and piping sump. PA will properly dispose of any accumulation of debris and/or liquid, as per N.J.A.C. 7:14B-5.1(d)2, or as may be revised. Every 30 calendar days
- 2) Provide certification that the liquid alarm for piping sump probe was not activated and is operating properly, as per N.J.A.C. 7:14B-6.5(a)7, or as may be revised. Every 30 calendar days
- 3) Visually inspect fill port product color marking to ensure it is clearly marked and not faded, as per N.J.A.C. 7:14B-5.8, or as may be revised. Every 30 calendar days
- 4) Print out, date and sign UST compliance summary report for each UST, as per N.J.A.C. 7:14B-6.7(e), Every 30 calendar days

or as may be revised.

- 5) Conduct tank tightness test capable of detecting 0.1 gallon per hour leak rate, as per N.J.A.C. 7:14B-6.5(a)3, or as may be revised. Once

B. Maintenance Tasks

Frequency of Service

Underground Storage Tank

➤ *EBW 960-145 High Level Alarm*

- 1) Press Alarm/Test Button to verify power, warning and alarm indicators light and audible alarm sounds operational. Every 30 calendar days

➤ *EBW Auto-Stik JR-1*

- 1) Check printer for paper and ink cartridge. Every 30 calendar days

- 2) Print out of check system inventory and verify actual inventory. Every 30 calendar days

- 3) Visually inspect level sensor, piping sensor and all cables, for signs of cracking or damage. Biannually

- 4) Test sensors. Annually

Oil/Water Separator

➤ *Omntec LU2 Leak Detection Panel*

- 1) Verify console is working, green system detecting light is illuminated. Every 30 calendar days

- 2) Visually inspect level sensor, interstitial sensor and all cables, for signs of cracking or damage. Biannually

- 3) Clean and test leak sensor and high level probe. Annually

➤ *Oil/Water Separator*

- 1) Empty, scrub down and thoroughly clean interior surfaces. Annually

IV. *Building 46*

A. Compliance Tasks

Frequency of Service

- 1) Visually inspect all spill containment boxes and piping sumps. PA will properly dispose of any accumulation of debris and/or liquid, as per N.J.A.C. 7:14B-5.1(d)2, or as may be revised. Every 30 calendar days

2) Provide certification that the liquid alarm for each piping sump probe (2 per tank) for each UST was not activated and is operating properly, as per N.J.A.C. 7:14B-6.5(a)7, or as may be revised.	Every 30 calendar days
3) Visually inspect all fill port product color markings to ensure they are clearly marked and not faded, as per N.J.A.C. 7:14B-5.8, or as may be revised.	Every 30 calendar days
4) Print out, date and sign UST compliance summary report for each UST, as per N.J.A.C. 7:14B-6.7(e) , or as may be revised.	Every 30 calendar days
5) Conduct tank tightness test capable of detecting 0.1 gallon per hour leak rate for each tank, as per N.J.A.C. 7:14B-6.5(a)3, or as may be revised.	Once
B. <u>Maintenance Tasks</u>	<u>Frequency of Service</u>
➤ <i>Pneumercator LC 1002 High Level Alarm</i>	
1) Press Alarm/Test Button to verify power, warning and alarm indicators light and audible alarm sounds operational.	Every 30 calendar days
➤ <i>Pneumercator TMS 2000 Leak and Level Panel</i>	
1) Run keypad self diagnostic command.	Every 30 calendar days
2) Check printer for paper and ink cartridge.	Every 30 calendar days
3) Print out of check system inventory and verify actual inventory.	Every 30 calendar days
4) Verify battery back up in console is working.	Annually
5) Visually inspect level sensor, piping sensor and all cables, for signs of cracking or damage.	Biannually
6) Test sensors.	Annually
➤ <i>Pneumercator LC 1004 High Water Level Alarm</i>	
1) Press Alarm/Test Button to verify power, warning and alarm indicators light and audible alarm sounds operational.	Every 30 calendar days
2) Test sensors.	Annually

V.	Building 60	
A.	<u>Compliance Tasks</u>	<u>Frequency of Service</u>
7)	Visually inspect all spill containment boxes and piping sumps. PA will properly dispose of any accumulation of debris and/or liquid, as per N.J.A.C. 7:14B-5.1(d)2, or as may be revised.	Every 30 calendar days
8)	Provide certification that the liquid alarm for tank interstitial probe was not activated and is operating properly, as per N.J.A.C. 7:14B-6.5(a)7, or as may be revised.	Every 30 calendar days
9)	Provide certification that the liquid alarm for piping sump probe was not activated and is operating properly, as per N.J.A.C. 7:14B-6.5(a)7, or as may be revised.	Every 30 calendar days
10)	Visually inspect all fill port product color markings to ensure they are clearly marked and not faded, as per N.J.A.C. 7:14B-5.8, or as may be revised.	Every 30 calendar days
11)	Print out, date and sign UST compliance summary report for each UST, as per N.J.A.C. 7:14B-6.7(e), or as may be revised.	Every 30 calendar days
B.	<u>Maintenance Tasks</u>	<u>Frequency of Service</u>
	<u>Underground Storage Tanks (Each tank has a separate alarm system)</u>	
	➤ <i>Veeder-Root LC 790091-001 Overfill Alarm</i>	
1)	Press Alarm/Test Button to verify power, warning and alarm indicators light and audible alarm sounds operational.	Every 30 calendar days
	➤ <i>Veeder-Root TLS 350 Leak and Level Panel</i>	
2)	Run keypad self diagnostic command.	Every 30 calendar days
3)	Check printer for paper and ink cartridge.	Every 30 calendar days
4)	Print out of check system inventory and verify actual inventory.	Every 30 calendar days
5)	Verify battery back up in console is working.	Annually
6)	Visually inspect level sensor, interstitial sensor, piping sensor and all cables, for signs of cracking or damage.	Biannually
7)	Test sensors.	Annually

Oil/Water Separator

Frequency of Service

➤ *Highland Tank HTG1 Leak Detection and High Oil Level Panel*

- 1) Press Alarm/Test Button to verify power, warning and alarm indicators light and audible alarm sounds operational. Every 30 calendar days
- 2) Verify battery back up in console is working. Annually
- 3) Visually inspect level sensor, interstitial sensor and all cables, for signs of cracking or damage. Biannually
- 4) Clean and test leak sensor and high level probe. Annually

➤ *Oil/Water Separator and Two-Chamber Sand Interceptor*

- 1) Empty, scrub down and thoroughly clean interior surfaces. Annually

VI. *Building 76*

A. **Compliance Tasks**

Frequency of Service

- 1) Visually inspect spill containment box and piping sump. PA will properly dispose of any accumulation of debris and/or liquid, as per N.J.A.C. 7:14B-5.1(d)2, or as may be revised. Every 30 calendar days
- 2) Provide certification that the liquid alarm for tank interstitial probe was not activated and is operating properly, as per N.J.A.C. 7:14B-6.5(a)7, or as may be revised. Every 30 calendar days
- 3) Provide certification that the liquid alarm for piping sump probe was not activated and is operating properly, as per N.J.A.C. 7:14B-6.5(a)7, or as may be revised. Every 30 calendar days
- 4) Visually inspect fill port product color marking to ensure it is clearly marked and not faded, as per N.J.A.C. 7:14B-5.8, or as may be revised. Every 30 calendar days
- 5) Print out, date and sign UST compliance summary report, as per N.J.A.C. 7:14B-6.7(e), or as may be revised. Every 30 calendar days

B. **Maintenance Tasks**

Frequency of Service

➤ *Pneumercator LC 1001 High Level Alarm*

- 1) Press Alarm/Test Button to verify power, warning and alarm indicators light and audible alarm sounds. Every 30 calendar days

operational.

➤ *Pneumercator TMS 2000 Leak and Level Panel*

- | | |
|---|------------------------|
| 1) Run keypad self diagnostic command. | Every 30 calendar days |
| 2) Check printer for paper and ink cartridge. | Every 30 calendar days |
| 3) Print out of check system inventory and verify actual inventory. | Every 30 calendar days |
| 4) Verify battery back up in console is working. | Annually |
| 5) Visually inspect level sensor, interstitial sensor, piping sensor and all cables, for signs of cracking or damage. | Biannually |
| 6) Test sensors. | Annually |

VII. *Building 79*

A. *Compliance Tasks*

Frequency of Service

- | | |
|--|----------|
| 1) Conduct Static Pressure Performance Test on Stage II vapor recovery system for two unleaded gasoline USTs, as per N.J.A.C. 7:27-16.3(i)(1)(i), or as may be revised. | Annually |
| 2) Conduct Pressure Vacuum Valve Test on Stage II vapor recovery system for two unleaded gasoline USTs, as per N.J.A.C. 7:27-16.3(i)(1)(i), or as may be revised. | Annually |
| 3) Conduct Air to Liquid Volume Ratio Test on Stage II vapor recovery system for two unleaded gasoline USTs, as per N.J.A.C. 7:27-16.3(i)(1)(i), or as may be revised. | Annually |
| 4) Conduct Dynamic Backpressure Performance Test on Stage II vapor recovery system for two unleaded gasoline USTs, as per N.J.A.C. 7:27-16.3(i)(1)(i), or as may be revised. | Once |

B. *Maintenance Tasks*

Frequency of Service

Oil/Water Separator

➤ *Pneumercator LC 1004 Leak and Level Alarm Panels*

- | | |
|--|------------------------|
| 1) Press Alarm/Test Button to verify power, warning and alarm indicators light and audible alarm sounds operational. | Every 30 calendar days |
| 2) Test sensors. | Annually |

- *Oil/Water Separator with Two-Chamber Sand Interceptors*
 - 1) Empty, scrub down and thoroughly clean interior surfaces. Biannually
- *1,000 Gallon Oil/Water Separator*
 - 1) Empty, scrub down and thoroughly clean interior surfaces. Annually

Deicing Tanks

- *Pneumercator LC 1001 High Level Alarm*
 - 1) Press Alarm/Test Button to verify power, warning and alarm indicators light and audible alarm sounds operational. Monthly
- *Warrick Controls High Level Alarm*
 - 1) Press Alarm/Test Button to verify power, warning and alarm indicators light and audible alarm sounds. Monthly
- *Pneumercator TMS 2000 Leak and Level Panel*
 - 1) Run keypad self diagnostic command. Monthly
 - 2) Check printer for paper and ink cartridge. Monthly
 - 3) Print out of check system inventory and verify actual inventory. Monthly
 - 4) Verify battery back up in console is working. Monthly
 - 5) Visually inspect level sensor and all cables, for signs of cracking or damage. Monthly
 - 6) Test level sensors. Annually
- *Pneumercator ETD 1000 Remote Display Unit*
 - 1) Verify power to device and display of information from TMS 2000 Panel. Monthly

Truck Washing System

Frequency of Service

- *Wet Pump Chamber*
 - 1) Remove accumulated sediment and debris. Monthly
 - 2) Remove sediment screens, thoroughly clean and reinstall. Monthly
- *Grit Collecting Catch Basins*
 - 1) Remove accumulated sediment and debris. Monthly
- *Truck Washing Solids Collection Pad*
 - 1) Clean and wash entire area within rollover berm. Monthly
 - 2) Collect solid debris and coordinate with PA for removal. Monthly

VIII *Building 113*

A. Compliance Tasks

Frequency of Service

- | | |
|---|------------------------|
| 1) Visually inspect spill containment box and piping sump, as per N.J.A.C. 7:14B-5.1(d)2, or as may be revised. PA will properly dispose of any accumulation of debris and/or liquid. | Every 30 calendar days |
| 2) Provide certification that the liquid alarm for tank interstitial probe was not activated and is operating properly, as per N.J.A.C. 7:14B-6.5(a)7, or as may be revised. | Every 30 calendar days |
| 3) Provide certification that the liquid alarm for piping sump probe was not activated and is operating properly, as per N.J.A.C. 7:14B-6.5(a)7, or as may be revised. | Every 30 calendar days |
| 4) Visually inspect fill port product color marking to ensure it is clearly marked and not faded, as per N.J.A.C. 7:14B-5.8, or as may be revised. | Every 30 calendar days |
| 5) Print out, date and sign UST compliance summary report, as per N.J.A.C. 7:14B-6.7(e), or as may be revised. | Every 30 calendar days |

B. Maintenance Tasks

Frequency of Service

- | | |
|---|------------------------|
| ➤ <i>Veeder-Root LC 790091-001 Overfill Alarm</i> | |
| 1) Press Alarm/Test Button to verify power, warning and alarm indicators light and audible alarm sounds operational. | Every 30 calendar days |
| ➤ <i>Veeder-Root TLS 350C Leak and Level Panel</i> | |
| 1) Run keypad self diagnostic command. | Every 30 calendar days |
| 2) Check printer for paper and ink cartridge. | Every 30 calendar days |
| 3) Print out of check system inventory and verify actual inventory. | Every 30 calendar days |
| 4) Verify battery back up in console is working. | Annually |
| 5) Visually inspect level sensor, interstitial sensor, piping sensor and all cables, for signs of cracking or damage. | Biannually |
| 6) Test sensor. | Annually |

IX. *Building 115*

A. *Compliance Tasks*

Frequency of Service

- | | |
|---|------------------------|
| 1) Visually inspect spill containment box and piping sump, as per N.J.A.C. 7:14B-5.1(d)2, or as may be revised. PA will properly dispose of any accumulation of debris and/or liquid. | Every 30 calendar days |
| 2) Provide certification that the liquid alarm for tank interstitial probe was not activated and is operating properly, as per N.J.A.C. 7:14B-6.5(a)7, or as may be revised. | Every 30 calendar days |
| 3) Provide certification that the liquid alarm for piping sump probe was not activated and is operating properly, as per N.J.A.C. 7:14B-6.5(a)7, or as may be revised. | Every 30 calendar days |
| 4) Visually inspect fill port product color marking to ensure it is clearly marked and not faded, as per N.J.A.C. 7:14B-5.8, or as may be revised. | Every 30 calendar days |
| 5) Print out, date and sign UST compliance summary report, as per N.J.A.C. 7:14B-6.7(e), or as may be revised. | Every 30 calendar days |

B. *Maintenance Tasks*

Frequency of Service

- | | |
|---|------------------------|
| ➤ <i>Veeder-Root LC 790091-001 Overfill Alarm</i> | |
| 1) Press Alarm/Test Button to verify power, warning and alarm indicators light and audible alarm sounds operational. | Every 30 calendar days |
| ➤ <i>Veeder-Root TLS 350C Leak and Level Panel</i> | |
| 1) Run keypad self diagnostic command. | Every 30 calendar days |
| 2) Check printer for paper and ink cartridge. | Every 30 calendar days |
| 3) Print out of check system inventory and verify actual inventory. | Every 30 calendar days |
| 4) Verify battery back up in console is working. | Annually |
| 5) Visually inspect level sensor, interstitial sensor, piping sensor and all cables, for signs of cracking or damage. | Biannually |
| 6) Test sensor. | Annually |

- X. *Parking Lot P-1 and P-3*
- A. Maintenance Tasks *Frequency of Service*
- *Stormceptors*
 - 1) Empty accumulated water in both structures (assume 13,000 gallons total). The Contractor shall pump out clean water from the Stormceptors into the adjacent peripheral ditch as directed by the Manager. Annually
 - 2) Empty accumulated oil and sediment in both structures. Annually
 - 3) Measure the accumulated sediment using PA provided measurement device. Annually*
* - first measurement to occur six (6) months from the beginning of this Contract and then annually afterwards.

- XI. *Terminal B FIS*
- A. Maintenance Tasks *Frequency of Service*
- *Oil Interceptor*
 - 1) Empty, scrub down and thoroughly clean interior surfaces. Annually

Teterboro Airport Compliance and Maintenance Tasks:

- I. *Building 73*
- A. Maintenance Tasks *Frequency of Service*
- *Highland Tank HTG1 Leak Detection and High Oil Level Panel*
 - 1) Press Alarm/Test Button to verify power, warning and alarm indicators light and audible alarm sounds operational. Every 30 calendar days
 - 2) Verify battery back up in console is working. Annually
 - 3) Visually inspect level sensor, interstitial sensor, and all cables, for signs of cracking or damage. Biannually
 - 4) Clean and test leak sensor and high level probe. Annually
 - *Aggressive Systems, Inc. ATA-2 Leak Detection and High Oil Level Panel*
 - 1) Press Alarm/Test Button to verify power, warning and alarm indicators light and audible alarm sounds operational. Every 30 calendar days
 - 2) Visually inspect level sensor, interstitial sensor, and all cables, for signs of cracking or damage. Biannually
 - 3) Clean and test leak sensor and high level probe. Annually

➤ *Oil/Water Separators and Sand Interceptor Chamber*

- 1) Empty, scrub down and thoroughly clean interior surfaces. Annually

Contractor Required Repairs on 550-Gallon Oil/Water Separator System at Building 73 (see drawing M001 and M002 in Attachment A):

A. Demolition:

1. Disconnect and remove tank manway and piping risers to the tank factory supplied flange and threaded tank connections. Work shall include the removal of the reinforced concrete slab and surrounding asphalt pavement as well as the removal of the existing tank backfill/bedding in order to expose the top surface of the separator.

B. Inspection:

1. Employ the services of the oil/water separator manufacturer, Highland Tank, to perform inspection activities on the separator once the top of the tank is exposed and prior to performing any repair activities. The scope of work for the inspection shall include:
 - Conduct a vacuum test of the interstitial space.
 - Conduct a visual inspection of the external surfaces and appurtenances of the separator.
 - Provide an inspection report within 5 days documenting all findings and recommendations for any repairs necessary.

C. Installation:

1. Once inspection activities have been accepted and approved by the Engineer, perform repair activities on the separator including:
 - Manway riser extensions
 - Riser pipes for interstitial sensor, high level probes and oil removal
 - FRP vent piping
 - H20 rated tank access grade-level manhole
2. Furnish and install DGABC backfill with geotextile fabric
3. Furnish and install replacement reinforced concrete top slab
4. Furnish and install replacement asphalt pavement with joint sealant
5. Furnish and install 1” PVC coated RGS spare electrical conduit for installation of future tank interstitial sensor and high level probe assembly

ATTACHMENT A – DRAWINGS

HATCH MOTT MACDONALD, LLC

John P. ...
 John P. ...
 N.Y. Registered Engineer # 2462815370
 Certificate of Authorization # 2462815600



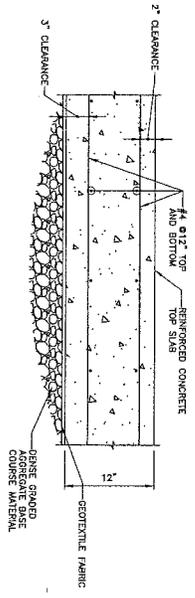
No.	Date	Revision	Approved
ENGINEERING DEPARTMENT			
TETERBORO			
AIRPORT			
MECHANICAL			

Title
MAINTENANCE GARAGE OIL WATER
SEPARATION REPAIR

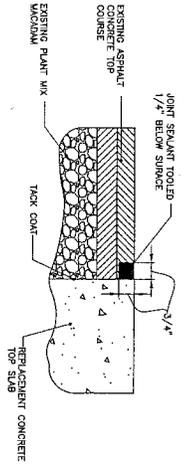
NOTES AND DETAILS

DESIGNED BY	DATE	CHECKED BY	DATE
D. LAUREA	09/10/2014	K. ...	
PROJECT NUMBER	M002		
PLN			

REPLACEMENT CONCRETE TOP SLAB DETAIL
 NOT TO SCALE



ASPHALT WEETING CONCRETE DETAIL
 NOT TO SCALE



GENERAL NOTES:

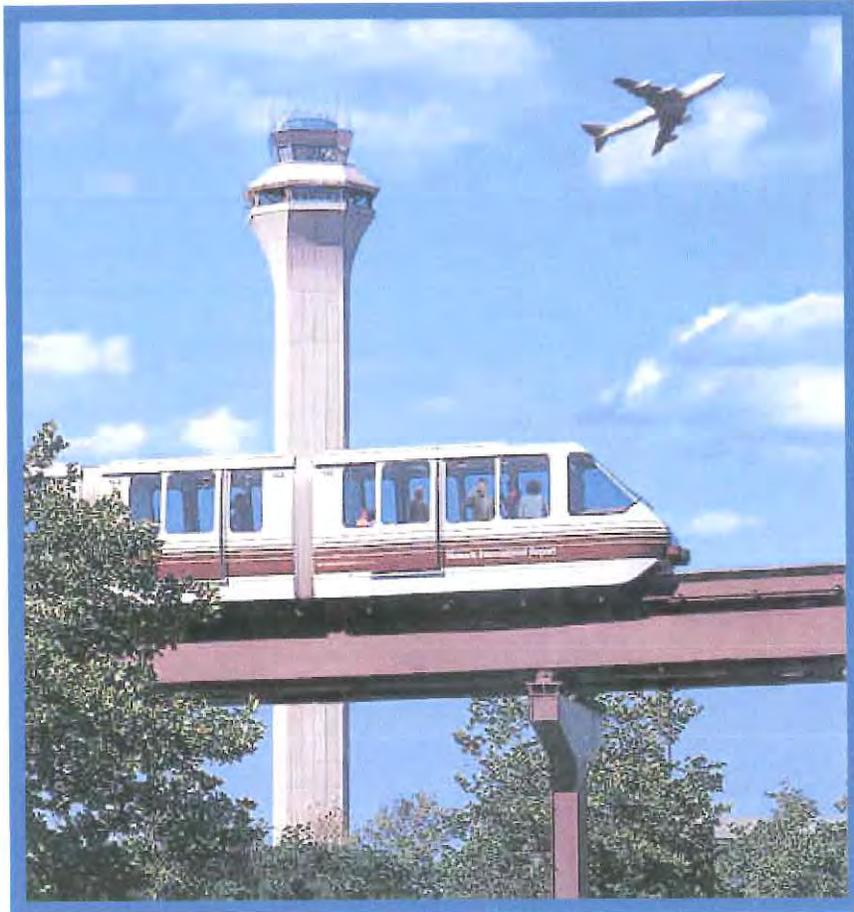
1. SAW CUT AND REMOVE ASPHALT PAVEMENT, REMOVE BACKFILL TO EXPOSE THE TOP SURFACE OF THE OIL/WATER SEPARATOR FOR THE ENTIRE LENGTH OF THE VESSEL.
2. PREPARE THE SERVICES OF HIGHWAY TANK TO CONDUCT A VACUUM TIGHTNESS TEST OF THE INTERSTITIAL SPACE BETWEEN THE WALLS OF THE VESSEL AND CONDUIT. AN EXTERNAL VISUAL INSPECTION OF THE TOP OF THE VESSEL AND ALL APPURTENANCES AND PROVIDE A RECORD OF THE RESULTS OF THE TEST. THE RESULTS OF THE TEST AND ANY RECOMMENDATIONS FOR REPAIR OF THE EXISTING. FURTHER WORK SHALL NOT COMMENCE UNTIL DIRECTED BY THE ENGINEER.
3. REMOVE AND INSTALL A SINGLE 1" PVC COATED RIGID CONDUIT FROM THE UNDERSIDE OF THE 42'x64' HOOD RATED RECTANGULAR MANHOLE ENDS SHALL BE SEALED WITH THREADED CAPS.
4. SLOPE VENT PIPING UPWARD TOWARDS VENT RISERS.

SPECIFICATIONS:

1. VENT PIPING AND FITTINGS SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION 15410.
2. TANK PIPING RISERS SHALL BE STANDARD WEIGHT, SCHEDULE 40, STEEL PIPE, ASTM A 53, GRADE B WELDED. ALL FITTINGS AND CONNECTIONS SHALL BE SORB-TITE.
3. GEOTEXTILE FABRIC SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION 02274 HAVING:
 - A. APPLICABLE OPENING SIZE: NO. 40 SIEVE, MAXIMUM PER ASTM 4751.
 - B. PERMEABILITY: 0.8 PER SECOND, MINIMUM PER ASTM D 4831.
4. CONCRETE:
 - A. CONCRETE WORK SHALL CONFORM TO ALL REQUIREMENTS OF ACI-301.
 - B. ALL CONCRETE SHALL BE 4000 PSI MINIMUM, CEMENT SHALL BE TYPE I, WATER/CEMENT RATIO SHALL BE MINIMUM OF 0.45
 - C. ALL CONCRETE PLACED WHEN TEMPERATURE IS BELOW 40 DEGREES F SHALL CONFORM TO ACI 308 LATEST EDITION "COLD WEATHER CONCRETING."
 - D. FOR ADDITIONAL REQUIREMENTS, SEE SPECIFICATION SECTION 02202.
5. REINFORCING STEEL:
 - A. REINFORCING STEEL SHALL BE GRADE 60, ASTM A615SI OR A706.
 - B. ALL SPLICES IN REINFORCING SHALL BE IN ACCORDANCE WITH ACI 318-05. SPLICES SHALL BE CLASS "B".
 - C. FOR ADDITIONAL REQUIREMENTS, SEE SPECIFICATION SECTION 02201.

ATTACHMENT B –
PERMIT-REQUIRED CONFINED SPACE PROGRAM

**THE PORT AUTHORITY OF NY & NJ
NEWARK LIBERTY INTERNATIONAL AIRPORT**



**PERMIT-REQUIRED
CONFINED SPACE PROGRAM**

**PORT AUTHORITY
NEWARK LIBERTY
INTERNATIONAL
AIRPORT**

**PERMIT-REQUIRED
CONFINED SPACE
PROGRAM**

Consolidated Edison of New York Inc. has prepared this site-specific Permit-Required Confined Space program for Port Authority Newark Liberty International Airport with the cooperation of Newark Liberty International Airport personnel.

This program contains information from procedures and documentation currently used by The Port Authority and OSHA and is subject to change as those procedures and documents are revised or as needed as determined by Newark Liberty International Airport.

Compliance and enforcement of this program is the sole responsibility of The Port Authority Newark Liberty International Airport.



Carmine Castorina
Consolidated Edison of N.Y. Inc.
Environmental & Safety Training
The Learning Center



Mehry Najafi
Environmental Unit
Port Authority
Newark Liberty International
Airport

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1.0 Purpose

It is the policy of Port Authority Newark Liberty International Airport to comply with Federal Regulations and Port Authority Operating and Maintenance Standards pertaining to Confined Spaces. This site-specific plan is established to protect Port Authority employees, contractors, and the public from the hazards of Permit-Required Confined Space entry. This permit system is Newark Liberty International Airport's written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

2.0 Applicability

This procedure applies to any Port Authority Newark Liberty International Airport employee involved in entry into a Permit-Required Confined Space. It is the responsibility of each department head to make this plan available to all employees and contractors who must perform work in confined spaces. If employees or contractors have questions concerning confined spaces or this written plan, they must contact their department head or designee. This procedure shall be used in conjunction with the following standards, manuals, and rules:

- Port Authority Operating and Maintenance Standard 61 – Work Performed in Confined Spaces
- Port Authority Operating and Maintenance Standard 62 – Testing Confined Space Atmospheres
- Port Authority Respiratory Protection Program
- Port Authority Confined Space Entry Administrative and Safety Rules
- Occupational Safety and Health Administration (OSHA) standards including:
 - OSHA 29CFR 1910.146 “Permit-Required Confined Space”
 - OSHA 29CFR 1910.147 “The Control of Hazardous Energy” (Lockout/Tag Out)

Note: If an employee or contractor has questions concerning this written plan contact Mehry Najafi, Supervisor, Environmental Unit (973-961-6093).

3.0 Port Authority Newark Liberty International Airport Personnel Directory

<u>Name</u>	<u>Title</u>	<u>Department</u>	<u>Office Phone</u>
Thomas Rosace	Chief Maintenance Supervisor	Maintenance Unit	973 961- 6074
Tim Maher	Designated Entry Supervisor	Maintenance Unit	973 961- 6084
Herman Ret	Chief Maintenance Supervisor	Electrical Unit	973 961- 6144
Moti Premcham	Designated Entry Supervisor	Airport Facilities Division	973 961- 6268
Mike Bowe	Designated Entry Supervisor	Monorail	973 961- 6690
Al Kosakowski	Chief Maintenance Supervisor	Heating/Refrigeration	973 961- 6356
Robert Kudlacik	Designated Entry Supervisor	Heating/Refrigeration	973 961- 6350
Bill Lynch	Designated Entry Supervisor	Heating/Refrigeration	973 961- 6365
Tiffany Chan	Supervisor	Environmental Unit	973 961- 6093
Raul Leonardo	Designated Entry Supervisor	Construction Mgmt	973 622- 0800 X207
Cathy Nigro	Designated Entry Supervisor	Construction Mgmt.	973 961- 6109
Michael Wallace	Designated Entry Supervisor	Construction Mgmt.	973 961- 6333

4.0 Terms and Definitions

Acceptable entry conditions are the conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter into and work within the space.

Attendant means an individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the employer's permit space program.

Authorized entrant means an employee who is authorized by the employer to enter a permit space.

Blanking or blinding means the absolute closure of a pipe, line, or duct by the fastening of a solid plate that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

Confined Space means a space that:

- 1) Is large enough and so configured that an employee can bodily enter and perform assigned work; and
- 2) Has limited or restricted means for entry and exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults and pits are spaces that may have limited means of entry.); and
- 3) Is not designed for continuous employee occupancy.

Double block and bleed means the closure of a line, duct, or pipe by closing and locking and tagging two in-line valves and by opening and locking or tagging a drain or vent valve in line between the two closed valves.

Emergency means any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit space that could endanger the entrants.

Engulfment means the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

Entry means the action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

Entry permit (permit) means the written or printed document that is provided by the employer to allow and control the entry into a permit space and that contains the information specified in Attachment 4 of this plan.

Entry supervisor means the person (Chief Maintenance Supervisor, Chief Engineer, Unit Supervisor or their designee) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry.

Note: An entry supervisor may also serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required by sections 15, 16, and 17 for each role he/she fills.

Grade “D” Air as defined by the Compressed gas Association, Grade “D” air meets the following requirements: Oxygen (O₂) content of 19.5% to 23.5%, Hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less, Carbon monoxide (CO) content of 10 ppm or less, Carbon dioxide (CO₂) content of 1,000 ppm or less, and a lack of noticeable odor.

Hazardous Atmosphere means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

- 1) Flammable gas, vapor, or mist in excess of 10 percent of its Lower Explosive Limit (LEL);
- 2) Airborne combustible dust that meets or exceeds its LEL;

Note: This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet or less.

- 3) Atmospheric oxygen concentration below 19.5 percent and above 23.5 percent;
- 4) Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances, and which could result in employee exposure in excess of its dose or permissible exposure limit.
- 5) Any other atmospheric condition that is immediately dangerous to life or health.

Hot work permit means the employer’s written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

IDLH means any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with and individual’s ability to escape unaided from a permit space.

Inerting means the displacement of the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible.

Isolation means the process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as: blanking or blinding; misaligning or removing sections of lines, pipes or ducts; a double block and bleed system; lockout or tag out of all sources of energy; or blocking or disconnecting all mechanical linkages.

Line breaking means the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas line, or any fluid at a volume, pressure, or temperature capable of causing injury.

Non Permit-Required Confined Space means a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

Non-entry rescue means not entering the confined space to perform rescue. A mechanical retrieval device must be used to rescue entrants who do not have the ability to self-rescue.

Oxygen deficient atmosphere means an atmosphere containing less than 19.5 percent oxygen by volume.

Oxygen enriched atmosphere means an atmosphere containing more than 23.5 percent oxygen by volume.

Permit-Required Confined Space (permit space) means a confined space that has one or more of the following characteristics:

- 1) Contains or has the potential to contain a hazardous atmosphere;
- 2) Contains a material that has the potential to engulf an entrant;
- 3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a small cross section; or
- 4) Contains any other recognized serious safety or health hazard

Permit system means Newark Liberty International Airport's written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

Prohibited condition means any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

Rescue service means the personnel designated to rescue employees from permit spaces.

Retrieval system means the equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

Testing means the process by which the hazard that may confront the entrants of a permit-required confined space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.

Trained means only employees and contractors who have received training in confined spaces and have acquired the understanding, knowledge, and skills necessary for the safe performance of their duties

5.0 Confined Space

Newark Liberty International Airport buildings contain spaces that, when entered, may endanger Port Authority employees and contractors. These spaces are primarily identified as:

- Large boiler (large enough for entry)
- Deaerators
- Traveling screen pits
- Tower pits for pumps
- Sanitary lift stations
- Sewer ejector pits
- Sanitary manholes
- Underground storage tanks (regardless of contents)
- Above ground storage tanks (regardless of contents)
- Tanks
- Vessels
- Hoppers
- Excavations/deep trenches
- Electrical sub-surface structures
 - Manholes
 - Underground transformer vaults

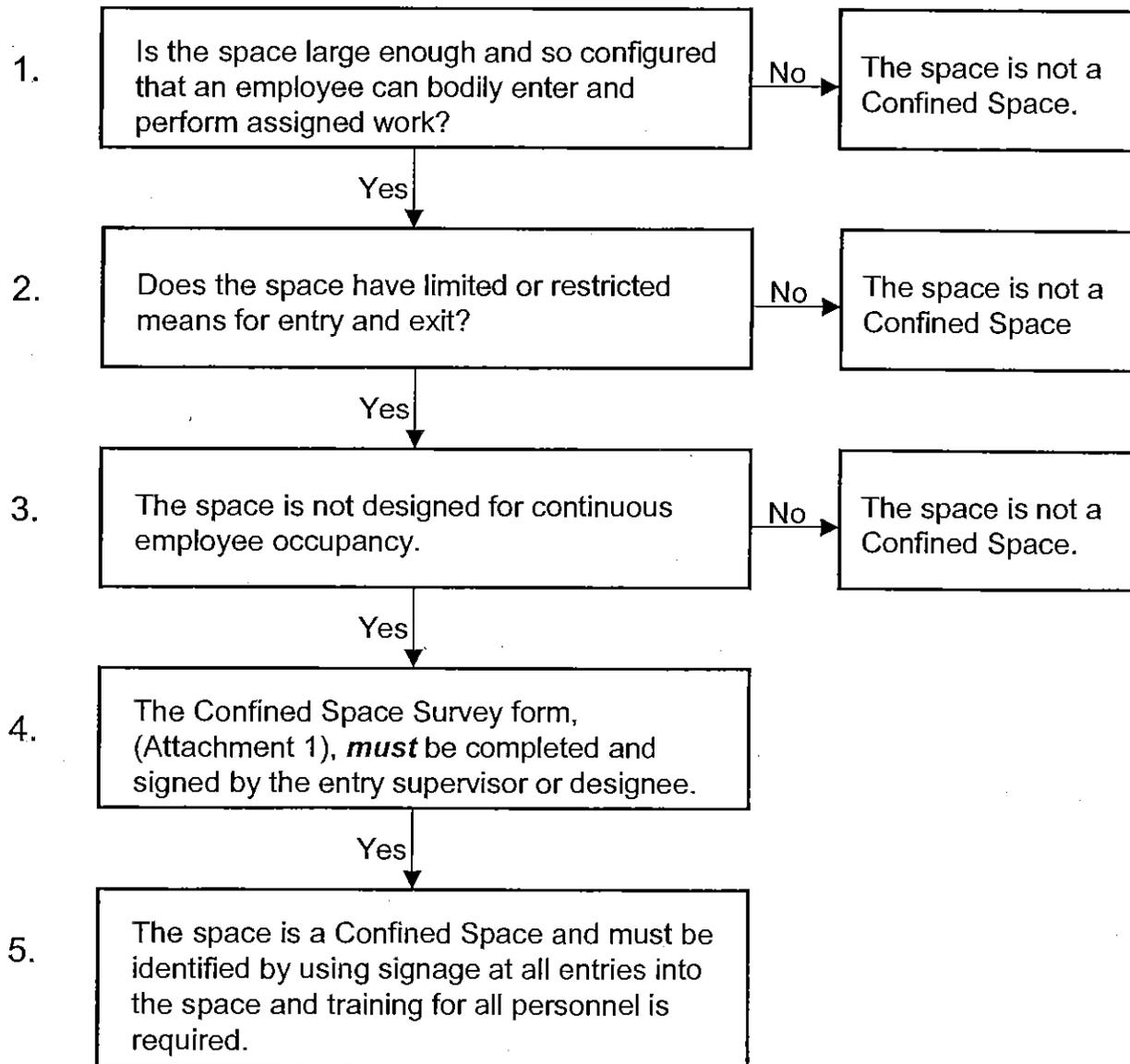
Other spaces not listed above may meet the definition of a confined space. If such a space does exist contact Mehry Najafi, Supervisor, Environmental Unit at (973 961-6093) for clarification before entering. Only trained authorized personnel may enter confined spaces.

Note: No confined space (whether permit-required or not) shall be entered without monitoring. Air monitoring must be conducted on a continuous basis until completion of work.

By definition a confined space is one that:

- 1) *Is large enough and configured so that an employee can bodily enter and perform assigned work and*
- 2) *Has limited or restricted means for entry and exit and*
- 3) *Is not designed for continuous employee occupancy*

HOW TO DETERMINE A CONFINED SPACE



6.0 Permit-Required Confined Space

A Permit-Required Confined Space is a confined space that has one or more of the following characteristics:

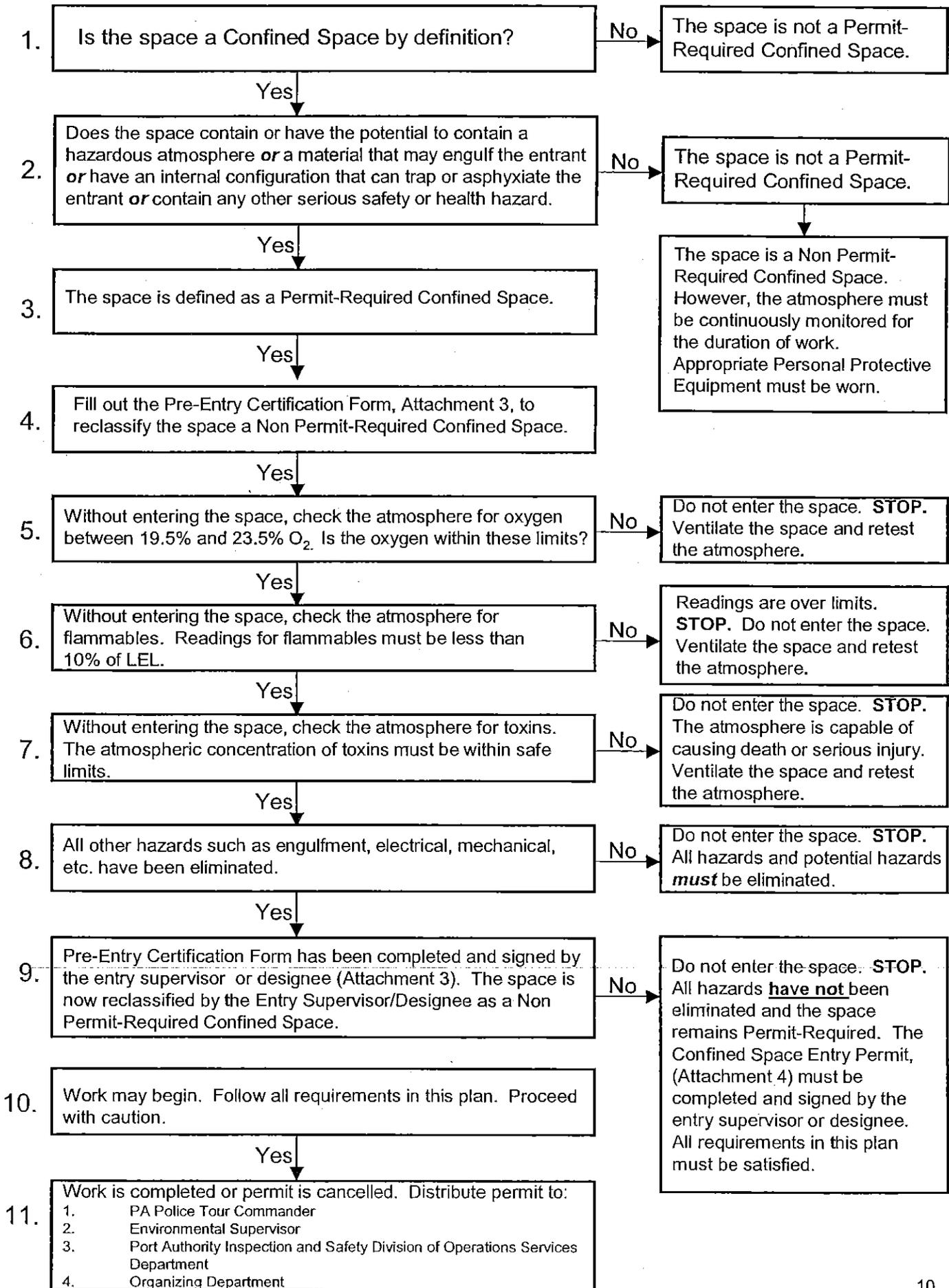
- 1) *Contains or has the potential to contain a hazardous atmosphere*
- 2) *Contains a material that has the potential for engulfing an entrant*
- 3) *Has an internal configuration in which an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross section, or*
- 4) *Contains any other recognized serious safety or health hazard*

Note: A serious hazard may be defined as Immediately Dangerous to Life and Health (IDLH)

All confined spaces must be considered permit-required confined spaces until all recognized serious hazards have been isolated, eliminated or controlled. When there is an indication that a dangerous atmospheric condition exists, or may exist, continuous forced air ventilation must be provided for entrants in the confined space.

Note: No confined space (whether permit-required or not) shall be entered without monitoring. Air monitoring must be conducted on a continuous basis until completion of work.

HOW TO DETERMINE A PERMIT-REQUIRED CONFINED SPACE/RECORD KEEPING



7.0 Re-classification of Permit-Required Confined Spaces

A space classified as a Permit-Required Confined space may be reclassified as a Non Permit-Required Confined Space under these conditions:

- The Permit-Required Confined Space poses no actual or potential atmospheric hazards
- All hazards in the space are eliminated without entry.
- If entry is required to eliminate hazards, it shall be in accordance with all applicable regulations. The Permit-Required Confined Space (PRCS) may be reclassified as a Non Permit-Required Confined Space for as long as the hazards remain eliminated.
- The entry supervisor/designee shall certify in writing that all hazards in the PRCS have been eliminated. This document shall be made available to each entrant. (See Attachment 3 Pre-Entry Certification form).
- If hazards arise in the re-classified Non Permit-Required Confined Space, employees shall exit immediately. The entry supervisor/designee shall determine if the space shall once again become a Permit-Required Confined Space (PRCS).

Note: Only the entry supervisor /designee is permitted to reclassify a Permit-Required Confined Space to a Non Permit-Required Confined Space. (Pre-Entry Certification Form Attachment 3).

8.0 Alternate Space Procedure

This alternate entry procedure shall be followed if it can be demonstrated that the only confined space hazard is a hazardous atmosphere that can be maintained by continuous forced air ventilation. The Pre-Entry Certification form (Attachment 3) shall be completed by the entry supervisor/designee, indicating that the following conditions are met:

- It can be demonstrated that the only hazard posed by the permit space is an actual or potential hazardous atmosphere.
- It can be demonstrated that continuous forced air ventilation alone is sufficient to maintain that permit space safe for entry. When a blower is used, the discharge tube must terminate six (6) inches

from the bottom of the confined space. Gasoline engine blowers shall not be used.

- Supporting monitoring and inspection data have been developed.
- Supporting data are documented and available to each authorized entrant

Entry into the confined space is performed as follows:

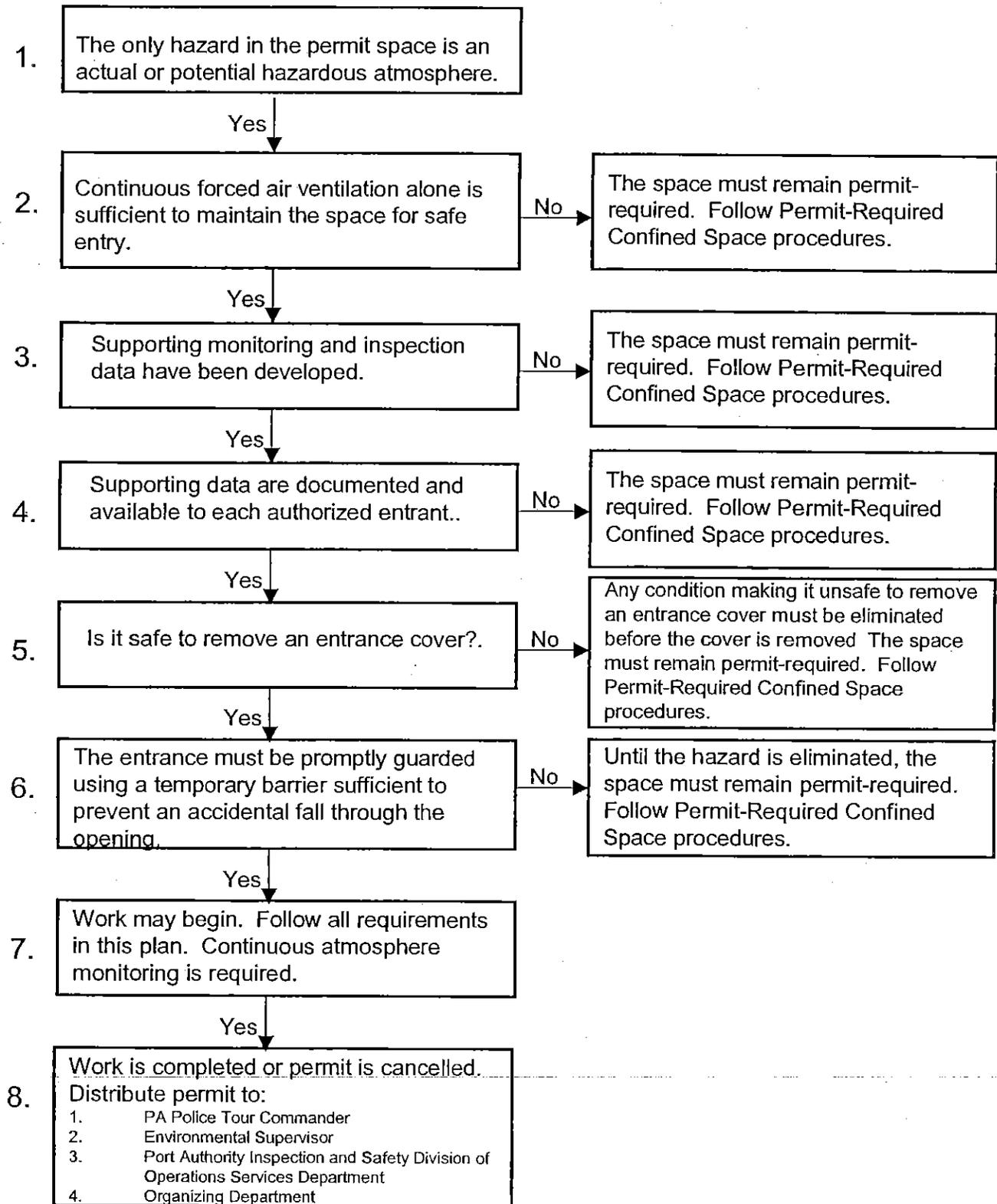
- 1) Any condition making it unsafe to remove an entrance cover must be eliminated before the cover is removed.
- 2) The entrance must be promptly guarded using a temporary barrier sufficient to prevent an accidental fall through the opening.
- 3) Before any employee enters the space, the internal atmosphere must be tested in accordance with The Port Authority Operations and Maintenance Standard No. 62 (Testing Confined Space Atmospheres).
- 4) There may be no hazardous atmosphere within the space whenever any employee is inside.
- 5) Continuous forced air ventilation must be used as follows:
 - i. An employee may not enter the space until the forced air ventilation has eliminated the hazardous atmosphere
 - ii. The forced air ventilation must be so directed as to ventilate the immediate areas where an employee is or will be present, and must continue until all employees have left the space.
 - iii. The air supply for the forced air ventilation must be from a clean source and cannot increase the hazards in the space.
 - iv. The atmosphere within the space must be continuously tested (and periodically recorded) to ensure that forced air ventilation is preventing the accumulation of a hazardous atmosphere.
 - v. If a hazardous atmosphere is detected during entry:
 - Each employee must leave the space immediately.
 - The space must be evaluated by the entry supervisor/designee to determine how the hazardous atmosphere developed.

- The space must be evaluated by the entry supervisor/designee to determine how the hazardous atmosphere developed.
- Measures must be implemented to protect employees from the hazardous atmosphere before any subsequent entry takes place.

Note: Whenever possible, electric blowers shall be used. If a gasoline driven blower must be used, or a gasoline driven electrical generator must be used, care must be exercised to ensure that exhaust from the engine does not enter the blower intake. Vehicles should be parked at least ten (10) feet away from the confined area. The exhaust must be directed away from the entrance and the blower intake.

Note: Control of atmospheric hazards through forced ventilation does not constitute elimination of the hazards. The entry supervisor/designee must demonstrate that forced air ventilation will eliminate all atmospheric hazards in the space.

PROCEDURE FOR ALTERNATE SPACE CLASSIFICATION AND ENTRY



Note: If a hazardous atmosphere is detected during entry:

- Each employee must leave the space immediately.
- The space must be evaluated by the entry supervisor or designee to determine how the hazardous atmosphere developed.
- Measures must be implemented to protect employees from the hazardous atmosphere before any subsequent entry takes place.
- Only use electric blowers for ventilating confined spaces.

9.0 Pre-Entry Certification Form

The entry supervisor/designee must document the basis for determining that all hazards have been eliminated from the Permit-Required Confined Space. The Pre-Entry Certification form (Attachment 3) requires the entry supervisor/designee to provide the following information:

- Location of the confined space
- Description of the confined space
- Date the form was completed
- Time the form was completed
- The hazards which were eliminated
- % Oxygen
- % LEL (Lower Explosive Level) for gases, vapors, and mists
- Concentration of carbon monoxide in parts per million
- Concentration of hydrogen sulfide in parts per million
- Name of the entry supervisor/designee

The Pre-Entry Certification form also provides information that allows a Permit-Required Confined Space to be reclassified as a Non Permit-Required Confined Space or as an Alternate Space.

Note: Where the confined space hazards cannot be eliminated, the space remains a Permit-Required Confined Space and the entry supervisor/designee shall determine and implement the safest methods for entry.

ATTACHMENT 3 PRE-ENTRY CERTIFICATION FORM

DATE _____ TIME _____

LOCATION OF CONFINED SPACE _____
 DESCRIPTION OF CONFINED SPACE _____
 PURPOSE OF ENTRY _____

RECLASSIFIED NON-PERMIT

LIST THE HAZARDS ELIMINATED

	PERMISSIBLE ENTRY LEVEL	TIME				
		AM/PM	AM/PM	AM/PM	AM/PM	AM/PM
% OXYGEN	19.5% TO 23.5%					
% LEL (GAS, VAPOR, MIST)	LESS THAN 10%					
CARBON MONOXIDE	LESS THAN 35ppm					
HYDROGEN SULFIDE	LESS THAN 5 ppm					

ALTERNATE PROCEDURE (FORCED AIR VENTILATION REQUIRED)	YES	NO
• SAFE TO REMOVE COVER	_____	_____
• ARE OPENINGS PROTECTED AS REQUIRED	_____	_____
• VENTILATION DEVICES IN GOOD WORKING ORDER	_____	_____
• ARE ATMOSPHERIC HAZARDS THE ONLY HAZARDS	_____	_____

	PERMISSIBLE ENTRY LEVEL	TIME				
		AM/PM	AM/PM	AM/PM	AM/PM	AM/PM
% OXYGEN	19.5% TO 23.5%					
% LEL (GAS, VAPOR, MIST)	LESS THAN 10%					
CARBON MONOXIDE	LESS THAN 35ppm					
HYDROGEN SULFIDE	LESS THAN 5 ppm					

NOTES/COMMENTS: _____

NOTE: INDICATE ANY HAZARDS PRODUCED BY WORK TO BE PERFORMED _____

NAME OF TESTER/MONITOR _____

NAME OF ENTRY SUPERVISOR _____

10.0 General Hazard Evaluation

All hazards must be considered when working in confined spaces. The entry supervisor/designee must conduct a thorough site evaluation designed to identify hazards before any work in a confined space begins.

Dangerous atmospheric conditions, engulfment by liquids and other flowable materials, mechanical equipment, sources of electricity, or inwardly converging walls that could entrap or asphyxiate an entrant may be the more common hazards associated with confined spaces. However, all hazards must be considered when working in confined spaces.

Other recognized hazards may include, but are not limited to:

- Electricity
- Steam
- Pressurized leaking hydraulic lines
- Natural gas
- Sewer gas
- Inert gases used for purging such as nitrogen and carbon dioxide
- Oxygen deficient or oxygen enriched atmospheres
- Carbon Monoxide
- Hydrogen Sulfide
- Rotating equipment
- Loud noise
- Conditions that would cause slips, trips, and falls
- Corrosive liquids or solids
- Fire
- Needles, syringes, bloodborne pathogens

All manhole covers, hatchways and access doors must be properly and promptly guarded once opened. Where applicable, guardrails, chains or similar devices with four-inch kick plates must be in place to sufficiently prevent people or equipment from accidentally falling into the space. Any hazardous condition that presents an unsafe entry must be eliminated before the cover is removed.

The Pre-Entry Certification Form (Attachment 3) serves a dual purpose.

- 1) It acts as a checklist for the entry supervisor/designee by listing recognized hazards and systematically addressing each concern.

- 2) The checklist is used to document that all hazards have been addressed so that a Permit-Required Confined Space can be reclassified to a Non-Permit-Required Confined Space.

11.0 Site Safety Work Practices

11.1 Site Safety Talks

Every job must begin with a site safety talk. The entry supervisor/designee must conduct a job briefing before entry is permitted into a confined space. The entry supervisor/designee shall at a minimum:

- Give a detailed explanation of the job task
- Assign individuals as entrants, attendants/monitors
- Select the personal protective equipment (PPE) to be used
- Verify that all recognized hazards have been eliminated
- Ensure that all questions have been satisfactorily answered

11.2 Roadway Protection

When entering confined spaces, such as manholes, vaults, and sewer ejector pits, safety measures must be taken to protect employees from vehicle traffic. Traffic cones that divert traffics away from the work site as well as arrow boards, and flagmen shall be used to protect employees and contractors working in the confined space. In some cases, where heavy traffic exists, work vehicles as well as traffic cones, arrow boards, and flagmen should be placed in front and behind the work set up for additional protection from on coming traffic. In some cases, closing the roadway to vehicle traffic may be necessary. Reflective traffic safety vests/clothing must be worn when working in roadways.

11.3 Atmosphere Testing

Confined spaces opened for the first time, or re-opened after having been closed for one hour or more must be retested. The time of each test shall be recorded. While in the space entrants shall continuously monitor the atmosphere for hazardous conditions. Atmosphere testing must always be conducted before anyone enters a confined space. (See Section 19.0 Atmosphere Testing Procedures and Section 20.0 Atmosphere Testing Devices for more information).

Note: All manholes must be tested prior to cover removal. All openings must be protected immediately after opening.

11.4 Ventilation Devices

Whenever possible, electric blowers shall be used. If a gasoline driven blower must be used, or a gasoline driven electrical generator must be used, care must be exercised to ensure that exhaust from the engine does not enter the blower intake. Vehicles should be parked at least ten (10) feet away from the confined area. The exhaust must be directed away from the entrance and the blower intake.

When a blower is used, the discharge tube must terminate six (6) inches from the bottom of the confined space.

11.5 Excavation and Trenching

Excavations are considered confined spaces. *Excavations deeper than four feet require atmosphere testing.* Certain gases may displace oxygen, causing a hazardous atmosphere for the entrant/s. Other safety measures, such as those listed below, must be followed while working in excavations:

- A competent person is required to supervise work in excavations
- Daily inspections must be conducted and documented. They include:
 - Inspecting the excavation for water accumulation
 - Ensuring that spoils remain 2 feet from the edge of the excavation
 - Verifying soil classification (to determine if sheeting/shoring is required before five feet)
 - Ensuring that excavation walls located next to building foundations are protected from vibration and collapse
 - Sheeting/shoring for excavations deeper than 5 feet
 - Using ladders in excavations deeper than 4 feet
 - Ensuring that ladders extend 3 feet above the excavation
 - Testing the atmosphere in excavations deeper than 4 feet
 - Wearing reflective traffic safety vests when working in roadways

11.6 Lockout/Tagout

Hazardous energy in confined spaces must be controlled before entry. When repair and maintenance of electrical equipment and or machinery is required the source of electrical energy must be locked. This prevents accidental start-up while entrants are working on or near equipment in a confined space. Only trained, authorized employees familiar with OSHA 29CFR 1910.147 The Control of Hazardous Energy (Lockout/Tagout) (Attachment 14) standard are permitted to isolate sources of electricity.

Electricity, steam, natural gas and sources of potential energy, such as spring loaded devices, must be isolated, or de-energized. Newark Liberty International Airport personnel responsible for overseeing contractor operations shall ensure that both parties are familiar with their lockout/tagout procedures.

11.7 Tools and Equipment

Hand tools and power tools must be inspected for defects and wear before use. Inspect electrical cords for damaged insulation and shorts. GFIC and/or double insulated power tools shall be used when working in confined spaces.

Ladders must be inspected for split side rails, broken rungs, and slippery surfaces. Non-conducting insulated ladders must be used in confined spaces where contact with electrical equipment is possible.

Cables, slings and mechanical lifting devices must be inspected for damage and wear.

11.8 Heat Stress

Entrants may experience heat stress when working in confined spaces. Entrants and attendant must be aware of the signs and symptoms of heat stress, heat exhaustion, and heat stroke.

Pre-planning is necessary to prevent injury and possible death. Wearing flame retardant clothing and/or chemically resistant disposable clothing without sufficient rest and water can endanger the entrants. Engineering controls including general ventilation and spot cooling by local exhaust ventilation at points of high heat production will reduce the effects of heat stress. Supplying cool, clean outside air into the confined space can also reduce heat in hot conditions. Acclimatization to heat through short

exposures followed by longer periods of work in the hot environment can reduce heat stress. Rotate workers to allow for longer rest periods.

Note: In some cases the use of salt tablets and beverages, such as “power drinks” containing salts are not advised. Cool drinking water is preferred. Alcoholic beverages are prohibited.

12.0 Personal Protective Equipment (PPE)

Where hazards are determined to be present that can cause injury or impairment to any part of the body through absorption, inhalation, or physical contact, it is necessary to select personal protective equipment to adequately protect the entrant. Engineering and administrative controls must be implemented before issuing personal protective equipment (PPE) to employees.

The entry supervisor/designee will ensure that entrants are aware of the hazards that will be encountered in the confined space. If necessary, employees will be provided protection for:

- Eyes-----safety glasses, goggles, face shields, welding/burning shields
- Head-----hard hats
- Hands-----gloves, (leather, cotton, neoprene, rubber, etc.)
- Feet-----steel toe work boot, rubber boots, etc.
- Hearing-----hard hat ear muffs, disposable inserts, pre-formed plugs

Respiratory protection will also be provided if necessary. See Port Authority’s Respiratory Protection Program, Section 13.0 in this program and Attachment 12.

The proper selection of protective clothing depends on the nature of the hazards (routes of entry, physical characteristics, toxicological properties) the type of work to be done, ergonomic constraints, and the chemical and physical performance required by the protective clothing.

Note: Proper decontamination techniques must be used when working in confined spaces where skin contact with chemicals may be likely. For details about the use of proper PPE and decontamination contact Mehry Najafi, Supervisor, Environmental Unit, (973 961-6093).

It is the responsibility of the employee to inspect their PPE for defects and wear. All defective PPE will be returned immediately to the entry supervisor/designee for replacement.

Only PPE approved by The Port Authority Inspection and Safety Division of Operations and Services Department shall be used. The use of unauthorized PPE by employees is prohibited.

13.0 Respiratory Protection

When a Permit-Required Confined Space contains harmful dusts, fumes, vapors, mists, or gases, the entry supervisor/designee must use methods that control the hazard. This can be accomplished through engineering and administrative controls.

Ventilation is an engineering control that may be used to control atmospheric hazards.

Note: Control of hazards does not mean the elimination of hazards. The entry supervisor/designee must ensure safe conditions before entry. Continuous forced air ventilation must be used (see Section 8.0 Alternate Space Procedure).

Administrative controls include methods that lower the concentration of the contaminant an entrant may receive by rotation of employees in that space or training the entrant to understand the risk of exposure thereby using alternate methods to complete the task.

When necessary, entrants may be required to wear respiratory protection while working in Permit-Required Confined Spaces. This will be determined by the entry supervisor/designee after completing the Pre-Entry Certification form (Attachment 3).

The entry supervisor/designee is responsible for enforcing the use of respiratory protection when the entrant faces atmospheric hazards such as:

- The presence of toxins at or above the PEL (Permissible Exposure Level)
- The presence of respirable dust
- An oxygen deficient atmosphere (less than 19.5%)
- An oxygen enriched atmosphere (greater than 23.5%). However, oxygen-enriched atmospheres present explosion hazards. Additional precautions must be taken.
- Any other conditions that require the use of an air purifying or air supplied respirator

All employees required to wear respirators must first be medically cleared and then fit-tested to wear a respirator. The Office of Medical Services shall establish the medical evaluation criteria for use of Air-Purifying Respirators (APRs) and Atmosphere-Supplying Respirators (ASRs). All employees, required to use respiratory protection in Permit-Required Confined Spaces, shall comply with The Port Authority Respiratory Protection Program (Attachment 12).

13.1 Types of Respiratory Protection

Depending on the condition/s encountered in the permit space and hazardous exposure generated by the task, either Air-Purifying Respirators (APRs) and Atmosphere-Supplying Respirators (ASRs) may be required.

- **Air-purifying respirators** can only be used in permit spaces where the air meets the requirements for breathable air and the concentration of the contaminant does not exceed the PEL (Permissible Exposure Level). Also, remember to use the proper cartridges to protect you from contaminants in the space.
- **Atmosphere-supplying respirators** have their own supply of breathable air (Grade “D” air), either through a hose connected to a source of outside air or to a bottle of compressed breathable air such as an SCBA (Self Contained Breathing Apparatus). All employees required to wear ASRs must be properly trained in their use.

Note: Hoses that connect to an outside source of air such as an air trailer (pre-tested for content before use, or an air compressor delivering grade “D” air) must be no longer than 300 feet in length. The wearer must also be supplied with a five-minute escape bottle. Employees must receive training as per OSHA 29 CFR 1910.134 Respiratory Protection and The Port Authority Respiratory Protection Program (Attachment 12).

13.2 Cartridge/Filter Selection

When selecting a cartridge/filter to use, color-coded cartridges provide a quick reference to the contaminant for which a cartridge/filter is intended. The following table identifies color codes for chemical cartridges:

COLOR	CONTAMINANTS CONTROLLED
Black	Organic vapors (OV) such as acetone, alcohol, gasoline, etc...
Green	Ammonia and methylamine
Olive	Formaldehyde
Orange	Mercury
White	Acid gases (AG) such as chlorine, hydrogen chloride, and sulfur dioxide
Yellow	Organic vapors and acid gases (OV/AG)
Magenta	Dust, mists, fumes, asbestos, and radionuclides

13.3 Responsibility

The entry supervisor/designee ensures that employees involved in Permit-Required Confined Space operations have:

- Proper training (refer to Port Authority Respiratory Protection Program Training section Attachment 12)
- Been medically cleared to wear a respirator by the Office of Medical Services
- Evaluated the respiratory hazards and identified those hazards before entry into the permit space
- Ensured that employees properly wear, maintain and store respiratory protection equipment (refer to Port Authority Respiratory Protection Program "Cleaning and Storage" section, Attachment 12).

Note: Report any respiratory protection equipment malfunction, insufficiencies, or questions to the entry supervisor/designee.

Entrants entering permit spaces must:

- Use assigned respiratory protection in accordance with their training
- Maintain and store respiratory equipment properly
- Report any respiratory protection equipment malfunction or insufficiencies to the entry supervisor/designee immediately
- Not enter the permit space with defective respiratory protection equipment
- Only use respirator/s that match the type, manufacturer, and size of the respirator/s they were fit tested for at their last fit-test
- Not have any facial hair except for a moustache which does not extend beyond the lip line
- Get re-fit-tested when the following conditions have changed since their last fit-test:
 - Facial scaring
 - Dental surgery that may interfere with a proper seal
 - A weight gain or loss of more than 20 pounds

14.0 Confined Space Survey

Newark Liberty International Airport contains a variety of confined spaces under the jurisdiction of various department heads. It is understood that these confined spaces are considered Permit-Required Confined Spaces until the entry supervisor/designee reclassifies the permit space by eliminating the hazards. Permit-Required Confined Spaces may only be reclassified to an Alternate Space when the only hazards that exist are atmospheric. In this case it is not enough for the atmospheric hazards to be controlled. They must be eliminated.

The more common confined spaces have already been identified in the memo “Confined Spaces Designations”, (Attachment 6).

These spaces are primarily identified as but not limited to:

- Large boiler (large enough for entry)
- Deaerators
- Traveling screen pits
- Tower pits for pumps
- Sanitary lift stations
- Sewer ejector pits
- Sanitary manholes
- Underground storage tanks (regardless of contents)
- Above ground storage tanks (regardless of contents)
- Tanks
- Vessels
- Hoppers
- Excavations/deep trenches
- Electrical sub-surface structures
 - Manholes
 - Underground transformer vaults

The entry supervisor/designee has the responsibility of identifying confined spaces not mentioned above. Mehry Najafi, Supervisor, Environmental Unit (973 961-6093) should be contacted regarding identification of suspect confined spaces before entry.

It is necessary to use an effective method of identifying these questionable confined spaces. Using the Confined Space Survey form (Attachment 1) ensures consistency and uniformity when identifying these spaces throughout Port Authority operated buildings and locations.

The form lists:

- Location of the space
- The date the survey was taken
- The description of the space
- The definition of a confined space

Is large enough and configured so that an employee can bodily enter and perform assigned work and

*Has limited or restricted means for entry and exit and
Is not designed for continuous employee occupancy*

- Questions that determine if the space is a Permit-Required Confined Space
- Questions that allow for the re-classification of the Permit-Required Confined Space to a Non Permit-Required Confined Space
- A section to indicate if danger signs were posted at all entrances
- The names and titles of the person/s conducting the survey

ATTACHMENT 1
CONFINED SPACE SURVEY
 ANSWER ALL QUESTIONS

LOCATION _____ DATE _____

DESCRIPTION OF SPACE _____

CONFINED SPACE DETERMINATION YES NO

- IS THE SPACE LARGE ENOUGH AND SO CONFIGURED THAT AN EMPLOYEE CAN BODILY ENTER AND PERFORM ASSIGNED WORK? _____
 - DOES THE SPACE HAVE LIMITED OR RESTRICTED MEANS FOR ENTRY OR EXIT? _____
 - IS THE SPACE NOT DESIGNED FOR CONTINUOUS EMPLOYEE OCCUPANCY? _____
- IF THE ANSWER TO ALL THREE QUESTIONS IS YES, IT IS A CONFINED SPACE
- IF THE ANSWER TO ANY QUESTION IS NO THEN EXPLAIN _____

NON-PERMIT CONFINED SPACE YES NO

- DOES THE CONFINED SPACE CONTAIN OR HAVE THE POTENTIAL TO CONTAIN A HAZARDOUS ATMOSPHERE? _____
 - DOES THE CONFINED SPACE CONTAIN ANY HAZARD CAPABLE OF CAUSING DEATH OR SERIOUS INJURY? _____
- IF THE ANSWER TO BOTH QUESTIONS IS NO, IT IS A NON-PERMIT CONFINED SPACE

PERMIT-REQUIRED CONFINED SPACE YES NO

- DOES THE SPACE CONTAIN OR HAVE THE POTENTIAL TO CONTAIN ANY OF THE FOLLOWING HAZARDOUS ATMOSPHERES?
 -A FLAMMABLE GAS, VAPOR, OR MIST IN EXCESS OF 10% OF ITS LOWER EXPLOSIVE LIMIT (LEL)? STATE THE HAZARD(S) _____
 - AIRBORNE COMBUSTIBLE DUST AT A CONCENTRATION THAT MEETS OR EXCEEDS ITS LEL? _____
 - ATMOSPHERIC OXYGEN CONCENTRATION BELOW 19.5% AND 23.5%? _____
 - AN ATMOSPHERIC CONCENTRATION OF ANY SUBSTANCE THAT IS CAPABLE OF CAUSING DEATH, INCAPACITATION, IMPAIRMENT OF ABILITY TO SELF RESCUE, INJURY, OR ACUTE ILLNESS DUE TO IT'S HEALTH EFFECTS?
 STATE HAZARD(S) _____
 - DOES THE CONFINED SPACE CONTAIN A MATERIAL THAT HAS THE POTENTIAL FOR ENGULFING AN ENTRANT?
 STATE HAZARD(S) _____
 - DOES THE CONFINED SPACE HAVE AN INTERNAL CONFIGURATION SUCH THAT AN ENTRANT COULD BE TRAPPED OR ASPHYXIATED BY INWARDLY CONVERGING WALLS OR BY A FLOOR WHICH SLOPES DOWNWARD AND TAPPERS TO A SMALLER CROSS SECTION? _____
 - DOES THE CONFINED SPACE CONTAIN ANY OTHER RECOGNIZED SAFETY OR HEALTH HAZARD(S)?
 STATE HAZARD(S) _____
- IF THE ANSWER TO ANY OF THESE QUESTIONS IS, IT IS A PERMIT-REQUIRED CONFINED SPACE
- ARE "DANGER" SIGNS POSTED AT ALL ENTRANCES YES _____ NO _____

SURVEY CONDUCTED BY: NAME _____ TITLE _____
 NAME _____ TITLE _____

15.0 Sign Posting

Each entry supervisor/designee selected by the department head is responsible for evaluating their work locations to determine if any space is a confined space.

Confined spaces such as sewer ejector pits, manholes, etc., when in service and operational may pose life-threatening conditions. For this reason, when in service, all confined spaces are considered Permit-Required Confined Spaces. The department head/designee is responsible for informing employees and contractors by reviewing this written Permit-Required Confined Space plan and by placing signs at all entrances into these spaces.

A sign reading “**Danger – Permit-Required Confined Space. Do Not Enter**” (Attachment 2) or using other similar language would satisfy the sign requirement.

ATTACHMENT 2

CONFINED SPACE ENTRY WARNING SIGN



16.0 Duties of the Attendant

Attendants have the responsibility to monitor the activities of the entrants working in the confined space. Employees are selected as attendants by the entry supervisor/designee. This decision is based on employee knowledge, skills, and understandings of permit confined space operations. Attendants must have completed Permit-Required Confined Space training. The attendant will not be assigned any other task that would distract the attendant from their primary duty of monitoring the entrants in the confined space.

Attendants must:

- Know the hazards that may be faced during entry, including information about their signs and symptoms
- Participate in a job briefing before work begins
- Be aware of possible behavioral effects of hazard exposure to entrants
- Continuously maintain an accurate account of the authorized entrants in the permit space. This is done by completing the authorized entrant section on the Permit-Required Confined Space Entry Permit (Attachment 4)
- Remain outside the entry space during entry operations until relieved by an authorized attendant

Note: Entry supervisors/designees and authorized entrants may substitute as attendants if they have been authorized by the entry supervisor/designee.

- Be familiar with rescue equipment needed to perform non-entry rescue
- Attendants will not enter the permit confined space to perform rescue
- Communicate with entrants to monitor their condition and to alert them should it be necessary to evacuate when:
 - The attendant detects a hazard inside or outside the space that may affect the entrants
 - The attendant detects the behavioral effects of hazard exposure
 - If the attendant cannot safely perform all regular duties
- Contact Port Authority Police /Communication desk as soon as the attendant determines that the entrants may need rescue assistance.

The attendant must remain in communication with Port Authority Police or emergency forces responding to the rescue.

- Takes the following actions when unauthorized persons approach or enter a permit space while entry is underway.
 - Warn the unauthorized persons that they must exit the area immediately

17.0 Duties of the Entrant

Authorized entrants perform work in confined spaces. Employees are selected as entrants by the entry supervisor/designee. This decision is based on employee knowledge, skills, and understandings of permit confined space operations. All entrants must have completed Permit-Required Confined Space training. The entry supervisor/designee shall ensure that all authorized entrants:

- Know the hazards that may be faced during entry, including information about their signs and symptoms
- Participate in a job briefing before work begins
- Are qualified to perform the duties listed on the entry permit
- Be trained in the use of applicable personal protective equipment (PPE) and rescue equipment
- Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space when:
 - An order to evacuate is given by the attendant or the entry supervisor/designee
 - The entrant recognizes any warning signs or symptoms of exposure to a dangerous situation
 - The entrant detects a prohibited condition
 - An evacuation alarm is activated

18.0 Duties of the Entry Supervisor

The department heads shall select the entry supervisor or their designee. This decision is based on employee knowledge, skills, and understandings of permit confined space operations. The entry supervisor designee assumes all of the responsibilities of the entry supervisor. Entry

Supervisors/designees must have completed Permit-Required Confined Space training.

Note: Only the entry supervisor /designee is permitted to reclassify a Permit-Required Confined Space to a Non Permit-Required Confined Space. (Pre- Entry Certification Form See Attachment 3).

The entry supervisors/designee must:

- Know the hazards that may be faced during entry, including information about their signs and symptoms
- Verifies, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place and inspected before signing the permit allowing work to begin
- Verifies that rescue services are available and that there are workable means of summoning help
- An original and three copies of each Permit-Required Confined Space entry permit and/or Pre Entry Certification form shall be completed for the following distribution:
 - The original shall be prominently posted at the work site for the duration of the job
 - One copy shall be hand delivered or faxed (followed by a call to verify receipt) to the Port Authority Police desk and the Communications desk and the PAPD Tour Commander to alert them of work being conducted in that space.
 - When the job is completed, the department head for future reference maintains the original entry permit. The department head must then forward the completed copy to the Inspection and Safety Port Authority Inspection and Safety Division of Operations and Services Department as specified in The Port Authority memo “Confined Space Administrative and Safety Rules”, (Attachment 9).
- Terminates and cancels the permit when:
 - The entry operations covered by the permit have been completed
 - A condition that is not allowed under the entry permit arises in or near the permit space
 - At the end of each shift

Note: All entry permits must be terminated at the end of each shift. A new permit will be filed accordingly when a new shift begins.

- Contacts the Port Authority Police, when unauthorized persons enter or attempt to enter the permit space.
- Determines whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space that entry operations remain consistent with the terms of the entry permit and that acceptable entry conditions are maintained.

19.0 Atmosphere Testing Procedure

Hazardous atmospheres are the leading cause of injuries and death in confined spaces. The great majority of rescuers enter confined spaces only to find oxygen deficient or toxic atmospheres. There are three types of atmospheric hazards to be concerned with when working in confined spaces: asphyxiating, toxic, and flammable. Before an employee or contractor enters a confined space, the atmosphere inside the space must be tested with a calibrated direct reading instrument for the following conditions in this order:

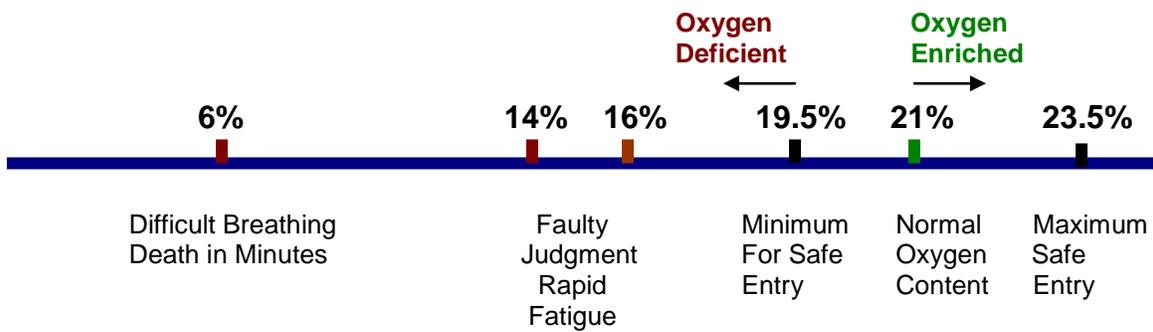
- 1) *Oxygen content***
- 2) *Flammable gases and vapors***
- 3) *Potential toxic air contaminants***

19.1 Asphyxiation

“Asphyxia” is a condition in which an extreme decrease in the concentration of oxygen in the body accompanied by an increase in the concentration of carbon dioxide leads to a loss of consciousness or death.

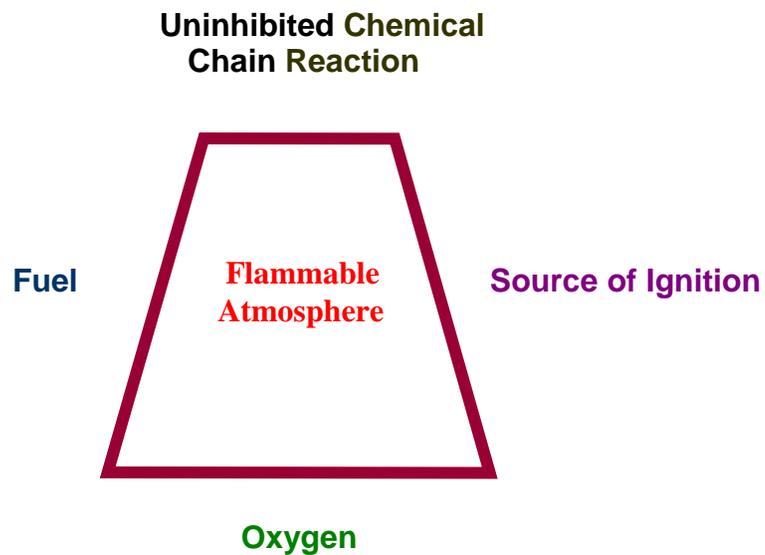
Asphyxiating atmospheres do not contain enough oxygen to sustain human life. An asphyxiating atmosphere contains less than 19.5% oxygen.

Note: A confined space with an oxygen content of less than 19.5% must not be entered.



Oxygen deficient atmospheres may be caused by the following conditions:

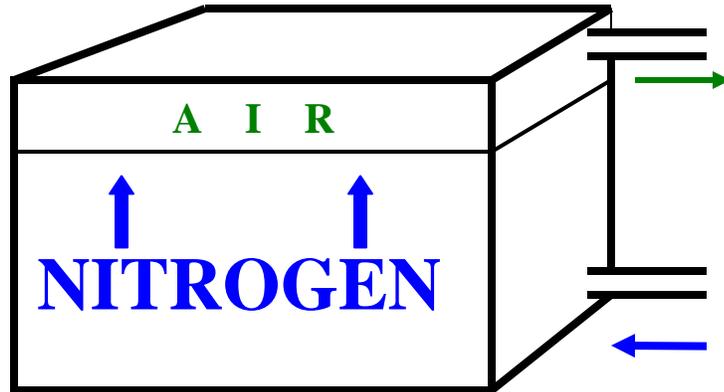
- Welding, burning, or brazing can use up the oxygen in a confined space resulting in an oxygen content of less than 19.5%. A fire in a confined space will use up available oxygen as well. Fire needs approximately 14% to 16% oxygen to sustain itself. In an atmosphere of 14% to 16% we start to experience faulty judgment and increased fatigue, which may eventually lead to unconsciousness.



FUEL + OXYGEN + SOURCE of IGNITION = Chemical Reaction (FIRE)

- A chemical reaction such as rusting will also deplete the oxygen in a confined space
- Bacterial action such as fermentation
- Being displaced by another gas

In this diagram air is displaced by nitrogen.



Oxygen enriched atmospheres in a confined space are equally hazardous. A concentration greater than 23.5% will support combustion. **Employees will not enter an atmosphere greater than 23.5% oxygen.**

19.2 Toxic Atmospheres

In cases where there is the slightest indication that a hazardous atmosphere exists, or may exist, continuous monitoring must be provided at all times while entrants are in the space.

Toxic atmospheres contain poisonous gases or vapors. The most commonly found toxins in confined spaces are:

- Carbon Monoxide
Employees/contractors are not permitted to enter a confined space where the concentration of carbon monoxide exceeds 35 ppm (parts per million).
- Hydrogen sulfide
- Employees/contractors are not permitted to enter a confined space where the concentration of hydrogen sulfide exceeds 5 ppm (parts per million).
- Toluene
- Carbon disulfide

Note: When toluene or carbon disulfide are expected toxins in a confined space, contact Mehry Najafi (973 961- 6093) for assistance before entering the space.

Toxic substances can come from products stored in the space or as a result of a chemical reaction with other substances. Some toxins, over time, can be absorbed into the walls, floors, and ceilings of confined spaces. In some cases cleaning these surfaces may result in the release of toxins into the atmosphere. Toxic materials should never be stored in or near confined spaces. Some toxic vapors may be heavier than air finding their way into a confined space. For this reason, it is the responsibility of the entry supervisor/designee to complete the Pre-Entry Certification form (Attachment 3) to identify and eliminate by ventilation any recognized toxins that may be in the confined space.

Note: Controlling an atmospheric hazard does not mean the hazard is eliminated. Refer to Section 8 Alternate Space Procedure for more information about ventilation.

19.3 Flammable or Explosive Atmospheres

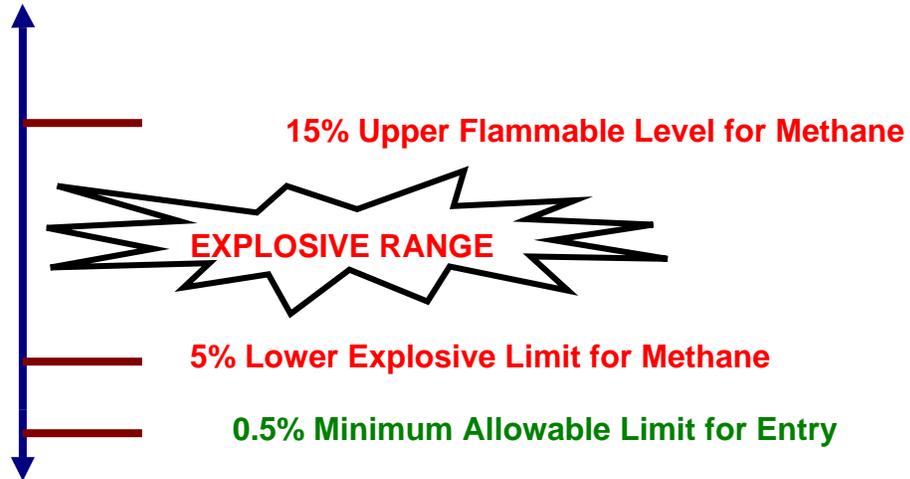
Flammable atmospheres are common in confined spaces. Some typical gases/vapors are:

- Methane
- Sewer gas
- Acetylene
- Gasoline
- Kerosene

Methane gas has an LEL of 5% and a UEL (Upper Explosive Limit) of 15%. Employees are not permitted in confined spaces where flammable/combustible limits exceed 10% of the LEL. For example, 10% of 5% = 0.5%. Employees are not permitted in the confined space when instrument readings exceed 0.5%.

If the atmosphere exceeds 10% of the LEL (Lower Explosive Level) or if a combustible is present above 10% of its LEL it can pose a serious condition. This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet or less.

EXPLOSIVE RANGE OF METHANE (CH₄)

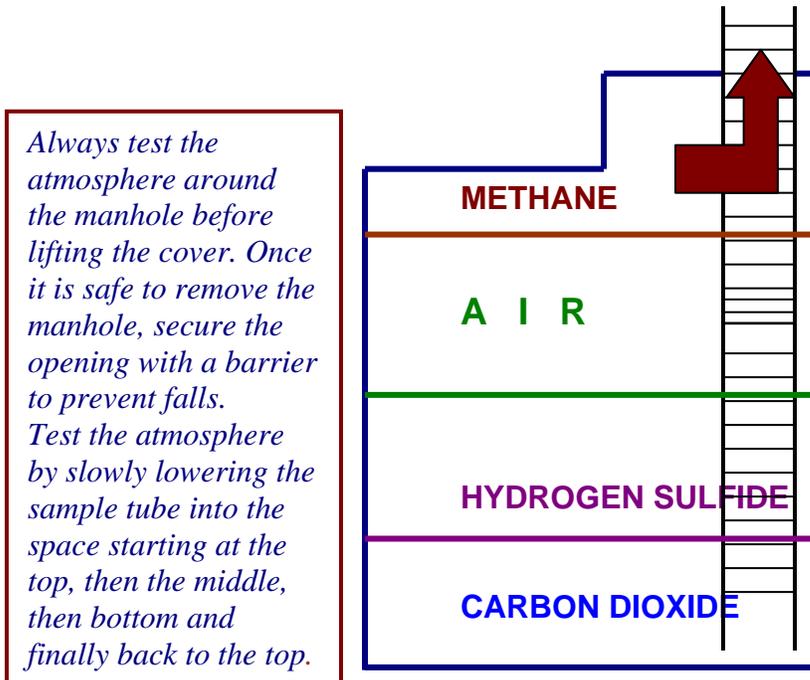


19.4 Stratification of Gases

Gases have different vapor densities that cause them to stratify in an unventilated space. Because of their vapor density, some gases are heavier or lighter than air. This is important to know in confined spaces where gases may collect and occupy different levels within the space. Here are vapor densities of typical gases we may encounter in confined spaces.

Hydrogen	H₂	0.070
Methane	CH₄	0.554
Acetylene	C₂H₂	0.910
Carbon Monoxide	CO	0.967
Nitrogen	N₂	0.972
Dry Air		1.000
Oxygen	O₂	1.105
Hydrogen Sulfide	H₂S	1.190
Carbon Dioxide	CO₂	1.530

This illustration shows how gases stratify in a confined space. Lighter gases are on the top, heavier gases on the bottom.



Identifying the types of atmospheric hazards in a confined space is the primary responsibility of the attendant. Verifying the presence of these gases/vapors prior to entry is the responsibility of the entry supervisor/designee.

19.5 Evaluating /Verifying Atmospheric Hazards

Gas detection equipment (see Section 20.0 “Atmosphere Testing Devices” for additional information about the types of gas analyzers currently used at Newark Liberty International Airport) must be used to identify and evaluate hazardous atmospheres that may exist in a confined space. Detection by sense of smell, taste, or any other method is prohibited. Safety Data Sheet (SDS) and OSHA Permissible Exposure Levels (PELs) are to be consulted during the evaluation process.

All authorized attendants, entrants, and entry supervisors/designees must be trained and qualified to use atmosphere-testing devices. This training must be documented and maintained by the department head. In cases where employees are introduced to new or different testing devices or if it is determined that employees have not maintained the skills necessary to

operate such equipment, the department head will provide additional training.

Prior to entry, the attendant must test for all previously identified contaminants in the confined space. Hazardous residue may have been absorbed into the walls, floors, and ceilings of the space or may have collected in corners and hard to reach places. The attendant must also test for suspected hazards that may be encountered.

Contact the Environmental Supervisor, Mehry Najafi at (973) 961-6093, for assistance when dealing with unfamiliar hazards.

Note: The entry supervisor/designee must evaluate the confined space for known hazards such as residual chemicals, solvents, gases, vapors, or other hazards that have occurred in that confined space or similar space. The entry supervisor/designee must use methods such as flushing and or ventilation to ensure safety entry into the confined space.

20.0 Atmosphere Testing Devices

Employees at Newark Liberty International Airport use several models of GASTECH devices. The testers are available in different gas combinations for the detection of flammable gases and vapors, oxygen, carbon monoxide, and hydrogen sulfide. Although some of these models are no longer produced, GASTECH still supplies material parts and service to maintain the instruments. All testing instrumentation must be approved by the Inspection and Safety Division of Operation Services Department.

It is the responsibility of the entry supervisor/designee to verify that testers are calibrated and operating properly according to manufacturer's specifications.

It is the responsibility of the respective department or unit to maintain testers in accordance with manufacturer specifications.

Instruments shall be labeled to indicate the last calibration date and the date the instrument should be re-calibrated. The specific type/s of tester/s to be used to monitor the atmosphere will be indicated on the Permit-Required Confined Space Entry Permit (see Attachment 3).

Before an employee/contractor enters a confined space, the internal atmosphere shall be tested, with a calibrated direct reading instrument, for the following conditions in the order given:

- 1) ***Oxygen content***
- 2) ***Flammable gases and vapors***
- 3) ***Potential toxic air contaminants***

It is the responsibility of the entry supervisor/designee to ensure that employees receive thorough training to qualify them in the use and maintenance of atmosphere testing equipment. The department head must maintain these training records. Training effectiveness must be evaluated periodically by the entry supervisor/designee. Administering a written test or asking employees to demonstrate their practical knowledge is acceptable proof of training.

21.0 The Permit Procedure

The entry permit procedure is an essential part of this written plan. It ensures the safety of the entrants who perform work in confined spaces. The Permit-Required Entry Permit (Attachment 4) is designed to provide the necessary information, equipment, and training to perform confined space work safely and effectively.

The entry supervisor/designee must sign the entry permit before any work in the permit-required space begins. Entry begins when any part of the body breaks the plane of an opening into the space.

The entry permit acts as a safety checklist. It contains the following information:

- The location of the permit space to be entered
- The work to be completed or the purpose of the entry
- Date and authorized duration of the permit
- Names of the authorized entrants
- Names of the authorized attendants
- Name/s of the entry supervisor/designee
- Recognized hazards in that space
- The measures taken to eliminate the hazards before entry
- Acceptable entry conditions
- Results of the initial and periodic tests performed and the names of the testers and the times the tests were performed
- Rescue and emergency services that can be summoned, and the means to summon those services when required

- Communication procedures by which entrants and attendants will maintain contact
- Equipment required (personal protective equipment, monitoring, communication, and rescue).
- Additional information needed to ensure safety during entry
- Additional permits that may have been issued to authorize work in the confined space such as hot work permits for welding or burning

Note: All permits shall terminate at the end of each shift. The permit process must be repeated for each new shift. This continues until the work is completed.

22.0 Non-Entry Rescue Procedure

In an emergency situation where an entrant cannot self-rescue, the attendant may only perform non-entry rescue. When responding to a non-entry rescue in a Permit-Required Confined Space the attendant, other entrants, and or the entry supervisor/designee **may not** enter the space.

A mechanical retrieval system must be used whenever an authorized entrant enters the Permit-Required Confined Space, unless the retrieval equipment would increase the risk of injury to the entrant. In some situations where the internal configuration of the permit space is such that an entrant would be pulled through or around small openings or over baffle plates or structures, etc., an alternate means of rescue must be used. It is the responsibility of the entry supervisor/designee to pre-plan the method(s) of rescue before entering a Permit-Required Confined Space.

To assist in Permit-Required Confined Space non-entry rescue, the entrants must wear a full body harness with a retrieval line attached to a mechanical retrieval device that would allow for immediate non-entry rescue. If the entry supervisor/designee can prove that the use of a full body harness would further injure the entrant during the rescue operation, wristlets or similar devices may be used.

SDS (Safety Data Sheet) must be made available at the site if there is a possibility that the entrant being rescued may be injured as a result of exposure to a substance.

23.0 Rescue Services

The primary responsibility of the attendant/s is to monitor entrants in a confined space and to be aware of emergencies inside and outside the space.

Note: In an emergency situation where an entrant cannot self- rescue, the attendant may only perform non-entry rescue.

Should an entrant be overcome while working in a confined space, it is likely that the cause would be anoxia (oxygen deprivation). The attendants should watch for the following symptoms, and order persons out of the confined space if such symptoms are observed:

- Shortness of breath
- Nausea
- Headache
- Dizziness
- Drowsiness
- Unconsciousness
- Incoherence of speech
- Slow movement
- Apathy
- Disinterest
- Poor judgment

In an emergency situation where an entrant cannot self- rescue, the attendant may only perform *non-entry rescue*.

Note: Should an emergency arise, it is the responsibility of the attendant to notify the Port Authority Police and the entry supervisor/designee immediately.

When a confined space emergency is reported to the Police Desk or Communications Desk, the local Municipal Police or Fire Department and EMS unit will be notified. The Newark Liberty International Airport Port Authority Police Tour Commander will establish a Command Post to coordinate and provide support to the municipal rescue units. Refer to the memo “Confined Space Permits – Police Involvement” (Attachment 7).

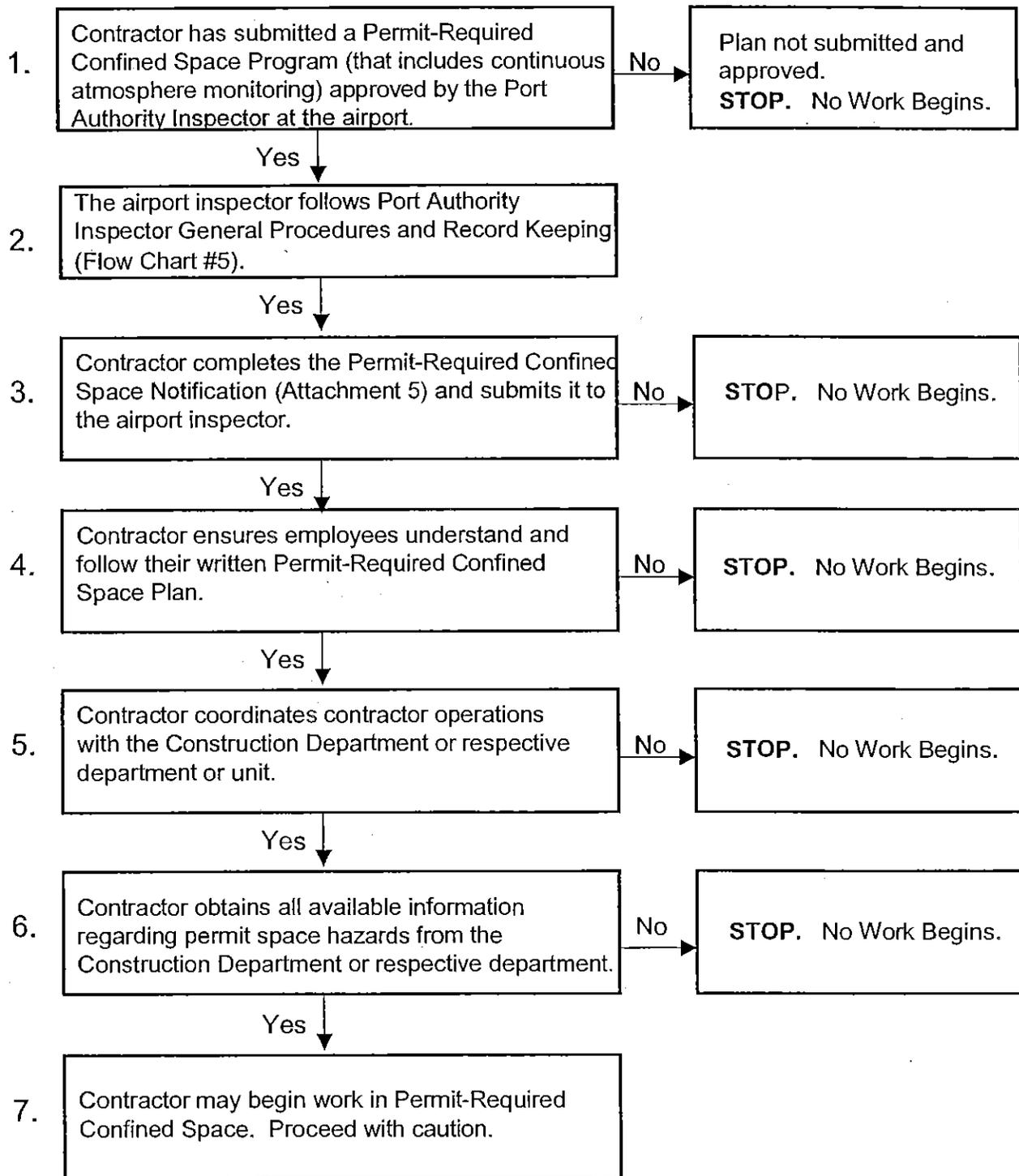
24.0 Contractors

Contractors performing work in Permit-Required Confined Spaces must coordinate their entry operations with the Chief Maintenance Supervisor, Chief Engineer, Unit Supervisor or their designee. An Inspector from the respective department or unit, competent in Permit-Required Confined Space operations and familiar with this written plan, will monitor the activities of the contractor to ensure safety. All Inspectors shall have completed Permit-Required Confined Space training.

Note: See Flow Chart #4, Approved Procedure for Contractors Performing Work in Confined Spaces. The contractor shall complete the Permit-Required Confined Space Notification PA3745C/11-95 (Attachment 5).

Note: The Contractor Inspector refers to the Port Authority staff overseeing contractor operations for that project.

APPROVED PROCEDURE FOR CONTRACTORS PERFORMING WORK IN CONFINED SPACES



NOTE:

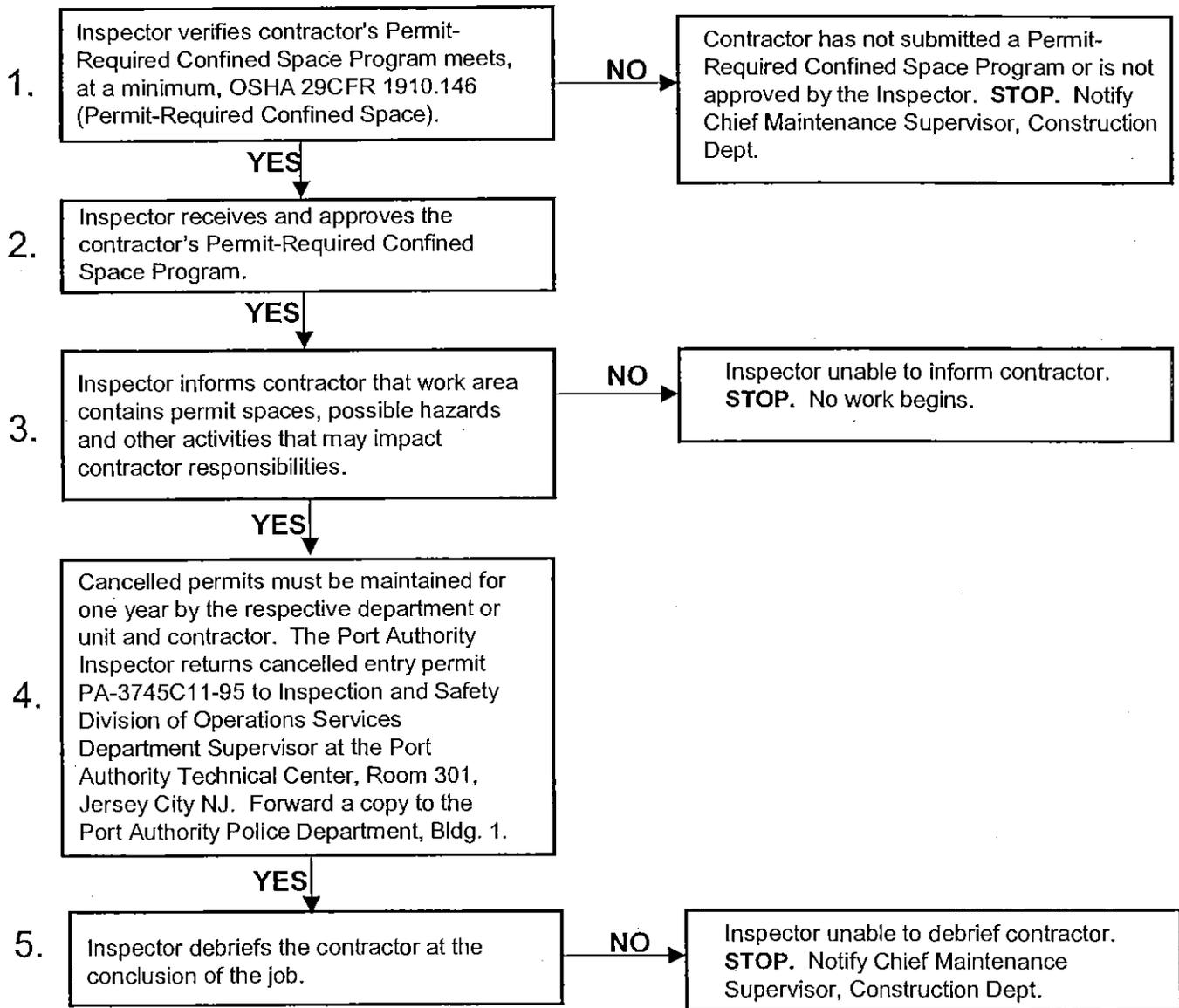
The contractor will report all emergencies, injuries, and environmental incidents to the inspector immediately. See Section 24.0 Contractors before work begins.

The Port Authority inspector at the airport must:

- Verify contractors meet OSHA 29CFR 1910.146 (Permit-Required Confined Spaces) by having the contractor present their Permit-Required Confined Space program

Note: The contractor's Permit-Required Confined Space plan must include, at a minimum, a written program, responsible personnel, entry permit (at a minimum must compare with The Port Authority Confined Space Entry Permit Attachment 4), and procedures to be followed when entering Permit-Required Confined Spaces.

PORT AUTHORITY INSPECTOR GENERAL PROCEDURES AND RECORD KEEPING



NOTE:

The inspector must immediately notify the PAPD Desk (973) 961-6230 and their department or unit when contractor emergencies, injuries or environmental incident occur. The Inspector must have a copy of the contractor's approved Permit-Required Confined Space procedure on-site.

24.0 Contractors (continued)

- Coordinate entry operations with the contractor
- Coordinate entry operations with responsible Port Authority departments or units, when both airport personnel and contractor personnel will be working in or near Permit-Required Confined Spaces
- Review and approve the contractor's Permit-Required Confined Space program before any work begins
- Inform the contractor that the work area contains permit spaces
- Inform the contractor of the hazards that exist or may exist
- Make the contractor aware of procedures that may impact the safety of the contractor entrant(s)
- Debrief the contractor at the conclusion of the job to learn about any unexpected hazards confronted or created during the entry operation.
- The Inspector must immediately notify the PAPD Desk (973) 961 6230 and their Department or Unit when contractor emergencies, injuries or environmental incidents occur.
- Must have reviewed, approved, and have on site a copy of the contractor's Permit-Required Confined Space plan including the contractor's entry permit. Upon completion of the job the Inspector must:
 1. Send the original contractor permit to the Port Authority Inspection and Safety Division of Operations and Services.
 2. Maintain a copy for their respective department or unit
 3. Send a copy for the PAPD

24.0 Contractors (continued)

The contractor must:

- Complete the Permit-Required Confined Space Notification PA3745C/08-10 (Attachment 5)
- Submit their written Permit-Required Confined Space plan for review and approval
- Ensure employees understand and follow the conditions in their written Permit-Required Confined Space plan
- Coordinate their operations with the Construction Department or the respective Department or Unit
- Obtain all available information regarding permit space hazards
- Report all emergencies, injuries, and environmental incidents to the Inspector immediately.

At the commencement of a Permit-Required Confined Space task a copy of PA-3745C/08-10 (Attachment 5) shall be given or faxed (with verification of receipt) to the Port Authority Police Desk and/or Communications Desk, and the local PAPD Tour Commander. At the worksite, the contractor's entry permit and form PA-3745C/08-10 and a copy of the contractor's entry permit (at a minimum equivalent to The Port Authority Confined Space Entry Permit Attachment 4) shall be prominently posted for the duration of the job.

Upon completion of work or when the shift ends, the contractor shall return their cancelled entry permit to a Port Authority Representative. A copy of these forms shall be retained by the facility Chief Maintenance Supervisor/designee for a minimum of one year to facilitate a program review. The original PA-3745C/08-10 and the completed contractor's entry permit shall be sent to Port Authority Inspection and Safety Division of Operations Services Department.

CONTRACTOR PERMIT REQUIRED CONFINED SPACE NOTIFICATION

PA 3745C / 08-10

Hand print in ink. (See instructions)

FACILITY:

Requested By: _____	Company Name/Telephone Number: _____
Print Name	Signature

Exact Location of Confined Space: _____	Contract Number: _____
---	------------------------

Purpose of Entry: _____

Prepared By: Chief Maintenance Supervisor/Designee (CMS/D) _____	Date: _____
Print Name	Signature

In accordance with 29 CFR 1910.146 (c) (8) (i) the issuance of this form explicitly states that the ensuing work involves entry into a Permit-Required Confined Space. Entry into this space is allowed only through compliance with the OSHA standard Permit-Required Confined Spaces, 29 CFR 1910.146.

A copy of this form shall be given or faxed (with verification of receipt) to the Police desk and/or Communications desk, and the local PAPD Tour Commander to alert personnel of work being performed in a PRCS.

PRE-ENTRY CHECKLIST					
	YES	N/A		YES	N/A
Contractor informed of the elements, including the hazards identified that make the space permit required	<input type="checkbox"/>	<input type="checkbox"/>	Contractor personnel and Port Authority personnel will be working in or near permit spaces requiring joint entry operations	<input type="checkbox"/>	<input type="checkbox"/>
Contractor informed of precautions or procedures implemented for the protection of employees.	<input type="checkbox"/>	<input type="checkbox"/>	Contractor has obtained available information regarding permit space hazards and entry operations	<input type="checkbox"/>	<input type="checkbox"/>

IN THE EVENT OF AN EMERGENCY CONTACT: _____

(COMPLETED BY CHIEF MAINTENANCE SUPERVISOR/DESIGNEE)

<ol style="list-style-type: none"> 1. Your name and company name. 2. Location, including cross streets. 3. Phone number from which you are calling. 4. This is a confined space operations. You need a rescue service. 	<ol style="list-style-type: none"> 5. Number of victims; conditions of victims if known. 6. Type of entry (manhole, door, etc.). 7. Any known conditions in the space (gas readings, flooding)
--	---

I UNDERSTAND THE ABOVE INFORMATION AND WILL ADHERE TO ALL RULES AND REGULATIONS MANDATED BY THE OSHA STANDARD FOR PERMIT REQUIRED CONFINED SPACES.

Print Full Name/Title Contractor Representative	Signature/Contract Number	Date
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THE CONTRACTOR IS OBLIGED TO INFORM THE PORT AUTHORITY OF ANY HAZARD CONFRONTED OR CREATED IN THE PERMIT SPACE BY USING THE SPACE BELOW.

Distribution: Copy 1. Completed PA 3745C and completed Contractor's Permit to Risk Management, PATC 43.
Copy 2. Retained by Facility CSM/D.

25.0 Training

All employees and contractors assigned to work in confined spaces must be trained. Employees must be trained to a level that demonstrates their understanding, knowledge, and skills to safely perform their duties as entry supervisors, attendants, or entrants.

Department heads will assign employees as attendants, entrants, and entry supervisors based on their understanding, knowledge, and skills.

Employees shall receive training before they are assigned confined space duties or before there is a change in assigned duties. Training will include:

- The operation of the permit system included in this plan
- Specific duties of each person involved in Permit-Required Confined Space operations
- The hazards that may exist in confined spaces including information on the mode, signs, symptoms, and consequences of exposure
- Employees must receive a job briefing before being assigned their duties. This allows an opportunity to ask questions and raise concerns about the job
- The proper use of:
 - Personal protective equipment (PPE)
 - Ventilation equipment
 - Rescue equipment used for non-entry rescue
- Methods of communication between attendant and entrants
- Conditions that warrant evacuation from the space
- Procedures to be used for non-entry rescue

Training must be provided:

- Whenever there is a change in confined space operations that presents a hazard for which an employee has not been previously trained
- Whenever the entry supervisor/designee has reason to believe that there are deviations from this written plan
- Whenever there are inadequacies in the employee's knowledge or use of this plan

Certification of training must contain the employee's name, the instructor's signature, and the date training was administered. The Training

Coordinator, Port Authority Inspection and Safety Division of Operations and Services Department (201) 216-2810 will maintain all training records.

Port Authority Newark Liberty International Airport employees and contractors must be familiar with this written plan. The individual department heads must maintain documentation of their training.

26.0 Fuel Farm

Allied Aviation has the responsibility of complying with OSHA 29CFR 1910.146 "Permit-Required Confined Space" concerning confined space operations at the Fuel Farm.

Port Authority employees assigned to work in confined spaces at the Fuel Farm shall follow the requirements of the contractor working in confined spaces (see Section 24.0 Contractors).

27.0 Newark Liberty International Airport Tenants

Tenants and their subcontractors are responsible for complying with OSHA 29CFR 1910.146 "Permit-Required Confined Space" as well as all related federal, state, local regulations, and applicable Port Authority contractual procedures and agreements including this document.

Tenants performing work in a Permit-Required Confined Space under an approved Tenant Alteration Application (TAA) are required to provide the Tenant Liaison Officer (TLO) in charge of the project with copies of the following:

- Their Permit-Required Confined Space Program and entry permit form
- A site-specific health and safety plan including the names, titles, and phone numbers of key personnel.
- Their non-entry rescue/emergency notification procedure
- All Safety Data Sheets (SDS's) for chemicals to be used.

The TLO will retain a copy of this information and forward a copy to the Inspection and Safety Division of Operating Services Department Supervisor for their review and approval located at Port Authority Technical Center, Room 301, Jersey City, New Jersey.

In addition, the tenant will notify the TLO and the Port Authority Tour Commander 48 hours before performing any work in a Permit-Required Confined Space once the TAA has been approved by Inspection and Safety Division of Operations Services Department.

The tenant will ensure the following information is posted at the permit space entrance:

- The confined space entry permit
- Contractor permitted confined space notification form (PA3745C/08-10)
- A listing of all recognized as well as possible hazards.
- Training certificates or training records verifying training has been completed for Permit-Required Confined Space personnel
- Safety Data Sheets (SDS') for chemicals to be used on site

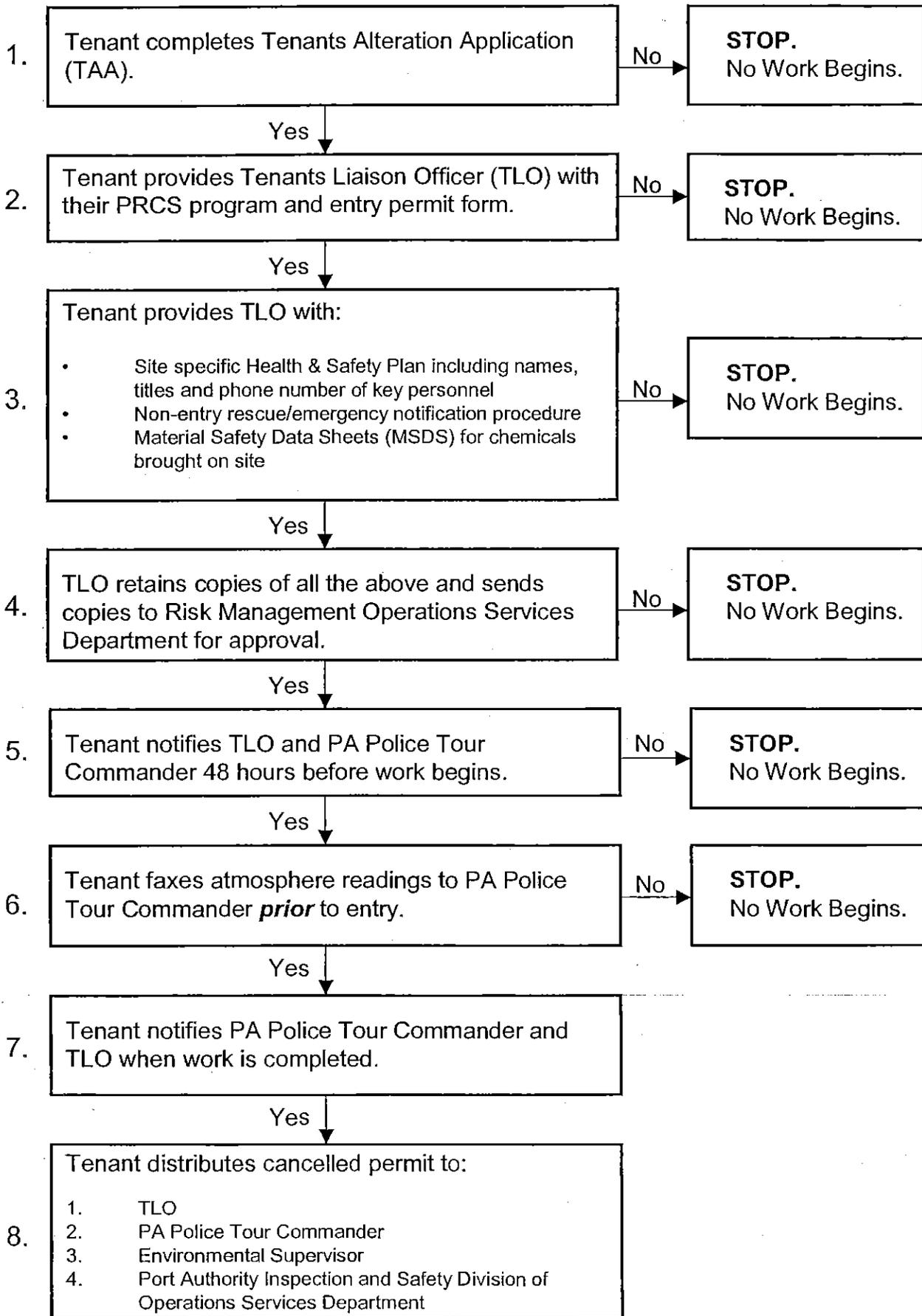
The tenant will fax a copy of the initial Permit-Required Confined Space atmosphere readings recorded on the contractor's permit to the Tour Commander prior to entry into the space.

The tenant must notify the Port Authority Police Tour Commander and the TLO when work is completed and the area is secure and free of hazards. Upon completion of work, the tenant shall retain a copy of the cancelled permit for one year for their records. The tenant shall distribute a copy of the cancelled permit to:

- The Tenant Liaison Officer (TLO)
- The Port Authority Police Tour Commander (Bldg. 1 Port Authority Police Department)
- The Environmental Supervisor (Bldg. 80, 2nd Floor, Environmental Unit)
- Inspection and Safety Division of Operations Services Department Supervisor

Note: The tenant must notify the Port Authority Police Tour Commander and the TLO immediately when accidents and/or uncontrolled hazardous substance releases occur.

**PROCEDURE FOR TENANTS PERFORMING WORK IN
PERMIT-REQUIRED CONFINED SPACE**



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ATTACHMENT 1
CONFINED SPACE SURVEY
 ANSWER ALL QUESTIONS

LOCATION _____ DATE _____

DESCRIPTION OF SPACE _____

CONFINED SPACE DETERMINATION YES NO

- IS THE SPACE LARGE ENOUGH AND SO CONFIGURED THAT AN EMPLOYEE CAN BODILY ENTER AND PERFORM ASSIGNED WORK? _____ _____
 - DOES THE SPACE HAVE LIMITED OR RESTRICTED MEANS FOR ENTRY OR EXIT? _____ _____
 - IS THE SPACE NOT DESIGNED FOR CONTINUOUS EMPLOYEE OCCUPANCY? _____ _____
- IF THE ANSWER TO ALL THREE QUESTIONS IS YES, IT IS A CONFINED SPACE**
- IF THE ANSWER TO ANY QUESTION IS NO THEN EXPLAIN _____

NON-PERMIT CONFINED SPACE YES NO

- DOES THE CONFINED SPACE CONTAIN OR HAVE THE POTENTIAL TO CONTAIN A HAZARDOUS ATMOSPHERE? _____ _____
- DOES THE CONFINED SPACE CONTAIN ANY HAZARD CAPABLE OF CAUSING DEATH OR SERIOUS INJURY? _____ _____

IF THE ANSWER TO BOTH QUESTIONS IS NO, IT IS A NON-PERMIT CONFINED SPACE

PERMIT-REQUIRED CONFINED SPACE YES NO

- DOES THE SPACE CONTAIN OR HAVE THE POTENTIAL TO CONTAIN ANY OF THE FOLLOWING HAZARDOUS ATMOSPHERES?
 -A FLAMMABLE GAS, VAPOR, OR MIST IN EXCESS OF 10% OF ITS LOWER EXPLOSIVE LIMIT (LEL)? STATE THE HAZARD(S) _____ _____
- -AIRBORNE COMBUSTIBLE DUST AT A CONCENTRATION THAT MEETS OR EXCEEDS ITS LEL? _____ _____
- -ATMOSPHERIC OXYGEN CONCENTRATION BELOW 19.5% AND 23.5%? _____ _____
- -AN ATMOSPHERIC CONCENTRATION OF ANY SUBSTANCE THAT IS CAPABLE OF CAUSING DEATH, INCAPACITATION, IMPAIRMENT OF ABILITY TO SELF RESCUE, INJURY, OR ACUTE ILLNESS DUE TO IT'S HEALTH EFFECTS?
 STATE HAZARD(S) _____ _____
- DOES THE CONFINED SPACE CONTAIN A MATERIAL THAT HAS THE POTENTIAL FOR ENGULFING AN ENTRANT?
 STATE HAZARD(S) _____ _____
- DOES THE CONFINED SPACE HAVE AN INTERNAL CONFIGURATION SUCH THAT AN ENTRANT COULD BE TRAPPED OR ASPHYXIATED BY INWARDLY CONVERGING WALLS OR BY A FLOOR WHICH SLOPES DOWNWARD AND TAPPERS TO A SMALLER CROSS SECTION? _____ _____
- DOES THE CONFINED SPACE CONTAIN ANY OTHER RECOGNIZED SAFETY OR HEALTH HAZARD(S)?
 STATE HAZARD(S) _____ _____

IF THE ANSWER TO ANY OF THESE QUESTIONS IS, IT IS A PERMIT-REQUIRED CONFINED SPACE

- ARE "DANGER" SIGNS POSTED AT ALL ENTRANCES YES _____ NO _____

SURVEY CONDUCTED BY: NAME _____ TITLE _____
 NAME _____ TITLE _____

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ATTACHMENT 2

CONFINED SPACE ENTRY WARNING SIGN



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ATTACHMENT 3 PRE-ENTRY CERTIFICATION FORM

DATE _____ TIME _____

LOCATION OF CONFINED SPACE _____
 DESCRIPTION OF CONFINED SPACE _____
 PURPOSE OF ENTRY _____

RECLASSIFIED NON-PERMIT

LIST THE HAZARDS ELIMINATED

		TIME				
PERMISSIBLE ENTRY LEVEL		AM/PM	AM/PM	AM/PM	AM/PM	AM/PM
% OXYGEN	19.5% TO 23.5%					
% LEL (GAS, VAPOR, MIST)	LESS THAN 10%					
CARBON MONOXIDE	LESS THAN 35ppm					
HYDROGEN SULFIDE	LESS THAN 5 ppm					

ALTERNATE PROCEDURE (FORCED AIR VENTILATION REQUIRED)

- | | YES | NO |
|---|-------|-------|
| • SAFE TO REMOVE COVER | _____ | _____ |
| • ARE OPENINGS PROTECTED AS REQUIRED | _____ | _____ |
| • VENTILATION DEVICES IN GOOD WORKING ORDER | _____ | _____ |
| • ARE ATMOSPHERIC HAZARDS THE ONLY HAZARDS | _____ | _____ |

		TIME				
PERMISSIBLE ENTRY LEVEL		AM/PM	AM/PM	AM/PM	AM/PM	AM/PM
% OXYGEN	19.5% TO 23.5%					
% LEL (GAS, VAPOR, MIST)	LESS THAN 10%					
CARBON MONOXIDE	LESS THAN 35ppm					
HYDROGEN SULFIDE	LESS THAN 5 ppm					

NOTES/COMMENTS: _____

NOTE: INDICATE ANY HAZARDS PRODUCED BY WORK TO BE PERFORMED _____

NAME OF TESTER/MONITOR _____

NAME OF ENTRY SUPERVISOR _____

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THE PORT AUTHORITY OF NY & NJ
CONFINED SPACE ENTRY ADMINISTRATIVE AND SAFETY RULES

1. No work shall be performed in any designated Permit Required Confined Space (PRCS) without acknowledgement by the Chief Maintenance Supervisor or his/her designee.
2. When work involving entrance into a PRCS is requested, the Confined Space Entry Permit (Form PA 3745) must be completed as follows:

Section 1 – Permit number, work order number, confined space number (if applicable), and high-tension permit number (if applicable).

Section 2 - Name of Supervisor requesting permit, Chief Maintenance Supervisor or designee, location of confined space, and purpose of entry.

Section 3 - Pre-entry checklist.

Section 4 - Record gas detection equipment name, serial number, and calibration date. Record attendant(s) and entrant(s) name(s). Prior to entering a PRCS, entrant(s) must initial that they are entering the space and upon completion of work entrant(s) must initial indicating they are exiting the space.

Section 5 - Monitoring results. Monitoring results must be recorded every two hours.

Section 6 - After verifying initial readings entry supervisor must provide his/her signature in the space provided on the permit. Upon completion of work entry supervisor must provide his/her initials.

Upon completion of work or when shift ends, the Chief Maintenance Supervisor or designee must cancel the permit, file copy, and route original to Risk Management, PATC 43.

3. The Requesting Unit, prior to starting work, shall assure itself that the confined space has been properly identified, monitored, secured and that all safety precautions have been implemented (such as ventilation, lock-out/tag-out, etc. Other interested personnel, such as the Resident Engineer, Tenant Representative, FAA, Utility companies, etc., may witness above operations. Responsibility for notification to interested and affected parties is the responsibility of the Chief Maintenance Supervisor or designee.
4. Once initial monitoring has been conducted in the PRCS the Confined Space Entry Permit shall be prominently posted at the work site for the duration of the job. A copy shall be given or faxed (with verification of receipt) to the Police desk and/or Communications desk, and the local PAPD Tour Commander to alert personnel of work being performed in a PRCS by the Chief Maintenance Supervisor. Any additional information regarding the Confined Space Entry Permit shall be included in the file with the original.
5. ***Should the scope of work or the entire work crew change at any time*** during the performance of the job described on the permit, a ***new*** Confined Space Entry Permit ***must be completed*** in accordance with all Confined Space Entry Administrative and Safety Rules.

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CONTRACTOR PERMIT REQUIRED CONFINED SPACE NOTIFICATION

PA 3745C / 08-10

Hand print in ink. (See instructions)

FACILITY:

Requested By: _____	Company Name/Telephone Number: _____
Print Name	Signature

Exact Location of Confined Space: _____	Contract Number: _____
---	------------------------

Purpose of Entry: _____

Prepared By: Chief Maintenance Supervisor/Designee (CMS/D) _____	Date: _____
Print Name	Signature

In accordance with 29 CFR 1910.146 (c) (8) (i) the issuance of this form explicitly states that the ensuing work involves entry into a Permit-Required Confined Space. Entry into this space is allowed only through compliance with the OSHA standard Permit-Required Confined Spaces, 29 CFR 1910.146.

A copy of this form shall be given or faxed (with verification of receipt) to the Police desk and/or Communications desk, and the local PAPD Tour Commander to alert personnel of work being performed in a PRCS.

PRE-ENTRY CHECKLIST					
	YES	N/A		YES	N/A
Contractor informed of the elements, including the hazards identified that make the space permit required	<input type="checkbox"/>	<input type="checkbox"/>	Contractor personnel and Port Authority personnel will be working in or near permit spaces requiring joint entry operations	<input type="checkbox"/>	<input type="checkbox"/>
Contractor informed of precautions or procedures implemented for the protection of employees.	<input type="checkbox"/>	<input type="checkbox"/>	Contractor has obtained available information regarding permit space hazards and entry operations	<input type="checkbox"/>	<input type="checkbox"/>

IN THE EVENT OF AN EMERGENCY CONTACT: _____

(COMPLETED BY CHIEF MAINTENANCE SUPERVISOR/DESIGNEE)

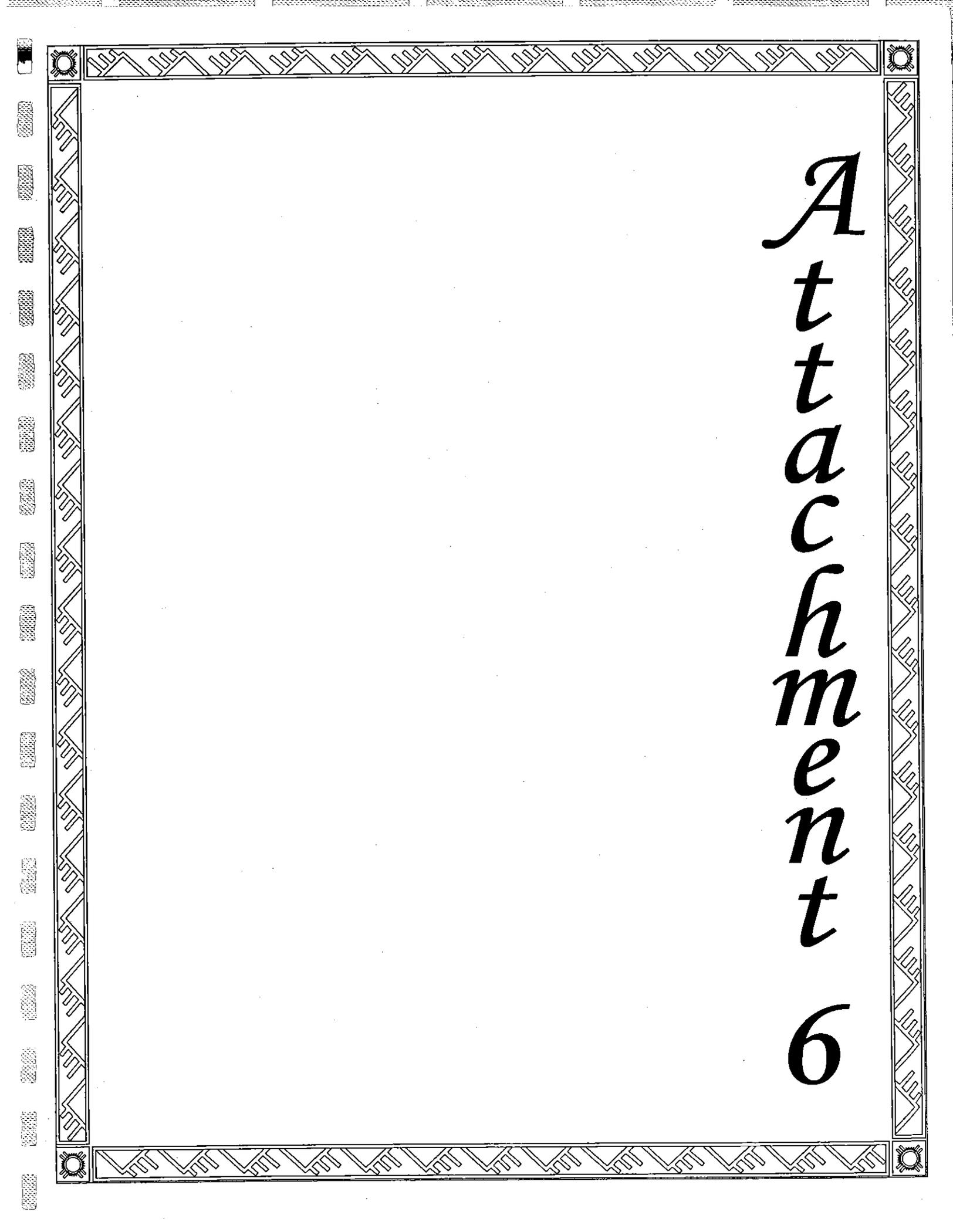
<ol style="list-style-type: none"> 1. Your name and company name. 2. Location, including cross streets. 3. Phone number from which you are calling. 4. This is a confined space operations. You need a rescue service. 	<ol style="list-style-type: none"> 5. Number of victims; conditions of victims if known. 6. Type of entry (manhole, door, etc.). 7. Any known conditions in the space (gas readings, flooding)
--	---

I UNDERSTAND THE ABOVE INFORMATION AND WILL ADHERE TO ALL RULES AND REGULATIONS MANDATED BY THE OSHA STANDARD FOR PERMIT REQUIRED CONFINED SPACES.

Print Full Name/Title Contractor Representative	Signature/Contract Number	Date
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THE CONTRACTOR IS OBLIGED TO INFORM THE PORT AUTHORITY OF ANY HAZARD CONFRONTED OR CREATED IN THE PERMIT SPACE BY USING THE SPACE BELOW.

Distribution: Copy 1. Completed PA 3745C and completed Contractor's Permit to Risk Management, PATC 43.
Copy 2. Retained by Facility CSM/D.

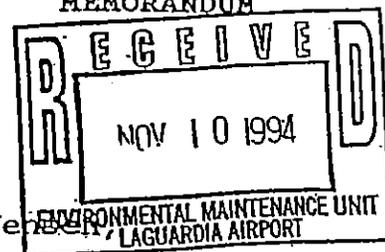


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THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY

MEMORANDUM

TO: S. Baer, B. DeCosta, G. FitzGerald
FROM: Robert J. Kelly
DATE: November 4, 1994
SUBJECT: CONFINED SPACE DESIGNATIONS
COPY TO: N. Chanfrau, W. Fife, A. Graser, E. Jensen,
R. Louis, J. Martinsen, S. Smolenski



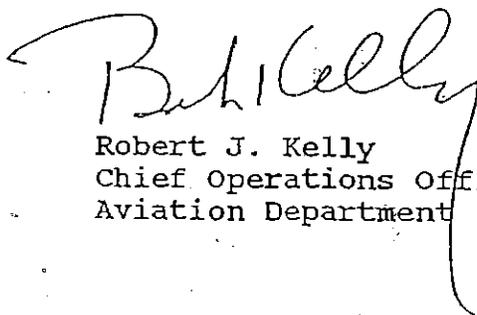
As part of the Port Authority's Confined Space Program, the Aviation Department has compiled an inventory of locations which would meet the definition of a permit required confined space. The locations are at all facilities unless designated otherwise:

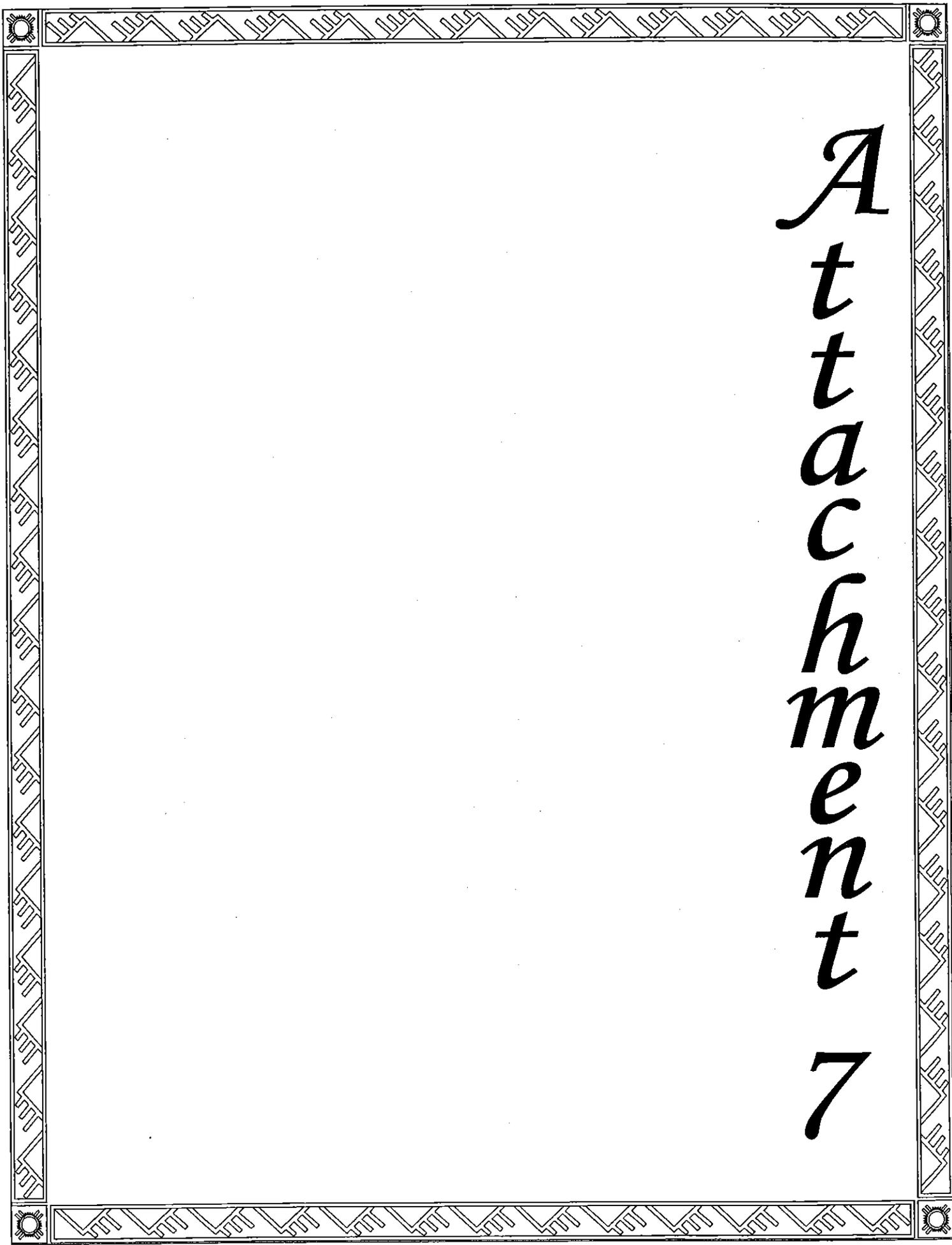
- * Large boilers
- * Sanitary lift stations
- * Sanitary manholes
- * Underground storage tanks - regardless of contents
- * Aboveground tanks - regardless of contents
- * Triple barrel sewer - JFK
- * Bulk and satellite fuel farm stormwater retention vaults - JFK
- * Van Wyck drainage sump - JFK
- * Urea hopper - LGA
- * Combined Sewer Overflow weir - LGA

We define the confined spaces below as not requiring permits:

- * Electrical manholes (High tension safety rules will govern)
- * Communications, transformer and lighting vaults
- * IAB crawl space - JFK

The next step will be to work with Risk Management to develop specific rules regarding the program that would make implementation of the program's requirements clear to the employees that will be referring to them. Attached for your review and comment are copies of a Confined Space Entry Permit and Confined Space Entry Administrative and Safety Rules. The Rules were prepared for ITD staff and I ask for your revisions to make them applicable to your facility. Please provide your comments to me by November 18, 1994.


Robert J. Kelly
Chief Operations Officer
Aviation Department



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THE PORT AUTHORITY OF NEW YORK & NEW JERSEY

M E M O R A N D U M

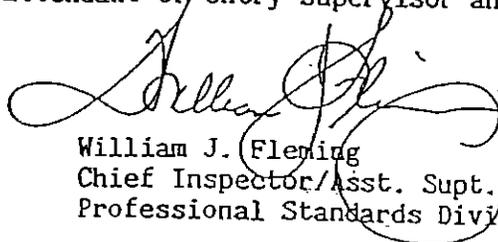
To: All Commanding Officers
From: William J. Fleming
Date: January 23, 1995
Subject: CONFINED SPACE PERMITS - POLICE INVOLVEMENT

Copy To: G. Drasheff, T. Farrell, C. Knox, J. Matthews, J. Nachstein,
S. Samperi

In compliance with OSHA regulations, certain areas at Port Authority facilities have been identified as confined space "Permit Required" work sites. Some examples of confined spaces requiring permits are sewers, sanitary manholes, underground and aboveground storage tanks, etc., where the level of oxygen can be very low and/or hazardous gases exist. The permit is not required for all "confined spaces" work sites. Each Facility Manager designates certain management personnel, e.g., Chief Maintenance Supervisor, as the party responsible for the issuance of permits. Once a permit is issued, the facility Police Desk or the Communications Desk, is provided with a copy and must be notified before the "permit required" confined space is entered. Maintenance personnel are trained and responsible to monitor all work activities and safety procedures required at the site and in the event of an emergency, will notify the facility police through the Police Desk or the Communications Desk.

Commanding Officers should contact local Police and/or Fire Department to pre-plan with them for the appropriate municipal rescue service response in the event of a "confined space" emergency. In all cases, when a confined space permit is received from maintenance, the Police Desk or Communications Desk must notify the facility Tour Commander, who, in turn, will ensure that police personnel are familiar with the location of the site and the fastest access route for emergency equipment to respond in the event of an emergency.

Upon receipt of notice of an emergency in a "confined space," the Police Desk or Communications Desk will request the local Municipal Police or Fire Department and EMS Unit to respond to the "confined space" emergency. A Port Authority Police escort will be provided to expedite the emergency response to the site. The Port Authority Police Tour Commander will establish a Command Post to coordinate and provide support to the municipal rescue units. The responding municipal personnel will confer with the Port Authority Police Incident Commander and maintenance attendant or entry supervisor and effect the rescue, if required.



William J. Fleming
Chief Inspector/Asst. Supt. of Police
Professional Standards Division

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THE PORT AUTHORITY OF NY&NJ

Memorandum

TO: Department Directors and Facility Managers
FROM: Nelson J. Chanfrau *MC*
DATE: January 5, 1996
SUBJECT: WORK PERFORMED IN CONFINED SPACES

COPY TO: K. Antion, A.P. Blanco, B. Bohlen, J. Collura, J. Green, C. McClafferty

Port Authority employees that perform work in confined spaces are required to follow Operations and Maintenance (O&M) Standards numbers 61 & 62. O&M Standard 61 addresses work performed in confined spaces and Standard 62 details the testing of confined space atmospheres. Both of these Standards have been revised by Engineering to incorporate new OSHA requirements.

In addition to both O&M Standards, several other documents have been developed to assist facility staff to work safely in confined spaces. Specifically, the Confined Space Administrative and Safety Rules, Confined Space Entry Permit - PA form 3745, and the Contractor Confined Space Work Notification - PA form 3745-C. The purpose of the Confined Space Administrative and Safety Rules is to provide a comprehensive reference document detailing the necessary tools, specific procedures, and the clear lines of responsibility of all PA staff involved in confined space work, the use of Confined Space Permits, and the use of Contractor Confined Space Work Notifications. These documents are intended to assist both Facility Managers and Chief Maintenance Supervisors that are charged with the implementation of the confined space program.

The Contractor Confined Space Work Notification - PA form 3745-C, has been created with the assistance of the Law Department and will greatly enhance the safety of our employees that are working in confined spaces which could adjoin a contractor's work site. Many of the confined spaces at our facilities are part of a system, such as sanitary sewers or utility manholes, and can easily be affected by the work that is being performed in another section of the system. This work notification will enable Resident Engineer Office Staff to coordinate work being performed by contractor staff with the Chief Maintenance Supervisor and/or his/her designee and allow them to determine if there will be any impact upon our employees. This coordination and communication between groups is vital to the safety of people working in confined spaces and the success of the confined space program for the organization.

The Law Department has further assisted our efforts to make confined space work sites as safe as possible by adding specific language to contract documents addressing confined space safety. It is important that all engineering and facility staff that are involved in the preparation of contract documents be aware that this language is available and should be inserted for all work involving confined spaces. All facilities have previously reviewed their structures to determine which may qualify as permit required confined spaces and have compiled lists of these areas. These lists will assist staff personnel in the preparation of contract documents.

Treasury's Risk Management will continue to support all facilities by providing confined space awareness training and equipment familiarization programs for your staff that work in confined spaces.

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The Port Authority of NY & NJ

**CONFINED SPACE ENTRY
ADMINISTRATIVE
AND
SAFETY RULES**

RISK MANAGEMENT

**ISSUED: AUGUST 1995
REVISED:**

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CONFINED SPACE ENTRY ADMINISTRATIVE AND SAFETY RULES

FOREWORD

The Confined Space Entry Administrative and Safety Rules establish the minimum operating and safety requirements to be followed at all Port Authority facilities when construction, maintenance, repair, or any other work is performed within a confined space.

A confined space is defined as a space which:

- (1) is large enough and so configured that an employee can bodily enter and perform assigned work;
- (2) has limited or restricted means for entry or exit (e.g., tanks, vessels, silos, storage bins, hoppers, vaults, pits, manholes, deep trenches, etc.); and
- (3) is not designed for continuous employee occupancy.

A permit required confined space (PRCS) is defined as a confined space that has one or more of the following characteristics:

- (1) contains or has a potential to contain a hazardous atmosphere;
- (2) contains a material that has the potential for engulfing an entrant;
- (3) has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
- (4) contains any other recognized serious safety or health hazard.

A non-permit required confined space is a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

No confined space (whether permit required or not) shall be entered without monitoring. Air monitoring must be conducted on a continuous basis until completion of work.

These rules are primarily intended to serve as a basis for safe practice in confined space areas. It should be noted that other rules and regulations may be applicable in addition to these rules and regulations and that where this occurs, the more stringent rules shall apply and be enforced in conjunction with the Confined Space Entry Administrative and Safety Rules. All facilities requiring specific procedures for implementation of these rules for operating purposes, or interpretation of any specific rule should contact and communicate with the General Manager, Risk Management.

Compliance with these rules by all personnel working in confined space areas is mandatory.

Supervisors are required to file formal charges against all employees observed to be violating any of these rules. Compliance will provide for the attainment of the following objectives:

- (1) Safety of personnel.
- (2) Continuity of service to the public.
- (3) Conformance with requirements set forth by OSHA Standard 1910.146 - Permit-required Confined Spaces.
- (4) Prevention of damage to Port Authority property.

GENERAL REQUIREMENTS

1. The Facility Manager has the responsibility of ensuring that Confined Space Entry Administrative and Safety Rules are enforced. (See Appendix).
2. Permit Required Confined Spaces (PRCS) must be identified by the facility.
3. The facility must inform employees of the existence, location and dangers of facility PRCS.
4. The Chief Maintenance Supervisor (CMS), under the direction of the Facility Manager, is responsible for ensuring all work performed by facility personnel, FCSD/SEMAC personnel, and all Port Authority contractors (Engineering, Construction, Materials, etc.) comply with the Confined Space Entry Program and Permit System.
5. When there are changes in the use or configuration of a non-permit confined space that might increase the hazards to entrants, the facility shall, if necessary, reclassify the space as a PRCS.
6. All permits originate from and are cancelled by the CMS and/or his/her designee.
7. A PRCS may be reclassified as a non-permit space under the following conditions:
 - a. If there are no actual or potential atmospheric hazards or if all hazards with the PRCS are eliminated without entry, the space may be reclassified for as long as the non-atmospheric hazards remain eliminated.
 - b. If entry is required to eliminate hazards, it shall be in accordance with all applicable regulations and the PRCS may be reclassified for as long as the hazards remain eliminated.
 - c. The facility Chief Maintenance Supervisor shall certify in writing that all hazards in the PRCS have been eliminated and make this document available to each entrant.
 - d. If hazards arise in declassified PRCS, employees shall exit and the Chief Maintenance Supervisor shall determine whether to reclassify space.

NOTE: SMOKING, DRINKING AND/OR EATING IN CONFINED SPACES IS PROHIBITED.

- Smoking - May cause an explosion or fire.
- Drinking, Eating - Drinks and food can easily become contaminated.

CONFINED SPACE ENTRY PERMIT SYSTEM

The Confined Space Entry Permit System is designed to:

- Prevent unauthorized entry
- Identify and evaluate hazards before entry
- Establish safe practices, such as isolation, purging, ventilation, barricades, lockout/tagout, etc.
- Provide and maintain equipment necessary for safe entry, including testing and monitoring, ventilation, communications, personal protection, lighting, barriers, ingress and egress, and rescue
- Test permit space and document results
- Maintain acceptable conditions in permit space
- Provide at least one attendant outside the PRCS for the duration of operations
- Identify duties of each employee and provide training
- Implement proper procedures for rescue
- Establish written system for preparation, issuance, use and cancellation of permits
- Coordinate entry operations during multiple employer entries
- Review entire entry program at least annually, unless previously reviewed at the conclusion of each specific entry

The Chief Maintenance Supervisor, through the permit system, shall:

- Complete and document all steps necessary for entry;
- Require signatures of persons completing the steps;
- Post permit at portal, or otherwise make available to all entrants at time of entry; and
- Ensure permit is signed by the entry supervisor.

The Permit System requires that:

- The duration of the permit is not to exceed time required to complete the assigned task.
- The permit must be cancelled if a prohibited condition arises, or the work has been completed.
- Each cancelled entry permit must be retained by the Chief Maintenance Supervisor for a minimum of one year to facilitate program review.

The Confined Space Entry Permit identifies:

- Permit space(s) to be entered
- Purpose of entry
- Date and authorized duration of entry permit
- Authorized entrant(s)
- Attendant(s)
- Entry supervisors, by printed name and signature
- Hazards of the permit space
- Measures required to control hazards of the space
- Acceptable entry conditions
- Test results with signature or initials of tester(s)
- Emergency notification numbers for Police or Communications Desk
- Communication procedures and equipment
- All special equipment and procedures, including personal protective equipment and rescue equipment

- Any additional permits needed [such as for high tension, hot work (i.e., welding, burning, riveting, and heating capable of providing a source of ignition), etc.]

TRAINING

Each employee serving as an authorized entrant, attendant or entry supervisor during any type of confined space operation shall be trained so they have the understanding, knowledge, and skills necessary for the safe performance of their assigned duties:

- Before the employee is assigned duties under this regulation;
- Before there is a change in assigned duties;
- Whenever there is reason to believe that *either* there are deviations from the permit space entry procedures or inadequacies in the employee's knowledge or use of these procedures.

DUTIES OF AUTHORIZED ENTRANTS

The Chief Maintenance Supervisor shall ensure that all authorized entrants:

- Know the hazards that may be faced during entry, including mode, signs or symptoms, and consequences of exposure;
- Properly use all required equipment;
- Communicate with the attendant to monitor status and alert entrants of need to evacuate;
- Alert attendant whenever any warning sign or symptom of exposure to a dangerous situation or a prohibited condition is detected;
- Exit from PRCS as quickly as possible whenever:
 - Order to evacuate is given by attendant or entry supervisor;
 - Entrant recognizes any warning sign or symptom of exposure to a dangerous situation;
 - Entrant detects a prohibited condition; or
 - Evacuation alarm is activated;
- Continually monitor the confined space by use of personal or other appropriate monitoring equipment (such as portable meters, probe attachments, etc.).

DUTIES OF ATTENDANTS

The Chief Maintenance Supervisor shall ensure that each attendant:

- Knows the hazards that may be faced during entry;
- Knows possible behavioral effects of hazards;
- Continuously maintains accurate count of entrants;
- Remains outside PRCS during entry operations until relieved by another attendant;
- Records results of Continuous Monitoring in Part #5 of the Confined Space Entry Permit;
- Communicates with entrants as necessary to monitor status and alert of need to evacuate space;
- Monitors activities inside and outside space to determine if safe for entrants to remain in space and orders evacuation when necessary;
- Summons rescue and emergency services when necessary;

- Takes the following actions when unauthorized persons approach or enter a permit space while entry is underway:
 - Warns them to stay away;
 - Advises them to exit immediately if they have entered; and,
 - Informs authorized entrants and entry supervisor if unauthorized persons enter space.
- Performs non-entry rescues in accordance with Confined Space Administrative and Safety Rules.
- Performs no duties that might interfere with their duty to monitor and protect authorized entrants.

NOTE: The designated Attendant may be replaced by an equally qualified person during confined space work without a new permit being required provided such replacement is noted in Part #4 of the Confined Space Entry Permit.

DUTIES OF ENTRY SUPERVISOR

The Chief Maintenance Supervisor shall ensure that each entry supervisor:

- Knows hazards that may be faced during entry;
- Verifies that acceptable conditions for entry exist;
- Terminates entry when operations are completed or a prohibited condition arises;
- Verifies that rescue services are available;
- Removes unauthorized persons who enter or attempt to enter the permit space during operations;
- Determines, at least when shifts change and/or entry supervisors change, that acceptable conditions as specified in the permit continue.

EMERGENCY NOTIFICATION

In case of a medical or fire emergency, immediately notify the Port Authority Police by calling the appropriate Facility Emergency Phone Number listed below.

TUNNEL & BRIDGE COMMUNICATIONS DESKS	FACILITY POLICE DESKS		LOCAL EMERGENCY
GWB 201-346-4100	JFK 718-244-4335	BP 718-330-2959	BIP 911
HT 201-714-7400	LGA 718-533-3900	PN 201-578-2180	EIP 911
LT 201-617-8115	PABT 212-502-2500	WTC 212-435-3540	QW 911
SIB 718-390-2501/2	EWR 201-961-6230	PATH 201-216-2677	YIP 911

NOTE: A phone number or means/method of contacting emergency personnel must be written in the designated space on the entry permit.

NON-ENTRY RESCUE

- Retrieval systems or methods shall be used whenever entry is made, unless the retrieval equipment would increase overall risk of entry or would not be of value.
- Each entrant shall use a full body harness, with retrieval line attached at the center of their back near shoulder level, or above their head.
- Wristlets may be used in lieu of the full body harness if it can be shown that the use of a full body harness is not feasible, not practical, or creates a greater hazard and that use of wristlets is *the* safest and most effective alternative.

- Other end of retrieval line shall be attached to a mechanical device or fixed point outside permit space for immediate use.
- Mechanical devices shall be used to retrieve personnel from vertical type permit spaces more than five feet deep.

CONFINED SPACE ENTRY ADMINISTRATIVE RULES

1. The Chief Maintenance Supervisor is responsible for ensuring that all administrative and safety rules are followed. Qualified alternates may be assigned to perform these tasks in the absence of the above designee. The Facility Manager with the counsel of the Chief Maintenance Supervisor sets up the Operating Procedure to be followed in case of emergencies involving confined space areas. Under no circumstances shall this Operating Procedure provide for any deviation from these Confined Space Entry Administrative and Safety Rules.
2. No work is to be performed in any Permit Required Confined Space area without the specific approval of the Chief Maintenance Supervisor.
3. Under the control of the Chief Maintenance Supervisor, each Permit Required Confined Space will be numbered. That same number shall be recorded on the Confined Space Entry Permit along with the corresponding Work Order Number. A copy of the permit shall be retained by the Chief Maintenance Supervisor until work is completed in the confined space.
4. In case of his absence from the facility, the Chief Maintenance Supervisor may authorize by telephone entrance into a Permit Required Confined Space, providing this work does not in any way conflict with the Confined Space Entry Administrative and Safety Rules and Regulations.
5. When work is required in a Permit Required Confined Space, a Confined Space Entry Permit (PA-3745) must be completed by the Requesting Unit, which is described as the group directly responsible for performing the job. All necessary work to secure the area, test for atmospheric hazards, etc., shall be performed under the direction/supervision of the Chief Maintenance Supervisor. If the work in the Confined Space requires isolation or de-energizing of any high tension equipment, the Chief Maintenance Supervisor shall work in conjunction with the High Tension System Operator to assure compliance with the High Tension Administrative and Safety Rules. The Chief Maintenance Supervisor shall assure that the appropriate personal protective equipment is worn and/or used by personnel working in the confined space.
6. An original and three copies of each Confined Space Entry Permit shall be filled out for the following distribution: the original shall be prominently posted at the work site for the duration of the job, one copy shall be hand delivered or faxed (followed by a phone call to verify receipt) to the Police Desk and/or the Communications Desk, and the local PAPD Tour Commander to alert emergency personnel of work being conducted in that PRCS. Upon completion of the job, and once the Entry Supervisor signs off on the permit, a copy of the original is to be retained by the Chief Maintenance Supervisor in the operating order file by permit work number along with any detailed information regarding said permit. [In addition, the Chief Maintenance Supervisor shall forward the *completed original permit* to the General Manager, Risk Management, PATC 43.]
7. The Requesting Unit (the group directly responsible for performing the job) prior to starting work and permitting any workers in the area (confined space covered by the Confined Space Entry Permit) shall assure itself by physical inspection that the following conditions have been met:
 - a. All atmospheric and physical hazards have been identified.
 - b. The Pre-Entry Checklist has been completed with all applicable items addressed regarding the specific aspects of the space (e.g., the area is free of all debris and objects, warning barriers are in place, atmospheric testing

has been completed, all High Tension Administrative and Safety Rules have been met, the confined space has been drained and flushed, forced air or ventilation is provided, rescue equipment is on location and readily accessible, etc.).

- c. Parts #1, #2, #3, #4, #5 and #6 of the Confined Space Entry Permit are properly completed.
 - d. A copy of the completed Permit is prominently posted at the work site.
 - e. All workers (with the exception of Construction and/or Safety Inspectors) within the work area have signed in the space provided in Section #4 of the Permit. The only workers permitted in the confined space work area are those who have signed the work permit.
 - f. The work area shall be suitably protected against access by unauthorized persons.
8. Once work has started, no further additions or alterations shall be made to Parts #1, #2, and #3, of the Confined Space Entry Permit. No work other than that detailed in Part #2 of the Confined Space Entry Permit shall be performed within the work area. ***Should the scope of the work or the work crew change at any time during the performance of the job described on the permit, a new Confined Space Entry Permit must be completed in accordance with all Confined Space Administrative and Safety Rules.***
 9. *Continuous Monitoring results shall be recorded every two hours and entered in Part #5 of the Confined Space Entry Permit.*
 10. Upon completion of work, the Entry Supervisor must initial in Part #6 of the Confined Space Entry Permit certifying that all employees have left the work site and have initialed upon exiting in Part #4 of the Permit.
 11. After all work pertaining to the Confined Space Entry Permit has been completed, the Requesting Unit or Agency shall notify the Police or Communications Desk of their departure from the confined space work area.
 12. As a safeguard, the Chief Maintenance Supervisor shall be responsible for securing the work site upon completion of work.
 13. The Chief Maintenance Supervisor shall be responsible for insuring that any and all additional permits related to the work are properly processed upon completion of work in the Permit Required Confined Space.

CONFINED SPACE SAFETY RULES

1. No work shall be performed in any designated Permit Required Confined Space without specific approval and/or supervision of the Chief Maintenance Supervisor.
2. **No confined space shall be entered without monitoring. Air monitoring must be conducted on a continuous basis until completion of job.**
3. Before any work commences, a detailed written plan of action (Confined Space Entry Permit, PA-3745) and, if appropriate, diagrams shall be prepared by the Chief Maintenance Supervisor to ensure the safe execution of the operation. This plan shall be reviewed with other qualified and interested personnel*** to ensure thorough consideration of the effect of each step of the procedure, taking full regard for other work that may be in progress within the system at the time.

*****Interested Persons:**

Facility Electrical Supervisor
FCSD/SEMAC Supervisor
Contractor
Resident Engineer

4. In all instances, the person who is to work in the Permit Required Confined Space must be trained and personally satisfied that all safety precautions have been taken.
5. When work is to be performed in any Permit Required Confined Space, at least two persons (attendant and entrant) must be present. At the discretion of the Chief Maintenance Supervisor, when no work of any kind, *such as a visual inspection*, is to be performed in a Non-Permit Required Confined Space, unaccompanied personnel may enter that non-permit space.
6. All safety and test equipment must either be approved by the General Manager, Risk Management prior to its acquisition and use by a facility, or appear on the list of such approved equipment compiled by Risk Management and periodically distributed for general Port Authority reference. The facility has the responsibility to ensure that such equipment shall be properly stored, maintained, and periodically calibrated and tested as prescribed by Port Authority Operating and Maintenance Standards or manufacturer's instructions.
7. All work areas (areas covered by scope of work in Part #2 of the Confined Space Entry Permit) must be properly marked off with approved signs to the satisfaction of the Chief Maintenance Supervisor and Risk Management. The only workers permitted in these areas are the Chief Maintenance Supervisor and those persons who have signed the Confined Space Entry Permit. *Construction and Safety inspectors may inspect the work area when the work site is properly supervised.* The Chief Maintenance Supervisor shall describe all work limitations and hazards to the Requesting Unit and other interested persons (Resident Engineer, Inspector, etc.); and shall provide these persons with copies of facility rules and regulations applicable to the work.
8. Personal protective equipment (such as personal monitors, gloves, hard hats, harnesses, etc.) shall be worn by all personnel working in the confined space until the completion of the work.
9. The monitoring equipment shall be visually checked and inspected by the Attendant who is responsible for monitoring activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders evacuation of the space when necessary.
10. Confined Spaces shall be tested for the presence of harmful gases prior to being ventilated or entered. Forced air ventilation shall continue to be used to maintain a safe atmosphere throughout the entire time that employees are working within the Confined Space. Personal monitors shall be worn by all entrants for the duration of the time work is conducted in the space.
11. Open manholes, tanks, silos, storage bins, hoppers, vaults, pits, deep trenches, etc., shall be properly guarded by railings or other means to the satisfaction of the supervisor of the job and shall not be left unattended. The Attendant shall be stationed at the openings to render help and to notify authorities in the event of an emergency. All approved personal protective equipment shall be available at the work site.
12. Within the scope of the confined space work permit and whenever applicable, the High Tension Administrative and Safety Rules, as well as any other applicable rules and regulations [such as Operating and Maintenance Standards, hot work permit (i.e. riveting, welding, cutting, burning and heating capable of providing a source of ignition), etc.] must be followed.

CONTRACTOR REQUIREMENTS

1. When the Port Authority arranges to have a Contractor enter a designated Permit Required Confined Space the Contractor must provide a copy of its Confined Space Entry Program, which shall include, at a minimum, a written program, responsible personnel, entry permit, and procedures to be followed when entering permit required confined spaces. This document shall be reviewed by the Engineering Department and/or the Facility requiring the work for program conformance.
2. In accordance with the OSHA Permit Required Confined Space standard the Contractor shall ensure that all contract personnel or subcontractor personnel are equipped and trained. The contractor must assure that all safety precautions and requirements are implemented prior to the commencement of work inside the PRCS. Examples of these safety precautions and requirements are appropriate site protection, air monitoring prior to and while inside the permit space, appropriate ventilation equipment is utilized, electrical and mechanical systems have been de-energized and locked/tagged out, and all other appropriate personal protective equipment (PPE) is furnished by contract personnel.
3. **A CONTRACTOR PERMIT REQUIRED CONFINED SPACE NOTIFICATION (PA-3745C)** form must be prepared prior to the commencement of work in any PRCS.
4. The Chief Maintenance Supervisor/Designee (in cooperation with the Port Authority Engineering staff) shall:
 - Inform the Contractor of the elements, including the hazards identified that make the space permit required;
 - Inform the Contractor of the precautions or procedures implemented for the protection of employees;
 - Determine if Contractor personnel and Port Authority personnel will be working in or near permit spaces which would require joint entry operations.
5. At the commencement of a PRCS task a copy of PA-3745C shall be given or faxed (with verification of receipt) to the Police desk and/or Communications desk, and the local PAPD Tour Commander. At the worksite, the contractor's entry permit and form PA-3745C shall be prominently posted for the duration of the job.
6. Upon completion of work or when shift ends, the contractor shall return their cancelled entry permit to a Port Authority Representative. A copy of these forms shall be retained by the facility CMS/D for a minimum of one year to facilitate program review. The original PA-3745C and the completed Contractor's Permit shall be sent to Risk Management, PATC 43.
7. Work being performed in PRCS is subject to immediate suspension by the Port Authority upon oral or written notice, if, in the opinion of the Port Authority Resident Engineer's Staff or Safety Inspectors/Engineers, such action is deemed justifiable to protect life or property.
8. Should the nature of the work being performed in the PRCS change or if all the employees working change during the performance of the task described on the contractor's permit, a new revised notification document and contractor's permit is necessary.

APPENDIX

As stated under the General Requirements of the Confined Space Entry Administrative and Safety Rules, the Facility Manager has the ultimate responsibility for ensuring that all rules and regulations are enforced. In accordance with the Confined Space Entry and Administrative Rules, the Chief Maintenance Supervisor administers the facility Confined Space Entry Program. When necessary, a Chief Maintenance Supervisor's designee may be appointed in accordance with the following:

SELECTION OF THE CHIEF MAINTENANCE SUPERVISOR'S DESIGNEE

The selection of a Chief Maintenance Supervisor's designee for purposes of implementing a facility's Confined Space Program must comply with the following:

1. The Facility Manager, together with the Chief Maintenance Supervisor, may nominate a candidate(s) to perform the duties associated with the Confined Space Entry Program, which includes the coordination of the Confined Space Permit process with all interested parties.
2. All designees must, at a minimum:
 - a. Currently hold a Maintenance Supervisory Position.
 - b. Have completed the Confined Space Training Program conducted by Risk Management.
 - c. Have in-depth knowledge of the Confined Space Program at the particular facility involved.
 - d. Be knowledgeable of the Port Authority Confined Space Entry Administrative and Safety Rules and the use and maintenance of confined space testing and retrieval equipment.

REFERENCES

1. OSHA Permit Required Confined Spaces Standard 1910.146
2. Port Authority Operating and Maintenance Standards:
No. 61 - WORK PERFORMED IN CONFINED SPACES
No. 62 - TESTING CONFINED ATMOSPHERES
No. 20 - ROADWAY WORK AREA PROTECTION
3. Port Authority Respiratory Protection Program
Office of Environmental Programs and Management
4. Instructional Manuals:
No. 12 - Timber Shoring for Excavation Work
5. Instruction Pamphlet - High Tension Administrative and Safety Rules
6. Risk Management, Treasury Department

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WORK PERFORMED IN CONFINED SPACES

I. INTRODUCTION

This standard establishes the procedures to be followed in protecting the public, and Port Authority employees and property, during work in manholes, sewers, catch basins, sump pits, electrical vaults, excavations, storage tanks, sanitary vaults, crawl spaces, hoppers, boilers, hollow pier legs, and similar confined areas where combustible mixtures, toxic gases, oxygen deficient/enriched atmospheres, or other physical hazards may be present.

This standard should be used in conjunction with the following Standards, Manuals, and Rules:

1. Standard No. 20 - Roadway Work Area Protection
2. Standard No. 37 - Tunnel Roadway Area Protection
3. Standard No. 45 - Safety Belts (Fall Protection)
4. Standard No. 62 - Testing Confined Space Atmospheres
5. Instruction Manual No. 12 - Timber Shoring for Excavation Work
6. Port Authority Respiratory Protection Program
7. Instruction Pamphlet - High Tension Administrative and Safety Rules
8. Instruction Pamphlet - Confined Space Entry Administrative and Safety Rules
9. Occupational Safety and Health Administration (OSHA) Standards including No. 29 CFR 1910.146 "Permit Required Confined Spaces" and No. 29 CFR 1910.147 "The Control of Hazardous Energy".

II. CONFINED SPACES

A. A confined space is one that:

1. Is large enough and configured so that an employee can bodily enter and perform assigned work
2. Has limited or restricted means for entry and exit
3. Is not designed for continuous employee occupancy.

O&M Standards

- B. A permit-required confined space is a confined space that has one or more of the following characteristics:
1. Contains or has the potential to contain a hazardous atmosphere
 2. Contains a material that has the potential for engulfing an entrant
 3. Has an internal configuration in which an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross section, or
 4. Contains any other recognized serious safety or health hazard.
- C. In cases where there is the slightest indication or suspicion that any hazards exist, or may exist, continuous ventilation and monitoring must be provided at all times while personnel are in the confined areas.
- D. Permit Issuance is subject to the following rules:
1. All permits are void after the shift ends or supervision is changed.
 2. All permits are void in the event of an emergency alarm (fire, equipment failure/problems, etc.) at the confined space worksite.
 3. The safe work permit shall be void if entry is not made within 30 minutes of the air tests. Any changes of entry supervisors, or working conditions shall void the permit.
 4. Prior to start of work, a copy of the permit must be sent, delivered, or faxed (with receipt verified) to the local PAPD desk and/or the communication desk, and the local PAPD Tour Commander. Facilities without Port Authority Police must notify local police. A copy of the permit must be maintained by the chief maintenance supervisor or designee with the original sent to the General Manager, Risk Management.

III. GUIDELINES FOR CONFINED SPACE OPERATIONS

- A. GENERAL PRECAUTIONS. Prior to working in permit-required confined spaces, the following general precautionary steps must be taken:
1. All openings in roadways, parking lots, sidewalks, or any other thoroughfares used by vehicles or pedestrians must be properly protected with barricades, traffic cones, lights, etc. in accordance with O&M Standard No. 20.

O&M Standards

2. If any circumstances regarding the type of work to be performed or the hazards encountered change, the permit is void and a new revised permit must be obtained.
3. If excavations are required, the need for timber shoring should be determined. See Instruction Manual No. 12.
4. A confined space must never be entered before initial air-monitoring tests are completed. Before entering a confined space, the atmosphere must be tested for the lack of oxygen, toxic atmosphere, and presence of combustible gas. See O&M Standard No. 62. If such tests indicate the slightest existence of these conditions, the area must be ventilated with a blower to change the air at least twice. The atmosphere must then be retested. The time required for ventilation prior to entry will be based upon the volume of space to be ventilated, and the rated capacity of the blower. Even though the retest may indicate that the atmosphere has been purged, ventilation should be continuously supplied while the area is occupied. The atmosphere must be continuously retested in accordance with the frequencies stipulated in O&M Standard No. 62, paragraph VII. In addition, the atmosphere must be tested continuously with personal monitors.
5. A confined space, which has been opened for the first time during the day or reopened after having been closed for one hour or more, must not be entered until tests have confirmed that the area is safe.
6. Confined areas must always be entered cautiously. If any irritation of the eyes, nose, or throat is experienced, or if any difficulty in breathing is encountered, the area must be vacated immediately. Re-entry must not be attempted until the area has been thoroughly ventilated, retested, and proven safe.
7. Whenever possible, electric blowers shall be used. If a gasoline engine driven blower must be used, or a gasoline driven electrical generator must be used, care must be exercised to ensure that fumes from the engine do not enter the blower intake. If work is being done with a truck, or other gasoline-powered equipment, the vehicle must not be parked within 10 feet of the confined area, and the exhaust must be directed away from the area entrance and the blower intake.
8. When a blower is used, the discharge tube must terminate 6 inches from the bottom of the confined space.
9. Smoking and open flames (torches, flares, etc.) must not be used in the vicinity of the entry operation.

O&M Standards

10. When working in areas where combustible gas or vapor may be encountered, explosion-proof equipment and non-ferrous tools must be used.
11. When artificial light is required, only safe lighting equipment designed for use in hazardous locations shall be used.
12. All electric handtools, blowers, etc. should be powered through GFI-protected outlets.

B. ISOLATION and LOCKOUT/TAGOUT. All energy sources which are potentially hazardous must be secured, relieved, disconnected and/or restrained before permit space work begins. (See Figures 1 and 2 on page 17.)

1. Methods must be used to prevent flammable, toxic, irritating, or oxygen-displacing gases and vapors from entering the permit space.
2. Pipelines must be drained, cleaned, or flushed of hazardous material as necessary.
3. Equipment or processes must be locked, tagged, or preferably both.

C. SPECIAL PRECAUTIONS IN ELECTRICAL AREAS. The following additional precautions must be taken when working in confined spaces containing electrical equipment:

1. After testing, the first employee entering the confined area must be the electrician responsible for locking out and/or de-energizing the sources of electrical energy, and for grounding the circuits or lines requiring maintenance.
2. All electrical wiring and components, even though de-energized, must be covered with insulating blankets, shields, or covers by an electrician.
3. When employees other than electricians are working in these areas, they must do so with the assistance of an electrical foreman who shall be the individual responsible for locking out the sources of electrical energy, and for grounding the circuits or lines requiring maintenance.
4. Where initial tests indicate the presence of explosive gases, meggers used for making insulation resistance measurements must be kept out of the confined area and their conductors must be discharged through the discharge switch even though the area was freed of gas following the initial test. Under no circumstances should sparks be created when working in such questionable atmospheres.

O&M Standards

- D. **EVALUATE HAZARDS.** During the hazard-evaluation process, several items must be considered. One significant item is history. If several years of history indicate that no hazardous situations were encountered in a particular confined space, then it is safe to consider that space as one which does not require an entry permit. Lacking this history, all other confined spaces must be considered permit spaces until further evaluation and testing proves otherwise. It is the responsibility of the facility to evaluate hazards and to identify permit spaces.

Items to consider when evaluating a space are:

1. What is the size and configuration of the space?
2. What is the size and location of the exit?
3. What is or has been stored in the space?
4. Are there nearby elements that could drift, fall, or spill into the space?
5. Does testing reveal any atmospheric hazards?
6. Are there any mechanical or electrical hazards?
7. Has there been, or is there work planned in adjoining spaces that could effect the space staff will be working in?

- E. **ENTRY PROCEDURES.** The following questions must be considered when entry procedures are being planned:

1. What precautions and personal protective equipment are required?
2. What tools are required?
3. Is cleaning required? If so:
 - a. Will the cleaning materials pose a hazard?
 - b. Are material safety data sheets (MSDS) available?

- F. **ATMOSPHERIC TESTING.** Atmospheric testing must be simultaneously performed for the following items:

NOTE

Manholes must be tested prior to cover removal. (Refer to O&M Standard 52, paragraph VI.)

1. Oxygen (deficient or enriched)
2. Combustible gases
3. Toxic gases and vapors

- G. **VENTILATION.** Use forced-air ventilation if atmospheric testing indicates a low or high oxygen level and/or the presence of harmful gases. The use of ventilation fans and air ducts/trunk hoses will increase the oxygen level and displace harmful gases.

O&M Standards

- H. ALTERNATE ENTRY PROCEDURES. Under certain circumstances, simplified procedures may be used to enter confined spaces.
1. A simplified alternate entry procedure may be used provided that all of the following conditions are met:
 - a. It can be demonstrated that the only hazard posed by the permit space is an actual or potential hazardous atmosphere.
 - b. It can be demonstrated that continuous forced air ventilation alone is sufficient to maintain the confined space safe for entry.
 - c. Supporting monitoring and inspection data have been developed.
 - d. Supporting data are documented and made available to each entrant.
 2. Entry into the confined space is performed as follows:
 - a. Any conditions making it unsafe to remove an entrance cover must be eliminated before the cover is removed.
 - b. The entrance opening must be promptly guarded by a temporary barrier that will prevent an accidental fall through the opening.
 - c. Before any employee enters the space, the internal atmosphere must be tested in accordance with O&M Standard No. 62.
 - d. There may be no hazardous atmosphere within the space whenever any employee is inside.
 - e. Continuous forced air ventilation must be used as follows:
 - (1) An employee may not enter the space until the forced air ventilation has eliminated any hazardous atmosphere
 - (2) The forced air ventilation must be so directed as to ventilate the immediate areas where an employee is or will be present, and must continue until all employees have left the space
 - (3) The air supply for the forced air ventilation must be from a clean source and cannot increase the hazards in the space.

U&M Standards

- f. The atmosphere within the space must be periodically tested as necessary to ensure that the forced air ventilation is preventing the accumulation of a hazardous atmosphere.
- g. If a hazardous atmosphere is detected during entry:
 - (1) Each employee must leave the space immediately
 - (2) The space must be evaluated to determine how the hazardous atmosphere developed
 - (3) Measures must be implemented to protect employees from the hazardous atmosphere before any subsequent entry takes place

IV. HAZARDS

- A. The three classes of hazards to be concerned with while working in confined spaces are Engulfment, Mechanical/Electrical, and Atmospheric.
 - 1. ENGULFMENT refers to the situation where the entrant is trapped or enveloped by the material already present in the confined space, or from material accidentally released into the confined space.
 - 2. MECHANICAL/ELECTRICAL hazards are difficult to avoid when working in confined spaces because the configuration of the spaces often place the entrant in close proximity to mechanical/electrical processes. In addition, limited space may restrict the entrant's mobility, thereby limiting one's ability to avoid potentially fatal conditions.
 - 3. ATMOSPHERIC hazards are classified into three categories: Asphyxiating, Toxic, and Flammable.
 - a. ASPHYXIATING atmospheres are those in which there is insufficient oxygen to sustain human respiratory needs. An asphyxiating atmosphere is one that contains less than 19.5 percent oxygen by volume.
 - b. TOXIC atmospheres are those containing poisonous gases, vapors, or fumes. The toxic gases most commonly found in confined spaces are carbon monoxide, toluene, carbon disulfide, and hydrogen sulfide. Toxins can be in the form of a liquid, solid, gas, or in any combination.

O&M Standards

- c. **FLAMMABLE** or **EXPLOSIVE** atmospheres are those containing gases such as methane or acetylene, vapors such as gasoline or kerosene, and combustible particles such as coal or grain dust. Atmospheres pose a serious fire or explosion hazard if flammable gas or vapor is present at a concentration greater than 10 percent of its lower flammable limit (LFL), or if combustible dust is present at a concentration greater than or equal to its LFL. This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet (1.52M) or less.

V. CONFINED SPACE EQUIPMENT

Items available for confined-space work can be categorized as either Monitoring, Ventilation, Personal Protective, or Rescue Equipment. All equipment must be intrinsically safe (spark-proof, etc.), and approved for use in hazardous atmospheres.

- A. **MONITORING EQUIPMENT** is available for use in measuring and monitoring for atmospheric hazards. This process is described in O&M Standard 62. Instruments are designed to measure oxygen content as well as to detect specific toxins and combustible gases.
- B. **VENTILATION EQUIPMENT** (fans, air ducts, and trunk hoses) is used to eliminate atmospheric hazards, and to maintain a safe working environment.

NOTE

The control of atmospheric hazards through forced air ventilation does not constitute elimination of the hazard.

- C. **PERSONAL PROTECTIVE EQUIPMENT** provides protection against many different hazards. There are two types of personal protective equipment: respiratory protection, and protective clothing.
 1. **RESPIRATORS** provide protection against inhalation of hazardous substances. Two types of respirators are:
 - a. Negative-pressure air purifying respirators which filter or remove airborne contaminants. (See Figure 3 on page 18.)
 - b. Air supplying respirators which supply air to the user. Refer to the PA Respiratory Protection Program for appropriate respirator selection.

O&M Standards

2. PROTECTIVE CLOTHING is available in several forms based upon hazards present and the kind of work to be performed. However, they can be described as belonging to one of two basic types:

a. Physical Hazard Protective Clothing such as hard hats, boots, and hearing protectors, which provide protection against such hazards as heat or cold, sparks or flame, abrasion, impact, or loud noise.

b. Chemical/Toxic Protective Clothing which provide spill and splash protection (gloves, boots, visors, goggles, etc.) or total encapsulation protection. Total encapsulation clothing is essentially a one-piece suit with one piece gloves and boots. A one-piece suit requires a self-contained breathing apparatus.

D. RESCUE EQUIPMENT is available to facilitate the removal of an injured or overcome worker from the confined space. Typical items are:

1. Body Harness
2. Retrieval Line
3. Tripod
4. Lifting Device

VI. ENTRY PERMIT SYSTEM

The key element in establishing and maintaining an effective confined space safety program is the entry permit. This permit is designed to provide the necessary information, equipment, and training to perform confined space work safely and effectively. A sample permit is appended to this standard.

A. To be compliant, the entry permit must identify the:

1. Permit space to be entered
2. Purpose of the entry
3. Date and authorized duration of the permit
4. Names of the authorized entrants
5. Names of the confined-space attendants
6. Name of the entry supervisor
7. Hazards in that particular permit space
8. Measures used to eliminate or control the hazards before entry
9. Acceptable entry conditions
10. Results of the initial and periodic tests performed, and names of the testers and an indication of when tests were performed
11. Rescue and emergency services that can be summoned, and the means for calling those services
12. Communication procedures by which entrants and attendants will maintain contact
13. Equipment required (protective, monitoring, communication, and rescue)

O&M Standards

14. Additional information needed to ensure safety during entry
 15. Additional permits that have been issued to authorize work in the confined space (such as for hot work).
- B. The implementation of the program must meet the following requirements:
1. Before entry begins, the entry supervisor must sign the permit. Entry begins when any part of the body breaks the plane of an opening into the permit space.
 2. The duration of the permit cannot exceed the time required to complete the job described on the permit.
 3. The entry supervisor must terminate the entry and the chief maintenance supervisor must cancel the permit when:
 - a. The job covered by the permit has been completed
 - b. An unsafe condition arises
 4. The entry supervisor must note on the permit any problems encountered during an entry. Canceled entry permits must be kept for one year.
- C. Training must be provided to all employees who are involved in confined space work. Training must be designed to ensure that affected employees have the understanding, knowledge, and skills necessary for safely performing their assigned duties. The training program shall include the following:
1. Operation of the permit system
 2. Specific duties of each person involved in permit-required confined space operations;
 3. Hazards of confined spaces including information on the mode, signs or symptoms, and consequences of exposure
 4. Proper use of equipment required during permit space operations including: testing and monitoring equipment, personal protective equipment, ventilating equipment, rescue equipment used for non-entry rescue, and any other equipment necessary for safe entry into and rescue from permit spaces
 5. Methods of communication between entrant and attendant
 6. Conditions under which the space should be evacuated
 7. Procedures to be used for a non-entry rescue.

O&M Standards

D. Training must be provided:

1. Before the employee is first assigned confined space duties
2. Before there is a change in assigned duties
3. Whenever there is a change in confined space operations that presents a hazard for which an employee has not previously been trained
4. Whenever the entry supervisor has reason to believe that there are deviations from the established procedures, or there are inadequacies in the employee's knowledge or use of these procedures.

Certification of training must contain each employee's name, the signature of the trainers, and the dates of the training. Records of training will be maintained by Risk Management.

VII. CONFINED-SPACE SAFETY

The following steps are those required to protect employees and the general public from the hazards of entry into permit-required confined spaces:

- A. IDENTIFICATION AND MARKING OF CONFINED SPACES. The atmosphere of a confined space must be analyzed to identify and evaluate any hazardous conditions that may exist. In addition, an evaluation must be made regarding the existence of electrical/mechanical hazards. As soon as it is determined that a workplace contains permit spaces, all exposed employees must be informed of the existence, location, and danger by the posting of signs reading "DANGER - PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER".
- B. PLANNING WORK. To ensure a successful entry and facilitate the performance of the assigned tasks, it is imperative that a detailed work plan be formulated. As a minimum, the work plan must define:
 1. The measures used to prevent unauthorized entry
 2. The methods by which hazards will be identified and evaluated
 3. The means, procedures, and practices to be used for safe entry operations
 4. The personal protective equipment to be used
 5. How to determine if acceptable entry conditions are being maintained during the course of entry operations
 6. The persons who are to have active roles in entry operations, and specify their duties

O&M Standards

7. The procedures for summoning rescue services, for rescuing entrants, for preventing unauthorized personnel from attempting a rescue, and for providing necessary emergency services to rescued employees.
 8. The procedures for the preparation, issuance, use, and cancellation of entry permits.
- C. ~~PROVIDING PROPER EQUIPMENT.~~ The following ~~equipment,~~ as required, must be provided, maintained, and used:
1. Testing and monitoring equipment
 2. Ventilating equipment
 3. Communications equipment
 4. Personal protective clothing
 5. Lighting equipment
 6. Barriers and shields
 7. Rescue and emergency equipment.
- D. ~~ADVANCE NOTIFICATION.~~ Advance notice must be given to the facility and to the Port Authority Police so that they can be prepared to respond to an emergency situation. The advance notification must include the location, dates, and types of hazards and potential hazards which might be encountered.
- E. ~~POSTING OF PERMIT.~~ The entry permit must be conspicuously posted outside of the permit space. This posting assures entrants that all required preparations have been made.

VIII. DUTIES OF ENTRY SUPERVISOR

The entry supervisor has the duty and responsibility for coordinating the entire entry operation. The safety of all entrants depends upon this vital person. Each entry supervisor must:

- A. Know the hazards that may be faced during entry, including the symptoms and consequences of exposure
- B. Verify that the permit is filled out correctly, that all tests specified have been conducted, and that all procedures and equipment specified by the permit are in place before allowing entry to begin
- C. Terminate the entry as described in paragraph VI.B.3
- D. Verify that rescue services are available, and that there are workable means for summoning help

O&M Standards

- E. Remove unauthorized individuals who enter, or attempt to enter, the permit space during entry operations
- F. Determine that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space.

IX. DUTIES OF ATTENDANTS

Attendants monitor the activities of the entrants. They can be assigned no other duties which would interfere with their duties as permit-space attendants. Attendants must:

- A. Know the hazards that may be faced during entry, including information on the signs, symptoms, and consequences of exposure
- B. Be aware of possible behavioral effects of the hazardous exposure on entrants
- C. Continuously maintain accurate count of authorized entrants in the permit space, and ensure that the entry permit accurately defines who is in the permit space.
- D. Remain outside the permit space during entry operations until relieved by another attendant
- E. Communicate with entrants as necessary to monitor entrant status and to alert entrants to the need to evacuate the space
- F. Monitor the activities inside and outside of the permit space to determine if it is safe for the entrants to remain in the space and order the entrants to evacuate the space immediately under any of the following conditions:
 - 1. If the attendant detects a prohibited condition
 - 2. If the attendant detects the behavioral effects of hazard exposure in an entrant
 - 3. If the attendant detects a situation outside the space that could endanger the entrants
 - 4. If the attendant cannot safely perform all required duties
- G. Summon rescue and other emergency services as soon as the attendant determines that the entrants may need assistance to escape from permit-space hazards. Remain in communication with PA Police or person who is responding to the rescue call.

O&M Standards

- H. Take the following actions when unauthorized persons approach or enter a permit space while entry is underway:
 - 1. Warn the unauthorized persons that they must stay away from the permit space
 - 2. Advise the unauthorized persons that they must exit immediately if they have entered the permit space, and inform authorized entrants and the entry supervisor that unauthorized persons have entered the permit space.
- I. Perform non-entry rescues.

X. DUTIES OF AUTHORIZED ENTRANTS

Authorized entrants are the employees who go into the permit space to perform the authorized work. All authorized entrants must:

- A. Know the hazards that may be faced during entry, including the signs or the symptoms and consequences of exposure to these hazards
- B. Use supplied equipment properly
- C. Communicate with the attendant as necessary to enable the attendant to monitor the entrant's status, and to enable the attendant to alert entrants to the need to evacuate the space
- D. Alert the attendant whenever the entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or detects a prohibited condition.
- E. Exit the permit space whenever:
 - 1. An order to evacuate is given by the attendant or the entry supervisor
 - 2. The entrant recognizes any warning sign or symptom of exposure to a dangerous situation
 - 3. The entrant detects a prohibited condition
 - 4. An evacuation alarm is activated.

O&M Standards

XI. DUTIES OF PORT AUTHORITY TO CONTRACTOR

When contractors are to be used to perform work in permit spaces it is the responsibility of the Port Authority chief maintenance supervisor to make the contractor aware of the permit system, and the contractor's duties under the system. As a minimum, the Port Authority chief maintenance supervisor shall:

- A. Inform the contractor that the workplace contains permit spaces, and that permit-space entry is only through compliance with a permit-space program
- B. Verify that the contractor meets OSHA 29 CFR 1910.146, permit required confined spaces; and provides its own permit which is approved by the facility.
- C. Apprise the contractor of the elements and hazards which make the space in question a permit space
- D. Apprise the contractor of any precautions or procedures which have been implemented for the protection of entrants
- E. Coordinate entry operations with the contractor
- F. Debrief the contractor at the conclusion of the entry operation regarding any hazards confronted or created during entry operation.

XII. DUTIES OF CONTRACTOR TO PORT AUTHORITY

In addition to complying with the permit space requirements that apply to all employers, each contractor who is retained to perform permit space entry operations shall:

- A. Obtain any available information regarding permit space hazards and entry operations from the Port Authority
- B. Coordinate entry operations with the Port Authority, when both host employer personnel and contractor personnel will be working in or near permit spaces, and
- C. Provide the required safety equipment
- D. Inform the Port Authority of the permit space program that the contractor will follow, and of any hazards confronted or created in permit spaces, either through a debriefing or during the entry operation.

O&M Standards

XIII. EMERGENCY CONDITIONS

The ability to recognize and react properly to an emergency can result in the avoidance of many of the injuries and deaths associated with confined spaces. In many of these incidents, it is not only the original entrant who dies, but also the rescuer. No one should attempt a confined space rescue unless that person is trained and properly equipped.

A. **RECOGNITION OF EMERGENCY SITUATIONS.** It is the primary responsibility of the attendant to be aware of emergency situations. While entrants might be able to communicate in an emergency, the attendant must be alert to symptoms which would indicate that a physical problem is developing.

Should one be overcome while working in a permit space, it is likely that the cause would be anoxia (oxygen deprivation). The attendant should watch for the following symptoms, and order persons out of the confined space if such symptoms are observed:

1. Shortness of breath out of proportion to work performed
2. Nausea, headache, and dizziness
3. Drowsiness
4. Poor color and blue lips. This symptom will not appear if the anoxia is caused by inhalation of carbon monoxide
5. Incoherence of speech and movements. Speech is slow and thick. Movement is clumsy along with dropping of tools among other signs indicating poor muscular coordination
6. Apathy, disinterest, and dull judgment.

B. **RESCUE GUIDELINES.** Should an emergency arise, it is imperative that a rescue operation is initiated which will result in the prompt removal of the affected employee from the confined space by persons trained in, and equipped for, rescue operations. To ensure this, the following guidelines must be followed:

1. Notify the Port Authority Police immediately.
2. Attendants may only perform non-entry rescues.

XIV. HOUSEKEEPING

All confined spaces shall not be used for unnecessary storage of any kind. Spaces must be kept clean and free of grease, grime, stagnant oil or water.

O&M Standards

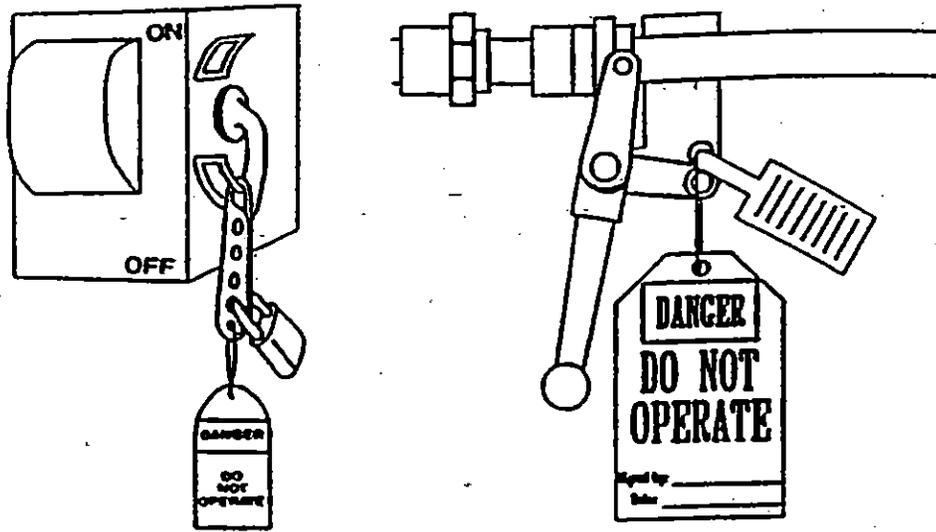


Figure 1. Lockout and Tag-Out

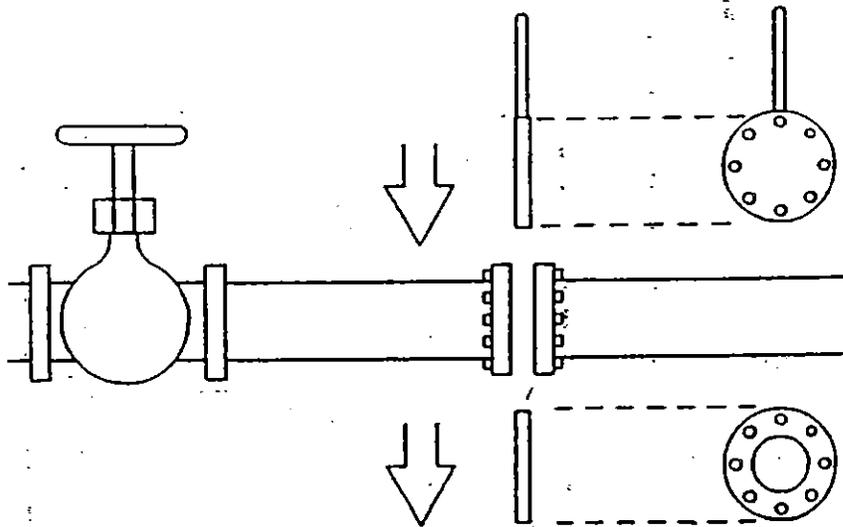
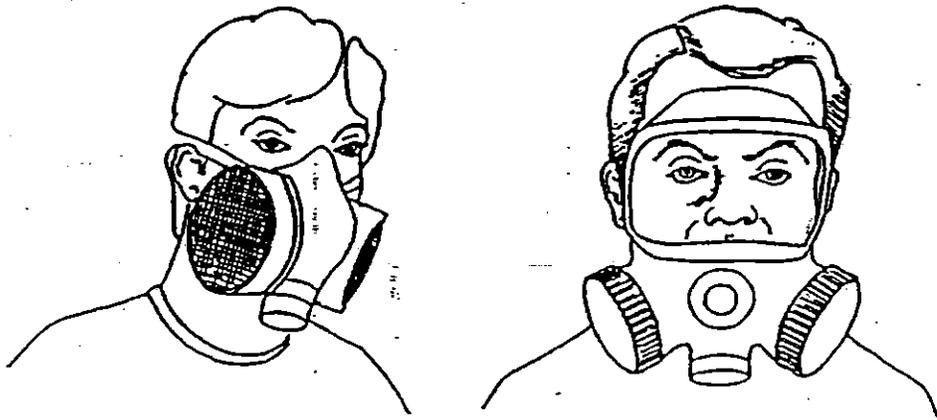


Figure 2. Blanking Hydraulic/Pneumatic Lines



Half-mask

Full-Facepiece

Figure 3. Air Purifying Respirators

APPENDIX
CONFINED SPACE ENTRY PERMIT

O&M Standards

THE PORT AUTHORITY OF NY & NJ CONFINED SPACE ENTRY PERMIT

FACILITY: _____

DURATION OF PERMIT: _____

Hand print in ink. (See reverse side for further instructions.)

1 PERMIT NUMBER: _____	WORK ORDER NUMBER: _____
CONFINED SPACE NUMBER: _____ (IF APPLICABLE)	HIGH TENSION PERMIT NUMBER: _____ (IF APPLICABLE)
2 REQUESTED BY: _____	ISSUED BY: _____
PRINT NAME SIGNATURE	CHIEF MTC. SUPV./DESIGNEE PRINT NAME - INITIALS - DATE
EXACT LOCATION OF CONFINED SPACE: _____	PURPOSE OF ENTRY: _____

3. PRE-ENTRY CHECKLIST - COMPLETED BY SUPERVISOR OF JOB SITE		YES	NA	YES	NA
ENTRY AND EMERGENCY PROCEDURES REVIEWED					
ALL PERSONNEL TRAINED (CLASSROOM/EXERCISE)					
ALL PERSONNEL KNOWLEDGEABLE ABOUT POTENTIAL HAZARDS					
ATTENDANT STATIONED AT ENTRANCE					
RESCUE EQUIPMENT ON LOCATION AND READILY ACCESSIBLE (TRIPOD, SAFETY LINES, HARNESSES)					
COMMUNICATION DEVICES AT SITE (RADIOS, CELLULAR PHONES, ETC.)					
PERSONAL MONITORS WORN BY ALL ENTRANTS					
ENTRY AREA IS FREE OF DEBRIS AND OBJECTS					
WARNING BARRIERS AND SIGNS ARE IN PLACE					
ATMOSPHERIC MONITORING CONDUCTED					
				ALL HAZARDOUS LINES HAVE BEEN ISOLATED	
				HOT WORK PERMITS (WELDING, CUTTING, ETC.)	
				ALL ENERGY SOURCES HAVE BEEN DE-ENERGIZED AND LOCKED/TAGGED OUT	
				SPACE HAS BEEN DRAINED AND FLUSHED	
				VENTILATION EQUIPMENT IS BEING UTILIZED	
				ELECTRICAL EQUIPMENT IS GROUNDED	
				GROUND FAULT CIRCUIT INTERRUPTERS (GFCI) USED	
				ELECTRICAL EQUIPMENT RATED FOR EXPLOSIVE ATMOSPHERES	
				LOW VOLTAGE (< 25 v) LIGHTING USED	
				NO COMPRESSED GAS CYLINDERS STORED IN SPACE	

4. GAS DETECTION EQUIPMENT/ATTENDANT(S)/ENTRANT(S)			
INSTRUMENT USED ↓	ATTENDANT (S) - PRINT NAME	INITIAL(S)	INITIAL - FINAL
SERIAL # ↓			
CALIBRATION DATE ↓	ENTRANT(S) - PRINT NAME	INITIAL (IN)	INITIAL (OUT)

5. MONITORING RESULTS: (record results every 2 hours) ENTRY SUPERVISOR MUST VERIFY INITIAL READINGS							
REQUIRED TESTING	ACCEPTABLE ENTRY CONDITIONS	(AM/PM)	(AM/PM)	(AM/PM)	(AM/PM)	(AM/PM)	(AM/PM)
% of Oxygen - O ₂	19.5% - 23.5%						
Lower Explosive Limit - LEL	10% OR LESS						
Carbon Monoxide - CO	UNDER 35 ppm						
Hydrogen Sulfide - H ₂ S	UNDER 10 ppm						
Other Tests							

6. APPROVAL TO PERFORM WORK IN CONFINED SPACE - DUTY OF ENTRY SUPERVISOR	
SIGNATURE AT START OF JOB	INITIALS AT COMPLETION OF JOB
_____	_____

IN THE EVENT OF AN EMERGENCY CONTACT:
(TO BE FILLED IN BY PERSON ISSUING PERMIT)

TELL THE OPERATOR:

- Your name, Port Authority of NY & NJ.
- Location, including cross streets.
- Phone number from which you are calling.
- This is a confined space operation. You need a rescue service.
- Number of victims; condition of victims if known.
- Type of entry (manhole, door, etc.)
- Any known conditions in the space (gas readings, flooding).

PERMIT IS VOIDED BY CHIEF MAINTENANCE SUPERVISOR OR DESIGNEE AT END OF SHIFT OR COMPLETION OF JOB.

SIGNATURE - CMS or Designee _____ DATE _____

O&M Standards

THE PORT AUTHORITY OF NY & NJ

CONFINED SPACE ENTRY ADMINISTRATIVE AND SAFETY RULES

1. No work shall be performed in any designated Permit Required Confined Space (PRCS) without specific approval and/or supervision of the Chief Maintenance Supervisor or his/her designee.
2. When work involving entrance into a PRCS is requested, the Confined Space Entry Permit (Form PA-3745) must be completed as follows:

Section 1 - Permit number, work order number, confined space number (if applicable), and high tension permit number (if applicable).

Section 2 - Name of Supervisor requesting permit, Chief Maintenance Supervisor or designee, location of confined space, and purpose of entry.

Section 3 - Pre-entry checklist.

Section 4 - Record gas detection equipment name, serial number, and calibration date. Record attendant(s) and entrant(s) names. Prior to entering a PRCS, entrant(s) must initial they are entering space and upon completion of work entrant(s) must initial indicating they are exiting space.

Section 5 - Monitoring results. Monitoring results must be recorded every two hours.

Section 6 - Supervisor of job site must give his/her approval for work to begin by providing his/her signature in the space provided on the permit.

Upon completion of work or when shift ends, the Chief Maintenance Supervisor or designee must cancel the permit, file copy, and route original to Risk Management, PATC 43.

3. The Requesting Agency, prior to starting work, shall assure itself that the confined space has been properly identified, monitored, secured and that all safety precautions have been implemented (such as ventilation, lock-out/tag-out, etc.). Other interested agencies, such as the Resident Engineer, Tenant Representatives, FAA, Utility companies, etc., may witness above operations. Responsibility for notification to interested and affected parties is the responsibility of the Chief Maintenance Supervisor or designee.
4. Once initial monitoring has been conducted and prior to any work being performed in a PRCS, the Confined Space Entry Permit shall be prominently posted at the work site for the duration of the job. A copy shall be given or faxed (with verification of receipt) to the Police desk and/or the Communications desk to alert personnel of work being performed in a PRCS by the Chief Maintenance Supervisor. Any additional information regarding the Confined Space Entry Permit shall be included in the file with the original.
5. *Should the scope of the work or the entire work crew change at any time during the performance of the job described on the permit, a new Confined Space Entry Permit must be completed in accordance with all Confined Space Entry Administrative and Safety Rules.*

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TESTING CONFINED SPACE ATMOSPHERES

I. INTRODUCTION

This standard establishes the equipment required and procedures to be followed to test the atmosphere and thereby protect the public and Port Authority employees and property, during work in confined spaces. This standard is to be used in conjunction with Operating and Maintenance Standard No. 61.

Several models of atmospheric testers are used at different facilities. Accordingly, this standard has been designed to have general applicability.

II. CONFINED SPACES

A. A confined space is one that:

- 1. Is large enough and configured so that an employee can bodily enter and perform assigned work
- 2. Has limited or restricted means for entry and exit
- 3. Is not designed for continuous employee occupancy.

B. A permit-required confined space is a confined space that has one or more of the following characteristics:

- 1. Contains or has the potential to contain a hazardous atmosphere
- 2. Contains a material that has the potential for engulfing an entrant
- 3. Has an internal configuration in which an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross section
- 4. Contains any other recognized serious safety or health hazard.

C. Examples of confined spaces:

- | | |
|--------------------|---------------------|
| 1. Manholes | 5. Hoppers |
| 2. Storage Tanks | 6. Boilers |
| 3. Sanitary Vaults | 7. Hollow Pier Legs |
| 4. Crawl Spaces | 8. Ditches |

O&M Standards

III. HAZARDS

- A. There are three classes of atmospheric hazards to be concerned with while working in confined spaces: asphyxiating, toxic, and flammable.
1. ASPHYXIATING atmospheres are those in which there is insufficient oxygen to sustain human respiratory needs. An asphyxiating atmosphere is one that contains less than 19.5 percent oxygen by volume.
 2. TOXIC atmospheres are those containing poisonous gases, vapors, or fumes. The toxic gases most commonly found in confined spaces are carbon monoxide, hydrogen sulfide, toluene, and carbon disulfide. Toxins can be in the form of a liquid, solid, gas, or in any combination.
 3. FLAMMABLE or EXPLOSIVE atmospheres are those containing gases such as methane or acetylene; vapors such as gasoline or kerosene; and combustible particles such as coal or grain dust. Atmospheres pose a serious fire or explosion hazard if flammable gas or vapor is present at a concentration greater than 10 percent of its lower flammable limit (LFL), or if combustible dust is present at a concentration greater than or equal to its LFL. This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet (1.52M) or less.

IV. HAZARD ASSESSMENT

- A. GENERAL GUIDELINES. The atmosphere of a confined space must be analyzed in order to identify and evaluate any hazardous conditions that may exist, or are likely to exist. Items to consider when evaluating a confined space are:
1. The size and configuration of the space
 2. The size and location of the exit
 3. Products which are, or have been stored in the space
 4. Nearby elements that could drift, fall, or spill into the space
 5. Results of atmospheric testing.

Before entry into a confined area, its atmosphere must be tested to ensure that there is sufficient oxygen, and that there are no existing toxic or explosive conditions. A direct-reading gas meter must be used. Testing must be performed by a supervisor who has successfully completed gas detector training for the instrument in use.

O&M Standards

Human senses are never to be trusted to determine if the air in a confined space is safe. You cannot see or smell many toxic gases and vapors, nor can you determine the level of oxygen present.

- B. **STRATIFIED ATMOSPHERES.** Some gases and vapors are heavier than air, and will settle to the bottom of a confined space. Also, some gases and vapors are lighter than air, and will be found at the top of the confined space. These conditions can result in a stratified atmosphere. (See Figure 1 on page 7.) Therefore, to ensure your safety, it is necessary to sample the atmosphere at the top, middle, and bottom levels of a confined space.

- C. **OXYGEN-DEFICIENT ATMOSPHERES.** An oxygen-deficient atmosphere contains less than 19.5% by volume available oxygen. Any atmosphere with an oxygen content of less than 19.5% by volume must not be entered. The oxygen scale shown in Figure 2 on page 7 indicates the effect that low oxygen levels has on people. The oxygen content of a confined atmosphere can be decreased by:
 - 1. Work being done such as welding or brazing
 - 2. Chemical reactions such as rusting
 - 3. Bacterial action such as fermentation
 - 4. Being displaced by another gas such as nitrogen.

- D. **FLAMMABLE/EXPLOSIVE ATMOSPHERES.** Two things make an atmosphere flammable:
 - 1. Oxygen enriched air
 - 2. A flammable gas, vapor, or dust in the proper mixture with oxygen.

If a source of ignition is introduced in a space containing a flammable atmosphere, an explosion will result. (See Figure 3 on page 8.)

- E. **TOXIC ATMOSPHERES.** In a confined space, most substances (liquids, vapors, gases, solids, and dusts) must be considered toxic. Toxic substances can come from products stored in the space, work being performed in the space, as well as from areas surrounding the space.
 - 1. Products which are stored in a confined space can be absorbed into the walls, which can emit toxic gases even after the product has been removed. In addition, the process of cleaning out the residue of previously stored material can result in the release of toxic gases.

O&M Standards

2. Work being performed in confined spaces such as welding, scraping, sanding, and degreasing, can cause the release of toxins.
3. Toxins produced by work being performed in surrounding areas can spill into, and contaminate, a confined space.

V. ATMOSPHERIC TESTERS

- A. **GENERAL.** Portable atmospheric testers are supplied which, when used properly, will afford protection against hazardous atmospheric conditions in confined spaces. These testers are available in different gas combinations for the detection of hydrocarbons, oxygen, carbon monoxide, and hydrogen sulfide. Most of the units incorporate microprocessor-controlled operation and calibration procedures. For added safety, audible alarms supplement the visual readouts.

Manufacturer's data for the latest types of sensors stocked by the Port Authority are provided as an appendix to this standard. The specific type(s) of tester(s) required for a particular entry operation will depend upon the space to be entered and the job to be performed. In every case, the required equipment will be specified on the entry permit.

- B. **TRAINING.** All personnel involved in atmospheric testing must be trained in the proper use of atmospheric monitoring instruments. Training must include field calibration of equipment, knowledge of the work being performed, anticipated atmospheric hazards, and any ongoing process which could change the conditions inside of the confined space.

Training effectiveness must be evaluated periodically. This can be accomplished by written tests or by asking personnel to demonstrate their practical knowledge.

Training sessions must be repeated as often as evaluation and performance observation dictate.

VI. TEST PROCEDURES

NOTE

This section contains general information regarding atmospheric testing. Refer to the manufacturer's data sheets appended to this standard for detailed information on specific gas testers.

O&M Standards

- A. **GENERAL.** Atmospheric testing is conducted in order to identify the types of hazards within the confined space (evaluation), and to later ascertain that acceptable conditions exist before entry into the space (verification).
1. **EVALUATION TESTING.** During this phase of testing, the atmosphere of a confined space must be analyzed, using gas detection equipment to identify and evaluate any hazardous atmospheres that may exist, or are likely to develop. Evaluation and interpretation of these data, and development of the entry procedure, should be done by, or reviewed by, a technically qualified professional (as designated by the facility manager) based on evaluation of all serious past and present hazards. Material safety data sheets (MSDS) and OSHA Permissible Exposure Limits (PEL's) are to be consulted during the evaluation process.
 2. **VERIFICATION TESTING.** Prior to entry, the atmosphere of a confined space which may contain a hazardous atmosphere must be tested for residues of all previously-identified contaminants to determine that residual concentrations at the time of entry are within the range of acceptable entry conditions.
- B. **INITIAL TESTS.** Initial tests for oxygen deficiencies and explosive conditions must be made from outside of the confined area. To facilitate this, testers with probes and sampling lines are available, and shall be utilized.
- C. **PROCEDURES FOR TESTING MANHOLES.** The following procedures apply to the testing of atmospheres within each manhole:
1. Test each manhole closed by a single cover which contains ventilating holes by inserting the free end of the sampling hose through one of the holes.
 2. Test each manhole closed by a single cover which does not have ventilating holes by raising one side of the cover sufficiently to insert and lower the free end of the sampling hose. Do not allow weight of the cover to compress the hose.
 3. Test each manhole closed by a cover and inner pan by removing the top cover and locking bar, and raising one side of the inner pan sufficiently to insert and lower the free end of the sampling hose.
 4. Do not submerge the sampling hose into any liquid during testing.

VII. TESTING FREQUENCY

- A. **INITIAL TEST.** Confined areas opened for the first time, or re-opened after having been closed for one hour or more, must be tested. The time of each test must be recorded on a tag or chart at the site.

O&M Standards

- B. **CONTINUOUS TESTING.** Continuous gas monitoring must be performed during all confined space operations.

VIII. TEST RESULTS/ACTIONS TAKEN

- A. **NO GAS DETECTED AND NO OXYGEN DEFICIENCY EXISTS.** If the tests made upon opening or reopening the confined area indicate a safe atmosphere, and the area has been ventilated with a spark-proof blower for ten minutes, the area may be entered.
- B. **GAS DETECTED OR OXYGEN DEFICIENCY EXISTS.** If a combustible gas and/or an oxygen deficiency is detected during the initial test, entry must not be attempted until:
 1. The area has been ventilated with a spark-proof blower to change the air at least twice, and
 2. Subsequent retesting indicates a safe atmosphere, and
 3. Continuous ventilation is provided.

IX. MAINTENANCE OF ATMOSPHERIC TESTERS

- A. **RESPONSIBILITY.** Facility management is responsible for ensuring proper operation and calibration of all testing equipment.
- B. **PERIODIC INSPECTION.** All instruments must be inspected monthly by responsible facility personnel.
- C. **CALIBRATION.** All instruments must be calibrated at least once every six months or as per manufacturer's recommendations.
- D. **RECORDS.** An inspection record must be attached to each instrument, and filed with the organizational unit. All inspections and calibrations, all deficiencies found, and all maintenance performed must be entered, dated, and initialed on this card.
- E. **INSPECTION BEFORE EACH USE.** Before each use, inspect all instruments for tightness of connectors, wear of rubber parts, and battery strength. Ensure that the monitor is operational.

O&M Standards

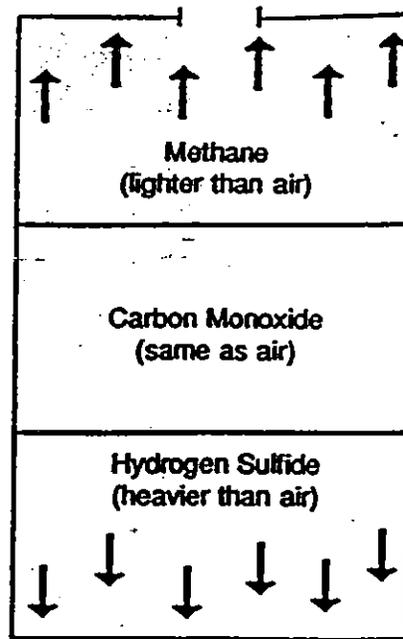


Figure 1. Stratification of Gas within a Confined Space

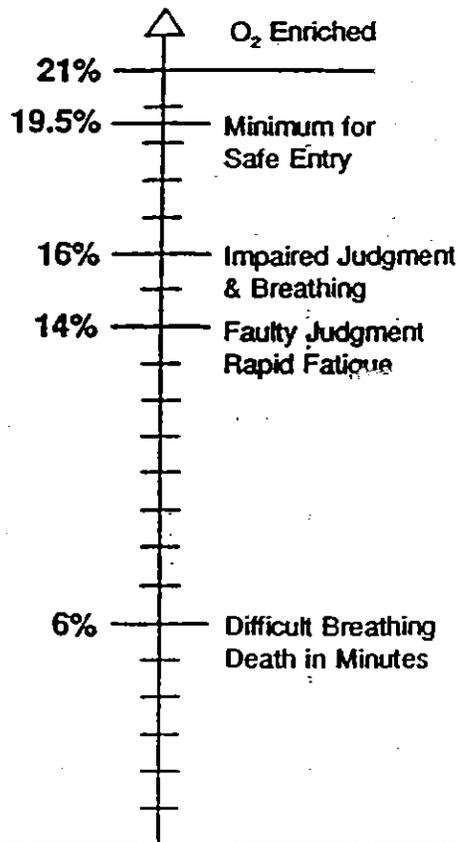


Figure 2. Oxygen Scale and Its Physical Effects

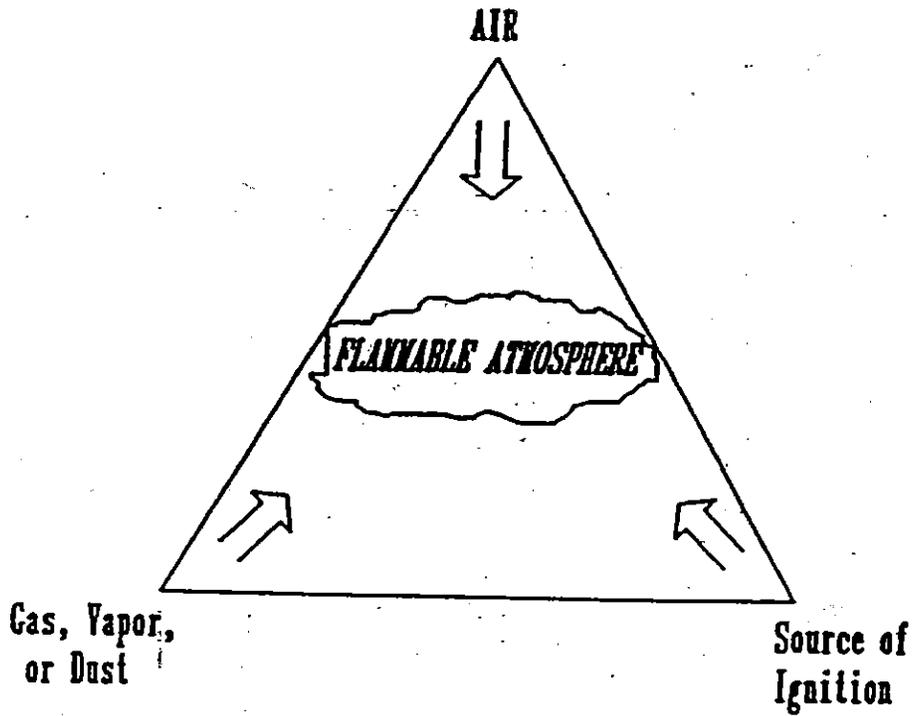
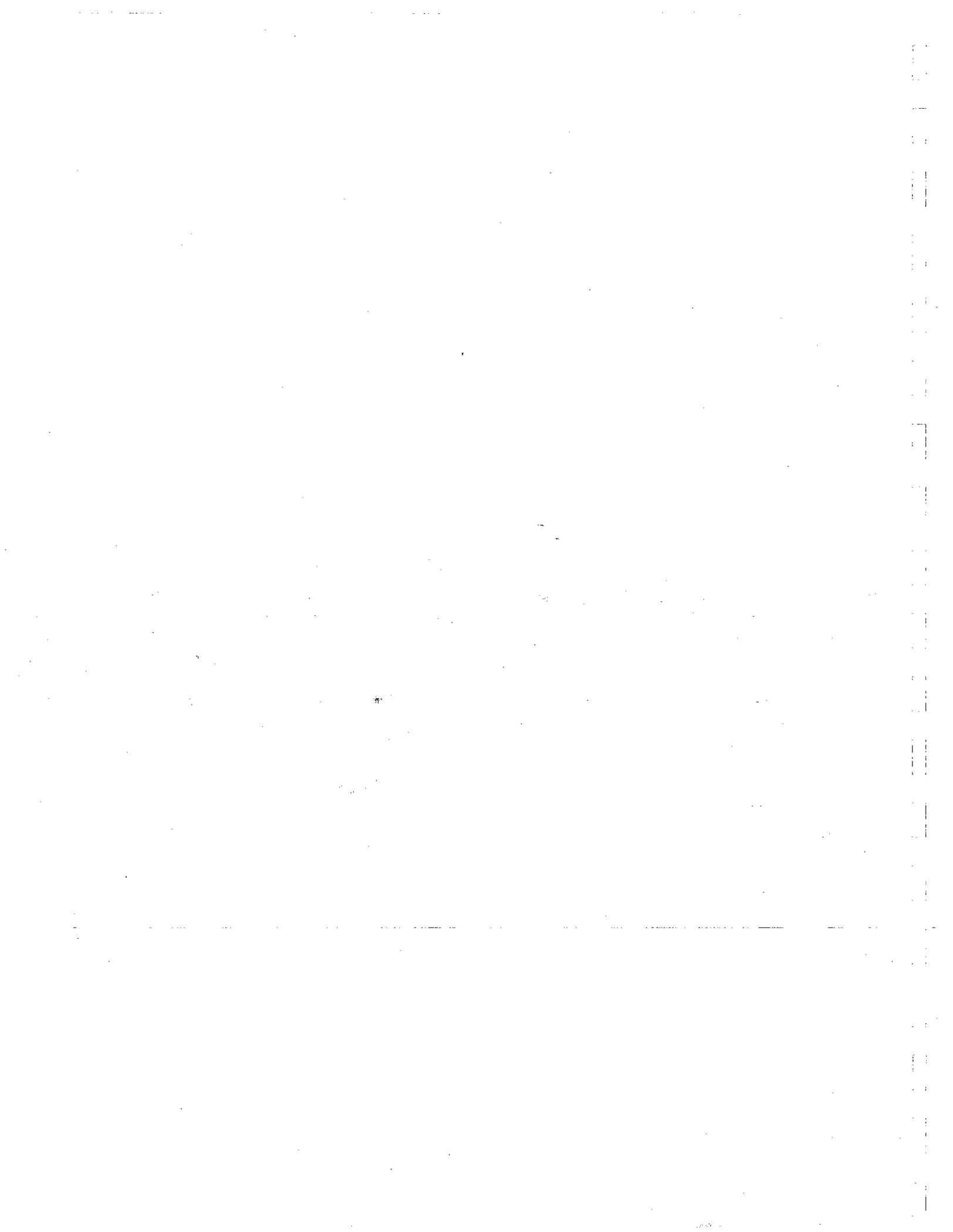


Figure 3. Ignition Triangle

APPENDIX
MANUFACTURER'S DATA SHEETS

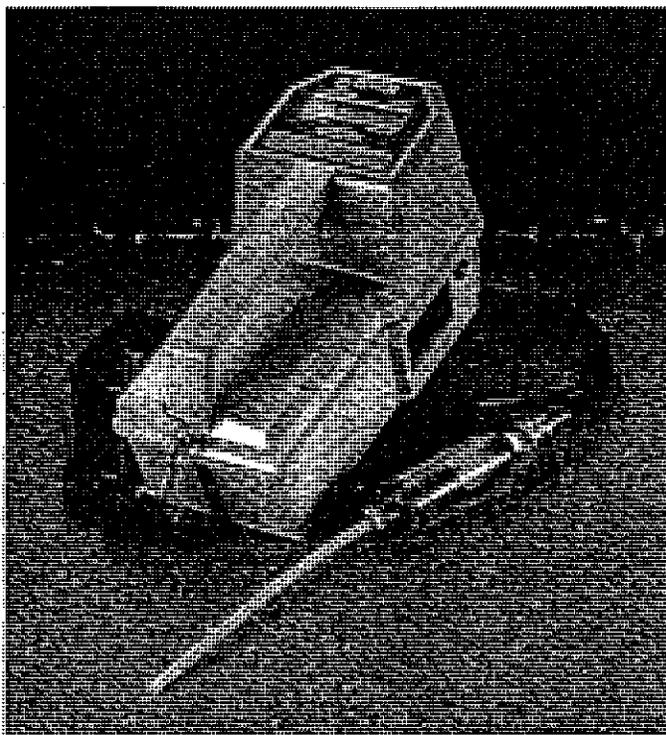


GASTECH

The Trusted Name In Gas Detection

GT Series Portable One, Two, Three, or Four Gas Monitors

Detection of hydrocarbons, oxygen, carbon monoxide and hydrogen sulfide



The GT Series of portable gas monitors are designed to protect workers from hazardous gases in confined spaces and other industrial work sites. They are available in eight different gas combinations for the detection of hydrocarbons in the PPM and LEL ranges, oxygen, carbon monoxide, and hydrogen sulfide. Microprocessor electronics and convenient top-mounted switches make operation and calibration simple.

Each GT Series monitor features two levels of alarm with audible and visible indications to warn of unsafe gas levels. Alarms can be programmed to trigger at user-defined levels and can be set to latching or self-resetting modes. Alarms also trigger if a low battery, low flow, or sensor malfunction condition exists. A top-mounted LCD with on-demand backlight shows real-time gas concentrations. TWA, STEL, minimum, and maximum readings can also be called to the display. For regulatory and safety reporting purposes, GT Series monitors feature a built-in datalogger.

At only 6" x 5" x 10" and 5 lbs., GT Series monitors are completely portable and can be comfortably worn over the shoulder for hands-free monitoring. They feature a rugged RFI resistant housing that is water-shedding and can be set down in an inch of water. All GT Series monitors have a built-in pump for pre-entry testing of confined spaces and other remote areas. A dust filter and hydrophobic filter prevent contaminants from being drawn into the pump. A unique "float probe" is available for monitoring underground storage tanks.

Four D alkaline or Ni-Cad batteries power the GT Series monitors for nine hours. The pin-mounted catalytic and electrochemical sensors are warranted for one year. Battery replacement, sensor replacement, and calibration can easily be performed in the field.

GT Series

SPECIFICATIONS

Gases detected	Range
Hydrocarbons	0 - 100% LEL, 0 - 10,000 PPM
Oxygen	0 - 30.0 %VOL
Carbon Monoxide	0 - 300 PPM
Hydrogen Sulfide	0 - 200 PPM
Sensor	
Hydrocarbons	Catalytic compensated
O ₂ , CO, H ₂ S	Electrochemical
Sampling method	Sample-draw, internal pump
Response time	90% in 20 seconds
Accuracy	PPM, CO, H ₂ S: ± 10% full scale LEL: ± 5% full scale O ₂ : ± 0.5 %VOL
Repeatability	PPM, CO, H ₂ S: ± 5% full scale LEL: ± 2% full scale O ₂ : ± 0.2 %VOL
Operating temperature	-20°F to 115°F (-43°C to 61°C)
Alarms	Audible and visual alarms
Display	LCD, backlight on demand
Power source	Four D alkaline or Ni-Cad batteries
Battery life	9 hours
Controls	Five top-mounted switches
Dimensions	10" x 6" x 5" (25.4 cm x 15.2 cm x 12.7 cm)
Weight	Approximately 5 pounds (2.25 g)
Case material	High impact plastic
Intrinsic safety rating	Class I, Div. 1, Groups B, C, D
Warranty	One year material and workmanship

ORDERING INFORMATION

Item	Cat #
GT101 O ₂	72-6101*
GT105 Hydrocarbons LEL/PPM	72-6105
GT201 Hydrocarbons LEL/PPM, O ₂	72-6201
GT202 " " " " with float probe	72-6202
GT302 Hydrocarbons LEL/PPM, O ₂ , H ₂ S	72-6302
GT303 Hydrocarbons LEL/PPM, O ₂ , CO	72-6303
GT402 Hydrocarbons LEL/PPM, O ₂ , CO, H ₂ S	72-6402

*Add -01 for alkaline, -02 for Ni-Cad version

Standard Accessories

Shoulder strap	13-0110
5' polyurethane hose	80-0505
10" probe with filter	80-0187
12' float probe assembly (GT202 only)	80-0801E-12

Optional Accessories

Test Kits:

GT-101	81-6101
GT-105	81-6105
GT-201	81-6201
GT-202	81-6202
GT-302	81-6302
GT-303	81-6303
GT-402	81-6402
Carrying case, for instrument only	20-0650
Dilution fitting, 50%	80-0403
Ni-Cad battery charger, internal, 115 VAC	49-2150
Ni-Cad battery charger, internal, 230 VAC	49-2149

DISTRIBUTED BY

GASTECH

The Trusted Name In Gas Detection

8407 Central Avenue / Newark / CA 94560-3431

PH (510) 745-8700 FAX (510) 794-6201 TLX 334-462

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GASTECH

The Trusted Name In Gas Detection

Model GX-91 Four Gas Portable

Simultaneous monitoring of oxygen, combustible gases, and two toxic gases



The GX-91's stainless steel case and water-shedding design make it ideally suited to use in demanding conditions.

Strong. Reliable. Flexible.

The perfect work companion. The GX-91 is an all-in-one monitor specifically designed for use in rough field conditions. The GX-91 provides immediate warning of hazardous or changing atmospheric conditions.

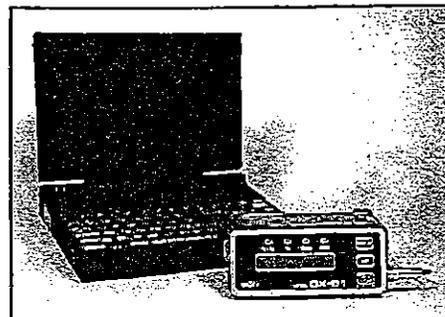
The GX-91 is simple to use. Just three flush-mounted switches operate this advanced monitor. Separate side-mounted switches are easily accessible, and allow the user or industrial hygienist to calibrate and program information into the GX-91.

The GX-91's two line LCD features auto backlighting for worry-free operation in low light areas. Concentrations of all four gases are displayed simultaneously.

The GX-91 can be used as an area monitor, or to test confined spaces prior to entry. The basic model samples air by diffusion. Optional sample draw pumps are available in two styles. A base-mount or pistol style pump draws samples from remote locations into the GX-91 for analysis.

The GX-91 is designed to make data collection and storage simple. An internal data logger captures gas concentrations at user-defined time intervals. Information contained in the GX-91's datalogger can be downloaded to a PC for long term storage and analysis. An optional bar code reader is also available and provides an easy way to identify users and monitoring locations.

The GX-91 is always ready to go to work when you are. Just two standard C size alkaline batteries power the GX-91 for 10 hours of continuous operation. Ni-Cad batteries, which provide up to 8 hours of continuous operation, and a Ni-Cad battery charger are also available for the GX-91.



Readings are easily downloaded to a PC for long term storage and analysis.

SPECIFICATIONS

Model GX-91

Gases detected	Range	
Oxygen	0 - 40%	
Combustibles	0 - 100%	
Two of the following:		
Hydrogen Sulfide	0 - 100 PPM	
Carbon Monoxide	0 - 500 PPM	
Sulfur Dioxide	0 - 50 PPM	
Chlorine	0 - 15 PPM	
Sensor	Combustibles:	Catalytic
	O₂ Toxics:	Electrochemical
Special functions		
Dosimeter:	Time weighted average (TWA), short term exposure limit (STEL)	
Peak hold:	Highest value encountered, lowest O ₂	
Datalogger:	5 to 300 second intervals, 60 hour capacity at 60 second intervals	
Demand zero:	Zeroes on demand	
Data logger output	RS-232; switchable for printer or computer	
Sampling method	Diffusion, continuous	
Response time	90% full scale in 30 seconds	
Accuracy/repeatability	±5%/±2%	
Operating temperature	-10° - 120°F	
Intrinsic safety rating	Class I, Division 1, Groups A, B, C, and D	

Humidity range	0 - 95%RH
Alarms	Audible/Visible: Low and High, TWA, STEL, Ceiling
Display	Two line 20 character self-illuminating LCD
Power source	Standard: Alkaline (two C) Optional: Ni-Cad (two C)
Battery life	Alkaline: 10 hours Ni-Cad: 8 hours
Controls	Display, Air, On/Off
Dimensions	6 1/2" x 2 3/4" x 6 1/4"
Weight	3 pounds, 11 ounces
Case material	Stainless steel

Attachable Sample Draw Pump

Flow Rate	Approx. 1 scfh
Operating temperature	14° F - 140° F
Humidity range	30 - 90% RH
Power source	Alkaline batteries (two C)
Battery life	30 hours
Controls	On/Off
Dimensions	6 1/2" x 2 3/4" x 2 1/4"
Weight	2 pounds, 4 ounces

ORDERING INFORMATION

<u>Item</u>	<u>Cat. #</u>
GX-91 LEL, O ₂ , H ₂ S, CO	72-8811-10
GX-91 LEL, O ₂ , H ₂ S, SO ₂	72-8811-12
GX-91 LEL, O ₂ , Cl ₂ , H ₂ S	72-8811-14
GX-91 LEL, O ₂ , Cl ₂ , CO	72-8811-16
GX-91 LEL, O ₂ , H ₂ S	72-8811-18

Standard accessories

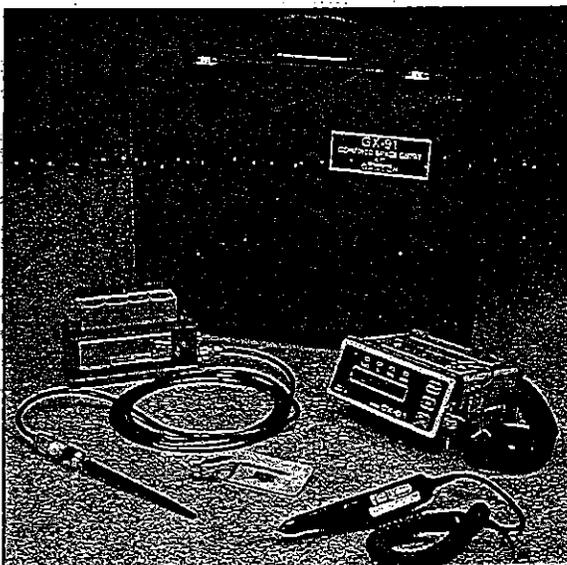
Two C alkaline batteries	49-1211
Quick reference instruction card	29-0962
Operator's manual	71-0004

Optional accessories

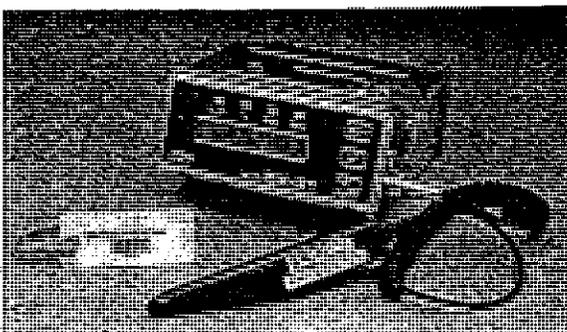
Carrying case with foam	20-0632
Bar code labels, 0 - 500 Codabar	29-0960
Adapter plate (required with pistol pump)	35-1511
Two C Ni-Cad batteries	49-1503
Charger, bench type for two C batteries	49-2006
Remote repeater alarm	52-2026
Straight hose with fittings, 3 meter for attachable pump	80-0011
Coiled hose with fittings for pistol pump	80-0012
Pistol pump, sample draw (requires 35-1511)	81-1164
Attachable pump, sample draw	81-1167
Data connector, CPU adapter, software	82-5005
Bar code reader	82-5030

Test Kits

Test kit (H ₂ S, CO version)	81-0312C
Test kit (H ₂ S, SO ₂ version)	81-0324C
Test kit (CO, SO ₂ version)	81-0325C



Durable carrying case holds the monitor and all accessories.



Identify users or sampling locations with the attachable bar code reader.

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The Trusted Name In Gas Detection

8407 Central Avenue / Newark / CA 94560-3431

PH (510) 745-8700 FAX (510) 794-6201 TLX 334-462

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Model GX-82

Three Gas Personal Portable

Detection for oxygen, combustibles and H₂S, CO or SO₂.

- Microprocessor Control
- Continuous Monitor & Readout
- Self-Illuminating LCD Display
- Rugged Housing
- RF Resistant
- Touch Controls
- Utilizes Standard "C" Batteries
- Peak & Dosimetry Functions

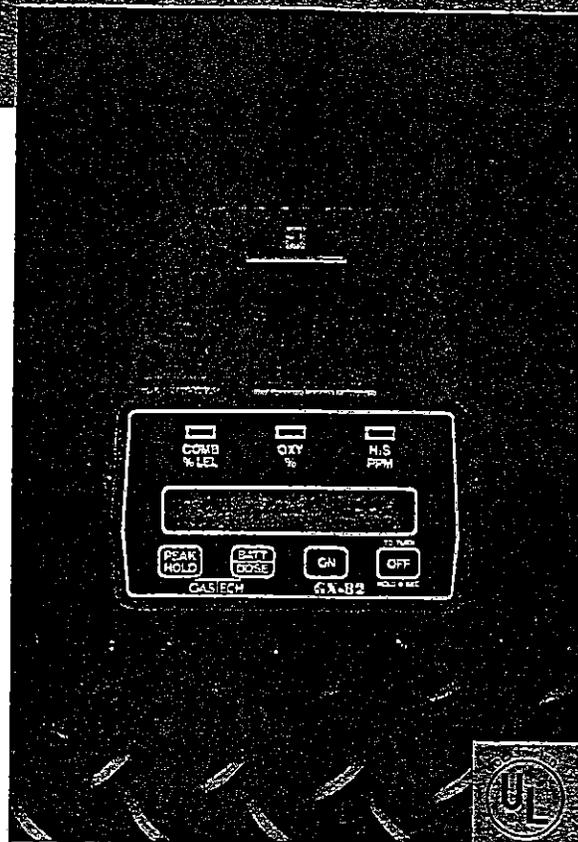
With the recognition of more dangers in the workplace, government regulations have made reliable gas detection an industry necessity. Gas Tech's Model GX-82 has the best combination of features for health and safety protection available in an affordable, personal monitor.

Microprocessor electronics has revolutionized gas detection to simplify operation and add safety features.

Following turn-on, the microprocessor scans basic instrument operation before allowing monitoring to proceed. Checks include tests and indications for battery voltage, sensor circuitry, and span settings.

Patterned audible alarm tones signal readiness to monitor. An LCD display gives you continuous concentration values in all sensing ranges and self-illuminates to maintain visibility in poorly lit areas.

Light compact design gives you total hands-free operation. Audible alarms and lights warn of dangerous conditions. A Dosimeter function records a time-weighted average exposure to toxic gases (TWA). Press the Peak Hold switch to retain the highest combustibles or toxic readings or lowest oxygen reading registered during a monitoring period. Accidental turn-off is prevented by a five second delay.



Sensors are mounted in a detachable modular assembly which is easily removed to use with an optional extender cable for testing a confined space prior to entry. Optional sample-draw adapters can also be used with the GX-82 to remotely monitor an area prior to entry. Sample-draw adapters are available in hand-aspirated and electrical pump type configurations that clip onto the GX-82.

The Gas Tech sensors have fast, accurate, repeatable responses and are easily replaced in the field. The combustibles sensor operates on the hot-wire catalytic principle. Oxygen and toxic sensors are electrochemical in design; in addition, toxic sensors minimize false readings caused by cross sensitive response to other gases by being highly specific. All sensors have a one year warranty.

Typical applications for the GX-82 include: sulfur plants, mines, waste water treatment, refineries, storage tanks, drilling rigs, hazardous waste sites, tunnels, chemical processing, mills, utilities, and manholes.

GAS TECH

14 of 17
The Trusted Name in Gas Detection

GAS|TECH

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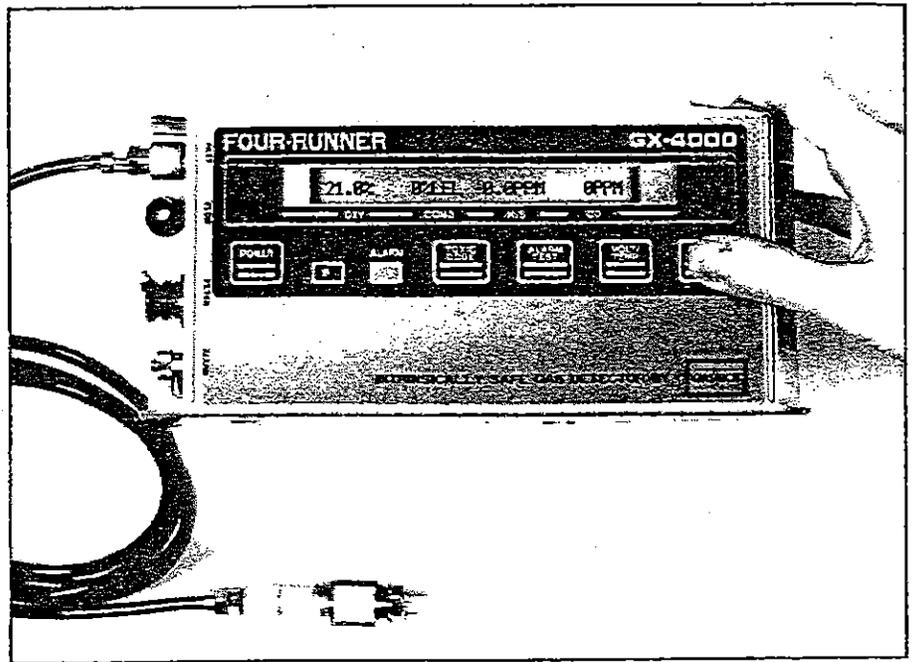
Model GX-4000

Four Gas Portable Gas Detector

Detection for O₂, LEL Combustibles, H₂S, CO

BENEFITS

- Microprocessor control
- Sample draw pump
- Audible/visible alarms
- Dosimeter function
- Replaceable std. D batteries
- Sample gas temperature
- Low sample flow alarm
- Latching alarms
- Fully portable
- Large LCD display
- Remote alarm
- Training video
- Intrinsically safe
- GasTech's Proven Dependability



PROTECTION

The Model GX-4000 offers simultaneous detection and readout of four gas concentrations. Microprocessor control gives you the best combination of operating simplicity and data. A sample drawing pump brings the test atmosphere to the sensors. This technique is especially useful for testing confined areas before entry. The self-illuminating dot-matrix LCD display gives you a continuous, simultaneous readout of gas concentrations in all four ranges, even in poorly lit environments. Operating instructions and cautionary information also appear on this large easy-to-read display.

The GX-4000's five external controls eliminate the need for extra tools and control adjustments. The

slightly raised switch surface is integrated into the top panel and stays free from dirt and dust contamination.

FEATURES

Audible and visible alarms warn of gas concentrations, sample flow interruption, sensor or circuit failure, and expiring batteries. An 'Alarm Test' function displays all alarm set points. As a safety precaution, triggered alarms continue to sound until the user acknowledges the condition by pressing the 'Alarm Silence' switch (latching alarms).

A dosimeter function displays, in parts per million (ppm), averaged accumulated toxic concentrations,

and time period over which the average is calculated. Temperature of the sample gas can also be displayed.

The sensors of the GX-4000 are electrochemical for oxygen and toxic gases, and catalytic for combustibles. These designs are superior for fast, repeatable response when exposed to gas.

Each GX-4000 is supplied with a soft protective carrying case, and a remote alarm accessory. A training video tape is available that shows operation, calibration, and basic maintenance of the GX-4000. The instrument has a one year material and workmanship warranty.

Model GX-4000

SPECIFICATIONS

Gases detected	Oxygen	Range 0 - 25%
	Combustible gas	0 - 100% LEL
	Hydrogen sulfide	0 - 125 PPM
	Carbon monoxide	0 - 250 PPM
Sensor	Electrochemical: H ₂ S, CO, O ₂ Catalytic: LEL	
Special functions	Dosimeter: Readout of cumulative toxic concentrations Temperature: Readout of sample gas temperature	
Sampling method	Continuous (sample draw)	
Response time	30 sec. to 90% reading	
Accuracy/repeatability	±5%/±2%	
Operating temperature	-10°C to 50°C	
Humidity range	0 - 95%RH	
Alarms	Audible/Visible: Abnormal gas concentration, circuit failure, flow interruption, low battery	
Display	Dot matrix self-illuminating LCD Simultaneous all ranges Trouble indications	
Power source	Four size D alkaline or NiCad batteries	
Battery life	8 - 10 hours, alkaline 6 - 8 hours, NiCad	
Controls	Tactile: Power, Toxic/Dosimeter, Alarm test, Volt/Temp., Alarm silence	
Dimensions	10" L X 4 5/8" W X 7" H	
Weight	7 pounds including batteries	
Case material	ABS plastic (top panel) Orange enameled aluminum (case)	
Intrinsic safety rating	Class I, Division 1 Group C and D	
Warranty	One year material and workmanship	

TYPICAL APPLICATIONS

Chemical plants
Construction sites
Food storage
Grain storage
Landfills
Municipalities
Oil fields
Paper mills
Refineries
Storage tanks
Underground vaults
Utilities
Waste water treatment

Contact your local distributor or the factory for specific application consultation.

ORDERING INFORMATION

GX-4000	Cat. #
Includes alkaline batteries, remote alarm repeater, sample hose, 10" probe, screwdriver, carrying case, manual	72-0085
GX-4000	
NiCad batteries, charger (115V AC), and accessories as above	72-0087
Accessories	
Training video	71-9011
Hydrophobic filter	80-0225
Continuous operation adapter, 115V AC	49-2055
Continuous operation adapter, 12V DC	49-2057

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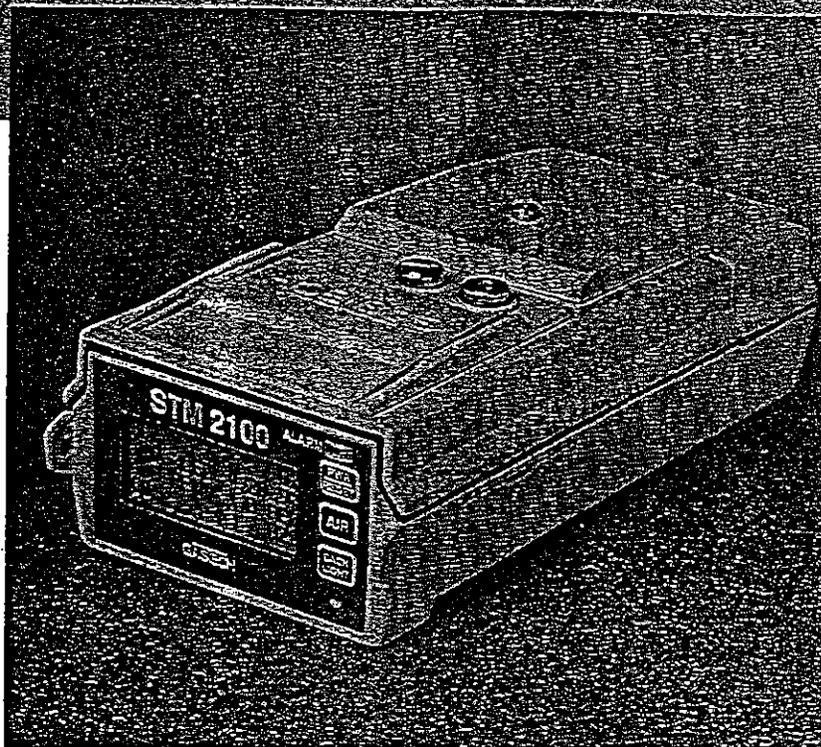
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STM2100

Portable Gas Monitor for Two, Three or Four Gases

Gas Tech's STM2100 personal portable gas monitor is designed to protect workers from hazardous gases in confined spaces and other industrial work sites. The monitor is available in a variety of different gas combinations for the detection of hydrocarbons in the LEL/ppm range, oxygen deficiency, carbon monoxide, hydrogen sulfide and other gases.



- Simultaneously monitors and displays up to four gases in a variety of configurations
- Two button operation combined with leading edge technology results in ease of use and calibration
- LCD display shows:
 - real-time gas concentrations
 - date & time
 - battery capacity
 - alarm set points
 - diagnostics
 - log time remaining
 - TWA, STEL, minimum, & maximum readings can be called to the display
 - backlight on demand
- Alarm points
 - programmable alarm levels
 - two levels of alarm with audible & visual indications to warn of unsafe gas levels
 - latching or self resetting modes
 - warning for low battery, low flow, or sensor failure
- Sensor recognition circuitry allows upgradeability in the field
- Monitoring of hydrocarbons in the LEL/ppm range is standard for all models
- Built-in datalogger; Programmable for user and location I.D.; Windows compatible software
- Battery pack & sensor replacement are easily performed in the field, as is basic calibration of the instrument
- Durable, impact and chemical resistant case material; compact and light weight monitor
- Optional sample-draw pump with low flow alarm, powered by instrument battery
- Exclusive LIP™ (*Liquid Inhibiting Probe*) attachment prevents damage to the sample system
- Designed to meet the requirements of Class I, Div. 1, Groups A, B, C & D

STM2100 SPECIFICATIONS

Range of Gases Detected

Hydrocarbons 0 to 100% LEL in 1% increments
0 to 10,000 ppm in 20 ppm increments
0 to 5.0 % Vol in 0.1% increments

Oxygen (O₂) 0 to 25.0 % Vol in 0.1% increments

Carbon Monoxide (CO) 0 to 300 ppm in 1 ppm increments

Hydrogen Sulfide (H₂S) 0 to 100 ppm in 1 ppm increments

Sensor

Hydrocarbons Catalytic compensated
O₂, H₂S, CO Electrochemical

Sampling Method Diffusion (standard)
Sample-draw (optional)

Response Time 90% in 30 seconds

Accuracy LEL: ±5% of reading
O₂: ±0.2% Vol
ppm, CO, H₂S: ±10% of reading
(when calibrated & maintained in accordance to instruction manual recommendations)

Repeatability LEL: ±3% of reading
O₂: ±0.1% Vol
CO, H₂S: ±5% of reading
(when calibrated & maintained in accordance to instruction manual recommendations)

Operating Temperature -4F to 113°F (-20°C to 45°C)
Storage Temperature -22F to 149°F (-30°C to 65°C)

Humidity Range 0 to 95% RH non-condensing

Alarms Audible & visual alarms

Display LCD, back light on demand

Power Source Battery Pack (Ni-Cd)
Backup Battery (Lithium, for stored data only)

Battery Life

10 hours minimum @ 68°F (20°C) (battery pack); 6 hours with sample-draw pump attached

Controls

Three top mounted buttons; Four side-mounted buttons for calibration

Dimensions

4.0 in. x 6.2 in. x 2.7 in. (10.2 cm x 15.7 cm x 6.9 cm)

Weight

Approximately 1.5 pounds (0.68 kg)

Case Material

High impact, chemical & RF resistant, polycarbonate-polyester blend

Intrinsic Safety Rating

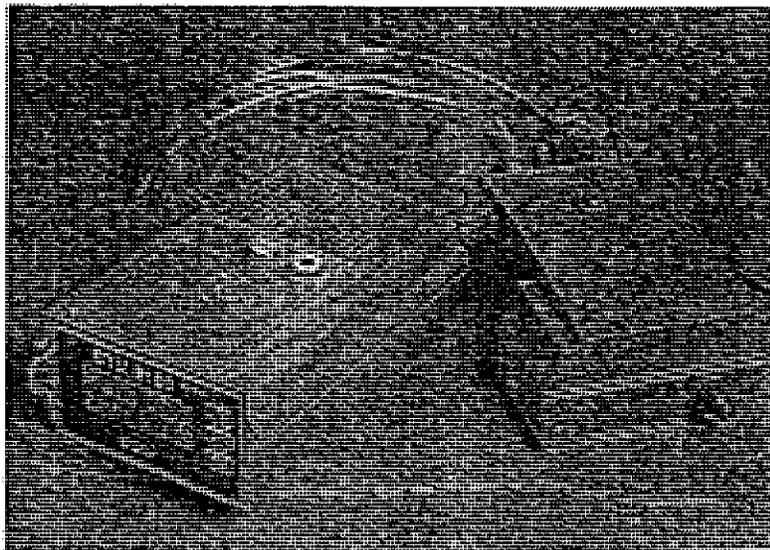
Designed to meet the requirements of Class I, Div. 1, Groups A, B, C, & D

Warranty

One year materials & workmanship

Options

- Modular sample-draw pump with low flow alarm, internally powered off instrument battery pack
- Remote display/audible alarm accessory
- Data retrieval software package
- Test kits
- 110VAC, 220VAC, & 12VDC battery chargers
- Hand aspirated sample-draw adapter
- Carrying case
- Belt case
- Lapel buzzer



STM2100 and modular sample-draw pump

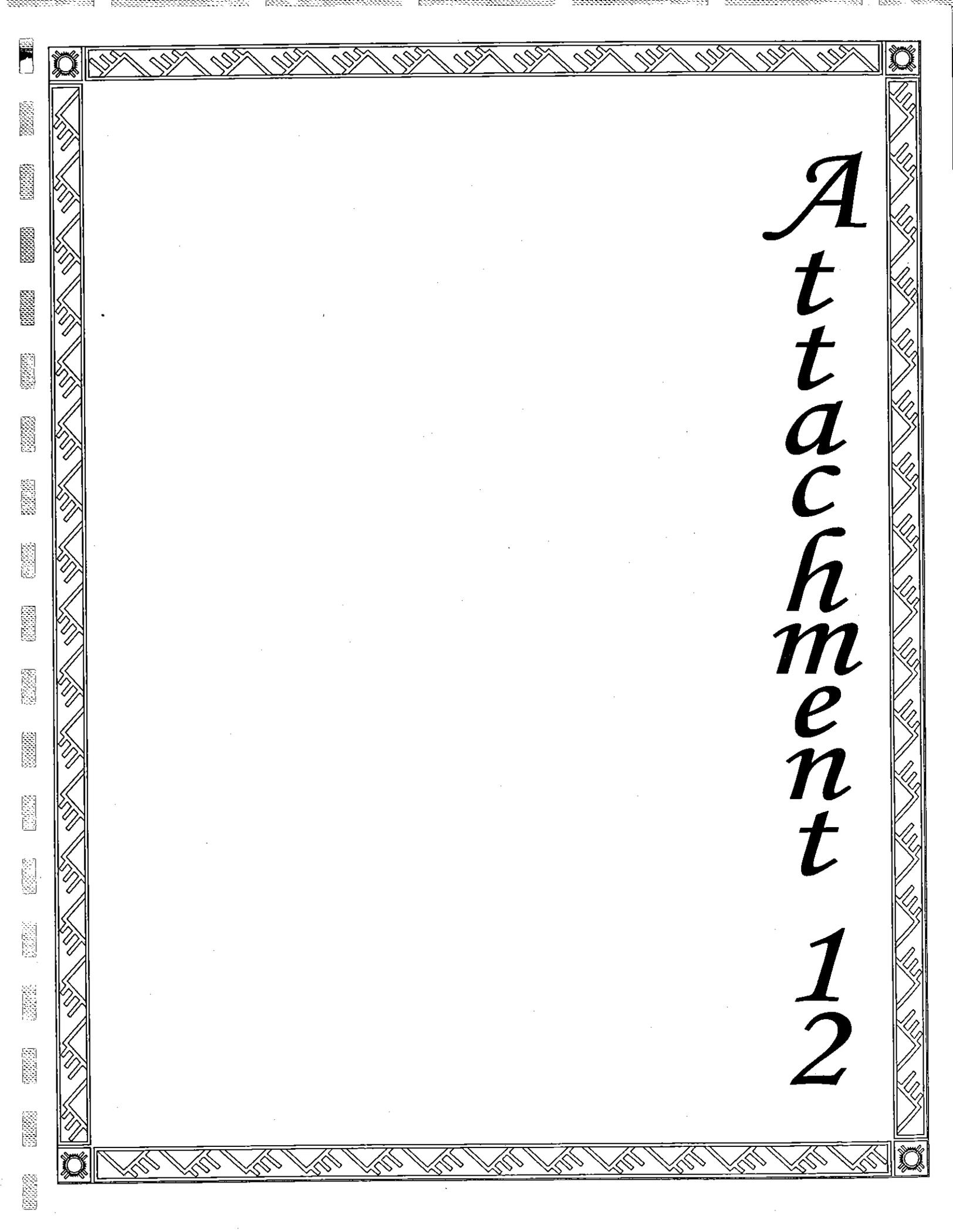


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THE PORT AUTHORITY OF NY & NJ

Respiratory Protection Program

***Operations Services Department
Inspection & Safety Division
Occupational Health
Revised - 1999***

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RESPIRATORY PROTECTION PROGRAM

1. SUMMARY

The Port Authority of New York and New Jersey's Respiratory Protection Program provides guidance to Port Authority and PATH employees, management regarding the proper use and care of respiratory protective equipment. The program describes the procedures an employee should follow when initially acquiring a respirator, as well as, the requirements for continued respirator use. An employee seeking to obtain a respirator must first be medically evaluated by the Office of Medical Services and determined to be physically able to use respiratory protective equipment. The employee must then be fit tested and trained in the proper use of the specific respirator required for the work activity. Annual follow-up medical evaluations, re-fit testing and re-training are required. When an uncertainty exists regarding the type of personal protective equipment needed, the facility should request an exposure evaluation to quantify the employee's exposure so that the appropriate respirator can be selected based on the hazards and the magnitude of exposure.

Employees who voluntarily choose to use dust masks (disposable respirators) will not be required to obtain annual medical clearance nor be fit tested. However, dust masks may only be used for those operations that do not require the use of other respiratory protective equipment.

This program discusses the important role a supervisor has in enforcing the proper use of respiratory protective equipment. It describes the participation of the employee, the Office of Medical Services, Occupational Health, and facility/unit supervisors, which are all essential in administering an effective program. The program lists the types of respiratory protection devices used within the Agency, including dust masks, half-face and full-face negative pressure respirators, powered air purifying respirators, airline supply respirators, and self contained breathing apparatus (SCBA). It describes how to use, store, clean and service the equipment for safe operation, and how to maintain records for implementing the program at the facility. Any questions or comments regarding this program should be directed to the Occupational Health Unit at (201) 216-2173.

2. PURPOSE

The Respiratory Protection Program establishes and maintains practices and procedures for employees requiring respiratory protection. The program was created to protect employees from occupational illnesses and diseases associated with the inhalation of hazardous airborne substances (e.g., dusts, fumes, mists, gases, vapors, etc.) It is in accordance with OSHA Standard 29 CFR 1910.134 and industry practices.

3. DEFINITIONS

The following technical terms are presented to further explain and enhance the topics covered in this Respiratory Protection Program. (See also Appendix I, page 22, for additional definitions.)

Abrasive Blasting Respirator

Airline respirator that has either a helmet or hood to protect the wearer from materials generated by abrasive blasting.

ACGIH

American Conference of Governmental Industrial Hygienists.

Aerosol

Fine particles, solid or liquid, suspended in air.

Airline Respirator

A respirator that is connected to a compressed breathing air source by a hose.

Assigned Protection Factor (APF)

The level of respiratory protection expected from a respirator that is properly functioning, has been properly fitted, and is worn by a worker trained in its use. APF's can be used to help provide an estimate of the maximum concentrations of a contaminant in which a particular respirator can be used.

Atmosphere-Supplying Respirator

A class of respirators that supply a respirable atmosphere, independent of the workplace atmosphere.

Canister/Cartridge

A container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

Ceiling Limit

An airborne concentration of a toxic substance in the work environment that should never be exceeded.

Certified Respirator

Term applied to respirators that have been evaluated by the National Institute for Occupational Safety and Health (NIOSH), the Mine Safety and Health Administration (MSHA), or the Bureau of Mines (BM).

Confined Space

An enclosed space that has the following characteristics:

- Its primary function is something other than human occupancy;
- It has restricted entry and exit; and
- It may contain potential or known hazards.

Contaminant

A harmful, irritating, or nuisance airborne material.

Continuous Flow Respirator

An atmosphere-supplying respirator that provides a continuous flow of breathing air to the respiratory inlet covering.

Demand Respirator

An atmosphere-supplying respirator that admits respirable gas to the facepiece only when a negative pressure is created inside the facepiece by inhalation.

Disposable Respirator

A respirator for which maintenance is not intended and that is designed to be discarded after excessive resistance, sorbent exhaustion, physical damage, or end-of-service-life renders it unsuitable for use.

Doffing

To remove a respirator from one's face.

Donning

To put a respirator on one's face.

Dust

Solid particles generated by handling, crushing, grinding, rapid impact, detonation, and decrepitation of organic materials, such as rock, ore, metal, coal, wood, and grain. Dusts do not tend to flocculate, except under electrostatic forces; they do not diffuse in air but settle under the influence of gravity.

Engineering Controls

Methods of controlling employee's exposure by modifying the source or reducing the quantity of contaminants released into the work environment.

Exposure

Contact with a chemical, biological, or physical hazard.

Exposure Limit

The maximum allowable concentration of a contaminant in the air to which an individual may be exposed. These may be time-weighted averages, short-term limits, or ceiling limits.

Facepiece

That portion of a respirator that covers the wearer's nose and mouth in a half-mask facepiece, or the nose, mouth, and eyes in a full facepiece. It is designed to make a gas-tight or dust-tight fit with the face and includes headbands, exhalation valves, and connections for air-purifying device, or respirable gas source, or both.

Filter

A fibrous medium used in respirators to remove solid or liquid particles from the airstream entering the respirator.

Filter Efficiency

The efficiency of various filters can be established on the basis of entrapped particles (that is, collection efficiency), or on the basis of particles passed through the filter (that is, penetration efficiency).

Filtering Facepiece/Dust Mask

A negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.

Fit Check

A test conducted by the wearer to determine if the respirator is properly seated to the face.

Fit Factor

The ratio of challenge agent concentration outside with respect to the inside of a respirator inlet covering (facepiece or enclosure).

Fit Test

The use of a challenge agent to evaluate the fit of a respirator on an individual.

Fume

Airborne particulate formed by the condensation of solid particles from the gaseous state. Usually, fumes are generated after initial volatilization from a combustion process or from a melting process (such as metal fume emitted during welding). Usually less than 1 micron in diameter.

Gas

A state of matter in which the material has very low density and viscosity, can expand and contract greatly in response to changes in temperature and pressure, easily diffuses into other gases, and readily and uniformly distributes itself throughout any container. A gas can be changed to the liquid or solid state only by increasing pressure and/or decreasing temperature (below the critical temperature).

General Ventilation

System of ventilation consisting of either natural or mechanically induced fresh air movements to mix with the dilute contaminants in the workroom air. This is not the recommended type of ventilation to control contaminants that are toxic.

Hazardous Atmosphere

An atmosphere that contains a contaminant(s) in excess of the exposure limit or that is oxygen deficient.

HEPA/P-100

High-Efficiency Particulate Air (HEPA/P-100) filter One that is at least 99.97 percent efficient in removing dust, mist and fume particles with a diameter of 0.3 micrometers. NIOSH respirator certification has designated P-100 to replace the HEPA designation. Efficiency will remain the same 99.97%.

IDLH

Immediately dangerous to life or health. Used to describe very hazardous atmospheres where employee exposure can cause serious injury or death within a short time or serious delayed effects.

Local Exhaust Ventilation

A ventilation system that captures and removes the contaminants at the point at which they are being produced before they escape into the workroom air.

Maximum Use Concentration (MUC)

The protection factor of the respiratory protection equipment multiplied by the permissible exposure limit.

Mists

Suspended liquid droplets generated by condensation from the gaseous to the liquid state or by breaking up a liquid into a dispersed state, such as by splashing, foaming, or atomizing. Formed when a finely divided liquid is suspended in air.

Negative-Pressure Respirator

A respirator in which the air pressure inside the respiratory inlet covering is negative during inhalation with respect to the ambient air pressure resulting in a tight-fit.

NIOSH

National Institute for Occupational Safety and Health.

OSHA

U.S. Occupational Safety and Health Administration.

Oxygen Deficiency

An atmosphere having less than the percentage of oxygen found in normal air.

Particulate Matter

A suspension of fine solid or liquid particles in air, such as dust, fog, fume, mist, smoke, or sprays. Particulate matter suspended in air is commonly known as an aerosol.

Permissible Exposure Limit (PEL)

An exposure limit published and enforced by OSHA as a legal standard.

Personal Protective Equipment (PPE)

Devices worn by workers to protect against hazards in the environment.

Poor Warning Properties

A substance whose odor, taste, or irritation effects are not detectable or not persistent at concentrations at or below the exposure limit.

Positive-Pressure Respirator

A respirator in which the pressure inside the respiratory inlet covering is normally positive with respect to ambient air pressure.

Powered Air-Purifying Respirator (PAPR)

An air-purifying respirator that uses a blower to force the ambient atmosphere through air-purifying elements to the inlet covering.

PPE

See Personal Protective Equipment.

Pressure-Demand Respirator

A positive pressure atmosphere-supplying respirator that admits breathing air to the facepiece when the positive pressure is reduced inside the facepiece by inhalation.

Protection Factor (PF)

(In respiratory protective equipment.) The ratio of the ambient airborne concentration of the contaminant to the concentration inside the facepiece.

PSI

Pounds per square inch.

Qualitative Fit Testing

A method of assessing the effectiveness of a particular size and brand of respirator on an individual's subjective response to a test atmosphere. The most common test agents are isoamyl acetate (banana oil), irritant smoke, and sodium saccharin. Proper respirator fit is indicated by the individual reporting no indication of the test agent inside the facepiece during the performance of a full range of facial movements.

Quantitative Fit Testing

A method of assessing the effectiveness of a particular size and brand of respirator on an individual. Instrumentation is used to measure both the test atmosphere (a gas, vapor or aerosol), and the concentration of the test contaminant inside the facepiece of the respirator. The quantitative fit factor thus obtained is used to determine if a suitable fit has been obtained.

Respirable Gas

Breathing air.

Respirable Size Particulate

Particulate in a size range that permits them to penetrate deep into the lungs upon inhalation.

Respirator

A device to protect the wearer from inhalation of harmful contaminants.

RPE

Respiratory Protection Equipment.

Sanitize

The removal of contaminants and the inhibiting of the action of the agents that cause infection or disease.

SCBA

Self-Contained Breathing Apparatus.

Self-Contained Breathing Apparatus (SCBA)

An atmosphere-supplying respirator in which the respirable gas source is designed to be carried by the wearer.

Service Life

The period of time that a respirator provides adequate protection to the wearer.

STEL – Short Term Exposure Limit

Maximum concentration to which workers can be exposed for a short period of time (15 minutes) only four times throughout the day with at least 1 hour between exposures.

Sorbent

A material that is contained in a cartridge or canister and removes specific gases and vapors from the inhaled air.

Supplied-Air Respirators

Air-line respirators or self contained breathing apparatus.

Tight-Fitting Facepiece

A respiratory inlet covering that is designed to form a complete seal with the face. A half-facepiece (includes quarter masks, disposable masks, and masks with elastomeric facepieces) covers the nose and mouth; a full facepiece covers the nose, mouth and eyes.

Time-Weighted Average (TWA)

The average concentration of a contaminant in air during a specific time period.

Vapors

The gaseous form of substances that are normally in the solid or liquid state (at room temperature and pressure). The vapor can be changed back to the solid or liquid state either by increasing the pressure or decreasing the temperature alone. Vapors also diffuse.

Ventilation

One of the principal methods to control health hazards may be defined as causing fresh air to circulate to replace foul air simultaneously removed.

Ventilation, Local Exhaust

Ventilation near the point of generation of a contaminant.

4. RESPONSIBILITY

The key element to a successful respiratory protection program is the participation and commitment of all involved in the administration, selection, evaluation and supervision of a respiratory protection program.

I. The Employee:

- A. Uses respiratory protection supplied to him/her in accordance with instruction and training.
- B. Maintains and stores his/her respiratory protective gear properly.
- C. Reports any respiratory protection equipment malfunction or insufficiencies to his/her supervisor.

II. The Facility/Unit Supervisors:

- A. Identify workplace activities that may require respiratory protection.
- B. Request an exposure evaluation of workplace tasks.
- C. Request and schedule fit testing and medical evaluations. Maintain respiratory protection records.
- D. Ensure that employees properly wear, maintain and store respiratory protection equipment as required.
- E. Report any respiratory protection equipment malfunction or insufficiencies to the Environmental Coordinator and Occupational Health Unit.

III. The Office of Medical Services:

- A. Perform an evaluation of employee's physical condition to determine his/her fitness to wear a respirator while performing work functions.
- B. Maintain records of employee's physical evaluation.
- C. Issue "Medical Clearance For Use Of Respirator" form.

IV. The Occupational Health Unit:

- A. Evaluate workplace exposures and recommend appropriate respiratory protection equipment.
- B. Perform respiratory fit testing and provide instructional training.
- C. Perform evaluations to assess Respiratory Protection Program's effectiveness.

5. RESPIRATOR SELECTION

There are many different types of respiratory protection devices available to protect employees from airborne hazards in the workplace. These include: filtering facepieces/dust masks, half-face and full-face masks, full-face negative pressure welding respirators, powered air purifying respirators, airline supply respirators and self-contained breathing apparatus (SCBA). Air purifying respirators require specific filters or cartridges to remove the hazardous respirable gas, vapor, or particulate (e.g., dust, asbestos, lead, solvent vapors, etc.).

Before selecting a respirator for a particular task or duty, a workplace exposure assessment should be conducted. This assessment must consider the chemical state and physical form and concentration of the contaminant, the need for other requirements such as eye protection, and the existence of other hazards such as oxygen deficiency and immediately dangerous to life and health (IDLH) atmospheres. Once the exposure assessment is complete, an approved respirator can be selected for the identified dust, mist, fume, gas or vapor. For instance, a welding respirator protects the use from light and airborne contaminants produced during welding. A welder's full-face negative pressure respirator is available in the stockroom. (A listing of the Port Authority's approved respiratory stock items is on pages 18 and 19).

Workplace Exposure Assessments

The Occupational Health Unit performs workplace exposure assessments to determine employee exposure to airborne hazards in the workplace. The assessment consists of a review of the work process to determine which airborne contaminants are generated and released during the process. Material Safety Data Sheets (MSDS) and other information are reviewed to determine the chemical and physical properties of the contaminant. Employees are interviewed and observations are made while the task is performed. Observations such as the release of odors, dust or smoke are noted. A sampling strategy is developed and air monitoring is conducted using specialized air monitoring instruments.

Personal air monitoring is performed during the task to measure the employee's exposure level. Area/environmental air monitoring may also be done to measure the contaminant in the general shop area. Also, during the workplace exposure assessments, an evaluation is made of the engineering controls (e.g., exhaust ventilation, etc.) in place to determine their effectiveness. The results are reviewed, verified, and compared to occupational exposure limits established by the Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH), and the American Conference of Governmental Industrial Hygienists (ACGIH).

Based on the level of exposure, the type of activity, the need for other safety equipment such as eye protection, and the particular contaminant(s) of concern (e.g., asbestos, lead, welding fumes, solvent vapors, dusts, etc.), recommendations are established to control exposures. These recommendations include engineering, work practice and procedural controls and personal protective equipment. Where personal protective equipment is required, recommendations for the selection of a NIOSH-certified respirator for the identified airborne contaminant are provided. For example, for the specific workplace task evaluated, a half mask or full facepiece respirator with a cartridge for a specific contaminant may be required (e.g., P-100 cartridge for lead exposure).

The concentration of an airborne contaminant determines the type of respirator required. The types of respirators that are available include half-face air purifying, full-face air purifying, full-face Powered Air Purifying, airline, and Self-Contained Breathing Apparatus (SCBA). Respirators are assigned values known as **Protection Factors**. A protection factor is a number that represents the ratio of the concentration of an airborne contaminant outside a respirator versus the concentration inside, or otherwise stated, the factor that a contaminant is reduced by a certain respirator. The selected respirator must have a high enough protection factor so that it is capable of reducing the contaminant to a safe level.

The table below lists the various types of respirators available and their assigned protection factors.

<i>Respiratory Type</i>	<i>Protection Factor</i>
Half-Face Air Purifying	10
Full-Face Air Purifying	50
Full Facepiece Powered Air Purifying	50
Airline Pressure Demand – Full Facepiece	1,000
Self-Contained Breathing Apparatus Open Circuit Pressure Demand – Full Facepiece	10,000

As a general rule, personal protective equipment in the form of a respirator is required when:

1. Mandated by OSHA regulations.
2. Exposures exceed OSHA Permissible Exposure Limits or OSHA Action Levels.
3. Identified as a requirement of a job or a facility based task.

Employees use respirators for a variety of contaminants such as asbestos, lead, paint solvents, welding fumes and general dust. When respiratory protection is not required, employees may choose to voluntarily use respirators. Employees who voluntarily use respiratory protective equipment (tight-fitting negative and positive pressure respirators), must follow all the requirements of this Respiratory Protection Program.

Employees who use filtering facepieces (disposable respirators) are directed to follow Appendix D of the OSHA Respiratory Protection standard located in Appendix I Page 22 of this program. Appendix D instructs a voluntary user to follow the manufacturer's instruction on use, maintenance, cleaning and care and warnings regarding respirator limitations.

Respirator Certification

Manufacturers are required to display information on respirators verifying that they have been certified by the Mine Safety and Health Administration (MSHA) or the National Institute for Occupational Safety and Health (NIOSH) for the hazard that has been identified. NIOSH recently revised the standard for particulate respirator certification. The new standard, 42 CFR Part 84, has a phase in period during which respirators certified under either the old standard or the new standard will be acceptable. All negative pressure air purifying particulate respirators previously designated for dusts, fumes, mists, asbestos and radionuclides and commonly referred to as HEPA Filters will now be classified "P-100". The cartridges will remain the characteristic magenta color.

Controls

When a workplace contains harmful dusts, mists, fumes, gases or vapors, action must be taken to minimize and control employees' exposure to these airborne hazards. Controlling airborne hazards can be accomplished through engineering and administrative controls, changes in work procedures and the use of personal protective equipment.

Engineering controls include such practices as substitution or replacement of a toxic material with a harmless one. In some cases it is practical to enclose or confine a contaminant producing procedure to reduce contaminant levels in the work area. General and localized ventilation can be very effective in removing the contaminant at the source of generation.

Administrative controls include any administrative decision that results in lowering the contaminant exposure for an employee. Administrative controls include rotation of employees through workplace tasks and varying an employee's work schedule. Employee training may reduce an exposure by presenting alternate methods of performing a task where a contaminant exists.

The use of **personal protective equipment** such as a respirator is the least desirable method of controlling exposure to airborne contaminants due to worker stress, reduced worker efficiency and increased work time. However, when engineering and administrative controls are not feasible, personnel will be provided with respiratory protection equipment (RPE) when such equipment is necessary to protect the employee. RPE shall be provided which is applicable and suitable for the purpose intended.

6. RESPIRATOR USE

Proper respirator use is a multi-step process that begins with the identification of workers that require respirators. Those employees who require respirators must be physically able to wear a respirator. Following respirator clearance from the Office of Medical Services (OMS), the worker is respiratory fit tested and trained using the type of respirator that has been selected based on a prior workplace evaluation.

Medical Evaluation

The Office of Medical Services shall establish the medical evaluation criteria for use of positive and negative pressure tight-fitting respirators based on accepted practice. Prior to fit testing and the issuance of negative and positive pressure tight-fitting respirators, the employee must be evaluated by the Office of Medical Services to determine that they are medically able to use the respirator. The Office of Medical Services will notify the employee, his/her supervisor and the Occupational Health Unit of the employee's ability or inability to use the respirator. In addition, the Office of Medical Services must annually evaluate the employee after the respirator has been issued, to assure that the employee's medical status has not changed. (A sample of the Office of Medical Services "Medical Clearance for use of Respirators" form is provided in Appendix IV).

Note: Employees who voluntarily use filtering facepieces/dust masks (disposable respirators) for activities that do not require respiratory protection are not required to be medically evaluated by the Office of Medical Services.

Respirator Fit Testing

All employees who will be using negative or positive pressure tight-fitting respirators must be fit tested **annually** using Occupational Safety and Health Administration (OSHA) recommended methods. OSHA-accepted quantitative or qualitative fit testing protocols will be implemented to evaluate the fit of a respirator on an individual. Each individual must be clean shaven to allow for a proper face-to-facepiece seal with the respirator. To accommodate facility scheduling and to minimize employees' time away from the workplace, Occupational Health Unit in conjunction with facility supervisory staff, will schedule fit testing and training at the facilities during the year.

During the fit testing process, the employee is fitted with different sizes and types of respirators and performs a variety of exercises that simulate tasks that may be performed during a workday. Based on the exercise routing and the ability of the respirator to seal to the employee's face, a determination is made as to which respirator best fits the employee. After successfully being fitted with a respirator, the employee is then given a copy of the Respirator Fit Test form that list the make, model and size of the respirator, and the results of the fit test. This form, which is valid for one year, is required by the employee to secure a respirator from the stockroom. (A sample of the Respirator Fit Test form is provided in Appendix IV).

Respirator fit testing and training shall be conducted **annually** for all employees who are required to or voluntarily request to use a positive or negative pressure tight-fitting respirator. Employees who; 1) are active participants in the Asbestos Operations and Maintenance Program, employees who 2) must comply with the OSHA Lead in Construction Standard and employees

who and/or 3) use self contained breathing apparatus or airline respirators will now be fit tested and trained **annually** for respirator use.

NOTE: Employees who **voluntarily** use filtering facepieces/dust masks (disposable respirators) for activities that do not require respiratory protection are not required to be fit tested for use of the filtering facepieces. Employees should follow the manufacturer's instructions regarding fit, use, care and storage of the filtering facepieces and should also review Appendix D of the OSHA Respirator standard. (A copy of Appendix D is located in Appendix I Page 22 of this manual).

QUALITATIVE FIT TESTING

Qualitative fit testing involves the employee's indication of the presence of an introduced odorous compound such as Isoamyl Acetate (banana oil). If the introduced material is not detected, the respirator provides an adequate fit for the employee.

I. Qualitative Fit Testing (Isoamyl Acetate Procedure)

1. Facepieces equipped with organic vapor cartridges will be used for this test.
2. A tissue or cloth is saturated with isoamyl acetate and suspended inside the top of the bag or hood.
3. The test subject will don the respirator and a visual inspection of the face-to-facepiece seal shall be made by the tester. An obvious leak in the face-to-facepiece seal shall be reason to abort the test and record that size mask unsatisfactory. Expression of discomfort created by the mask shall also be reason to abort the test.
4. The test subject will perform an inhalation and exhalation valve fit check.
5. The test subject shall be instructed to enter the bag or hood and breathe normally during a short sedentary period (20-60 seconds). If no leakage is detected by the subject during the sedentary period, the subject shall be instructed to perform various exercises simulating, as near as possible, his/her work conditions (e.g., talking, running in place, head movements, bending over, etc.). Leakage at any time shall be cause to terminate the test.
6. Detection of the odor by the test subject during fit testing indicates a failure of that respirator. If leakage is detected, the subject shall be removed from the test atmosphere and the face-to-facepiece seal shall be visually inspected for obvious leakage. If any doubt about the condition of the facepiece or the cartridges exist, another respirator shall be tested to assure the leakage was due to face-to-facepiece seal.

QUANTITATIVE FIT TESTING

Quantitative fit testing utilizes an instrument that measures particles in the air inside the respirator and outside the respirator. When an acceptable reduction in particles is achieved the employee has demonstrated an adequate fit for that respirator.

II. Quantitative Fit Testing (PORTA COUNT Procedure)

1. Probed facepieces equipped with HEPA/P-100 cartridges will be used for this fit testing procedure.
2. The test subject will don the respirator and a visual inspection of the face-to-facepiece seal shall be made by the tester. An obvious leak in the face-to-facepiece seal shall be reason to abort the test and record that size mask as unsatisfactory. Expression of discomfort created by the mask shall also be reason to abort the test.
3. The test subject will perform a prescribed number of exercises as required by the fit tester, which shall include deep and normal breathing, head movements, grimacing, jogging, touching toes and the vocalizing of the rainbow passage. The fit tester shall prescribe the required amount of time for each exercise.
4. A fit factor will be attained which is a ratio between the airborne particulate concentrations of the room air and the filtered air inside the mask. Fit factors which are not at least 10 times greater than the assigned protection factor for a negative pressure half or full face respirator shall fail the test. If a failed test occurs, another size respirator shall be donned by the test subject and the entire procedure repeated until a passing fit is recorded.

NOTE: APPENDIX III, page 74, provides details on the method for quantitative fit testing of self-contained breathing apparatus.

Training

At the time of the initial and annual fit test, Occupational Health provides instruction to each employee on how to properly fit, use, care and store his/her individually issued respirator. Special emphasis is placed on proper positioning on the face, adjustment of the straps and checking for leaks. The limitations and capabilities of the respirator are discussed.

Training for specialized respiratory protection equipment must conform to regulations as well as manufacturer recommendations and should include demonstrations under simulated conditions.

Supervisors should review this Respiratory Protection Program so they will be able to oversee the respirator usage by their staff. Supervisors should routinely check to ensure that respiratory equipment is being used properly.

Breathing Air Quality

The quality of breathing air shall meet at least the requirements for Type 1 - Grade D breathing air as described in the ANSI/Compressed Gas Association (CGA) Commodity Specification for Air G-7.1-1989, listed in the table below:

The compressor for supplying breathing air shall be equipped as a breathing air type compressor. It shall be so constructed and situated as to avoid entry of contaminated air into the system. Suitable in-line air purifying sorbent beds and filters shall be installed to ensure breathing air quality. Sorbent beds must be maintained and replaced as recommended by the manufacturer and tagged with the date of last replacement. For compressors that are not oil-lubricated, the breathing air shall not contain more than 10 parts per million of carbon monoxide. For oil-lubricated compressors, a high temperature or carbon monoxide alarm, or both shall be used to monitor carbon monoxide levels. If only a high temperature alarm is used, the air supply shall be monitored periodically to maintain carbon monoxide levels below 10 parts per million.

Breathing air shall be tested by an approved laboratory at the ratio of four (4) samples from every seventy (70) cylinders filled to insure that the breathing air meets the CGA Type 1 - Grade D Standards. Cylinders of purchased air must have a certificate of analysis that meets Type 1 - Grade D breathing air.

The requirements for Type 1 - Grade D breathing air include:

Oxygen	19.5-23.5%
Hydrocarbons (condensed) in mg/m ³ of gas	5 mg/m ³ max.
Carbon Monoxide	10 ppm max.
Carbon Dioxide	1,000 ppm max.
Odor	No detectable odor

No toxic contaminants at levels that make air unsafe to breathe.

mg/m³ - milligrams per cubic meter

ppm - parts per million

Respirator Donning and Doffing

I. DONNING – Putting On A Respirator

1. Loosen the mask's elastic straps or unblock headstraps depending on mask in use.
2. Position the mask on your face so that the inside portion of the mask is over your nose.
3. Place the headbands on your head so that they rest comfortably on the back and top of your head.
4. Adjust the mask until it is comfortable on your face. Adjust the headbands on both sides to produce a comfortable fit and tight seal.
5. Two fit checks shall be conducted by the wearer each time the respirator is donned or adjusted to determine if the respirator is properly seated and that the inhalation and exhalation valves are functioning correctly.

A. Exhalation Valve Fit Check

To conduct this check, place the palms of your hands over the face of each cartridge, inhale and hold your breath for five (5) seconds. If the facepiece collapses slightly and no air leaks between the facepiece and the face are detected, a good fit has been obtained and the exhalation valve is functioning correctly.

B. Inhalation Valve Fit Check

To conduct this check, cover the opening of the exhalation valve cap with the heel of your palm while simultaneously exhaling. If the facepiece bulges slightly and no air leaks between the facepiece and face are detected, a good fit has been obtained and the two inhalation valves are functioning correctly.

II. DOFFING – Removing A Respirator

1. When finished working, leave work area wearing respirator.
2. Once outside the contaminated area, remove respirator. In most cases it is easier to unhook or loosen straps rather than pulling respirator off.
3. Follow proper decontamination procedures before leaving the work area.

Inspection and Maintenance of RPE

A. Cartridge Type

1. Respiratory protection equipment shall be inspected before use and cleaned and inspected again at the conclusion of each work period. Pre-moistened individual germicidal wipes are provided for cleaning the units. Any unit showing deterioration must be replaced.
2. Respirators shall be stored in clean airtight bags and stored in such a manner that outside pressures shall not distort the facepiece.
3. Respirator cartridges will be changed when there is difficulty in breathing through them.
4. Chemical cartridges used for protection against exposure to gaseous air contaminants must be periodically replaced to ensure their effectiveness. Cartridges for contaminants such as organic vapors should be changed at intervals such as one workshift. The cartridge must be sealed in an airtight bag when not in use to prevent saturation. The cartridge should be replaced at any time when the user detects a solvent odor inside the respirator.

B. Self-Contained Breathing Apparatus (SCBA)

1. Each SCBA unit shall be inspected monthly, or as specified in Appendix II-Page 68. Air cylinders shall be fully charged and it shall be determined that the regulator and warning devices function properly. A record shall be kept of inspection dates and maintenance performed on SCBA units by the assigned individual. SCBA units must be cleaned and disinfected after use. After inspection and cleaning, SCBA units shall be stored to protect against extreme heat and cold, excessive moisture and dust. SCBA units should be stored so that the facepiece and exhalation valve will rest in a normal undistorted position. This will prevent the elastomer of the facepiece from setting in an abnormal shape thereby impairing its function.
2. Replacement of parts, repair and/or inspection on SCBA units shall be performed only by factory certified personnel. Repair parts shall be manufactured and approved by the SCBA unit manufacturer. All repairs must be performed in accordance with manufacturers' standards and specifications. Field maintenance personnel will perform only those functions for which they are certified.

C. Hood or Helmet Airline Respirators

1. Respiratory protection equipment shall be inspected before use and cleaned and inspected again at the conclusion of each work period. Inspection and cleaning should comply with the manufacturer's recommendations. All parts of hoods and helmets should be examined for sign of damage or wear and, when necessary, replaced with replacement parts from the equipment manufacturer by qualified personnel. Damage to the headband suspension, lens, gaskets or any seal shall cause the equipment to be taken out of service. All replacement parts must be from the same manufacturer and airline hoses must not exceed 300 feet in length.

Cleaning and Storage

The employee must properly clean and store their respirator so that it is available for future use. Respirators issued for exclusive use by an employee shall be cleaned and disinfected as often as necessary to be maintained in a sanitary condition. Respirators issued to more than one person shall be cleaned and disinfected before being worn by different individuals. Respirators maintained for emergency use shall be cleaned and disinfected after each use. Pre-moistened individual germicidal wipes are available for cleaning and disinfecting respirators.

Provided below is a detailed cleaning procedure to be used when a respirator has become contaminated or is heavily soiled.

1. Remove the cartridges and all gaskets that are not affixed to seats.
2. Remove all elastic headbands.
3. Remove exhalation valve cover.
4. Remove valve cover.
5. Remove speaking diaphragm or speaking diaphragm-exhalation valve assembly or pressure-demand exhalation valve assembly.
6. Remove inhalation valves.
7. Wash, rinse and sanitize facepiece. (Maximum water temperature 140°F, optimum range 120°F to 140°F). Parts removed from respirators may be washed separately as necessary.
8. Hand wipe facepiece, valves and valve seats with a damp cloth to remove any soap or water residues.
9. Air dry mask.
10. Disassemble and hand clean the pressure-demand and exhalation valve assembly, exercising care to avoid damage to the rubber diaphragm.
11. Visually inspect the facepiece and all parts for deterioration, distortion, or other faults that might affect the performance of the respirator.
12. Reassemble mask and visually inspect completed assembly.
13. Install new or retested filters or cartridges.
14. Install outside lens cover (full-facepieces only).
15. Place each mask in a clean airtight plastic bag and seal bag.

Respirators shall be stored to protect them from damage, contamination, dust sunlight, extreme temperatures, excessive moisture, damaging chemicals, and to prevent deformation of the facepiece and exhalation valve.

Equipment Malfunction

Malfunctions of any respiratory protective equipment shall be investigated to determine the cause and to assure corrective measures are taken. The employee should report suspected manufacturing defects or malfunctions to the unit supervisor. The unit supervisor should provide the facility Environmental Coordinator with specific information relating to the suspected defect or malfunction. All related information must be forwarded to the Occupational Health Unit for notification of the manufacturer and the National Institute for Occupational Safety and Health.

Port Authority Stock Items – Respiratory Protection

A current list of Respiratory Protective Equipment is included in Inspection and Safety Division's "Safety Coordinator Program and Resource Guide" and the Port Authority's Stockroom Catalogue. Replacement units are available at Port Authority Stockrooms.

The chart below lists current Respiratory Protective Equipment in the Stockroom.

RESPIRATORS - See Note Following Respirator Replacement Filters – Page 19

AS0100606	Dust Mask/Disposable Respirator	For Nuisance Dusts Only. NIOSH Approved N-95
AS0100605	Dust Mask	For Nuisance Dusts Only. Item is Not NIOSH/MSHA Approved.
AS0100700	Respirator, 1/2 Face Size: Small	North 7700-30 Series, No substitute
AS0100705	Medium	Same As Above
AS0100710	Large	Same As Above
AS0100762	Respirator, Full-Face, Powered Air Purifying Respirator Size: Small	North 9800-30AS Respirator Only
AS0100760	Medium/Large	North 9800-30A Respirator Only
AS0100755	Medium/Large	North 9800-70A. Full Kit. Includes Battery Pack And Charger. No Substitute.
AS0100775	Respirator, Full-Face, Air Purifying Respirator Size: Small	North 7600-30S
AS0100780	Medium/Large	North 7600-30M
AS0102050	Respirator, Full-Face, Small	North 7600-8ASW - WELDING ONLY
AS0102060	Respirator, Full-Face, Medium/Large	North 7600-8AW - WELDING ONLY
AS0102070	Fire-Retardent Hood For Use With WELDING ONLY Respirator.	North 8419

RESPIRATORS (RESPIRATOR REPLACEMENT FILTERS) - See Note

*AS0100715	Organic Vapor	North 7500-1; No Substitute
*AS0100720	Organic Vapor/Acid Gas	North 7500-3; No Substitute
*AS0100725	P-100 (Formerly HEPA)	North 7500-8; No Substitute
AS0100727	Organic Vapor/P-100 (Was HEPA)	North 7500-81; No Substitute
AS0100731	Respirator Filter Shower Cap	North 7500-29; No Substitute
AS0100735	Pesticide Prefilter (Use With Organic Vapor Cartridge* & Filter Cover).	North 7500-23; No Substitute
AS0100740	Paint Prefilter (Use With Organic Vapor Cartridge & Filter Cover).	North 7500-10; No Substitute
*AS0100730	Filter Covers	North 7500-27; No Substitute
AS0100750	P-100 (Formerly HEPA)	North 9800-8. Fits North PAPR 9800 Series
AS0100753	Peel Away Faceshields	Fits All North Full-Face Respirators
AS0100745	Respirator, Wipes	North 7003 Or Occupational Health Approved Equal

* An Asterisk Indicates Compatible Products.

PLEASE NOTE: The Occupational Health Unit permits no substitutes for respirators without prior approval. Each employee requiring respirator protection against toxins must be medically cleared, fit tested, and trained according to OSHA 29 CFR 1910.134.

Restrictions/Conditions of Use

Facial Hair

A respirator, either positive or negative pressure, equipped with a facepiece (tight or loose fitting) shall not be worn if facial hair comes between the sealing surface of the facepiece and the face, or if facial hair interferes with valve function.

Communication

Ambient noise environment and communication needs shall be considered when specific respirators are selected.

Vision

When a respirator user must wear corrective lenses, a protective spectacle or goggle, a face shield, a welding helmet, or other eye and face protective devices, the item shall be fitted to provide good vision and shall be worn in such a manner as not to interfere with the seal of the respirator. Spectacles with straps or temple bars that pass through the sealing surface of either negative or positive pressure, tight-fitting, full-facepiece respirators, shall not be used.

Respirator Sealing Problems

A head covering that passes between the sealing surface of a tight-fitting respirator facepiece and the wearer's face, shall not be used. The head harness straps of tight-fitting respirators shall not be positioned or worn over hard hats. The wearing of a hard hat or other protective equipment shall not interfere with the seal of a respirator.

Worker Activity

Consider the entire package of safety equipment required for the job. The respirator selected must be compatible with hard hats, goggles, glasses, welding hoods, faceshields, etc. In addition, the worker must be able to communicate and perform required job duties without removing the respirator. If strenuous work is to be performed, or if the respirator is to be worn for an extended period of time, it may be desirable to select a lightweight respirator with low breathing resistance. If a respirator does not have good worker acceptance and does not stay on the worker's face, it will not provide the protection needed.

Re-Fitting

Because the sealing of the respirator may be affected, fit testing shall be repeated immediately when the test subject has a:

- ◆ Weight change of 10% or more,
- ◆ Significant facial scarring in the area of the facepiece seal,
- ◆ Significant dental changes; i.e.; multiple extraction's without prosthesis, or acquiring dentures,
- ◆ Reconstructive or cosmetic surgery, or
- ◆ Any other condition that may interfere with facepiece sealing.

Recordkeeping

Each facility is responsible for maintaining respiratory protection records associated with their operations. At a minimum, these records should include:

- ◆ List of facility employees who are using negative or positive pressure tight-fitting respiratory protective equipment.
- ◆ “Medical Clearance For Use Of Respirator” forms
- ◆ Respirator Fit Test forms
- ◆ SCBA Inspection Records
- ◆ Certificate of analysis for purchased breathing air
- ◆ Maintenance tags for breathing air compressors

Program Evaluation

Periodic evaluations of the Respiratory Protection Program will be performed under the supervision of the Inspection and Safety Division’s Occupational Health Unit. The Program Administrator for the Respiratory Protection Program is George Wojnar of the Occupational Health Unit.

Periodic evaluations of the workplace will ensure that the written Respiratory Protection Program is being implemented, as required. Evaluations will include an examination of recordkeeping, respirator use, respirator maintenance and the overall effectiveness of the Program.

APPENDIX I

RESPIRATORY PROTECTION STANDARD 29 CFR 1910.134

(a) Permissible practice.

- (1) In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective shall be to prevent atmospheric contamination. This shall be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used pursuant to this section.
- (2) Respirators shall be provided by the employer when such equipment is necessary to protect the health of the employee. The employer shall provide the respirators which are applicable and suitable for the purpose intended. The employer shall be responsible for the establishment and maintenance of a respiratory protection program which shall include the requirements outlined in paragraph (c) of this section.

(b) Definitions. The following definitions are important terms used in the respiratory protection standard in this section.

Air-purifying respirator means a respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

Assigned protection factor (APF) [Reserved]

Atmosphere-supplying respirator means a respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.

Canister or cartridge means a container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

Demand respirator means an atmosphere-supplying respirator that admits breathing air to the facepiece only when a negative pressure is created inside the facepiece by inhalation.

Emergency situation means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.

Employee exposure means exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection.

End-of-service-life indicator (ESLI) means a system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

Escape-only respirator means a respirator intended to be used only for emergency exit.

Filter or air purifying element means a component used in respirators to remove solid or liquid aerosols from the inspired air.

Filtering facepiece (dust mask) means a negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.

Fit factor means a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

Fit test means the use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual. (See also Qualitative Fit Test QLFT and Quantitative Fit Test QNFT.)

Helmet means a rigid respiratory inlet covering that also provides head protection against impact and penetration.

High efficiency particulate air (HEPA) filter means a filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

Hood means a respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.

Immediately dangerous to life or health (IDLH) means an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

Interior structural firefighting means the physical activity of fire suppression, rescue or both, inside of buildings or enclosed structures which are involved in a fire situation beyond the incipient stage. (See 29 CFR 1910.155)

Loose-fitting facepiece means a respiratory inlet covering that is designed to form a partial seal with the face.

Maximum use concentration (MUC) [Reserved].

Negative pressure respirator (tight-fitting) means a respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.

Oxygen deficient atmosphere means an atmosphere with an oxygen content below 19.5% by volume.

Physician or other licensed health care professional (PLHCP) means an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required by paragraph (e) of this section.

Positive pressure respirator means a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

Powered air-purifying respirator (PAPR) means an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

Pressure demand respirator means a positive pressure atmosphere-supplying respirator that admits breathing air to the facepiece when the positive pressure is reduced inside the facepiece by inhalation.

Qualitative fit test (QLFT) means a pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

Quantitative fit test (QNFT) means an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

Respiratory inlet covering means that portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source, or both. It may be a facepiece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.

Self-contained breathing apparatus (SCBA) means an atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

Service life means the period of time that a respirator, filter or sorbent, or other respiratory equipment provides adequate protection to the wearer.

Supplied-air respirator (SAR) or airline respirator means an atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

This section means this respiratory protection standard.

Tight-fitting facepiece means a respiratory inlet covering that forms a complete seal with the face.

User seal check means an action conducted by the respirator user to determine if the respirator is properly seated to the face.

(c) Respiratory protection program. This paragraph requires the employer to develop and implement a written respiratory protection program with required worksite-specific procedures and elements for required respirator use. The program must be administered by a suitably trained program administrator. In addition, certain program elements may be required for voluntary use to prevent potential hazards associated with the use of the respirator. The Small Entity Compliance Guide contains criteria for the selection of a program administrator and a sample program that meets the requirements of this paragraph. Copies of the Small Entity Compliance Guide will be available on or about April 8, 1998 from the Occupational Safety and Health Administration's Office of Publications, Room N 3101, 200 Constitution Avenue, NW, Washington, DC, 20210 (202-219-4667).

(1) In any workplace where respirators are necessary to protect the health of the employee or whenever respirators are required by the employer, the employer shall establish and implement a written respiratory protection program with worksite-specific procedures. The program shall be updated as necessary to reflect those changes in workplace conditions that affect respirator use. The employer shall include in the program the following provisions of this section, as applicable:

- (i) Procedures for selecting respirators for use in the workplace;
- (ii) Medical evaluations of employees required to use respirators;
- (iii) Fit testing procedures for tight-fitting respirators; (iv) Procedures for proper use of respirators in routine and reasonably foreseeable emergency situations;
- (iv) Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators;
- (v) Procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators;
- (vi) Training of employees in the respiratory hazards to which they are potentially exposed during routine and emergency situations;
- (vii) Training of employees in the proper use of respirators, including putting on and removing them, any limitations on their use, and their maintenance; and
- (viii) Procedures for regularly evaluating the effectiveness of the program.

(2) Where respirator use is not required:

- (i) An employer may provide respirators at the request of employees or permit employees to use their own respirators, if the employer determines that such respirator use will not in itself create a hazard. If the employer determines that any voluntary respirator use is permissible, the employer shall provide the respirator users with the information contained in Appendix D to this section ("Information for Employees Using Respirators When Not Required Under the Standard"); and
- (ii) In addition, the employer must establish and implement those elements of a written respiratory protection program necessary to ensure that any employee using a respirator voluntarily is medically able to use that respirator, and that the

respirator is cleaned, stored, and maintained so that its use does not present a health hazard to the user. Exception: Employers are not required to include in a written respiratory protection program those employees whose only use of respirators involves the voluntary use of filtering facepieces (dust masks).

- (3) The employer shall designate a program administrator who is qualified by appropriate training or experience that is commensurate with the complexity of the program to administer or oversee the respiratory protection program and conduct the required evaluations of program effectiveness.

- (1) The employer shall provide respirators, training, and medical evaluations at no cost to the employee.

(d) Selection of respirators. This paragraph requires the employer to evaluate respiratory hazard(s) in the workplace, identify relevant workplace and user factors, and base respirator selection on these factors. The paragraph also specifies appropriately protective respirators for use in IDLH atmospheres, and limits the selection and use of air-purifying respirators.

- (1) General requirements.

- (i) The employer shall select and provide an appropriate respirator based on the respiratory hazard(s) to which the worker is exposed and workplace and user factors that affect respirator performance and reliability.
- (ii) The employer shall select a NIOSH-certified respirator. The respirator shall be used in compliance with the conditions of its certification.
- (iii) The employer shall identify and evaluate the respiratory hazard(s) in the workplace; this evaluation shall include a reasonable estimate of employee exposures to respiratory hazard(s) and an identification of the contaminant's chemical state and physical form. Where the employer cannot identify or reasonably estimate the employee exposure, the employer shall consider the atmosphere to be IDLH. The employer shall select respirators from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.

- (2) Respirators for IDLH atmospheres.

- (i) The employer shall provide the following respirators for employee use in IDLH atmospheres:
 - (A) A full facepiece pressure demand SCBA certified by NIOSH for a minimum service life of thirty minutes, or
 - (B) A combination full facepiece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply.
- (ii) Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.
- (iii) All oxygen-deficient atmospheres shall be considered IDLH. Exception: If the employer demonstrates that, under all foreseeable conditions, the oxygen concentration can be maintained within the ranges specified in Table II of this

section (i.e., for the altitudes set out in the table), then any atmosphere-supplying respirator may be used.

(3) Respirators for atmospheres that are not IDLH.

(i) The employer shall provide a respirator that is adequate to protect the health of the employee and ensure compliance with all other OSHA statutory and regulatory requirements, under routine and reasonably foreseeable emergency situations.

(A) Assigned Protection Factors (APFs) [Reserved]

(B) Maximum Use Concentration (MUC) [Reserved]

(ii) The respirator selected shall be appropriate for the chemical state and physical form of the contaminant.

(iii) For protection against gases and vapors, the employer shall provide:

(A) An atmosphere-supplying respirator, or

(B) An air-purifying respirator, provided that:

(1) The respirator is equipped with an end-of-service-life indicator (ESLI) certified by NIOSH for the contaminant; or

(2) If there is no ESLI appropriate for conditions in the employer's workplace, the employer implements a change schedule for canisters and cartridges that is based on objective information or data that will ensure that canisters and cartridges are changed before the end of their service life. The employer shall describe in the respirator program the information and data relied upon and the basis for the canister and cartridge change schedule and the basis for reliance on the data.

(iv) For protection against particulates, the employer shall provide:

(A) An atmosphere-supplying respirator; or

(B) An air-purifying respirator equipped with a filter certified by NIOSH under 30 CFR part 11 as a high efficiency particulate air (HEPA) filter, or an air-purifying respirator equipped with a filter certified for particulates by NIOSH under 42 CFR part 84; or

(C) For contaminants consisting primarily of particles with mass median aerodynamic diameters (MMAD) of at least 2 micrometers, an air-purifying respirator equipped with any filter certified for particulates by NIOSH.

TABLE I.—ASSIGNED PROTECTION FACTORS [Reserved]

Table II.

**Oxygen deficient Atmospheres (%O₂) for
which the employer may rely on atmosphere-**

supplying Altitude (ft.) respirators

Altitude (ft.)

Less than 3,001.....	16.0 – 19.5
3,000-4,000.....	16.4 - 19.5
4,001-5,000.....	17.1 – 19.5
5,001-6,000.....	17.8 – 19.5
6,001-7,000.....	18.5 – 19.5
7,001-8,00 ⁽¹⁾	19.3 – 19.5

¹Above 8,000 feet the exception does not apply. Oxygen-enriched breathing air must be supplied above 14,000 feet.

(e) Medical evaluation. Using a respirator may place a physiological burden on employees that varies with the type of respirator worn, the job and workplace conditions in which the respirator is used, and the medical status of the employee. Accordingly, this paragraph specifies the minimum requirements for medical evaluation that employers must implement to determine the employee's ability to use a respirator.

- (1) General. The employer shall provide a medical evaluation to determine the employee's ability to use a respirator, before the employee is fit tested or required to use the respirator in the workplace. The employer may discontinue an employee's medical evaluations when the employee is no longer required to use a respirator.
- (2) Medical evaluation procedures.
 - (i) The employer shall identify a physician or other licensed health care professional (PLHCP) to perform medical evaluations using a medical questionnaire or an initial medical examination that obtains the same information as the medical questionnaire.
 - (ii) The medical evaluation shall obtain the information requested by the questionnaire in Sections 1 and 2, Part A of Appendix C of this section.
- (3) Follow-up medical examination.
 - (i) The employer shall ensure that a follow-up medical examination is provided for an employee who gives a positive response to any question among questions 1 through 8 in Section 2, Part A of Appendix C or whose initial medical examination demonstrates the need for a follow-up medical examination.
 - (ii) The follow-up medical examination shall include any medical tests, consultations, or diagnostic procedures that the PLHCP deems necessary to make a final determination.
- (4) Administration of the medical questionnaire and examinations.
 - (i) The medical questionnaire and examinations shall be administered confidentially during the employee's normal working hours or at a time and place convenient to the employee. The medical questionnaire shall be administered in a manner that ensures that the employee understands its content.
 - (ii) The employer shall provide the employee with an opportunity to discuss the questionnaire and examination results with the PLHCP.

(5) Supplemental information for the PLHCP.

- (i) The following information must be provided to the PLHCP before the PLHCP makes a recommendation concerning an employee's ability to use a respirator:
 - (A) The type and weight of the respirator to be used by the employee;
 - (B) The duration and frequency of respirator use (including use for rescue and escape);
 - (C) The expected physical work effort;
 - (D) Additional protective clothing and equipment to be worn; and
 - (E) Temperature and humidity extremes that may be encountered.
- (ii) Any supplemental information provided previously to the PLHCP regarding an employee need not be provided for a subsequent medical evaluation if the information and the PLHCP remain the same.
- (iii) The employer shall provide the PLHCP with a copy of the written respiratory protection program and a copy of this section.

Note to Paragraph (e)(5)(iii): When the employer replaces a PLHCP, the employer must ensure that the new PLHCP obtains this information, either by providing the documents directly to the PLHCP or having the documents transferred from the former PLHCP to the new PLHCP. However, OSHA does not expect employers to have employees medically reevaluated solely because a new PLHCP has been selected.

(6) Medical determination. In determining the employee's ability to use a respirator, the employer shall:

- (i) Obtain a written recommendation regarding the employee's ability to use the respirator from the PLHCP. The recommendation shall provide only the following information:
 - (A) Any limitations on respirator use related to the medical condition of the employee, or relating to the workplace conditions in which the respirator will be used, including whether or not the employee is medically able to use the respirator;
 - (B) The need, if any, for follow-up medical evaluations; and
 - (C) A statement that the PLHCP has provided the employee with a copy of the PLHCP's written recommendation.
- (ii) If the respirator is a negative pressure respirator and the PLHCP finds a medical condition that may place the employee's health at increased risk if the respirator is used, the employer shall provide a PAPR if the PLHCP's medical evaluation finds that the employee can use such a respirator; if a subsequent medical evaluation finds that the employee is medically able to use a negative pressure respirator, then the employer is no longer required to provide a PAPR.

(7) Additional medical evaluations. At a minimum, the employer shall provide additional medical evaluations that comply with the requirements of this section if:

- (i) An employee reports medical signs or symptoms that are related to ability to use a respirator;

- (ii) A PLHCP, supervisor, or the respirator program administrator informs the employer that an employee needs to be reevaluated;
- (iii) Information from the respiratory protection program, including observations made during fit testing and program evaluation, indicates a need for employee reevaluation; or
- (iv) A change occurs in workplace conditions (e.g., physical work effort, protective clothing, temperature) that may result in a substantial increase in the physiological burden placed on an employee.

(f) *Fit testing.* This paragraph requires that, before an employee may be required to use any respirator with a negative or positive pressure tight-fitting facepiece, the employee must be fit tested with the same make, model, style, and size of respirator that will be used. This paragraph specifies the kinds of fit tests allowed, the procedures for conducting them, and how the results of the fit tests must be used.

- (1) The employer shall ensure that employees using a tight-fitting facepiece respirator pass an appropriate qualitative fit test (QLFT) or quantitative fit test (QNFT) as stated in this paragraph.
- (2) The employer shall ensure that an employee using a tight-fitting facepiece respirator is fit tested prior to initial use of the respirator, whenever a different respirator facepiece (size, style, model or make) is used, and at least annually thereafter.
- (3) The employer shall conduct an additional fit test whenever the employee reports, or the employer, PLHCP, supervisor, or program administrator makes visual observations of, changes in the employee's physical condition that could affect respirator fit. Such conditions include, but are not limited to, facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight.
- (4) If after passing a QLFT or QNFT, the employee subsequently notifies the employer, program administrator, supervisor, or PLHCP that the fit of the respirator is unacceptable, the employee shall be given a reasonable opportunity to select a different respirator facepiece and to be retested.
- (5) The fit test shall be administered using an OSHA-accepted QLFT or QNFT protocol. The OSHA-accepted QLFT and QNFT protocols and procedures are contained in Appendix A of this section.
- (6) QLFT may only be used to fit test negative pressure air-purifying respirators that must achieve a fit factor of 100 or less.
- (7) If the fit factor, as determined through an OSHA-accepted QNFT protocol, is equal to or greater than 100 for tight-fitting half facepieces, or equal to or greater than 500 for tight-fitting full facepieces, the QNFT has been passed with that respirator.
- (8) Fit testing of tight-fitting atmosphere-supplying respirators and tight-fitting powered air-purifying respirators shall be accomplished by performing quantitative or qualitative fit testing in the negative pressure mode, regardless of the mode of operation (negative or positive pressure) that is used for respiratory protection.
 - (i) Qualitative fit testing of these respirators shall be accomplished by temporarily converting the respirator user's actual facepiece into a negative pressure respirator with appropriate filters, or by using an identical negative pressure air-purifying respirator facepiece with the same sealing surfaces as a surrogate for the atmosphere-supplying or powered air-purifying respirator facepiece.
 - (ii) Quantitative fit testing of these respirators shall be accomplished by modifying the facepiece to allow sampling inside the facepiece in the breathing zone of the

user, midway between the nose and mouth. This requirement shall be accomplished by installing a permanent sampling probe onto a surrogate facepiece, or by using a sampling adapter designed to temporarily provide a means of sampling air from inside the facepiece.

- (iii) Any modifications to the respirator facepiece for fit testing shall be completely removed, and the facepiece restored to NIOSH-approved configuration, before that facepiece can be used in the workplace.

(g) Use of respirators. This paragraph requires employers to establish and implement procedures for the proper use of respirators. These requirements include prohibiting conditions that may result in facepiece seal leakage, preventing employees from removing respirators in hazardous environments, taking actions to ensure continued effective respirator operation throughout the work shift, and establishing procedures for the use of respirators in IDLH atmospheres or in interior structural firefighting situations.

(1) Facepiece seal protection.

- (i) The employer shall not permit respirators with tight-fitting facepieces to be worn by employees who have:

- (A) Facial hair that comes between the sealing surface of the facepiece and the face or that interferes with valve function; or
- (B) Any condition that interferes with the face-to-facepiece seal or valve function.

- (ii) If an employee wears corrective glasses or goggles or other personal protective equipment, the employer shall ensure that such equipment is worn in a manner that does not interfere with the seal of the facepiece to the face of the user.

- (iii) For all tight-fitting respirators, the employer shall ensure that employees perform a user seal check each time they put on the respirator using the procedures in Appendix B-1 or procedures recommended by the respirator manufacturer that the employer demonstrates are as effective as those in Appendix B-1 of this section.

(2) Continuing respirator effectiveness.

- (i) Appropriate surveillance shall be maintained of work area conditions and degree of employee exposure or stress. When there is a change in work area conditions or degree of employee exposure or stress that may affect respirator effectiveness, the employer shall reevaluate the continued effectiveness of the respirator.

- (ii) The employer shall ensure that employees leave the respirator use area:

- (A) To wash their faces and respirator facepieces as necessary to prevent eye or skin irritation associated with respirator use; or
- (B) If they detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece; or
- (C) To replace the respirator or the filter, cartridge, or canister elements.

- (iii) If the employee detects vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece, the employer must replace or repair the respirator before allowing the employee to return to the work area.

(3) Procedures for IDLH atmospheres. For all IDLH atmospheres, the employer shall ensure that:

- (i) One employee or, when needed, more than one employee is located outside the IDLH atmosphere;
- (ii) Visual, voice, or signal linecommunication is maintained between the employee(s) in the IDLH atmosphere and the employee(s) located outside the IDLH atmosphere;
- (iii) The employee(s) located outside the IDLH atmosphere are trained and equipped to provide effective emergency rescue;
- (iv) The employer or designee is notified before the employee(s) located outside the IDLH atmosphere enter the IDLH atmosphere to provide emergency rescue;
- (v) The employer or designee authorized to do so by the employer, once notified, provides necessary assistance appropriate to the situation;
- (vi) Employee(s) located outside the IDLH atmospheres are equipped with:
 - (A) Pressure demand or other positive pressure SCBAs, or a pressure demand or other positive pressure supplied-air respirator with auxiliary SCBA; and either
 - (B) Appropriate retrieval equipment for removing the employee(s) who enter(s) these hazardous atmospheres where retrieval equipment would contribute to the rescue of the employee(s) and would not increase the overall risk resulting from entry; or
 - (C) Equivalent means for rescue where retrieval equipment is not required under paragraph (g)(3)(vi)(B).

(4) Procedures for interior structural firefighting. In addition to the requirements set forth under paragraph (g)(3), in interior structural fires, the employer shall ensure that:

- (i) At least two employees enter the IDLH atmosphere and remain in visual or voice contact with one another at all times;
- (ii) At least two employees are located outside the IDLH atmosphere; and
- (iii) All employees engaged in interior structural firefighting use SCBAs.

Note 1 to paragraph (g): One of the two individuals located outside the IDLH atmosphere may be assigned to an additional role, such as incident commander in charge of the emergency or safety officer, so long as this individual is able to perform assistance or rescue activities without jeopardizing the safety or health of any firefighter working at the incident.

Note 2 to paragraph (g): Nothing in this section is meant to preclude firefighters from performing emergency rescue activities before an entire team has assembled.

(h) Maintenance and care of respirators. This paragraph requires the employer to provide for the cleaning and disinfecting, storage, inspection, and repair of respirators used by employees.

- (1) Cleaning and disinfecting. The employer shall provide each respirator user with a respirator that is clean, sanitary, and in good working order. The employer shall ensure that respirators are cleaned and disinfected using the procedures in Appendix B-2 of this section, or procedures recommended by the respirator manufacturer, provided that such procedures are of equivalent effectiveness. The respirators shall be cleaned and disinfected at the following intervals:

- (i) Respirators issued for the exclusive use of an employee shall be cleaned and disinfected as often as necessary to be maintained in a sanitary condition;
- (ii) Respirators issued to more than one employee shall be cleaned and disinfected before being worn by different individuals;
- (iii) Respirators maintained for emergency use shall be cleaned and disinfected after each use; and
- (iv) Respirators used in fit testing and training shall be cleaned and disinfected after each use.

(2) Storage. The employer shall ensure that respirators are stored as follows:

- (i) All respirators shall be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals, and they shall be packed or stored to prevent deformation of the facepiece and exhalation valve.
- (ii) In addition to the requirements of paragraph (h)(2)(i) of this section, emergency respirators shall be:

- (A) Kept accessible to the work area;
- (B) Stored in compartments or in covers that are clearly marked as containing emergency respirators; and
- (C) Stored in accordance with any applicable manufacturer instructions.

(3) Inspection.

- (i) The employer shall ensure that respirators are inspected as follows:

- (A) All respirators used in routine situations shall be inspected before each use and during cleaning;
- (B) All respirators maintained for use in emergency situations shall be inspected at least monthly and in accordance with the manufacturer's recommendations, and shall be checked for proper function before and after each use; and
- (C) Emergency escape-only respirators shall be inspected before being carried into the workplace for use.

- (ii) The employer shall ensure that respirator inspections include the following:

- (A) A check of respirator function, tightness of connections, and the condition of the various parts including, but not limited to, the facepiece, head straps, valves, connecting tube, and cartridges, canisters or filters; and
- (B) A check of elastomeric parts for pliability and signs of deterioration.

- (iii) In addition to the requirements of paragraphs (h)(3)(i) and (ii) of this section, self-contained breathing apparatus shall be inspected monthly. Air and oxygen cylinders shall be maintained in a fully charged state and shall be recharged when the pressure falls to 90% of the manufacturer's recommended pressure level. The employer shall determine that the regulator and warning devices function properly.

- (iv) For respirators maintained for emergency use, the employer shall:

- (A) Certify the respirator by documenting the date the inspection was performed, the name (or signature) of the person who made the inspection, the findings, required remedial action, and a serial number or other means of identifying the inspected respirator; and
 - (B) Provide this information on a tag or label that is attached to the storage compartment for the respirator, is kept with the respirator, or is included in inspection reports stored as paper or electronic files. This information shall be maintained until replaced following a subsequent certification.
- (4) Repairs. The employer shall ensure that respirators that fail an inspection or are otherwise found to be defective are removed from service, and are discarded or repaired or adjusted in accordance with the following procedures:
- (i) Repairs or adjustments to respirators are to be made only by persons appropriately trained to perform such operations and shall use only the respirator manufacturer's NIOSH-approved parts designed for the respirator;
 - (ii) Repairs shall be made according to the manufacturer's recommendations and specifications for the type and extent of repairs to be performed; and
 - (iii) Reducing and admission valves, regulators, and alarms shall be adjusted or repaired only by the manufacturer or a technician trained by the manufacturer.

(i) Breathing air quality and use. This paragraph requires the employer to provide employees using atmosphere-supplying respirators (supplied-air and SCBA) with breathing gases of high purity.

- (1) The employer shall ensure that compressed air, compressed oxygen, liquid air, and liquid oxygen used for respiration accords with the following specifications:
- (i) Compressed and liquid oxygen shall meet the United States Pharmacopoeia requirements for medical or breathing oxygen; and
 - (ii) Compressed breathing air shall meet at least the requirements for Grade D breathing air described in ANSI/ Compressed Gas Association Commodity Specification for Air, G-7.1-1989, to include:

[1910.134(i)(1)(ii) corrected at 63 FR 20098, April 23, 1998]

- (A) Oxygen content (v/v) of 19.5- 23.5%;
 - (B) Hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less;
 - (C) Carbon monoxide (CO) content of 10 ppm or less;
 - (D) Carbon dioxide content of 1,000 ppm or less; and
 - (E) Lack of noticeable odor.
- (2) The employer shall ensure that compressed oxygen is not used in atmosphere-supplying respirators that have previously used compressed air.
- (3) The employer shall ensure that oxygen concentrations greater than 23.5% are used only in equipment designed for oxygen service or distribution.
- (4) The employer shall ensure that cylinders used to supply breathing air to respirators meet the following requirements:

- (i) Cylinders are tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR part 173 and part 178);
- (ii) Cylinders of purchased breathing air have a certificate of analysis from the supplier that the breathing air meets the requirements for Grade D breathing air; and

[1910.134(i)(4)(ii) corrected at 63 FR 20098, April 23, 1998]

- (iii) The moisture content in the cylinder does not exceed a dew point of -50° F (-45.6° C) at 1 atmosphere pressure.
- (5) The employer shall ensure that compressors used to supply breathing air to respirators are constructed and situated so as to:
- (i) Prevent entry of contaminated air into the air-supply system;
 - (ii) Minimize moisture content so that the dew point at 1 atmosphere pressure is 10 degrees F (5.56° C) below the ambient temperature;
 - (iii) Have suitable in-line air-purifying sorbent beds and filters to further ensure breathing air quality. Sorbent beds and filters shall be maintained and replaced or refurbished periodically following the manufacturer's instructions.
 - (iv) Have a tag containing the most recent change date and the signature of the person authorized by the employer to perform the change. The tag shall be maintained at the compressor.
- (6) For compressors that are not oil-lubricated, the employer shall ensure that carbon monoxide levels in the breathing air do not exceed 10 ppm.
- (7) For oil-lubricated compressors, the employer shall use a high-temperature or carbon monoxide alarm, or both, to monitor carbon monoxide levels. If only high-temperature alarms are used, the air supply shall be monitored at intervals sufficient to prevent carbon monoxide in the breathing air from exceeding 10 ppm.
- (8) The employer shall ensure that breathing air couplings are incompatible with outlets for nonrespirable worksite air or other gas systems. No asphyxiating substance shall be introduced into breathing air lines.
- (9) The employer shall use breathing gas containers marked in accordance with the NIOSH respirator certification standard, 42 CFR part 84.

(j) Identification of filters, cartridges, and canisters. The employer shall ensure that all filters, cartridges and canisters used in the workplace are labeled and color coded with the NIOSH approval label and that the label is not removed and remains legible.

(k) Training and information. This paragraph requires the employer to provide effective training to employees who are required to use respirators. The training must be comprehensive, understandable, and recur annually, and more often if necessary. This paragraph also requires the employer to provide the basic information on respirators in Appendix D of this section to employees who wear respirators when not required by this section or by the employer to do so.

- (1) The employer shall ensure that each employee can demonstrate knowledge of at least the following:

- (i) Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator;
 - (ii) What the limitations and capabilities of the respirator are;
 - (iii) How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions;
 - (iv) How to inspect, put on and remove, use, and check the seals of the respirator;
 - (v) What the procedures are for maintenance and storage of the respirator;
 - (vi) How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators; and
 - (vii) The general requirements of this section.
- (2) The training shall be conducted in a manner that is understandable to the employee.
 - (3) The employer shall provide the training prior to requiring the employee to use a respirator in the workplace.
 - (4) An employer who is able to demonstrate that a new employee has received training within the last 12 months that addresses the elements specified in paragraph (k)(1)(i) through (vii) is not required to repeat such training provided that, as required by paragraph (k)(1), the employee can demonstrate knowledge of those element(s). Previous training not repeated initially by the employer must be provided no later than 12 months from the date of the previous training.
 - (5) Retraining shall be administered annually, and when the following situations occur:
 - (i) Changes in the workplace or the type of respirator render previous training obsolete;
 - (ii) Inadequacies in the employee's knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill; or
 - (iii) Any other situation arises in which retraining appears necessary to ensure safe respirator use.
 - (6) The basic advisory information on respirators, as presented in Appendix D of this section, shall be provided by the employer in any written or oral format, to employees who wear respirators when such use is not required by this section or by the employer.

(l) Program evaluation. This section requires the employer to conduct evaluations of the workplace to ensure that the written respiratory protection program is being properly implemented, and to consult employees to ensure that they are using the respirators properly.

- (1) The employer shall conduct evaluations of the workplace as necessary to ensure that the provisions of the current written program are being effectively implemented and that it continues to be effective.
- (2) The employer shall regularly consult employees required to use respirators to assess the employees' views on program effectiveness and to identify any problems. Any problems that are identified during this assessment shall be corrected. Factors to be assessed include, but are not limited to:
 - (i) Respirator fit (including the ability to use the respirator without interfering with effective workplace performance);
 - (ii) Appropriate respirator selection for the hazards to which the employee is exposed;

- (iii) Proper respirator use under the workplace conditions the employee encounters; and
- (iv) Proper respirator maintenance.

(m) Recordkeeping. This section requires the employer to establish and retain written information regarding medical evaluations, fit testing, and the respirator program. This information will facilitate employee involvement in the respirator program, assist the employer in auditing the adequacy of the program, and provide a record for compliance determinations by OSHA.

- (1) Medical evaluation. Records of medical evaluations required by this section must be retained and made available in accordance with 29 CFR 1910.1020.
- (2) Fit testing.
 - (i) The employer shall establish a record of the qualitative and quantitative fit tests administered to an employee including:
 - (A) The name or identification of the employee tested;
 - (B) Type of fit test performed;
 - (C) Specific make, model, style, and size of respirator tested;
 - (D) Date of test; and
 - (E) The pass/fail results for QLFTs or the fit factor and strip chart recording or other recording of the test results for QNFTs.
 - (ii) Fit test records shall be retained for respirator users until the next fit test is administered.
- (3) A written copy of the current respirator program shall be retained by the employer.
- (4) Written materials required to be retained under this paragraph shall be made available upon request to affected employees and to the Assistant Secretary or designee for examination and copying.

(n) Dates.

- (1) Effective date. This section is effective April 8, 1998. The obligations imposed by this section commence on the effective date unless otherwise noted in this paragraph. Compliance with obligations that do not commence on the effective date shall occur no later than the applicable start-up date.
- (2) Compliance dates. All obligations of this section commence on the effective date except as follows:
 - (i) The determination that respirator use is required (paragraph (a)) shall be completed no later than September 8, 1998.
 - (ii) Compliance with provisions of this section for all other provisions shall be completed no later than October 5, 1998.
- (3) The provisions of 29 CFR 1910.134 and 29 CFR 1926.103, contained in the 29 CFR parts 1900 to 1910.99 and the 29 CFR part 1926 editions, revised as of July 1, 1997, are in effect and enforceable until October 5, 1998, or during any administrative or judicial stay of the provisions of this section.

- (4) Existing Respiratory Protection Programs. If, in the 12 month period preceding April 8, 1998, the employer has conducted annual respirator training, fit testing, respirator program evaluation, or medical evaluations, the employer may use the results of those activities to comply with the corresponding provisions of this section, providing that these activities were conducted in a manner that meets the requirements of this section.

(o) Appendices.

- (1) Compliance with Appendix A, Appendix B-1, Appendix B-2, and Appendix C of this section is mandatory.
- (2) Appendix D of this section is non-mandatory and is not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

APPENDIX A TO §1910.134: FIT TESTING PROCEDURES (Mandatory)

Part I. OSHA-Accepted Fit Test Protocols

A. Fit Testing Procedures—General Requirements

The employer shall conduct fit testing using the following procedures. The requirements in this appendix apply to all OSHA-accepted fit test methods, both QLFT and QNFT.

1. The test subject shall be allowed to pick the most acceptable respirator from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.
2. Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine an acceptable fit. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This instruction may not constitute the subject's formal training on respirator use, because it is only a review.
3. The test subject shall be informed that he/she is being asked to select the respirator that provides the most acceptable fit. Each respirator represents a different size and shape, and if fitted and used properly, will provide adequate protection.
4. The test subject shall be instructed to hold each chosen facepiece up to the face and eliminate those that obviously do not give an acceptable fit.
5. The more acceptable facepieces are noted in case the one selected proves unacceptable; the most comfortable mask is donned and worn at least five minutes to assess comfort. Assistance in assessing comfort can be given by discussing the points in the following item A.6. If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.

6. Assessment of comfort shall include a review of the following points with the test subject and allowing the test subject adequate time to determine the comfort of the respirator:
 - (a) Position of the mask on the nose
 - (b) Room for eye protection
 - (c) Room to talk
 - (d) Position of mask on face and cheeks
7. The following criteria shall be used to help determine the adequacy of the respirator fit:
 - (a) Chin properly placed;
 - (b) Adequate strap tension, not overly tightened;
 - (c) Fit across nose bridge;
 - (d) Respirator of proper size to span distance from nose to chin;
 - (e) Tendency of respirator to slip;
 - (f) Self-observation in mirror to evaluate fit and respirator position.
8. The test subject shall conduct a user seal check, either the negative and positive pressure seal checks described in Appendix B-1 of this section or those recommended by the respirator manufacturer which provide equivalent protection to the procedures in Appendix B-1. Before conducting the negative and positive pressure checks, the subject shall be told to seat the mask on the face by moving the head from side-to-side and up and down slowly while taking in a few slow deep breaths. Another facepiece shall be selected and retested if the test subject fails the user seal check tests.
9. The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface, such as stubble beard growth, beard, mustache or sideburns which cross the respirator sealing surface. Any type of apparel which interferes with a satisfactory fit shall be altered or removed.
10. If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician or other licensed health care professional, as appropriate, to determine whether the test subject can wear a respirator while performing her or his duties.
11. If the employee finds the fit of the respirator unacceptable, the test subject shall be given the opportunity to select a different respirator and to be retested.
12. Exercise regimen. Prior to the commencement of the fit test, the test subject shall be given a description of the fit test and the test subject's responsibilities during the test procedure. The description of the process shall include a description of the test exercises

that the subject will be performing. The respirator to be tested shall be worn for at least 5 minutes before the start of the fit test.

13. The fit test shall be performed while the test subject is wearing any applicable safety equipment that may be worn during actual respirator use which could interfere with respirator fit.

14. Test Exercises.

(a) The following test exercises are to be performed for all fit testing methods prescribed in this appendix, except for the CNP method. A separate fit testing exercise regimen is contained in the CNP protocol. The test subject shall perform exercises, in the test environment, in the following manner:

- (1) Normal breathing. In a normal standing position, without talking, the subject shall breathe normally.
- (2) Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply, taking caution so as not to hyperventilate.
- (3) Turning head side to side. Standing in place, the subject shall slowly turn his/her head from side to side between the extreme positions on each side. The head shall be held at each extreme momentarily so the subject can inhale at each side.
- (4) Moving head up and down. Standing in place, the subject shall slowly move his/her head up and down. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling).
- (5) Talking. The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song.

Rainbow Passage

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

- (6) Grimace. The test subject shall grimace by smiling or frowning. (This applies only to QNFT testing; it is not performed for QLFT)
- (7) Bending over. The test subject shall bend at the waist as if he/she were to touch his/her toes. Jogging in place shall be substituted for this exercise in those test environments such as shroud type QNFT or QLFT units that do not permit bending over at the waist.
- (8) Normal breathing. Same as exercise (1).

- (b) Each test exercise shall be performed for one minute except for the grimace exercise which shall be performed for 15 seconds. The test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried. The respirator shall not be adjusted once the fit test exercises begin. Any adjustment voids the test, and the fit test must be repeated.

B. Qualitative Fit Test (QLFT) Protocols

1. General

- (a) The employer shall ensure that persons administering QLFT are able to prepare test solutions, calibrate equipment and perform tests properly, recognize invalid tests, and ensure that test equipment is in proper working order.
- (b) The employer shall ensure that QLFT equipment is kept clean and well maintained so as to operate within the parameters for which it was designed.

2. Isoamyl Acetate Protocol

Note: This protocol is not appropriate to use for the fit testing of particulate respirators. If used to fit test particulate respirators, the respirator must be equipped with an organic vapor filter.

(a) Odor Threshold Screening

Odor threshold screening, performed without wearing a respirator, is intended to determine if the individual tested can detect the odor of isoamyl acetate at low levels.

- (1) Three 1 liter glass jars with metal lids are required.
- (2) Odor-free water (e.g., distilled or spring water) at approximately 25° C (77° F) shall be used for the solutions.
- (3) The isoamyl acetate (IAA) (also known as isopentyl acetate) stock solution is prepared by adding 1 ml of pure IAA to 800 ml of odor-free water in a 1 liter jar, closing the lid and shaking for 30 seconds. A new solution shall be prepared at least weekly.
- (4) The screening test shall be conducted in a room separate from the room used for actual fit testing. The two rooms shall be well-ventilated to prevent the odor of IAA from becoming evident in the general room air where testing takes place.
- (5) The odor test solution is prepared in a second jar by placing 0.4 ml of the stock solution into 500 ml of odor-free water using a clean dropper or pipette. The solution shall be shaken for 30 seconds and allowed to stand for two to three minutes so that the IAA concentration above the liquid may reach equilibrium. This solution shall be used for only one day.
- (6) A test blank shall be prepared in a third jar by adding 500 cc of odor-free water.

- (7) The odor test and test blank jar lids shall be labeled (e.g., 1 and 2) for jar identification. Labels shall be placed on the lids so that they can be peeled off periodically and switched to maintain the integrity of the test.
- (8) The following instruction shall be typed on a card and placed on the table in front of the two test jars (i.e., 1 and 2): "The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in front of you contain water. One of these bottles also contains a small amount of banana oil. Be sure the covers are on tight, then shake each bottle for two seconds. Unscrew the lid of each bottle, one at a time, and sniff at the mouth of the bottle. Indicate to the test conductor which bottle contains banana oil."
- (9) The mixtures used in the IAA odor detection test shall be prepared in an area separate from where the test is performed, in order to prevent olfactory fatigue in the subject.
- (10) If the test subject is unable to correctly identify the jar containing the odor test solution, the IAA qualitative fit test shall not be performed.
- (11) If the test subject correctly identifies the jar containing the odor test solution, the test subject may proceed to respirator selection and fit testing.

(b) Isoamyl Acetate Fit Test

- (1) The fit test chamber shall be a clear 55-gallon drum liner suspended inverted over a 2-foot diameter frame so that the top of the chamber is about 6 inches above the test subject's head. If no drum liner is available, a similar chamber shall be constructed using plastic sheeting. The inside top center of the chamber shall have a small hook attached.
- (2) Each respirator used for the fitting and fit testing shall be equipped with organic vapor cartridges or offer protection against organic vapors.
- (3) After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well-ventilated, as by an exhaust fan or lab hood, to prevent general room contamination.
- (4) A copy of the test exercises and any prepared text from which the subject is to read shall be taped to the inside of the test chamber.
- (5) Upon entering the test chamber, the test subject shall be given a 6-inch by 5-inch piece of paper towel, or other porous, absorbent, single-ply material, folded in half and wetted with 0.75 ml of pure IAA. The test subject shall hang the wet towel on the hook at the top of the chamber. An IAA test swab or ampule may be substituted for the IAA wetted paper towel provided it has been demonstrated that the alternative IAA source will generate an IAA test atmosphere with a concentration equivalent to that generated by the paper towel method.

- (6) Allow two minutes for the IAA test concentration to stabilize before starting the fit test exercises. This would be an appropriate time to talk with the test subject; to explain the fit test, the importance of his/her cooperation, and the purpose for the test exercises; or to demonstrate some of the exercises.
- (7) If at any time during the test, the subject detects the banana-like odor of IAA, the test is failed. The subject shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.
- (8) If the test is failed, the subject shall return to the selection room and remove the respirator. The test subject shall repeat the odor sensitivity test, select and put on another respirator, return to the test area and again begin the fit test procedure described in (b) (1) through (7) above. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject shall wait at least 5 minutes before retesting. Odor sensitivity will usually have returned by this time.
- (9) If the subject passes the test, the efficiency of the test procedure shall be demonstrated by having the subject break the respirator face seal and take a breath before exiting the chamber.
- (10) When the test subject leaves the chamber, the subject shall remove the saturated towel and return it to the person conducting the test, so that there is no significant IAA concentration buildup in the chamber during subsequent tests. The used towels shall be kept in a self-sealing plastic bag to keep the test area from being contaminated.

3. Saccharin Solution Aerosol Protocol

The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

- (a) Taste threshold screening. The saccharin taste threshold screening, intended to determine whether the individual being tested can detect the taste of saccharin.
 - (1) During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches in diameter by 14 inches tall with at least the front portion clear and that allows free movements of the head when a respirator is worn. An enclosure substantially similar to the 3M hood assembly, parts # FT 14 and # FT 15 combined, is adequate.
 - (2) The test enclosure shall have a $\frac{3}{4}$ -inch (1.9 cm) hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.
 - (3) The test subject shall don the test enclosure. Throughout the threshold screening test, the test subject shall breathe through his/her slightly open mouth with tongue extended. The subject is instructed to report when he/she detects a sweet taste.
 - (4) Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the threshold check solution into the enclosure. The nozzle is

directed away from the nose and mouth of the person. This nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

- (5) The threshold check solution is prepared by dissolving 0.83 gram of sodium saccharin USP in 100 ml of warm water. It can be prepared by putting 1 ml of the fit test solution (see (b)(5) below) in 100 ml of distilled water.
- (6) To produce the aerosol, the nebulizer bulb is firmly squeezed so that it collapses completely, then released and allowed to fully expand.
- (7) Ten squeezes are repeated rapidly and then the test subject is asked whether the saccharin can be tasted. If the test subject reports tasting the sweet taste during the ten squeezes, the screening test is completed. The taste threshold is noted as ten regardless of the number of squeezes actually completed.
- (8) If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet taste during the second ten squeezes, the screening test is completed. The taste threshold is noted as twenty regardless of the number of squeezes actually completed.
- (9) If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted. If the test subject reports tasting the sweet taste during the third set of ten squeezes, the screening test is completed. The taste threshold is noted as thirty regardless of the number of squeezes actually completed.
- (10) The test conductor will take note of the number of squeezes required to solicit a taste response.
- (11) If the saccharin is not tasted after 30 squeezes (step 10), the test subject is unable to taste saccharin and may not perform the saccharin fit test.

Note to paragraph 3. (a): If the test subject eats or drinks something sweet before the screening test, he/she may be unable to taste the weak saccharin solution.

- (12) If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.
 - (13) Correct use of the nebulizer means that approximately 1 ml of liquid is used at a time in the nebulizer body.
 - (14) The nebulizer shall be thoroughly rinsed in water, shaken dry, and refilled at least each morning and afternoon or at least every four hours.
- (b) Saccharin solution aerosol fit test procedure.

- (1) The test subject may not eat, drink (except plain water), smoke, or chew gum for 15 minutes before the test.

- (2) The fit test uses the same enclosure described in 3. (a) above.
- (3) The test subject shall don the enclosure while wearing the respirator selected in section I. A. of this appendix. The respirator shall be properly adjusted and equipped with a particulate filter(s).
- (4) A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.
- (5) The fit test solution is prepared by adding 83 grams of sodium saccharin to 100 ml of warm water.
- (6) As before, the test subject shall breathe through the slightly open mouth with tongue extended, and report if he/she tastes the sweet taste of saccharin.
- (7) The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of saccharin fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20 or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test. A minimum of 10 squeezes is required.
- (8) After generating the aerosol, the test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.
- (9) Every 30 seconds the aerosol concentration shall be replenished using one half the original number of squeezes used initially (e.g., 5, 10 or 15).
- (10) The test subject shall indicate to the test conductor if at any time during the fit test the taste of saccharin is detected. If the test subject does not report tasting the saccharin, the test is passed.
- (11) If the taste of saccharin is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).
- (12) Since the nebulizer has a tendency to clog during use, the test operator must make periodic checks of the nebulizer to ensure that it is not clogged. If clogging is found at the end of the test session, the test is invalid.

4. Bitrex™ (Denatonium Benzoate) Solution Aerosol Qualitative Fit Test Protocol

The Bitrex™ (Denatonium benzoate) solution aerosol QLFT protocol uses the published saccharin test protocol because that protocol is widely accepted. Bitrex is routinely used as a taste aversion agent in household liquids which children should not be drinking and is endorsed by the American Medical Association, the National Safety Council, and the American Association of Poison Control Centers. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) Taste Threshold Screening.

The Bitrex taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of Bitrex.

- (1) During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches (30.5 cm) in diameter by 14 inches (35.6 cm) tall. The front portion of the enclosure shall be clear from the respirator and allow free movement of the head when a respirator is worn. An enclosure substantially similar to the 3M hood assembly, parts # FT 14 and # FT 15 combined, is adequate.

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- (2) The test enclosure shall have a $\frac{3}{4}$ inch (1.9 cm) hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.
- (3) The test subject shall don the test enclosure. Throughout the threshold screening test, the test subject shall breathe through his or her slightly open mouth with tongue extended. The subject is instructed to report when he/she detects a bitter taste.
- (4) Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the Threshold Check Solution into the enclosure. This Nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.
- (5) The Threshold Check Solution is prepared by adding 13.5 milligrams of Bitrex to 100 ml of 5% salt (NaCl) solution in distilled water.
- (6) To produce the aerosol, the nebulizer bulb is firmly squeezed so that the bulb collapses completely, and is then released and allowed to fully expand.
- (7) An initial ten squeezes are repeated rapidly and then the test subject is asked whether the Bitrex can be tasted. If the test subject reports tasting the bitter taste during the ten squeezes, the screening test is completed. The taste threshold is noted as ten regardless of the number of squeezes actually completed.
- (8) If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste during the second ten squeezes, the screening test is completed. The taste threshold is noted as twenty regardless of the number of squeezes actually completed.
- (9) If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the Bitrex is tasted. If the test subject reports tasting the bitter taste during the third set of ten squeezes, the screening test is completed. The taste threshold is noted as thirty regardless of the number of squeezes actually completed.
- (10) The test conductor will take note of the number of squeezes required to solicit a taste response.

- (11) If the Bitrex is not tasted after 30 squeezes (step 10), the test subject is unable to taste Bitrex and may not perform the Bitrex fit test.
- (12) If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.
- (13) Correct use of the nebulizer means that approximately 1 ml of liquid is used at a time in the nebulizer body.
- (14) The nebulizer shall be thoroughly rinsed in water, shaken to dry, and refilled at least each morning and afternoon or at least every four hours.

(b) Bitrex Solution Aerosol Fit Test Procedure.

- (1) The test subject may not eat, drink (except plain water), smoke, or chew gum for 15 minutes before the test.
- (2) The fit test uses the same enclosure as that described in 4. (a) above.
- (3) The test subject shall don the enclosure while wearing the respirator selected according to section I. A. of this appendix. The respirator shall be properly adjusted and equipped with any type particulate filter(s).
- (4) A second DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.
- (5) The fit test solution is prepared by adding 337.5 mg of Bitrex to 200 ml of a 5% salt (NaCl) solution in warm water.
- (6) As before, the test subject shall breathe through his or her slightly open mouth with tongue extended, and be instructed to report if he/she tastes the bitter taste of Bitrex.
- (7) The nebulizer is inserted into the hole in the front of the enclosure and an initial concentration of the fit test solution is sprayed into the enclosure using the same number of squeezes (either 10, 20 or 30 squeezes) based on the number of squeezes required to elicit a taste response as noted during the screening test.
- (8) After generating the aerosol, the test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.
- (9) Every 30 seconds the aerosol concentration shall be replenished using one half the number of squeezes used initially (e.g., 5, 10 or 15).
- (10) The test subject shall indicate to the test conductor if at any time during the fit test the taste of Bitrex is detected. If the test subject does not report tasting the Bitrex, the test is passed.

- (11) If the taste of Bitrex is detected, the fit is deemed unsatisfactory and the test is failed. A different respirator shall be tried and the entire test procedure is repeated (taste threshold screening and fit testing).

5. Irritant Smoke (Stannic Chloride) Protocol

This qualitative fit test uses a person's response to the irritating chemicals released in the "smoke" produced by a stannic chloride ventilation smoke tube to detect leakage into the respirator.

(a) General Requirements and Precautions

- (1) The respirator to be tested shall be equipped with high efficiency particulate air (HEPA) or P100 series filter(s).
- (2) Only stannic chloride smoke tubes shall be used for this protocol.
- (3) No form of test enclosure or hood for the test subject shall be used.
- (4) The smoke can be irritating to the eyes, lungs, and nasal passages. The test conductor shall take precautions to minimize the test subject's exposure to irritant smoke. Sensitivity varies, and certain individuals may respond to a greater degree to irritant smoke. Care shall be taken when performing the sensitivity screening checks that determine whether the test subject can detect irritant smoke to use only the minimum amount of smoke necessary to elicit a response from the test subject.
- (5) The fit test shall be performed in an area with adequate ventilation to prevent exposure of the person conducting the fit test or the build-up of irritant smoke in the general atmosphere.

(b) Sensitivity Screening Check

The person to be tested must demonstrate his or her ability to detect a weak concentration of the irritant smoke.

- (1) The test operator shall break both ends of a ventilation smoke tube containing stannic chloride, and attach one end of the smoke tube to a low flow air pump set to deliver 200 milliliters per minute, or an aspirator squeeze bulb. The test operator shall cover the other end of the smoke tube with a short piece of tubing to prevent potential injury from the jagged end of the smoke tube.
- (2) The test operator shall advise the test subject that the smoke can be irritating to the eyes, lungs, and nasal passages and instruct the subject to keep his/her eyes closed while the test is performed.
- (3) The test subject shall be allowed to smell a weak concentration of the irritant smoke before the respirator is donned to become familiar with its irritating properties and to determine if he/she can detect the irritating properties of the smoke. The test operator shall carefully direct a small amount of the irritant smoke in the test subject's direction to determine that he/she can detect it.

(c) Irritant Smoke Fit Test Procedure

- (1) The person being fit tested shall don the respirator without assistance, and perform the required user seal check(s).
- (2) The test subject shall be instructed to keep his/her eyes closed.
- (3) The test operator shall direct the stream of irritant smoke from the smoke tube toward the face seal area of the test subject, using the low flow pump or the squeeze bulb. The test operator shall begin at least 12 inches from the facepiece and move the smoke stream around the whole perimeter of the mask. The operator shall gradually make two more passes around the perimeter of the mask, moving to within six inches of the respirator.
- (4) If the person being tested has not had an involuntary response and/or detected the irritant smoke, proceed with the test exercises.
- (5) The exercises identified in section I.A. 14. of this appendix shall be performed by the test subject while the respirator seal is being continually challenged by the smoke, directed around the perimeter of the respirator at a distance of six inches.
- (6) If the person being fit tested reports detecting the irritant smoke at any time, the test is failed. The person being retested must repeat the entire sensitivity check and fit test procedure.
- (7) Each test subject passing the irritant smoke test without evidence of a response (involuntary cough, irritation) shall be given a second sensitivity screening check, with the smoke from the same smoke tube used during the fit test, once the respirator has been removed, to determine whether he/she still reacts to the smoke. Failure to evoke a response shall void the fit test.
- (8) If a response is produced during this second sensitivity check, then the fit test is passed.

C. Quantitative Fit Test (QNFT) Protocols

The following quantitative fit testing procedures have been demonstrated to be acceptable: quantitative fit testing using a non-hazardous test aerosol (such as corn oil, polyethylene glycol 400 [PEG 400], di-2-ethyl hexyl sebacate [DEHS], or sodium chloride) generated in a test chamber, and employing instrumentation to quantify the fit of the respirator; quantitative fit testing using ambient aerosol as the test agent and appropriate instrumentation (condensation nuclei counter) to quantify the respirator fit; quantitative fit testing using controlled negative pressure and appropriate instrumentation to measure the volumetric leak rate of a facepiece to quantify the respirator fit.

1. General

- (a) The employer shall ensure that persons administering QNFT are able to calibrate equipment and perform tests properly, recognize invalid tests, calculate fit factors properly and ensure that test equipment is in proper working order.
- (b) The employer shall ensure that QNFT equipment is kept clean, and is maintained and calibrated according to the manufacturer's instructions so as to operate at the parameters for which it was designed.

2. Generated Aerosol Quantitative Fit Testing Protocol

(a) Apparatus.

- (1) Instrumentation. Aerosol generation, dilution, and measurement systems using particulates (corn oil, polyethylene glycol 400 [PEG 400], di-2-ethyl hexyl sebacate [DEHS] or sodium chloride) as test aerosols shall be used for quantitative fit testing.
- (2) Test chamber. The test chamber shall be large enough to permit all test subjects to perform freely all required exercises without disturbing the test agent concentration or the measurement apparatus. The test chamber shall be equipped and constructed so that the test agent is effectively isolated from the ambient air, yet uniform in concentration throughout the chamber.
- (3) When testing air-purifying respirators, the normal filter or cartridge element shall be replaced with a high efficiency particulate air (HEPA) or P100 series filter supplied by the same manufacturer.
- (4) The sampling instrument shall be selected so that a computer record or strip chart record may be made of the test showing the rise and fall of the test agent concentration with each inspiration and expiration at fit factors of at least 2,000. Integrators or computers that integrate the amount of test agent penetration leakage into the respirator for each exercise may be used provided a record of the readings is made.
- (5) The combination of substitute air-purifying elements, test agent and test agent concentration shall be such that the test subject is not exposed in excess of an established exposure limit for the test agent at any time during the testing process, based upon the length of the exposure and the exposure limit duration.
- (6) The sampling port on the test specimen respirator shall be placed and constructed so that no leakage occurs around the port (e.g., where the respirator is probed), a free air flow is allowed into the sampling line at all times, and there is no interference with the fit or performance of the respirator. The in-mask sampling device (probe) shall be designed and used so that the air sample is drawn from the breathing zone of the test subject, midway between the nose and mouth and with the probe extending into the facepiece cavity at least $\frac{1}{4}$ inch.

- (7) The test setup shall permit the person administering the test to observe the test subject inside the chamber during the test.
- (8) The equipment generating the test atmosphere shall maintain the concentration of test agent constant to within a 10 percent variation for the duration of the test.
- (9) The time lag (interval between an event and the recording of the event on the strip chart or computer or integrator) shall be kept to a minimum. There shall be a clear association between the occurrence of an event and its being recorded.
- (10) The sampling line tubing for the test chamber atmosphere and for the respirator sampling port shall be of equal diameter and of the same material. The length of the two lines shall be equal.
- (11) The exhaust flow from the test chamber shall pass through an appropriate filter (i.e., high efficiency particulate filter) before release.

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- (12) When sodium chloride aerosol is used, the relative humidity inside the test chamber shall not exceed 50 percent.
- (13) The limitations of instrument detection shall be taken into account when determining the fit factor.
- (14) Test respirators shall be maintained in proper working order and be inspected regularly for deficiencies such as cracks or missing valves and gaskets.

(b) Procedural Requirements.

- (1) When performing the initial user seal check using a positive or negative pressure check, the sampling line shall be crimped closed in order to avoid air pressure leakage during either of these pressure checks.
- (2) The use of an abbreviated screening QLFT test is optional. Such a test may be utilized in order to quickly identify poor fitting respirators that passed the positive and/or negative pressure test and reduce the amount of QNFT time. The use of the CNC QNFT instrument in the count mode is another optional method to obtain a quick estimate of fit and eliminate poor fitting respirators before going on to perform a full QNFT.
- (3) A reasonably stable test agent concentration shall be measured in the test chamber prior to testing. For canopy or shower curtain types of test units, the determination of the test agent's stability may be established after the test subject has entered the test environment.
- (4) Immediately after the subject enters the test chamber, the test agent concentration inside the respirator shall be measured to ensure that the peak penetration does not exceed 5 percent for a half mask or 1 percent for a full facepiece respirator.

- (5) A stable test agent concentration shall be obtained prior to the actual start of testing.
- (6) Respirator restraining straps shall not be over-tightened for testing. The straps shall be adjusted by the wearer without assistance from other persons to give a reasonably comfortable fit typical of normal use. The respirator shall not be adjusted once the fit test exercises begin.
- (7) The test shall be terminated whenever any single peak penetration exceeds 5 percent for half masks and 1 percent for full facepiece respirators. The test subject shall be refitted and retested.
- (8) Calculation of fit factors.
 - (i) The fit factor shall be determined for the quantitative fit test by taking the ratio of the average chamber concentration to the concentration measured inside the respirator for each test exercise except the grimace exercise.
 - (ii) The average test chamber concentration shall be calculated as the arithmetic average of the concentration measured before and after each test (i.e., 7 exercises) or the arithmetic average of the concentration measured before and after each exercise or the true average measured continuously during the respirator sample.
 - (iii) The concentration of the challenge agent inside the respirator shall be determined by one of the following methods:
 - (A) Average peak penetration method means the method of determining test agent penetration into the respirator utilizing a strip chart recorder, integrator, or computer. The agent penetration is determined by an average of the peak heights on the graph or by computer integration, for each exercise except the grimace exercise. Integrators or computers that calculate the actual test agent penetration into the respirator for each exercise will also be considered to meet the requirements of the average peak penetration method.
 - (B) Maximum peak penetration method means the method of determining test agent penetration in the respirator as determined by strip chart recordings of the test. The highest peak penetration for a given exercise is taken to be representative of average penetration into the respirator for that exercise.
 - (C) Integration by calculation of the area under the individual peak for each exercise except the grimace exercise. This includes computerized integration.
 - (D) The calculation of the overall fit factor using individual exercise fit factors involves first converting the exercise fit factors to penetration values, determining the average, and then converting that result back to a fit factor. This procedure is described in the following equation:

Where ff_1 , ff_2 , ff_3 , etc. are the fit factors for exercises 1, 2, 3, etc.

- (9) The test subject shall not be permitted to wear a half mask or quarter facepiece respirator unless a minimum fit factor of 100 is obtained, or a full facepiece respirator unless a minimum fit factor of 500 is obtained.
- (10) Filters used for quantitative fit testing shall be replaced whenever increased breathing resistance is encountered, or when the test agent has altered the integrity of the filter media.

3. Ambient Aerosol Condensation Nuclei Counter (CNC) Quantitative Fit Testing Protocol.

The ambient aerosol condensation nuclei counter (CNC) quantitative fit testing (Portacount™) protocol quantitatively fit tests respirators with the use of a probe. The probed respirator is only used for quantitative fit tests. A probed respirator has a special sampling device, installed on the respirator, that allows the probe to sample the air from inside the mask. A probed respirator is required for each make, style, model, and size that the employer uses and can be obtained from the respirator manufacturer or distributor. The CNC instrument manufacturer, TSI Inc., also provides probe attachments (TSI sampling adapters) that permit fit testing in an employee's own respirator. A minimum fit factor pass level of at least 100 is necessary for a half-mask respirator and a minimum fit factor pass level of at least 500 is required for a full facepiece negative pressure respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) Portacount Fit Test Requirements.

- (1) Check the respirator to make sure the sampling probe and line are properly attached to the facepiece and that the respirator is fitted with a particulate filter capable of preventing significant penetration by the ambient particles used for the fit test (e.g., NIOSH 42 CFR 84 series 100, series 99, or series 95 particulate filter) per manufacturer's instruction.

[Revised at 63 FR 20099, April 23, 1998]

- (2) Instruct the person to be tested to don the respirator for five minutes before the fit test starts. This purges the ambient particles trapped inside the respirator and permits the wearer to make certain the respirator is comfortable. This individual shall already have been trained on how to wear the respirator properly.
- (3) Check the following conditions for the adequacy of the respirator fit: Chin properly placed; Adequate strap tension, not overly tightened; fit across nose bridge; Respirator of proper size to span distance from nose to chin; Tendency of the respirator to slip; Self-observation in a mirror to evaluate fit and respirator position.
- (4) Have the person wearing the respirator do a user seal check. If leakage is detected, determine the cause. If leakage is from a poorly fitting facepiece, try another size of the same model respirator, or another model of respirator.
- (5) Follow the manufacturer's instructions for operating the Portacount and proceed with the test.

- (6) The test subject shall be instructed to perform the exercises in section I. A. 14. of this appendix.
- (7) After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of respirator shall be tried.

(b) Portacount Test Instrument.

- (1) The Portacount will automatically stop and calculate the overall fit factor for the entire set of exercises. The overall fit factor is what counts. The Pass or Fail message will indicate whether or not the test was successful. If the test was a Pass, the fit test is over.
- (2) Since the pass or fail criterion of the Portacount is user programmable, the test operator shall ensure that the pass or fail criterion meet the requirements for minimum respirator performance in this Appendix.
- (3) A record of the test needs to be kept on file, assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model, style, and size of respirator used; and date tested.

4. Controlled Negative Pressure (CNP) Quantitative Fit Testing Protocol.

The CNP protocol provides an alternative to aerosol fit test methods. The CNP fit test method technology is based on exhausting air from a temporarily sealed respirator facepiece to generate and then maintain a constant negative pressure inside the facepiece. The rate of air exhaust is controlled so that a constant negative pressure is maintained in the respirator during the fit test. The level of pressure is selected to replicate the mean inspiratory pressure that causes leakage into the respirator under normal use conditions. With pressure held constant, air flow out of the respirator is equal to air flow into the respirator. Therefore, measurement of the exhaust stream that is required to hold the pressure in the temporarily sealed respirator constant yields a direct measure of leakage air flow into the respirator. The CNP fit test method measures leak rates through the facepiece as a method for determining the facepiece fit for negative pressure respirators. The CNP instrument manufacturer Dynatech Nevada also provides attachments (sampling manifolds) that replace the filter cartridges to permit fit testing in an employee's own respirator. To perform the test, the test subject closes his or her mouth and holds his/her breath, after which an air pump removes air from the respirator facepiece at a pre-selected constant pressure. The facepiece fit is expressed as the leak rate through the facepiece, expressed as milliliters per minute. The quality and validity of the CNP fit tests are determined by the degree to which the in-mask pressure tracks the test pressure during the system measurement time of approximately five seconds. Instantaneous feedback in the form of a real-time pressure trace of the in-mask pressure is provided and used to determine test validity and quality. A minimum fit factor pass level of 100 is necessary for a half-mask respirator and a minimum fit factor of at least 500 is required for a full facepiece respirator. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(a) CNP Fit Test Requirements.

- (1) The instrument shall have a non-adjustable test pressure of 15.0 mm water pressure.

- (2) The CNP system defaults selected for test pressure shall be set at -15 mm of water (-0.58 inches of water) and the modeled inspiratory flow rate shall be 53.8 liters per minute for performing fit tests.

[Corrected at 63 FR 20099, April 23, 1998]

(Note: CNP systems have built-in capability to conduct fit testing that is specific to unique work rate, mask, and gender situations that might apply in a specific workplace. Use of system default values, which were selected to represent respirator wear with medium cartridge resistance at a low-moderate work rate, will allow inter-test comparison of the respirator fit.)

- (3) The individual who conducts the CNP fit testing shall be thoroughly trained to perform the test.
- (4) The respirator filter or cartridge needs to be replaced with the CNP test manifold. The inhalation valve downstream from the manifold either needs to be temporarily removed or propped open.
- (5) The test subject shall be trained to hold his or her breath for at least 20 seconds.
- (6) The test subject shall don the test respirator without any assistance from the individual who conducts the CNP fit test.
- (7) The QNFT protocol shall be followed according to section I. C. 1. of this appendix with an exception for the CNP test exercises.

(b) CNP Test Exercises.

- (1) Normal breathing. In a normal standing position, without talking, the subject shall breathe normally for 1 minute. After the normal breathing exercise, the subject needs to hold head straight ahead and hold his or her breath for 10 seconds during the test measurement.
- (2) Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply for 1 minute, being careful not to hyperventilate. After the deep breathing exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during test measurement.
- (3) Turning head side to side. Standing in place, the subject shall slowly turn his or her head from side to side between the extreme positions on each side for 1 minute. The head shall be held at each extreme momentarily so the subject can inhale at each side. After the turning head side to side exercise, the subject needs to hold head full left and hold his or her breath for 10 seconds during test measurement. Next, the subject needs to hold head full right and hold his or her breath for 10 seconds during test measurement.
- (4) Moving head up and down. Standing in place, the subject shall slowly move his or her head up and down for 1 minute. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling). After the moving head up and down

exercise, the subject shall hold his or her head full up and hold his or her breath for 10 seconds during test measurement. Next, the subject shall hold his or her head full down and hold his or her breath for 10 seconds during test measurement.

- (5) Talking. The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage, count backward from 100, or recite a memorized poem or song for 1 minute. After the talking exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement.
- (6) Grimace. The test subject shall grimace by smiling or frowning for 15 seconds.
- (7) Bending Over. The test subject shall bend at the waist as if he or she were to touch his or her toes for 1 minute. Jogging in place shall be substituted for this exercise in those test environments such as shroud-type QNFT units that prohibit bending at the waist. After the bending over exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement.
- (8) Normal Breathing. The test subject shall remove and re-don the respirator within a one-minute period. Then, in a normal standing position, without talking, the subject shall breathe normally for 1 minute. After the normal breathing exercise, the subject shall hold his or her head straight ahead and hold his or her breath for 10 seconds during the test measurement. After the test exercises, the test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become unacceptable, another model of a respirator shall be tried.

(c) CNP Test Instrument.

- (1) The test instrument shall have an effective audio warning device when the test subject fails to hold his or her breath during the test. The test shall be terminated whenever the test subject failed to hold his or her breath. The test subject may be refitted and retested.
- (2) A record of the test shall be kept on file, assuming the fit test was successful. The record must contain the test subject's name; overall fit factor; make, model, style and size of respirator used; and date tested.

Part II. New Fit Test Protocols

- A. Any person may submit to OSHA an application for approval of a new fit test protocol. If the application meets the following criteria, OSHA will initiate a rulemaking proceeding under section 6(b)(7) of the OSH Act to determine whether to list the new protocol as an approved protocol in this Appendix A.
- B. The application must include a detailed description of the proposed new fit test protocol. This application must be supported by either:
 1. A test report prepared by an independent government research laboratory (e.g., Lawrence Livermore National Laboratory, Los Alamos National Laboratory, the National Institute

for Standards and Technology) stating that the laboratory has tested the protocol and had found it to be accurate and reliable; or

2. An article that has been published in a peer-reviewed industrial hygiene journal describing the protocol and explaining how test data support the protocol's accuracy and reliability.
- C. If OSHA determines that additional information is required before the Agency commences a rulemaking proceeding under this section, OSHA will so notify the applicant and afford the applicant the opportunity to submit the supplemental information. Initiation of a rulemaking proceeding will be deferred until OSHA has received and evaluated the supplemental information.

APPENDIX B-1 TO §1910.134: USER SEAL CHECK PROCEDURES (Mandatory)

The individual who uses a tight-fitting respirator is to perform a user seal check to ensure that an adequate seal is achieved each time the respirator is put on. Either the positive and negative pressure checks listed in this appendix, or the respirator manufacturer's recommended user seal check method shall be used. User seal checks are not substitutes for qualitative or quantitative fit tests.

I. Facepiece Positive and/or Negative Pressure Checks

- A. Positive pressure check. Close off the exhalation valve and exhale gently into the facepiece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the facepiece without any evidence of outward leakage of air at the seal. For most respirators this method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test.
- B. Negative pressure check. Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s), inhale gently so that the facepiece collapses slightly, and hold the breath for ten seconds. The design of the inlet opening of some cartridges cannot be effectively covered with the palm of the hand. The test can be performed by covering the inlet opening of the cartridge with a thin latex or nitrile glove. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

II. Manufacturer's Recommended User Seal Check Procedures

The respirator manufacturer's recommended procedures for performing a user seal check may be used instead of the positive and/or negative pressure check procedures provided that the employer demonstrates that the manufacturer's procedures are equally effective.

APPENDIX B-2 TO §1910.134: RESPIRATOR CLEANING PROCEDURES (Mandatory)

These procedures are provided for employer use when cleaning respirators. They are general in nature, and the employer as an alternative may use the cleaning recommendations provided by

the manufacturer of the respirators used by their employees, provided such procedures are as effective as those listed here in Appendix B-2. Equivalent effectiveness simply means that the procedures used must accomplish the objectives set forth in Appendix B-2, i.e., must ensure that the respirator is properly cleaned and disinfected in a manner that prevents damage to the respirator and does not cause harm to the user.

I. Procedures for Cleaning Respirators

- A. Remove filters, cartridges, or canisters. Disassemble facepieces by removing speaking diaphragms, demand and pressure-demand valve assemblies, hoses, or any components recommended by the manufacturer. Discard or repair any defective parts.
- B. Wash components in warm (43° C [110° F] maximum) water with a mild detergent or with a cleaner recommended by the manufacturer. A stiff bristle (not wire) brush may be used to facilitate the removal of dirt.
- C. Rinse components thoroughly in clean, warm (43° C [110° F] maximum), preferably running water. Drain.
- D. When the cleaner used does not contain a disinfecting agent, respirator components should be immersed for two minutes in one of the following:
 - 1. Hypochlorite solution (50 ppm of chlorine) made by adding approximately one milliliter of laundry bleach to one liter of water at 43° C (110° F); or,
 - 2. Aqueous solution of iodine (50 ppm iodine) made by adding approximately 0.8 milliliters of tincture of iodine (6-8 grains ammonium and/or potassium iodide/100 cc of 45% alcohol) to one liter of water at 43° C (110° F); or,
 - 3. Other commercially available cleansers of equivalent disinfectant quality when used as directed, if their use is recommended or approved by the respirator manufacturer.
- E. Rinse components thoroughly in clean, warm (43° C [110° F] maximum), preferably running water. Drain. The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on facepieces may result in dermatitis. In addition, some disinfectants may cause deterioration of rubber or corrosion of metal parts if not completely removed.
- F. Components should be hand-dried with a clean lint-free cloth or air-dried.
- G. Reassemble facepiece, replacing filters, cartridges, and canisters where necessary.
- H. Test the respirator to ensure that all components work properly.

APPENDIX C TO §1910.134: OSHA RESPIRATOR MEDICAL EVALUATION QUESTIONNAIRE (Mandatory)

To the employer: Answers to questions in Section 1, and to question 9 in Section 2 of Part A, do not require a medical examination.

To the employee:

Can you read (circle one): Yes/No

Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

Part A. Section 1. (Mandatory) The following information must be provided by every employee who has been selected to use any type of respirator (please print).

1. Today's date: _____
2. Your name: _____
3. Your age (to nearest year): _____
4. Sex (circle one): Male/Female
5. Your height: _____ ft. _____ in.
6. Your weight: _____ lbs.
7. Your job title: _____
8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code): _____
9. The best time to phone you at this number: _____
10. Has your employer told you how to contact the health care professional who will review this questionnaire (circle one): Yes/No
11. Check the type of respirator you will use (you can check more than one category):
 - a. ___ N, R, or P disposable respirator (filter-mask, non-cartridge type only).
 - b. ___ Other type (for example, half- or full-facepiece type, powered-air purifying, supplied-air, self-contained breathing apparatus).
12. Have you worn a respirator (circle one): Yes/No
If "yes," what type(s): _____

Part A. Section 2. (Mandatory) Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please circle "yes" or "no").

1. Do you currently smoke tobacco, or have you smoked tobacco in the last month: Yes/No

2. Have you ever had any of the following conditions?
 - a. Seizures (fits): Yes/No
 - b. Diabetes (sugar disease): Yes/No
 - c. Allergic reactions that interfere with your breathing: Yes/No
 - d. Claustrophobia (fear of closed-in places): Yes/No
 - e. Trouble smelling odors: Yes/No

3. Have you ever had any of the following pulmonary or lung problems?
 - a. Asbestosis: Yes/No
 - b. Asthma: Yes/No
 - c. Chronic bronchitis: Yes/No
 - d. Emphysema: Yes/No
 - e. Pneumonia: Yes/No
 - f. Tuberculosis: Yes/No
 - g. Silicosis: Yes/No
 - h. Pneumothorax (collapsed lung): Yes/No
 - i. Lung cancer: Yes/No
 - j. Broken ribs: Yes/No
 - k. Any chest injuries or surgeries: Yes/No
 - l. Any other lung problem that you've been told about: Yes/No

4. Do you currently have any of the following symptoms of pulmonary or lung illness?
 - a. Shortness of breath: Yes/No
 - b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Yes/No
 - c. Shortness of breath when walking with other people at an ordinary pace on level ground: Yes/No
 - d. Have to stop for breath when walking at your own pace on level ground: Yes/No

- e. Shortness of breath when washing or dressing yourself: Yes/No
 - f. Shortness of breath that interferes with your job: Yes/No
 - g. Coughing that produces phlegm (thick sputum): Yes/No
 - h. Coughing that wakes you early in the morning: Yes/No
 - i. Coughing that occurs mostly when you are lying down: Yes/No
 - j. Coughing up blood in the last month: Yes/No
 - k. Wheezing: Yes/No
 - l. Wheezing that interferes with your job: Yes/No
 - m. Chest pain when you breathe deeply: Yes/No
 - n. Any other symptoms that you think may be related to lung problems: Yes/No
5. Have you ever had any of the following cardiovascular or heart problems?
- a. Heart attack: Yes/No
 - b. Stroke: Yes/No
 - c. Angina: Yes/No
 - d. Heart failure: Yes/No
 - e. Swelling in your legs or feet (not caused by walking): Yes/No
 - f. Heart arrhythmia (heart beating irregularly): Yes/No
 - g. High blood pressure: Yes/No
 - h. Any other heart problem that you've been told about: Yes/No
6. Have you ever had any of the following cardiovascular or heart symptoms?
- a. Frequent pain or tightness in your chest: Yes/No
 - b. Pain or tightness in your chest during physical activity: Yes/No
 - c. Pain or tightness in your chest that interferes with your job: Yes/No
 - d. In the past two years, have you noticed your heart skipping or missing a beat: Yes/No
 - e. Heartburn or indigestion that is not related to eating: Yes/No

- f. Any other symptoms that you think may be related to heart or circulation problems: Yes/No
7. Do you currently take medication for any of the following problems?
- a. Breathing or lung problems: Yes/No
 - b. Heart trouble: Yes/No
 - c. Blood pressure: Yes/No
 - d. Seizures (fits): Yes/No
8. If you've used a respirator, have you ever had any of the following problems? (If you've never used a respirator, check the following space and go to question 9:)
- a. Eye irritation: Yes/No
 - b. Skin allergies or rashes: Yes/No
 - c. Anxiety: Yes/No
 - d. General weakness or fatigue: Yes/No
 - e. Any other problem that interferes with your use of a respirator: Yes/No
9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire: Yes/No

Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-facepiece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.

10. Have you ever lost vision in either eye (temporarily or permanently): Yes/No
11. Do you currently have any of the following vision problems?
- a. Wear contact lenses: Yes/No
 - b. Wear glasses: Yes/No
 - c. Color blind: Yes/No
 - d. Any other eye or vision problem: Yes/No
12. Have you ever had an injury to your ears, including a broken ear drum: Yes/No
13. Do you currently have any of the following hearing problems?

- a. Difficulty hearing: Yes/No
- b. Wear a hearing aid: Yes/No
- c. Any other hearing or ear problem: Yes/No

14. Have you ever had a back injury: Yes/No

15. Do you currently have any of the following musculoskeletal problems?

- a. Weakness in any of your arms, hands, legs, or feet: Yes/No
- b. Back pain: Yes/No
- c. Difficulty fully moving your arms and legs: Yes/No
- d. Pain or stiffness when you lean forward or backward at the waist: Yes/No
- e. Difficulty fully moving your head up or down: Yes/No
- f. Difficulty fully moving your head side to side: Yes/No
- g. Difficulty bending at your knees: Yes/No
- h. Difficulty squatting to the ground: Yes/No
- i. Climbing a flight of stairs or a ladder carrying more than 25 lbs: Yes/No
- j. Any other muscle or skeletal problem that interferes with using a respirator: Yes/No

[Corrected at 63 FR 20099, April 23, 1998]

Part B Any of the following questions, and other questions not listed, may be added to the questionnaire at the discretion of the health care professional who will review the questionnaire.

1. In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen: Yes/No

If "yes," do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions: Yes/No

2. At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (e.g., gases, fumes, or dust), or have you come into skin contact with hazardous chemicals: Yes/No

If "yes," name the chemicals if you know them: _____

3. Have you ever worked with any of the materials, or under any of the conditions, listed below:

a. Asbestos: Yes/No

- b. Silica (e.g., in sandblasting): Yes/No
- c. Tungsten/cobalt (e.g., grinding or welding this material): Yes/No
- d. Beryllium: Yes/No
- e. Aluminum: Yes/No
- f. Coal (for example, mining): Yes/No
- g. Iron: Yes/No
- h. Tin: Yes/No
- i. Dusty environments: Yes/No
- j. Any other hazardous exposures: Yes/No

If "yes," describe these exposures: _____

- 4. List any second jobs or side businesses you have: _____
- 5. List your previous occupations: _____
- 6. List your current and previous hobbies:
- 7. Have you been in the military services? Yes/No

If "yes," were you exposed to biological or chemical agents (either in training or combat):
Yes/No

- 8. Have you ever worked on a HAZMAT team? Yes/No
- 9. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason (including over-the-counter medications): Yes/No

If "yes," name the medications if you know them: _____

- 10. Will you be using any of the following items with your respirator(s)?
 - a. HEPA Filters: Yes/No
 - b. Canisters (for example, gas masks): Yes/No
 - c. Cartridges: Yes/No
- 11. How often are you expected to use the respirator(s) (circle "yes" or "no" for all answers that apply to you)?:

- a. Escape only (no rescue): Yes/No
- b. Emergency rescue only: Yes/No
- c. Less than 5 hours per week: Yes/No
- d. Less than 2 hours per day: Yes/No
- e. 2 to 4 hours per day: Yes/No
- f. Over 4 hours per day: Yes/No

12. During the period you are using the respirator(s), is your work effort:

- a. Light (less than 200 kcal per hour): Yes/No

If "yes," how long does this period last during the average shift: ____ hrs. ____ mins.

Examples of a light work effort are sitting while writing, typing, drafting, or performing light assembly work; or standing while operating a drill press (1-3 lbs.) or controlling machines.

- b. Moderate (200 to 350 kcal per hour): Yes/No

If "yes," how long does this period last during the average shift: ____ hrs. ____ mins.

Examples of moderate work effort are sitting while nailing or filing; driving a truck or bus in urban traffic; standing while drilling, nailing, performing assembly work, or transferring a moderate load (about 35 lbs.) at trunk level; walking on a level surface about 2 mph or down a 5-degree grade about 3 mph; or pushing a wheelbarrow with a heavy load (about 100 lbs.) on a level surface.

- c. Heavy (above 350 kcal per hour): Yes/No

If "yes," how long does this period last during the average shift: ____ hrs. ____ mins.

Examples of heavy work are lifting a heavy load (about 50 lbs.) from the floor to your waist or shoulder; working on a loading dock; shoveling; standing while bricklaying or chipping castings; walking up an 8-degree grade about 2 mph; climbing stairs with a heavy load (about 50 lbs.).

13. Will you be wearing protective clothing and/or equipment (other than the respirator) when you're using your respirator: Yes/No

If "yes," describe this protective clothing and/or equipment: _____

14. Will you be working under hot conditions (temperature exceeding 77° F): Yes/No

15. Will you be working under humid conditions: Yes/No

16. Describe the work you'll be doing while you're using your respirator(s): _____

17. Describe any special or hazardous conditions you might encounter when you're using your respirator(s) (for example, confined spaces, life-threatening gases):

18. Provide the following information, if you know it, for each toxic substance that you'll be exposed to when you're using your respirator(s):

Name of the first toxic substance: _____

Estimated maximum exposure level per shift: _____

Duration of exposure per shift _____

Name of the second toxic substance: _____

Estimated maximum exposure level per shift: _____

Duration of exposure per shift: _____

Name of the third toxic substance: _____

Estimated maximum exposure level per shift: _____

Duration of exposure per shift: _____

The name of any other toxic substances that you'll be exposed to while using your respirator:

19. Describe any special responsibilities you'll have while using your respirator(s) that may affect the safety and well-being of others (for example, rescue, security):

APPENDIX D TO §1910.134 (Mandatory) INFORMATION FOR EMPLOYEES USING RESPIRATORS WHEN NOT REQUIRED UNDER THE STANDARD

[Heading corrected at 63 FR 20099, April 23, 1998]

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.

2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

APPENDIX II – Inspection of Self-Contained Breathing Apparatus (SCBA)

Checklist For Inspection Of Demand Or Positive Pressure Demand Open Circuit Self-Contained Breathing Apparatus 2.5 With Mode Select Lever

PRIOR TO BEGINNING INSPECTION

1. Check to assure that high pressure hose connect is tight on cylinder fitting.
2. Check the bypass valve – it should be closed.
3. Make sure the mainline valve is open and locked (when lock present).
4. Place the select lever (if present) on demand mode.
5. Check to assure there is no cover or obstruction on regulator outlet.

BACK PACK AND HARNESS ASSEMBLY

A. Straps

1. Visually inspect for complete set.
2. Visually inspect for frayed or damaged straps that may break during use.

B. Buckles

1. Visually inspect for mating ends.
2. Check locking function.

C. Backplate and Cylinder Lock

1. Visually inspect backplate for cracks and for missing rivets or screws.
2. Visually inspect cylinder, hold down strap and physically check strap adjustments and lock to assure that it is fully engaged.

CYLINDER AND CYLINDER VALVE ASSEMBLY

A. Cylinder

1. Physically check cylinder to assure that it is tightly fastened to backplate.
2. Check Hydrostatic Test Date to assure it is current.
3. Visually inspect cylinder for large dents or gouges in metal.

B. Visually Inspect Cylinder Valve Lock For Pressure.

1. Visually inspect cylinders gauge for condition of face, needle and lens.

2. Open cylinder valve and listen for leakage around packing. (If leakage is noted, do not use until repaired). Note function of valve lock.

REGULATOR AND HIGH PRESSURE HOSE

A. High Pressure Hose and Connector

1. Listen or feel for leakage in hose or at hose to cylinder connector. (Bubble in outer hose covering may be caused by seepage of air through hose when stored under pressure. This does not necessarily mean a faulty hose).
2. Visually inspect condition of hose for drying, cracking or gashes.

B. Regulator and Low Pressure Alarm

1. Read pressure on regulator gauge. (Must read at least 1800 psi and not more than rated cylinder pressure).
2. Close cylinder valve. Ascertain that no obstruction is in or over regulator outlet. Position regulator to observe gauge. Slowly open bypass valve. Air should flow from outlet, and gauge pressure should begin to decrease immediately. Alarm should sound at pressure reading between 650 and 550 psi. (This assures function of bypass valve and low pressure alarm). After pressure is completely released, close bypass valve.
3. Place mouth onto or over regulator outlet and blow. A positive pressure should be created and maintained for 5-10 seconds without any loss of air. Next, create a slight negative pressure on regulator and hold for 5-10 seconds. Vacuum should remain constant. This tests the integrity of the diaphragm. Any loss of pressure or vacuum during the test indicates a leak in the apparatus.
4. Open the cylinder valve.
5. Breathe in using the regulator. Air should be delivered with very slight effort.
6. On units with select lever, place hand over regulator outlet. Select pressure demand mode. Remove and replace hand over outlet in rapid movement. Repeat twice more. Air should escape when hand is removed each time, indicating a positive pressure in chamber. Select demand mode on select lever and remove hand from outlet. At this point, there should be no air leaking from any point on the pressurized unit.

FACEPIECE AND CORRUGATED BREATHING TUBE

A. Facepiece

1. Visually inspect head harness for damaged serrations and deteriorated rubber. Visually inspect rubber facepiece body for sign of deterioration or extreme distortion.
2. Visually inspect the lens for a proper seal in the rubber facepiece, check to see that the retaining clamp is properly in place, and check lens for cracks, or large scratches.
3. Visually inspect exhalation valve for visible deterioration or build-up of foreign materials.

B. Breathing Tube and Connector

1. Stretch breathing tube and visually inspect for deterioration and holes.
2. Visually inspect connector to assure good condition of threads and for presence and proper condition of "O" ring or rubber gasket seal.

NOTE: The final test of a facepiece involves a negative-pressure test for overall seal and check of the exhalation valve. When performing a monthly inspection, place the mask against the face and perform the following test. If preparing for use, don the backpack, then the facepiece and use the following procedure.

C. Negative-Pressure Test On Facepiece

1. With facepiece held tightly to face or properly donned, stretch breathing tube to open corrugations and place thumb or hand over end of connector and inhale. Negative pressure should be created inside mask, causing it to pull tightly to face. If negative pressure is not maintained, the facepiece assembly is not adequate and should not be worn.

NOTE: On Scott Pressure-Pak II and IIA facepiece units only, place connector end of the breathing tube approximately $\frac{1}{4}$ - $\frac{1}{2}$ inch from palm of hand and exhale. If you notice any air returning through tube, the mask should not be used.

STORAGE OF UNITS

- A. Replace the cylinder and clean and inspect the unit after each use.
- B. Check to see that the cylinder valve is closed.
- C. Make sure the high pressure hose connector is tight on the cylinder.
- D. Bleed the pressure from the high pressure hose and regulator.
- E. Make sure the bypass valve is closed.
- F. Make sure the mainline valve is open. (When mainline valve lock is present, it should be engaged).
- G. Place the select lever, if present, on demand mode.
- H. Check to make sure all straps are completely loosened and laid straight.
- I. Make sure the facepiece is properly stored to protect against dust, sunlight, heat, extreme cold, excessive moisture, and damaging chemicals.

NOTE: Any discrepancy should be cause to set the unit aside until repair can be performed by a certified repair person.

Checklist For Inspection Of Pressure Demand Open Circuit Self-Contained Breathing Apparatus 4.5 With Donning Switch

PRIOR TO BEGINNING INSPECTION

Check to assure that high pressure hose connection is tight on cylinder fitting.

BACKPACK AND HARNESS ASSEMBLY

A. Straps

1. Visually inspect for complete set.
2. Visually inspect for frayed or damaged straps that may break during use.

B. Buckles

1. Visually inspect for mating ends.
2. Check locking function.

C. Backplate and Cylinder Lock

1. Visually inspect backplate for cracks and missing rivets or screws.
2. Visually inspect cylinder hold down strap and physically check strap tightener and lock to assure that it is fully engaged.

CYLINDER AND CYLINDER VALVE ASSEMBLY

A. Cylinder

1. Physically check cylinder to assure that it is tightly fastened to backplate.
2. Check Hydrostatic Test Date to assure it is current. (Within 3 years for composite lightweight cylinders).
3. Visually inspect cylinder for large dents or gouges in metal.

B. Head and Valve Assembly

1. Visually inspect cylinder valve lock for pressure.
2. Visually inspect cylinder gauge for condition of face, needle and lens.

CYLINDER PRESSURE GAUGE – VIBRALERT ALARM

A. Donning SCBA

1. Check the cylinder pressure gauge for “FULL” indication. If indicated cylinder pressure is below “FULL”, recharge cylinder to 4500 psi or replace with a fully charged cylinder.

2. Check the latest cylinder hydrostatic test date to ensure it is current.

WARNING

CYLINDERS WHICH SHOW EVIDENCE OF EXPOSURE TO HIGH HEAT OR FLAME, SUCH AS PAINT TURNED BROWN OR BLACK, DECALS CHARRED OR MISSING, GAUGE LENS MELTED OR ELASTOMERIC BUMPER DISTORTED, SHALL BE REMOVED FROM SERVICE AND RETESTED PRIOR TO RECHARGING.

3. Check that the breathing regulator purge valve (red knob on regulator) is closed (full clockwise and pointer on knob upward).

CAUTION

DO NOT USE TOOLS TO OPEN OR CLOSE THE PURGE VALVE. CLOSE OR OPEN FINGER-TIGHT ONLY. ROTATION OF THE PURGE VALVE KNOB LIMITED TO $\frac{1}{2}$ TURN.

B. Fully depress the center of the donning switch on the top of the regulator and release.

1. Slowly open the cylinder valve by rotating knob counterclockwise. Listen for Vibralert alarm to actuate and then stop. There shall be no airflow from the facepiece.
2. Don the facepiece or hold the facepiece to the face to effect a good seal.
3. Inhale sharply to automatically start the flow of air.
4. Breathe normally from the facepiece to ensure proper operation.

C. Removing (Doffing) SCBA

1. Remove facepiece from face. Air shall freely flow from the facepiece.
2. Fully depress center of the donning switch on top of regulator and release. The flow of air from the facepiece shall stop.
3. Rotate purge valve $\frac{1}{2}$ turn counterclockwise (pointer on knob downward). Air shall freely flow from the regulator.
4. Rotate purge valve $\frac{1}{2}$ turn counterclockwise to fully closed position (pointer on knob upward). Airflow from regulator must stop.
5. Push in and rotate cylinder valve knob clockwise to close. When cylinder valve is fully closed, open purge valve slightly to vent residual air pressure from system. The Vibralert will actuate as the pressure drops below 1200 psi. When airflow stops, return purge valve to fully closed position (pointer on knob upward).
6. After checking, unit should be placed back into case or walk away bracket, ready for use, with all straps fully extended, cylinder full, purge valve closed and head harness turned back over facepiece.

WARNING

FOLLOW THE ABOVE PROCEDURE EXACTLY. IF THE VIBRALERT ALARM DOES NOT ACTUATE, THE PURGE VALVE DOES NOT ACTUATE, THE DONNING SWITCH DOES NOT OPERATE AS DESCRIBED OR ANY OTHER OPERATIONAL MALFUNCTION IS NOTED, REMOVE THE APPARATUS FROM SERVICE AND TAG FOR REPAIRS.

FACEPIECE AND CORRUGATED BREATHING TUBE

A. Facepiece

1. Visually inspect head harness for damaged serrations and deteriorated rubber. Visually inspect rubber facepiece body for sign of deterioration or extreme distortion.
2. Visually inspect lens for proper seal in rubber facepiece, retaining clamp properly in place, for cracks, or large scratches.

STORAGE OF UNITS

- A. Replace the cylinder and clean and inspect the unit after each use.
- B. After replacing, make sure the cylinder valve is closed.
- C. Make sure the pressure hose connector is tight on the cylinder.
- D. Check to see that the pressure has been bled off of the high pressure hose and regulator.
- E. Adjust all straps so that they are completely loosened and laid straight.
- F. When storing, make sure to protect the facepiece against dust, sunlight, heat, extreme cold, excessive moisture, and damaging chemicals.

NOTE: Any discrepancy found should be cause to set the unit aside until repair can be performed by a certified repair person.

APPENDIX III – Self-Contained Breathing Apparatus Quantitative Fit Test Procedure for Scott-O-Vista and Av- 2000 Facepiece Using Probed Adapter Kit

DIRECTIONS FOR USE OF FIT TEST RESPIRATOR

1. Inspect adapter and be certain that probe is fully retracted.

WARNING

DONNING THE FACEPIECE WITH THE PROBE EXTENDED MAY CAUSE INJURY TO THE TEST SUBJECT

2. Firmly attach a flexible sampling line having an approximately $\frac{1}{8}$ " inside diameter over sampling probe outlet. A drop of water, applied to the exterior of the probe, may be used as lubricant, to facilitate installation of tubing on probe.
3. Have the test subject don the respirator according to directions in the Model 65 Twin Cartridge Respirator Instruction Manual, Donning and Doffing section or with the instructions supplied with the particular facepiece being used.
4. Loosen nut on adapter assembly by turning counterclockwise using fingers, but do not completely remove nut from body of fitting. While observing the tip of the probe and the face of the test subject through the lens of the facepiece, gently push the sampling probe tube inward toward the test subject's upper lip, stopping approximately $\frac{1}{2}$ inch prior to contact with his face.
5. Tighten nut on adapter assembly by turning clockwise with fingers until O-ring is firmly seated.

NOTE: When positive and/or a negative fit check is performed, it should be done after probe is locked into position. (Step 5). Sample line may have to be temporarily blocked for such checks.

6. Proceed to quantitative fit testing. Follow the fit test equipment manufacturer's instructions and/or the established procedures of your respiratory protection program.

WARNING

DO NOT STRIKE OR PUSH ON THE SAMPLING PROBE DURING USE. FORCE APPLIED TO THE PROBE MAY PUSH IT INTO THE FACEPIECE POSSIBLY CAUSING IT TO STRIKE THE TEST SUBJECT'S FACE.

GENERAL RECOMMENDATIONS

Allow sufficient slack in the sample line so that the test subject can perform exercises without exerting a pulling force on the sample line.

Follow the instructions of the test equipment manufacturer, regarding line length, connections, etc. as these variables will effect sample losses and response time.

7. When testing is completed **and before removing facepiece** loosen nut on adapter assembly by turning counterclockwise with finger. Do not completely remove nut from body. Pull probe gently outward away from test subject's face and retighten nut to lock probe tube in the fully retracted position. Then loosen head harness buckles and doff the facepiece as instructed in the manual supplied with the respirator being used. Clean and inspect test respirator after use. See Inspection and Cleaning section of these instructions.

WARNING

REMOVAL OF THE FACEPIECE FROM THE FACE WITHOUT RETRACTING AND LOCKING THE PROBE MAY CAUSE INJURY TO FACE OR EYES OF THE TEST SUBJECT.

CLEANING, INSPECTION AND MAINTENANCE

It is recommended that the facepiece and probed adapter are cleaned and disinfected between testing of different subjects and after the last test of the day. The facepiece, head harness and probed adapter should be inspected at the start of each day's testing and after each cleaning before the next use.

A. CLEANING

Cleaning is to be done as instructed in the Inspection, Cleaning and Storage section of the Twin Cartridge Respirator Instruction Manual with the addition of the following:

Remove the sampling probe assembly and soak it in a container of alcohol for at least (1) minute between testing of different subjects. Shake the probe dry prior to use. If it is necessary to remove the flexible tubing, reassemble stainless steel probe tube so approximately 1/4" of probe tube is inserted into the flexible tubing. Reassemble sampling probe assembly into adapter.

CAUTION

TO AVOID POSSIBLE SWELLING OR DISTORTION OR ELASTOMERIC COMPONENTS (e.g., FACESEAL, GASKETS, O-RING) OF THE FACEPIECE OR ADAPTER, DO NOT CLEAN WITH ALCOHOL.

APPENDIX IV – Sample Forms

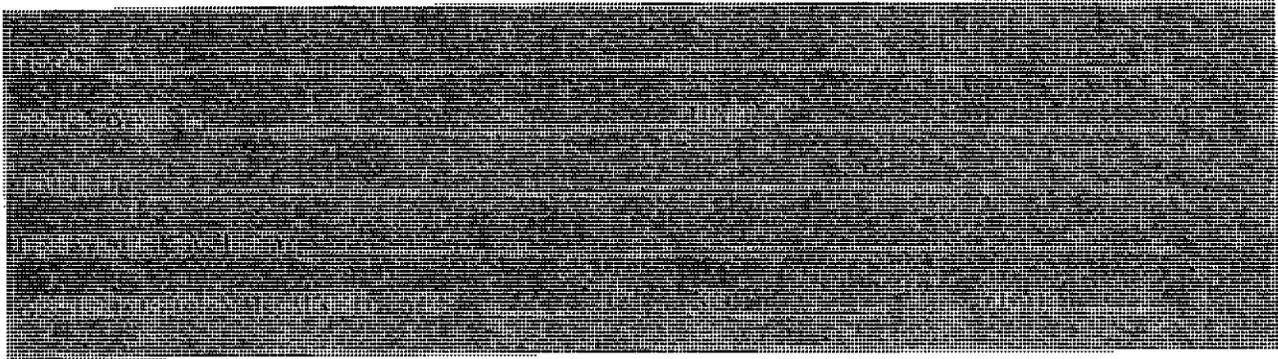
❖ **Respirator Fit Test Form**

❖ **Medical Clearance For Use Of Respirator Form**

THE PORT AUTHORITY OF NY & NJ



INSPECTION & SAFETY DIVISION OCCUPATIONAL HEALTH RESPIRATORY FIT TEST FORM



YES NO

____ HAS BEEN FIT TESTED TO WEAR A NORTH **HALF-FACE** RESPIRATOR

____ HAS BEEN FIT TESTED TO WEAR A NORTH **FULL-FACE** RESPIRATOR

FIT TEST EMPLOYED: QUANTITATIVE/NUMERICAL FIT FACTOR _____
QUALITATIVE _____
UNABLE TO FIT _____

NORTH **HALF-FACE** RESPIRATOR SIZE:

NORTH **FULL-FACE** RESPIRATOR SIZE:

SMALL _____
MEDIUM _____
LARGE _____

SMALL _____
MEDIUM/LARGE _____

NEXT RESPIRATOR REFIT AND MEDICAL CLEARANCE IS REQUIRED BEFORE _____

PLEASE CALL AT LEAST TWO (2) WEEKS PRIOR TO THE DATE ABOVE FOR A FIT TEST APPOINTMENT. PROOF OF ANNUAL MEDICAL CLEARANCE FOR RESPIRATOR USE IS REQUIRED.

I HAVE BEEN FITTED AND HAVE RECEIVED TRAINING IN THE USE AND MAINTENANCE OF MY ASSIGNED RESPIRATOR. I AM ALSO AWARE THAT A COPY OF THE WRITTEN RESPIRATORY PROGRAM IS AVAILABLE AT THE FACILITY FOR MY REVIEW.

EMPLOYEE SIGNATURE

DATE

TEST ADMINISTRATOR SIGNATURE

DATE

Revised: March 1999
Operations Services Department

MEDICAL CLEARANCE FOR USE OF RESPIRATOR

Office Of Medical Services

NOTE: THIS MEDICAL CLEARANCE MUST BE REVIEWED ANNUALLY

INSTRUCTIONS: 1. Prepare in triplicate. 2. Retain original copy for Medical Chart.
 3. Forward duplicate copy to employee. 4. Forward third copy to Health Services Coordinator.

NAME	EMPLOYEE NO.	UNIT NO.	FACILITY
FACILITY ADDRESS			
<input type="checkbox"/> IS MEDICALLY CLEARED FOR USE OF: <div style="text-align: center; margin-top: 10px;"> NEGATIVE PRESSURE RESPIRATOR _____ (POWERED AIR) POSITIVE PRESSURE RESPIRATOR _____ </div>			
<input type="checkbox"/> IS NOT ABLE TO USE A RESPIRATOR AT THIS TIME _____ _____ _____ _____			
_____ SIGNATURE--M.D.			_____ DATE / /

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U.S. Department of Labor

Occupational Safety and Health Administration

Protecting the Safety and Health of America's Workers



[Text Only]

Regulations (Standards - 29 CFR)

Permit-required confined spaces - 1910.146

◀ [Regulations \(Standards - 29 CFR\) - Table of Contents](#)

• Part Number:	1910
• Part Title:	Occupational Safety and Health Standards
• Subpart:	J
• Subpart Title:	General Environmental Controls
• Standard Number:	<u>1910.146</u>
• Title:	Permit-required confined spaces
• Appendix:	<u>A</u> , <u>B</u> , <u>C</u> , <u>D</u> , <u>E</u> , <u>F</u>

1910.146(a)

Scope and application. This section contains requirements for practices and procedures to protect employees in general industry from the hazards of entry into permit-required confined spaces. This section does not apply to agriculture, to construction, or to shipyard employment (Parts 1928, 1926, and 1915 of this chapter, respectively).

1910.146(b)

Definitions.

"Acceptable entry conditions" means the conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter into and work within the space.

"Attendant" means an individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the employer's permit space program.

"Authorized entrant" means an employee who is authorized by the employer to enter a permit space.

"Blanking or blinding" means the absolute closure of a pipe, line, or

duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

"Confined space" means a space that:

- (1) Is large enough and so configured that an employee can bodily enter and perform assigned work; and
- (2) Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.); and
- (3) Is not designed for continuous employee occupancy.

"Double block and bleed" means the closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.

"Emergency" means any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit space that could endanger entrants.

"Engulfment" means the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

"Entry" means the action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

"Entry permit (permit)" means the written or printed document that is provided by the employer to allow and control entry into a permit space and that contains the information specified in paragraph (f) of this section.

"Entry supervisor" means the person (such as the employer, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this section.

NOTE: An entry supervisor also may serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required by this section for each role he or she fills. Also, the duties of entry supervisor may be passed from one individual to

another during the course of an entry operation.

"Hazardous atmosphere" means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

- (1) Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL);
- (2) Airborne combustible dust at a concentration that meets or exceeds its LFL;

NOTE: This concentration may be approximated as a condition in which the dust obscures vision at a distance of 5 feet (1.52 m) or less.

- (3) Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;

- (4) Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances, of this Part and which could result in employee exposure in excess of its dose or permissible exposure limit;

NOTE: An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this provision.

- (5) Any other atmospheric condition that is immediately dangerous to life or health.

NOTE: For air contaminants for which OSHA has not determined a dose or permissible exposure limit, other sources of information, such as Material Safety Data Sheets that comply with the Hazard Communication Standard, section 1910.1200 of this Part, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.

"Hot work permit" means the employer's written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

"Immediately dangerous to life or health (IDLH)" means any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.

NOTE: Some materials -- hydrogen fluoride gas and cadmium vapor, for example -- may produce immediate transient effects that, even if severe, may pass without medical attention, but are followed by sudden, possibly fatal collapse 12-72 hours after exposure. The victim "feels normal" from recovery from transient effects until collapse. Such materials in hazardous quantities are considered to be "immediately" dangerous to life or health.

"Inerting" means the displacement of the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible.

NOTE: This procedure produces an IDLH oxygen-deficient atmosphere.

"Isolation" means the process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as: blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy; or blocking or disconnecting all mechanical linkages.

"Line breaking" means the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

"Non-permit confined space" means a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

"Oxygen deficient atmosphere" means an atmosphere containing less than 19.5 percent oxygen by volume.

"Oxygen enriched atmosphere" means an atmosphere containing more than 23.5 percent oxygen by volume.

"Permit-required confined space (permit space)" means a confined space that has one or more of the following characteristics:

- (1) Contains or has a potential to contain a hazardous atmosphere;
- (2) Contains a material that has the potential for engulfing an entrant;
- (3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
- (4) Contains any other recognized serious safety or health hazard.

"Permit-required confined space program (permit space program)" means the employer's overall program for controlling, and, where appropriate, for protecting employees from, permit space hazards and for regulating employee entry into permit spaces.

"Permit system" means the employer's written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

"Prohibited condition" means any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

"Rescue service" means the personnel designated to rescue employees from permit spaces.

"Retrieval system" means the equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

"Testing" means the process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.

NOTE: Testing enables employers both to devise and implement adequate control measures for the protection of authorized entrants and to determine if acceptable entry conditions are present immediately prior to, and during, entry.

1910.146(c)

General requirements.

1910.146(c)(1)

The employer shall evaluate the workplace to determine if any spaces are permit-required confined spaces.

NOTE: Proper application of the decision flow chart in Appendix A to section 1910.146 would facilitate compliance with this requirement.

1910.146(c)(2)

If the workplace contains permit spaces, the employer shall inform exposed employees, by posting danger signs or by any other equally effective means, of the existence and location of and the danger posed by the permit spaces.

NOTE: A sign reading DANGER -- PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER or using other similar language would satisfy the requirement for a sign.

..1910.146(c)(3)

1910.146(c)(3)

If the employer decides that its employees will not enter permit spaces, the employer shall take effective measures to prevent its employees from entering the permit spaces and shall comply with paragraphs (c)(1), (c)(2), (c)(6), and (c)(8) of this section.

1910.146(c)(4)

If the employer decides that its employees will enter permit spaces, the employer shall develop and implement a written permit space program that complies with this section. The written program shall be available for inspection by employees and their authorized representatives.

1910.146(c)(5)

An employer may use the alternate procedures specified in paragraph (c)(5)(ii) of this section for entering a permit space under the conditions set forth in paragraph (c)(5)(i) of this section.

1910.146(c)(5)(i)

An employer whose employees enter a permit space need not comply with paragraphs (d) through (f) and (h) through (k) of this section, provided that:

1910.146(c)(5)(i)(A)

The employer can demonstrate that the only hazard posed by the permit space is an actual or potential hazardous atmosphere;

1910.146(c)(5)(i)(B)

The employer can demonstrate that continuous forced air ventilation alone is sufficient to maintain that permit space safe for entry;

..1910.146(c)(5)(i)(C)

1910.146(c)(5)(i)(C)

The employer develops monitoring and inspection data that supports the demonstrations required by paragraphs (c)(5)(i)(A) and (c)(5)(i)(B) of this section;

1910.146(c)(5)(i)(D)

If an initial entry of the permit space is necessary to obtain the data required by paragraph (c)(5)(i)(C) of this section, the entry is performed in compliance with paragraphs (d) through (k) of this section;

1910.146(c)(5)(i)(E)

The determinations and supporting data required by paragraphs (c)(5)(i)(A), (c)(5)(i)(B), and (c)(5)(i)(C) of this section are documented by the employer and are made available to each employee who enters the permit space under the terms of paragraph (c)(5) of this section or to that employee's authorized representative; and

1910.146(c)(5)(i)(F)

Entry into the permit space under the terms of paragraph (c)(5)(i) of this section is performed in accordance with the requirements of paragraph (c)(5)(ii) of this section.

NOTE: See paragraph (c)(7) of this section for reclassification of a permit space after all hazards within the space have been eliminated.

1910.146(c)(5)(ii)

The following requirements apply to entry into permit spaces that meet the conditions set forth in paragraph (c)(5)(i) of this section.

1910.146(c)(5)(ii)(A)

Any conditions making it unsafe to remove an entrance cover shall be eliminated before the cover is removed.

..1910.146(c)(5)(ii)(B)**1910.146(c)(5)(ii)(B)**

When entrance covers are removed, the opening shall be promptly guarded by a railing, temporary cover, or other temporary barrier that will prevent an accidental fall through the opening and that will protect each employee working in the space from foreign objects entering the space.

1910.146(c)(5)(ii)(C)

Before an employee enters the space, the internal atmosphere shall be tested, with a calibrated direct-reading instrument, for oxygen content, for flammable gases and vapors, and for potential toxic air contaminants, in that order. Any employee who enters the space, or that employee's authorized representative, shall be provided an opportunity to observe the pre-entry testing required by this paragraph.

1910.146(c)(5)(ii)(C)(1)

Oxygen content,

1910.146(c)(5)(ii)(C)(2)

Flammable gases and vapors, and

1910.146(c)(5)(ii)(C)(3)

Potential toxic air contaminants.

1910.146(c)(5)(ii)(D)

There may be no hazardous atmosphere within the space whenever any employee is inside the space.

1910.146(c)(5)(ii)(E)

Continuous forced air ventilation shall be used, as follows:

1910.146(c)(5)(ii)(E)(1)

An employee may not enter the space until the forced air ventilation has eliminated any hazardous atmosphere;

1910.146(c)(5)(ii)(E)(2)

The forced air ventilation shall be so directed as to ventilate the immediate areas where an employee is or will be present within the space and shall continue until all employees have left the space;

1910.146(c)(5)(ii)(E)(3)

The air supply for the forced air ventilation shall be from a clean source and may not increase the hazards in the space.

..1910.146(c)(5)(ii)(F)

1910.146(c)(5)(ii)(F)

The atmosphere within the space shall be periodically tested as necessary to ensure that the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere. Any employee who enters the space, or that employee's authorized representative, shall be provided with an opportunity to observe the periodic testing required by this paragraph.

1910.146(c)(5)(ii)(G)

If a hazardous atmosphere is detected during entry:

1910.146(c)(5)(ii)(G)(1)

Each employee shall leave the space immediately;

1910.146(c)(5)(ii)(G)(2)

The space shall be evaluated to determine how the hazardous atmosphere developed; and

1910.146(c)(5)(ii)(G)(3)

Measures shall be implemented to protect employees from the hazardous atmosphere before any subsequent entry takes place.

1910.146(c)(5)(ii)(H)

The employer shall verify that the space is safe for entry and that the pre-entry measures required by paragraph (c)(5)(ii) of this section have been taken, through a written certification that contains the date, the location of the space, and the signature of

the person providing the certification. The certification shall be made before entry and shall be made available to each employee entering the space or to that employee's authorized representative .

1910.146(c)(6)

When there are changes in the use or configuration of a non-permit confined space that might increase the hazards to entrants, the employer shall reevaluate that space and, if necessary, reclassify it as a permit-required confined space.

..1910.146(c)(7)

1910.146(c)(7)

A space classified by the employer as a permit-required confined space may be reclassified as a non-permit confined space under the following procedures:

1910.146(c)(7)(i)

If the permit space poses no actual or potential atmospheric hazards and if all hazards within the space are eliminated without entry into the space, the permit space may be reclassified as a non-permit confined space for as long as the non-atmospheric hazards remain eliminated.

1910.146(c)(7)(ii)

If it is necessary to enter the permit space to eliminate hazards, such entry shall be performed under paragraphs (d) through (k) of this section. If testing and inspection during that entry demonstrate that the hazards within the permit space have been eliminated, the permit space may be reclassified as a non-permit confined space for as long as the hazards remain eliminated.

NOTE: Control of atmospheric hazards through forced air ventilation does not constitute elimination of the hazards. Paragraph (c)(5) covers permit space entry where the employer can demonstrate that forced air ventilation alone will control all hazards in the space.

1910.146(c)(7)(iii)

The employer shall document the basis for determining that all hazards in a permit space have been eliminated, through a

certification that contains the date, the location of the space, and the signature of the person making the determination. The certification shall be made available to each employee entering the space or to that employee's authorized representative.

..1910.146(c)(7)(iv)

1910.146(c)(7)(iv)

If hazards arise within a permit space that has been declassified to a non-permit space under paragraph (c)(7) of this section, each employee in the space shall exit the space. The employer shall then reevaluate the space and determine whether it must be reclassified as a permit space, in accordance with other applicable provisions of this section.

1910.146(c)(8)

When an employer (host employer) arranges to have employees of another employer (contractor) perform work that involves permit space entry, the host employer shall:

1910.146(c)(8)(i)

Inform the contractor that the workplace contains permit spaces and that permit space entry is allowed only through compliance with a permit space program meeting the requirements of this section;

1910.146(c)(8)(ii)

Apprise the contractor of the elements, including the hazards identified and the host employer's experience with the space, that make the space in question a permit space;

1910.146(c)(8)(iii)

Apprise the contractor of any precautions or procedures that the host employer has implemented for the protection of employees in or near permit spaces where contractor personnel will be working;

1910.146(c)(8)(iv)

Coordinate entry operations with the contractor, when both host employer personnel and contractor personnel will be working in or near permit spaces, as required by paragraph (d)(11) of this

section; and

..1910.146(c)(8)(v)

1910.146(c)(8)(v)

Debrief the contractor at the conclusion of the entry operations regarding the permit space program followed and regarding any hazards confronted or created in permit spaces during entry operations.

1910.146(c)(9)

In addition to complying with the permit space requirements that apply to all employers, each contractor who is retained to perform permit space entry operations shall:

1910.146(c)(9)(i)

Obtain any available information regarding permit space hazards and entry operations from the host employer;

1910.146(c)(9)(ii)

Coordinate entry operations with the host employer, when both host employer personnel and contractor personnel will be working in or near permit spaces, as required by paragraph (d)(11) of this section; and

1910.146(c)(9)(iii)

Inform the host employer of the permit space program that the contractor will follow and of any hazards confronted or created in permit spaces, either through a debriefing or during the entry operation.

1910.146(d)

Permit-required confined space program (permit space program). Under the permit space program required by paragraph (c)(4) of this section, the employer shall:

1910.146(d)(1)

Implement the measures necessary to prevent unauthorized entry;

..1910.146(d)(2)**1910.146(d)(2)**

Identify and evaluate the hazards of permit spaces before employees enter them;

1910.146(d)(3)

Develop and implement the means, procedures, and practices necessary for safe permit space entry operations, including, but not limited to, the following:

1910.146(d)(3)(i)

Specifying acceptable entry conditions;

1910.146(d)(3)(ii)

Providing each authorized entrant or that employee's authorized representative with the opportunity to observe any monitoring or testing of permit spaces;

1910.146(d)(3)(iii)

Isolating the permit space;

1910.146(d)(3)(iv)

Purging, inerting, flushing, or ventilating the permit space as necessary to eliminate or control atmospheric hazards;

1910.146(d)(3)(v)

Providing pedestrian, vehicle, or other barriers as necessary to protect entrants from external hazards; and

1910.146(d)(3)(vi)

Verifying that conditions in the permit space are acceptable for entry throughout the duration of an authorized entry.

1910.146(d)(4)

Provide the following equipment (specified in paragraphs (d)(4)(i) through (d)(4)(ix) of this section) at no cost to employees, maintain that equipment properly, and ensure that employees use that equipment properly:

..1910.146(d)(4)(i)

1910.146(d)(4)(i)

Testing and monitoring equipment needed to comply with paragraph (d)(5) of this section;

1910.146(d)(4)(ii)

Ventilating equipment needed to obtain acceptable entry conditions;

1910.146(d)(4)(iii)

Communications equipment necessary for compliance with paragraphs (h)(3) and (i)(5) of this section;

1910.146(d)(4)(iv)

Personal protective equipment insofar as feasible engineering and work practice controls do not adequately protect employees;

1910.146(d)(4)(v)

Lighting equipment needed to enable employees to see well enough to work safely and to exit the space quickly in an emergency;

1910.146(d)(4)(vi)

Barriers and shields as required by paragraph (d)(3)(iv) of this section;

1910.146(d)(4)(vii)

Equipment, such as ladders, needed for safe ingress and egress by authorized entrants;

1910.146(d)(4)(viii)

Rescue and emergency equipment needed to comply with paragraph (d)(9) of this section, except to the extent that the equipment is provided by rescue services; and

1910.146(d)(4)(ix)

Any other equipment necessary for safe entry into and rescue from permit spaces.

..1910.146(d)(5)

1910.146(d)(5)

Evaluate permit space conditions as follows when entry operations are conducted:

1910.146(d)(5)(i)

Test conditions in the permit space to determine if acceptable entry conditions exist before entry is authorized to begin, except that, if isolation of the space is infeasible because the space is large or is part of a continuous system (such as a sewer), pre-entry testing shall be performed to the extent feasible before entry is authorized and, if entry is authorized, entry conditions shall be continuously monitored in the areas where authorized entrants are working;

1910.146(d)(5)(ii)

Test or monitor the permit space as necessary to determine if acceptable entry conditions are being maintained during the course of entry operations; and

1910.146(d)(5)(iii)

When testing for atmospheric hazards, test first for oxygen, then for combustible gases and vapors, and then for toxic gases and vapors.

1910.146(d)(5)(iv)

Provide each authorized entrant or that employee's authorized representative an opportunity to observe the pre-entry and any subsequent testing or monitoring of permit spaces;

1910.146(d)(5)(v)

Reevaluate the permit space in the presence of any authorized entrant or that employee's authorized representative who requests that the employer conduct such reevaluation because the entrant or representative has reason to believe that the evaluation of that space may not have been adequate;

1910.146(d)(5)(vi)

Immediately provide each authorized entrant or that employee's authorized representative with the results of any testing conducted in accord with paragraph (d) of this section.

NOTE: Atmospheric testing conducted in accordance with Appendix B to section 1910.146 would be considered as satisfying the requirements of this paragraph. For permit space operations in sewers, atmospheric testing conducted in accordance with Appendix B, as supplemented by Appendix E to section 1910.146, would be considered as satisfying the requirements of this paragraph.

1910.146(d)(6)

Provide at least one attendant outside the permit space into which entry is authorized for the duration of entry operations;

NOTE: Attendants may be assigned to monitor more than one permit space provided the duties described in paragraph (i) of this section can be effectively performed for each permit space that is monitored. Likewise, attendants may be stationed at any location outside the permit space to be monitored as long as the duties described in paragraph (i) of this section can be effectively performed for each permit space that is monitored.

..1910.146(d)(7)**1910.146(d)(7)**

If multiple spaces are to be monitored by a single attendant, include in the permit program the means and procedures to enable the attendant to respond to an emergency affecting one or more of the permit spaces being monitored without distraction from the attendant's responsibilities under paragraph (i) of this section;

1910.146(d)(8)

Designate the persons who are to have active roles (as, for example, authorized entrants, attendants, entry supervisors, or persons who test or monitor the atmosphere in a permit space) in entry operations, identify the duties of each such employee, and provide each such employee with the training required by paragraph (g) of this section;

1910.146(d)(9)

Develop and implement procedures for summoning rescue and emergency services, for rescuing entrants from permit spaces, for providing necessary emergency services to rescued employees, and for preventing unauthorized personnel from attempting a rescue;

1910.146(d)(10)

Develop and implement a system for the preparation, issuance, use, and cancellation of entry permits as required by this section;

1910.146(d)(11)

Develop and implement procedures to coordinate entry operations when employees of more than one employer are working simultaneously as authorized entrants in a permit space, so that employees of one employer do not endanger the employees of any other employer;

..1910.146(d)(12)**1910.146(d)(12)**

Develop and implement procedures (such as closing off a permit space and canceling the permit) necessary for concluding the entry after entry operations have been completed;

1910.146(d)(13)

Review entry operations when the employer has reason to believe that the measures taken under the permit space program may not protect employees and revise the program to correct deficiencies found to exist before subsequent entries are authorized; and

NOTE: Examples of circumstances requiring the review of the permit space program are: any unauthorized entry of a permit space, the detection of a permit space hazard not covered by the

permit, the detection of a condition prohibited by the permit, the occurrence of an injury or near-miss during entry, a change in the use or configuration of a permit space, and employee complaints about the effectiveness of the program.

1910.146(d)(14)

Review the permit space program, using the canceled permits retained under paragraph (e)(6) of this section within 1 year after each entry and revise the program as necessary, to ensure that employees participating in entry operations are protected from permit space hazards.

NOTE: Employers may perform a single annual review covering all entries performed during a 12-month period. If no entry is performed during a 12-month period, no review is necessary.

Appendix C to section 1910.146 presents examples of permit space programs that are considered to comply with the requirements of paragraph (d) of this section.

1910.146(e)

Permit system.

1910.146(e)(1)

Before entry is authorized, the employer shall document the completion of measures required by paragraph (d)(3) of this section by preparing an entry permit.

NOTE: Appendix D to section 1910.146 presents examples of permits whose elements are considered to comply with the requirements of this section.

1910.146(e)(2)

Before entry begins, the entry supervisor identified on the permit shall sign the entry permit to authorize entry.

1910.146(e)(3)

The completed permit shall be made available at the time of entry to all authorized entrants or their authorized representatives, by posting it at the entry portal or by any other equally effective means, so that the entrants can confirm that pre-entry preparations have been completed.

..1910.146(e)(4)**1910.146(e)(4)**

The duration of the permit may not exceed the time required to complete the assigned task or job identified on the permit in accordance with paragraph (f)(2) of this section.

1910.146(e)(5)

The entry supervisor shall terminate entry and cancel the entry permit when:

1910.146(e)(5)(i)

The entry operations covered by the entry permit have been completed; or

1910.146(e)(5)(ii)

A condition that is not allowed under the entry permit arises in or near the permit space.

1910.146(e)(6)

The employer shall retain each canceled entry permit for at least 1 year to facilitate the review of the permit-required confined space program required by paragraph (d)(14) of this section. Any problems encountered during an entry operation shall be noted on the pertinent permit so that appropriate revisions to the permit space program can be made.

1910.146(f)

Entry permit. The entry permit that documents compliance with this section and authorizes entry to a permit space shall identify:

1910.146(f)(1)

The permit space to be entered;

1910.146(f)(2)

The purpose of the entry;

..1910.146(f)(3)

1910.146(f)(3)

The date and the authorized duration of the entry permit;

1910.146(f)(4)

The authorized entrants within the permit space, by name or by such other means (for example, through the use of rosters or tracking systems) as will enable the attendant to determine quickly and accurately, for the duration of the permit, which authorized entrants are inside the permit space;

NOTE: This requirement may be met by inserting a reference on the entry permit as to the means used, such as a roster or tracking system, to keep track of the authorized entrants within the permit space.

1910.146(f)(5)

The personnel, by name, currently serving as attendants;

1910.146(f)(6)

The individual, by name, currently serving as entry supervisor, with a space for the signature or initials of the entry supervisor who originally authorized entry;

1910.146(f)(7)

The hazards of the permit space to be entered;

1910.146(f)(8)

The measures used to isolate the permit space and to eliminate or control permit space hazards before entry;

NOTE: Those measures can include the lockout or tagging of equipment and procedures for purging, inerting, ventilating, and flushing permit spaces.

1910.146(f)(9)

The acceptable entry conditions;

1910.146(f)(10)

The results of initial and periodic tests performed under paragraph (d)(5) of this section, accompanied by the names or initials of the testers and by an indication of when the tests were performed;

..1910.146(f)(11)**1910.146(f)(11)**

The rescue and emergency services that can be summoned and the means (such as the equipment to use and the numbers to call) for summoning those services;

1910.146(f)(12)

The communication procedures used by authorized entrants and attendants to maintain contact during the entry;

1910.146(f)(13)

Equipment, such as personal protective equipment, testing equipment, communications equipment, alarm systems, and rescue equipment, to be provided for compliance with this section;

1910.146(f)(14)

Any other information whose inclusion is necessary, given the circumstances of the particular confined space, in order to ensure employee safety; and (15) Any additional permits, such as for hot work, that have been issued to authorize work in the permit space.

1910.146(g)

Training.

1910.146(g)(1)

The employer shall provide training so that all employees whose work is regulated by this section acquire the understanding, knowledge, and skills necessary for the safe performance of the duties assigned under this section.

1910.146(g)(2)

Training shall be provided to each affected employee:

1910.146(g)(2)(i)

Before the employee is first assigned duties under this section;

..1910.146(g)(2)(ii)

1910.146(g)(2)(ii)

Before there is a change in assigned duties;

1910.146(g)(2)(iii)

Whenever there is a change in permit space operations that presents a hazard about which an employee has not previously been trained;

1910.146(g)(2)(iv)

Whenever the employer has reason to believe either that there are deviations from the permit space entry procedures required by paragraph (d)(3) of this section or that there are inadequacies in the employee's knowledge or use of these procedures.

1910.146(g)(3)

The training shall establish employee proficiency in the duties required by this section and shall introduce new or revised procedures, as necessary, for compliance with this section.

1910.146(g)(4)

The employer shall certify that the training required by paragraphs (g)(1) through (g)(3) of this section has been accomplished. The certification shall contain each employee's name, the signatures or initials of the trainers, and the dates of training. The certification shall be available for inspection by employees and their authorized representatives.

1910.146(h)

Duties of authorized entrants. The employer shall ensure that all authorized entrants:

..1910.146(h)(1)**1910.146(h)(1)**

Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

1910.146(h)(2)

Properly use equipment as required by paragraph (d)(4) of this section;

1910.146(h)(3)

Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space as required by paragraph (i)(6) of this section;

1910.146(h)(4)

Alert the attendant whenever:

1910.146(h)(4)(i)

The entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or

1910.146(h)(4)(ii)

The entrant detects a prohibited condition; and

1910.146(h)(5)

Exit from the permit space as quickly as possible whenever:

1910.146(h)(5)(i)

An order to evacuate is given by the attendant or the entry supervisor,

1910.146(h)(5)(ii)

The entrant recognizes any warning sign or symptom of exposure to a dangerous situation,

..1910.146(h)(5)(iii)

1910.146(h)(5)(iii)

The entrant detects a prohibited condition, or

1910.146(h)(5)(iv)

An evacuation alarm is activated.

1910.146(i)

Duties of attendants. The employer shall ensure that each attendant:

1910.146(i)(1)

Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

1910.146(i)(2)

Is aware of possible behavioral effects of hazard exposure in authorized entrants;

1910.146(i)(3)

Continuously maintains an accurate count of authorized entrants in the permit space and ensures that the means used to identify authorized entrants under paragraph (f)(4) of this section accurately identifies who is in the permit space;

1910.146(i)(4)

Remains outside the permit space during entry operations until relieved by another attendant;

NOTE: When the employer's permit entry program allows attendant entry for rescue, attendants may enter a permit space to attempt a rescue if they have been trained and equipped for rescue operations as required by paragraph (k)(1) of this section and if

they have been relieved as required by paragraph (i)(4) of this section.

1910.146(i)(5)

Communicates with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space under paragraph (i)(6) of this section;

..1910.146(i)(6)

1910.146(i)(6)

Monitors activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized entrants to evacuate the permit space immediately under any of the following conditions;

1910.146(i)(6)(i)

If the attendant detects a prohibited condition;

1910.146(i)(6)(ii)

If the attendant detects the behavioral effects of hazard exposure in an authorized entrant;

1910.146(i)(6)(iii)

If the attendant detects a situation outside the space that could endanger the authorized entrants; or

1910.146(i)(6)(iv)

If the attendant cannot effectively and safely perform all the duties required under paragraph (i) of this section;

1910.146(i)(7)

Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards;

1910.146(i)(8)

Takes the following actions when unauthorized persons approach or enter a permit space while entry is underway:

1910.146(i)(8)(i)

Warn the unauthorized persons that they must stay away from the permit space;

..1910.146(i)(8)(ii)

1910.146(i)(8)(ii)

Advise the unauthorized persons that they must exit immediately if they have entered the permit space; and

1910.146(i)(8)(iii)

Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space;

1910.146(i)(9)

Performs non-entry rescues as specified by the employer's rescue procedure; and

1910.146(i)(10)

Performs no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

1910.146(j)

Duties of entry supervisors. The employer shall ensure that each entry supervisor:

1910.146(j)(1)

Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

1910.146(j)(2)

Verifies, by checking that the appropriate entries have been made

on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin;

..1910.146(j)(3)

1910.146(j)(3)

Terminates the entry and cancels the permit as required by paragraph (e)(5) of this section;

1910.146(j)(4)

Verifies that rescue services are available and that the means for summoning them are operable;

1910.146(j)(5)

Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations; and

1910.146(j)(6)

Determines, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

1910.146(k)

Rescue and emergency services.

1910.146(k)(1)

An employer who designates rescue and emergency services, pursuant to paragraph (d)(9) of this section, shall:

1910.146(k)(1)(i)

Evaluate a prospective rescuer's ability to respond to a rescue summons in a timely manner, considering the hazard(s) identified;

Note to paragraph (k)(1)(i): What will be considered timely will vary

according to the specific hazards involved in each entry. For example, §1910.134, Respiratory Protection, requires that employers provide a standby person or persons capable of immediate action to rescue employee(s) wearing respiratory protection while in work areas defined as IDLH atmospheres.

..1910.146(k)(1)(ii)

1910.146(k)(1)(ii)

Evaluate a prospective rescue service's ability, in terms of proficiency with rescue-related tasks and equipment, to function appropriately while rescuing entrants from the particular permit space or types of permit spaces identified;

1910.146(k)(1)(iii)

Select a rescue team or service from those evaluated that:

1910.146(k)(1)(iii)(A)

Has the capability to reach the victim(s) within a time frame that is appropriate for the permit space hazard(s) identified;

1910.146(k)(1)(iii)(B)

Is equipped for and proficient in performing the needed rescue services;

1910.146(k)(1)(iv)

Inform each rescue team or service of the hazards they may confront when called on to perform rescue at the site; and

1910.146(k)(1)(v)

Provide the rescue team or service selected with access to all permit spaces from which rescue may be necessary so that the rescue service can develop appropriate rescue plans and practice rescue operations.

Note to paragraph (k)(1): Non-mandatory Appendix F contains examples of criteria which employers can use in evaluating prospective rescuers as required by paragraph (k)(I) of this section.

1910.146(k)(2)

An employer whose employees have been designated to provide permit space rescue and emergency services shall take the following measures:

1910.146(k)(2)(i)

Provide affected employees with the personal protective equipment (PPE) needed to conduct permit space rescues safely and train affected employees so they are proficient in the use of that PPE, at no cost to those employees;

1910.146(k)(2)(ii)

Train affected employees to perform assigned rescue duties. The employer must ensure that such employees successfully complete the training required to establish proficiency as an authorized entrant, as provided by paragraphs (g) and (h) of this section;

1910.146(k)(2)(iii)

Train affected employees in basic first-aid and cardiopulmonary resuscitation (CPR). The employer shall ensure that at least one member of the rescue team or service holding a current certification in first aid and CPR is available; and

1910.146(k)(2)(iv)

Ensure that affected employees practice making permit space rescues at least once every 12 months, by means of simulated rescue operations in which they remove dummies, manikins, or actual persons from the actual permit spaces or from representative permit spaces. Representative permit spaces shall, with respect to opening size, configuration, and accessibility, simulate the types of permit spaces from which rescue is to be performed.

..1910.146(k)(3)

1910.146(k)(3)

To facilitate non-entry rescue, retrieval systems or methods shall be used whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. Retrieval systems shall meet the following requirements.

1910.146(k)(3)(i)

Each authorized entrant shall use a chest or full body harness, with a retrieval line attached at the center of the entrant's back near shoulder level, above the entrant's head, or at another point which the employer can establish presents a profile small enough for the successful removal of the entrant. Wristlets may be used in lieu of the chest or full body harness if the employer can demonstrate that the use of a chest or full body harness is infeasible or creates a greater hazard and that the use of wristlets is the safest and most effective alternative.

1910.146(k)(3)(ii)

The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary. A mechanical device shall be available to retrieve personnel from vertical type permit spaces more than 5 feet (1.52 m) deep

1910.146(k)(4)

If an injured entrant is exposed to a substance for which a Material Safety Data Sheet (MSDS) or other similar written information is required to be kept at the worksite, that MSDS or written information shall be made available to the medical facility treating the exposed entrant.

..1910.146(l)**1910.146(l)*****Employee participation.*****1910.146(l)(1)**

Employers shall consult with affected employees and their authorized representatives on the development and implementation of all aspects of the permit space program required by paragraph (c) of this section.

1910.146(l)(2)

Employers shall make available to affected employees and their

authorized representatives all information required to be developed by this section.

[58 FR 4549, Jan. 14, 1993; 58 FR 34845, June 29, 1993; 59 FR 26115, May 19, 1994; 63 FR 66038, Dec. 1, 1998]

◀ [Next Standard \(1910.146 App A\)](#)

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U.S. Department of Labor
Occupational Safety and Health Administration

Protecting the Safety and Health of America's Workers

[Text Only]

Regulations (Standards - 29 CFR) The control of hazardous energy (lockout/tagout). - 1910.147

◀ [Regulations \(Standards - 29 CFR\) - Table of Contents](#)

• Part Number:	1910
• Part Title:	Occupational Safety and Health Standards
• Subpart:	J
• Subpart Title:	General Environmental Controls
• Standard Number:	<u>1910.147</u>
• Title:	The control of hazardous energy (lockout/tagout).
• Appendix:	A

1910.147(a)

Scope, application and purpose -

1910.147(a)(1)

Scope

1910.147(a)(1)(i)

This standard covers the servicing and maintenance of machines and equipment in which the **unexpected** energization or start up of the machines or equipment, or release of stored energy could cause injury to employees. This standard establishes minimum performance requirements for the control of such hazardous energy.

1910.147(a)(1)(ii)

This standard does not cover the following:

1910.147(a)(1)(ii)(A)

Construction, agriculture and maritime employment;

1910.147(a)(1)(ii)(B)

Installations under the exclusive control of electric utilities for the purpose of power generation, transmission and distribution,

including related equipment for communication or metering; and

1910.147(a)(1)(ii)(C)

Exposure to electrical hazards from work on, near, or with conductors or equipment in electric utilization installations, which is covered by Subpart S of this part; and

1910.147(a)(1)(ii)(D)

1910.147(a)(1)(ii)(D)

Oil and gas well drilling and servicing.

1910.147(a)(2)

Application.

1910.147(a)(2)(i)

This standard applies to the control of energy during servicing and/or maintenance of machines and equipment.

1910.147(a)(2)(ii)

Normal production operations are not covered by this standard (See Subpart O of this Part). Servicing and/or maintenance which takes place during normal production operations is covered by this standard only if:

1910.147(a)(2)(ii)(A)

An employee is required to remove or bypass a guard or other safety device; or

1910.147(a)(2)(ii)(B)

An employee is required to place any part of his or her body into an area on a machine or piece of equipment where work is actually performed upon the material being processed (point of operation) or where an associated danger zone exists during a machine operating cycle.

Note: ***Exception to paragraph (a)(2)(ii):*** Minor tool changes and adjustments, and other minor servicing activities, which take place during normal production operations, are not covered by this standard if they are routine, repetitive, and integral to the use of the equipment for production, provided that the work is performed using alternative measures which provide effective protection (See Subpart O of this Part).

1910.147(a)(2)(iii)

This standard does not apply to the following:

..1910.147(a)(2)(iii)(A)**1910.147(a)(2)(iii)(A)**

Work on cord and plug connected electric equipment for which exposure to the hazards of unexpected energization or start up of the equipment is controlled by the unplugging of the equipment from the energy source and by the plug being under the exclusive control of the employee performing the servicing or maintenance.

1910.147(a)(2)(iii)(B)

Hot tap operations involving transmission and distribution systems for substances such as gas, steam, water or petroleum products when they are performed on pressurized pipelines, provided that the employer demonstrates that-

1910.147(a)(2)(iii)(B)(1)

continuity of service is essential;

1910.147(a)(2)(iii)(B)(2)

shutdown of the system is impractical; and

1910.147(a)(2)(iii)(B)(3)

documented procedures are followed, and special equipment is used which will provide proven effective protection for employees.

1910.147(a)(3)***Purpose.*****1910.147(a)(3)(i)**

This section requires employers to establish a program and utilize procedures for affixing appropriate lockout devices or tagout devices to energy isolating devices, and to otherwise disable machines or equipment to prevent unexpected energization, start up or release of stored energy in order to prevent injury to employees.

1910.147(a)(3)(ii)

When other standards in this part require the use of lockout or tagout, they shall be used and supplemented by the procedural and training requirements of this section.

1910.147(b)***Definitions applicable to this section.***

Affected employee. An employee whose job requires him/her to operate or use a machine or equipment on which servicing or

maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

Authorized employee. A person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance covered under this section.

Capable of being locked out. An energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.

Energized. Connected to an energy source or containing residual or stored energy.

Energy isolating device. A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: A manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

Energy source. Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Hot tap. A procedure used in the repair, maintenance and services activities which involves welding on a piece of equipment (pipelines, vessels or tanks) under pressure, in order to install connections or appurtenances. It is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam, and petrochemical distribution systems.

Lockout. The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout device. A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe position and prevent the energizing of a machine

or equipment. Included are blank flanges and bolted slip blinds.

Normal production operations. The utilization of a machine or equipment to perform its intended production function.

Servicing and/or maintenance. Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the **unexpected** energization or startup of the equipment or release of hazardous energy.

Setting up. Any work performed to prepare a machine or equipment to perform its normal production operation.

Tagout. The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Tagout device. A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

..1910.147(c)

1910.147(c)

General -

1910.147(c)(1)

Energy control program. The employer shall establish a program consisting of energy control procedures, employee training and periodic inspections to ensure that before any employee performs any servicing or maintenance on a machine or equipment where the unexpected energizing, startup or release of stored energy could occur and cause injury, the machine or equipment shall be isolated from the energy source and rendered inoperative.

1910.147(c)(2)

Lockout/tagout.

1910.147(c)(2)(i)

If an energy isolating device is not capable of being locked out, the employer's energy control program under paragraph (c)(1) of this section shall utilize a tagout system.

1910.147(c)(2)(ii)

If an energy isolating device is capable of being locked out, the employer's energy control program under paragraph (c)(1) of this section shall utilize lockout, unless the employer can demonstrate that the utilization of a tagout system will provide full employee protection as set forth in paragraph (c)(3) of this section.

1910.147(c)(2)(iii)

After January 2, 1990, whenever replacement or major repair, renovation or modification of a machine or equipment is performed, and whenever new machines or equipment are installed, energy isolating devices for such machine or equipment shall be designed to accept a lockout device.

1910.147(c)(3)***Full employee protection.*****1910.147(c)(3)(i)**

When a tagout device is used on an energy isolating device which is capable of being locked out, the tagout device shall be attached at the same location that the lockout device would have been attached, and the employer shall demonstrate that the tagout program will provide a level of safety equivalent to that obtained by using a lockout program.

..1910.147(c)(3)(ii)**1910.147(c)(3)(ii)**

In demonstrating that a level of safety is achieved in the tagout program which is equivalent to the level of safety obtained by using a lockout program, the employer shall demonstrate full compliance with all tagout-related provisions of this standard together with such additional elements as are necessary to provide the equivalent safety available from the use of a lockout device. Additional means to be considered as part of the demonstration of full employee protection shall include the implementation of additional safety measures such as the removal of an isolating circuit element, blocking of a controlling switch, opening of an extra disconnecting device, or the removal of a valve handle to reduce the likelihood of inadvertent energization.

1910.147(c)(4)***Energy control procedure.*****1910.147(c)(4)(i)**

Procedures shall be developed, documented and utilized for the control of potentially hazardous energy when employees are engaged in the activities covered by this section.

Note: **Exception:** The employer need not document the required procedure for a particular machine or equipment, when all of the following elements exist: (1) The machine or equipment has no potential for stored or residual energy or reaccumulation of stored energy after shut down which could endanger employees; (2) the machine or equipment has a single energy source which can be readily identified and isolated; (3) the isolation and locking out of that energy source will completely deenergize and deactivate the machine or equipment; (4) the machine or equipment is isolated from that energy source and locked out during servicing or maintenance; (5) a single lockout device will achieve a locker-out condition; (6) the lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance; (7) the servicing or maintenance does not create hazards for other employees; and (8) the employer, in utilizing this exception, has had no accidents involving the unexpected activation or reenergization of the machine or equipment during servicing or maintenance.

1910.147(c)(4)(ii)

The procedures shall clearly and specifically outline the scope, purpose, authorization, rules, and techniques to be utilized for the control of hazardous energy, and the means to enforce compliance including, but not limited to, the following:

1910.147(c)(4)(ii)(A)

A specific statement of the intended use of the procedure;

1910.147(c)(4)(ii)(B)

Specific procedural steps for shutting down, isolating, blocking and securing machines or equipment to control hazardous energy;

1910.147(c)(4)(ii)(C)

Specific procedural steps for the placement, removal and transfer of lockout devices or tagout devices and the responsibility for them; and

..1910.147(c)(4)(ii)(D)

1910.147(c)(4)(ii)(D)

Specific requirements for testing a machine or equipment to determine and verify the effectiveness of lockout devices, tagout

devices, and other energy control measures.

1910.147(c)(5)

Protective materials and hardware.

1910.147(c)(5)(i)

Locks, tags, chains, wedges, key blocks, adapter pins, self-locking fasteners, or other hardware shall be provided by the employer for isolating, securing or blocking of machines or equipment from energy sources.

1910.147(c)(5)(ii)

Lockout devices and tagout devices shall be singularly identified; shall be the only devices(s) used for controlling energy; shall not be used for other purposes; and shall meet the following requirements:

1910.147(c)(5)(ii)(A)

Durable.

1910.147(c)(5)(ii)(A)(1)

Lockout and tagout devices shall be capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected.

1910.147(c)(5)(ii)(A)(2)

Tagout devices shall be constructed and printed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible.

1910.147(c)(5)(ii)(A)(3)

Tags shall not deteriorate when used in corrosive environments such as areas where acid and alkali chemicals are handled and stored.

..1910.147(c)(5)(ii)(B)

1910.147(c)(5)(ii)(B)

Standardized. Lockout and tagout devices shall be standardized within the facility in at least one of the following criteria: Color; shape; or size; and additionally, in the case of tagout devices, print and format shall be standardized.

1910.147(c)(5)(ii)(C)

Substantial -

1910.147(c)(5)(ii)(C)(1)

Lockout devices. Lockout devices shall be substantial enough to prevent removal without the use of excessive force or unusual techniques, such as with the use of bolt cutters or other metal cutting tools.

1910.147(c)(5)(ii)(C)(2)

Tagout devices. Tagout devices, including their means of attachment, shall be substantial enough to prevent inadvertent or accidental removal. Tagout device attachment means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds and having the general design and basic characteristics of being at least equivalent to a one-piece, all environment-tolerant nylon cable tie.

1910.147(c)(5)(ii)(D)

Identifiable. Lockout devices and tagout devices shall indicate the identity of the employee applying the device(s).

1910.147(c)(5)(iii)

Tagout devices shall warn against hazardous conditions if the machine or equipment is energized and shall include a legend such as the following: **Do Not Start. Do Not Open. Do Not Close. Do Not Energize. Do Not Operate.**

..1910.147(c)(6)

1910.147(c)(6)

Periodic inspection.

1910.147(c)(6)(i)

The employer shall conduct a periodic inspection of the energy control procedure at least annually to ensure that the procedure and the requirements of this standard are being followed.

1910.147(c)(6)(i)(A)

The periodic inspection shall be performed by an authorized employee other than the ones(s) utilizing the energy control procedure being inspected.

1910.147(c)(6)(i)(B)

The periodic inspection shall be conducted to correct any deviations or inadequacies identified.

1910.147(c)(6)(i)(C)

Where lockout is used for energy control, the periodic inspection

shall include a review, between the inspector and each authorized employee, of that employee's responsibilities under the energy control procedure being inspected.

1910.147(c)(6)(i)(D)

Where tagout is used for energy control, the periodic inspection shall include a review, between the inspector and each authorized and affected employee, of that employee's responsibilities under the energy control procedure being inspected, and the elements set forth in paragraph (c)(7)(ii) of this section.

..1910.147(c)(6)(ii)

1910.147(c)(6)(ii)

The employer shall certify that the periodic inspections have been performed. The certification shall identify the machine or equipment on which the energy control procedure was being utilized, the date of the inspection, the employees included in the inspection, and the person performing the inspection.

1910.147(c)(7)

Training and communication.

1910.147(c)(7)(i)

The employer shall provide training to ensure that the purpose and function of the energy control program are understood by employees and that the knowledge and skills required for the safe application, usage, and removal of the energy controls are acquired by employees. The training shall include the following:

1910.147(c)(7)(i)(A)

Each authorized employee shall receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.

1910.147(c)(7)(i)(B)

Each affected employee shall be instructed in the purpose and use of the energy control procedure.

1910.147(c)(7)(i)(C)

All other employees whose work operations are or may be in an area where energy control procedures may be utilized, shall be instructed about the procedure, and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.

1910.147(c)(7)(ii)

When tagout systems are used, employees shall also be trained in the following limitations of tags:

..1910.147(c)(7)(ii)(A)

1910.147(c)(7)(ii)(A)

Tags are essentially warning devices affixed to energy isolating devices, and do not provide the physical restraint on those devices that is provided by a lock.

1910.147(c)(7)(ii)(B)

When a tag is attached to an energy isolating means, it is not to be removed without authorization of the authorized person responsible for it, and it is never to be bypassed, ignored, or otherwise defeated.

1910.147(c)(7)(ii)(C)

Tags must be legible and understandable by all authorized employees, affected employees, and all other employees whose work operations are or may be in the area, in order to be effective.

1910.147(c)(7)(ii)(D)

Tags and their means of attachment must be made of materials which will withstand the environmental conditions encountered in the workplace.

1910.147(c)(7)(ii)(E)

Tags may evoke a false sense of security, and their meaning needs to be understood as part of the overall energy control program.

1910.147(c)(7)(ii)(F)

Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use.

1910.147(c)(7)(iii)

Employee retraining.

..1910.147(c)(7)(iii)(A)

1910.147(c)(7)(iii)(A)

Retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machines, equipment or processes that present a new hazard, or when there is a change in the energy control procedures.

1910.147(c)(7)(iii)(B)

Additional retraining shall also be conducted whenever a periodic inspection under paragraph (c)(6) of this section reveals, or whenever the employer has reason to believe that there are deviations from or inadequacies in the employee's knowledge or use of the energy control procedures.

1910.147(c)(7)(iii)(C)

The retraining shall reestablish employee proficiency and introduce new or revised control methods and procedures, as necessary.

1910.147(c)(7)(iv)

The employer shall certify that employee training has been accomplished and is being kept up to date. The certification shall contain each employee's name and dates of training.

1910.147(c)(8)

Energy isolation. Lockout or tagout shall be performed only by the authorized employees who are performing the servicing or maintenance.

1910.147(c)(9)

Notification of employees. Affected employees shall be notified by the employer or authorized employee of the application and removal of lockout devices or tagout devices. Notification shall be given before the controls are applied, and after they are removed from the machine or equipment.

..1910.147(d)

1910.147(d)

Application of control. The established procedures for the application of energy control (the lockout or tagout procedures) shall cover the following elements and actions and shall be done in the following sequence:

1910.147(d)(1)

Preparation for shutdown. Before an authorized or affected employee turns off a machine or equipment, the authorized employee shall have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.

1910.147(d)(2)

Machine or equipment shutdown. The machine or equipment

shall be turned off or shut down using the procedures established for the machine or equipment. An orderly shutdown must be utilized to avoid any additional or increased hazard(s) to employees as a result of the equipment stoppage.

1910.147(d)(3)

Machine or equipment isolation. All energy isolating devices that are needed to control the energy to the machine or equipment shall be physically located and operated in such a manner as to isolate the machine or equipment from the energy source(s).

1910.147(d)(4)

Lockout or tagout device application.

1910.147(d)(4)(i)

Lockout or tagout devices shall be affixed to each energy isolating device by authorized employees.

..1910.147(d)(4)(ii)

1910.147(d)(4)(ii)

Lockout devices, where used, shall be affixed in a manner to that will hold the energy isolating devices in a "safe" or "off" position.

1910.147(d)(4)(iii)

Tagout devices, where used, shall be affixed in such a manner as will clearly indicate that the operation or movement of energy isolating devices from the "safe" or "off" position is prohibited.

1910.147(d)(4)(iii)(A)

Where tagout devices are used with energy isolating devices designed with the capability of being locked, the tag attachment shall be fastened at the same point at which the lock would have been attached.

1910.147(d)(4)(iii)(B)

Where a tag cannot be affixed directly to the energy isolating device, the tag shall be located as close as safely possible to the device, in a position that will be immediately obvious to anyone attempting to operate the device.

1910.147(d)(5)

Stored energy.

1910.147(d)(5)(i)

Following the application of lockout or tagout devices to energy

isolating devices, all potentially hazardous stored or residual energy shall be relieved, disconnected, restrained, and otherwise rendered safe.

..1910.147(d)(5)(ii)

1910.147(d)(5)(ii)

If there is a possibility of reaccumulation of stored energy to a hazardous level, verification of isolation shall be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.

1910.147(d)(6)

Verification of isolation. Prior to starting work on machines or equipment that have been locked out or tagged out, the authorized employee shall verify that isolation and deenergization of the machine or equipment have been accomplished.

1910.147(e)

Release from lockout or tagout. Before lockout or tagout devices are removed and energy is restored to the machine or equipment, procedures shall be followed and actions taken by the authorized employee(s) to ensure the following:

1910.147(e)(1)

The machine or equipment. The work area shall be inspected to ensure that nonessential items have been removed and to ensure that machine or equipment components are operationally intact.

1910.147(e)(2)

Employees.

1910.147(e)(2)(i)

The work area shall be checked to ensure that all employees have been safely positioned or removed.

1910.147(e)(2)(ii)

After lockout or tagout devices have been removed and before a machine or equipment is started, affected employees shall be notified that the lockout or tagout device(s) have been removed.

1910.147(e)(3)

Lockout or tagout devices removal. Each lockout or tagout device shall be removed from each energy isolating device by the employee who applied the device. **Exception to paragraph (e) (3):** When the authorized employee who applied the lockout or

tagout device is not available to remove it, that device may be removed under the direction of the employer, provided that specific procedures and training for such removal have been developed, documented and incorporated into the employer's energy control program. The employer shall demonstrate that the specific procedure provides equivalent safety to the removal of the device by the authorized employee who applied it. The specific procedure shall include at least the following elements:

1910.147(e)(3)(i)

Verification by the employer that the authorized employee who applied the device is not at the facility:

1910.147(e)(3)(ii)

Making all reasonable efforts to contact the authorized employee to inform him/her that his/her lockout or tagout device has been removed; and

1910.147(e)(3)(iii)

Ensuring that the authorized employee has this knowledge before he/she resumes work at that facility.

..1910.147(f)

1910.147(f)

Additional requirements.

1910.147(f)(1)

Testing or positioning of machines, equipment or components thereof. In situations in which lockout or tagout devices must be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the machine, equipment or component thereof, the following sequence of actions shall be followed:

1910.147(f)(1)(i)

Clear the machine or equipment of tools and materials in accordance with paragraph (e)(1) of this section;

1910.147(f)(1)(ii)

Remove employees from the machine or equipment area in accordance with paragraph (e)(2) of this section;

1910.147(f)(1)(iii)

Remove the lockout or tagout devices as specified in paragraph (e)

(3) of this section;

1910.147(f)(1)(iv)

Energize and proceed with testing or positioning;

1910.147(f)(1)(v)

Deenergize all systems and reapply energy control measures in accordance with paragraph (d) of this section to continue the servicing and/or maintenance.

1910.147(f)(2)

Outside personnel (contractors, etc.).

1910.147(f)(2)(i)

Whenever outside servicing personnel are to be engaged in activities covered by the scope and application of this standard, the on-site employer and the outside employer shall inform each other of their respective lockout or tagout procedures.

..1910.147(f)(2)(ii)

1910.147(f)(2)(ii)

The on-site employer shall ensure that his/her employees understand and comply with the restrictions and prohibitions of the outside employer's energy control program.

1910.147(f)(3)

Group lockout or tagout.

1910.147(f)(3)(i)

When servicing and/or maintenance is performed by a crew, craft, department or other group, they shall utilize a procedure which affords the employees a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device.

1910.147(f)(3)(ii)

Group lockout or tagout devices shall be used in accordance with the procedures required by paragraph (c)(4) of this section including, but not necessarily limited to, the following specific requirements:

1910.147(f)(3)(ii)(A)

Primary responsibility is vested in an authorized employee for a set number of employees working under the protection of a group lockout or tagout device (such as an operations lock);

1910.147(f)(3)(ii)(B)

Provision for the authorized employee to ascertain the exposure status of individual group members with regard to the lockout or tagout of the machine or equipment and

1910.147(f)(3)(ii)(C)

When more than one crew, craft, department, etc. is involved, assignment of overall job-associated lockout or tagout control responsibility to an authorized employee designated to coordinate affected work forces and ensure continuity of protection; and

..1910.147(f)(3)(ii)(D)**1910.147(f)(3)(ii)(D)**

Each authorized employee shall affix a personal lockout or tagout device to the group lockout device, group lockbox, or comparable mechanism when he or she begins work, and shall remove those devices when he or she stops working on the machine or equipment being serviced or maintained.

1910.147(f)(4)

Shift or personnel changes. Specific procedures shall be utilized during shift or personnel changes to ensure the continuity of lockout or tagout protection, including provision for the orderly transfer of lockout or tagout device protection between off-going and oncoming employees, to minimize exposure to hazards from the unexpected energization or start-up of the machine or equipment, or the release of stored energy.

Note: The following appendix to §1910.147 services as a non-mandatory guideline to assist employers and employees in complying with the requirements of this section, as well as to provide other helpful information. Nothing in the appendix adds to or detracts from any of the requirements of this section.

[54 FR 36687, Sept. 1, 1989, as amended at 54 FR 42498, Oct. 17, 1989; 55 FR 38685, 38686, Sept. 20, 1990; 61 FR 5507, Feb. 13, 1996]

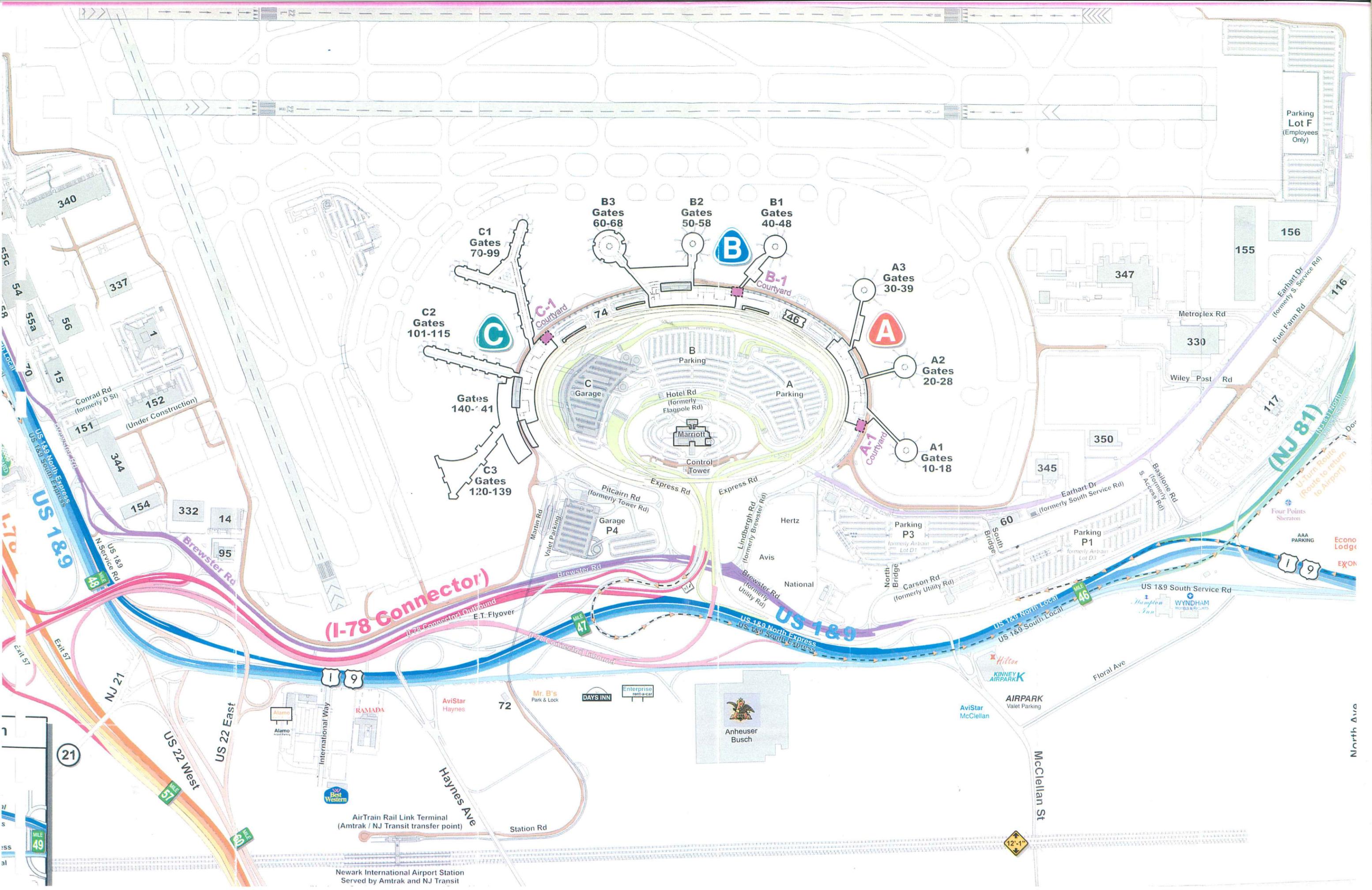
◀ [Next Standard \(1910.147 App A\)](#)

◀ [Regulations \(Standards - 29 CFR\) - Table of Contents](#)

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Parking Lot F (Employees Only)

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Map 1 - Approaches to Terminals A, B, C

NJ Turnpike South

Exit at Interchange 14
Follow signs for "Newark Airport"

US 1&9 South

Follow signs for
"US 1&9 South-Local Lanes"
then signs for "Newark Airport"

Legend

-  Path from NJ TP South to Terminals A, B, C
-  Path from NJ TP North to Terminals A, B, C
-  Path on US 1 & 9 South to Terminals A, B, C
-  Path on US 1 & 9 North to Terminals A, B, C
-  Path on I-78 East to Terminals A, B, C
-  Newark Airport Symbol on roadway signs

NJ Turnpike North

Exit at Interchange 13A
Follow signs for "Newark Airport"

US 1&9 North

Use Local Lanes through Elizabeth
Follow signs for "Newark Airport"

I-78 East

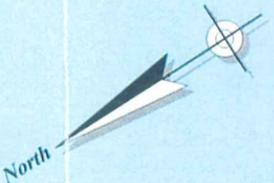
Exit I-78 at Exit 57
Follow signs for "Newark Airport"

Garden State Pkwy North

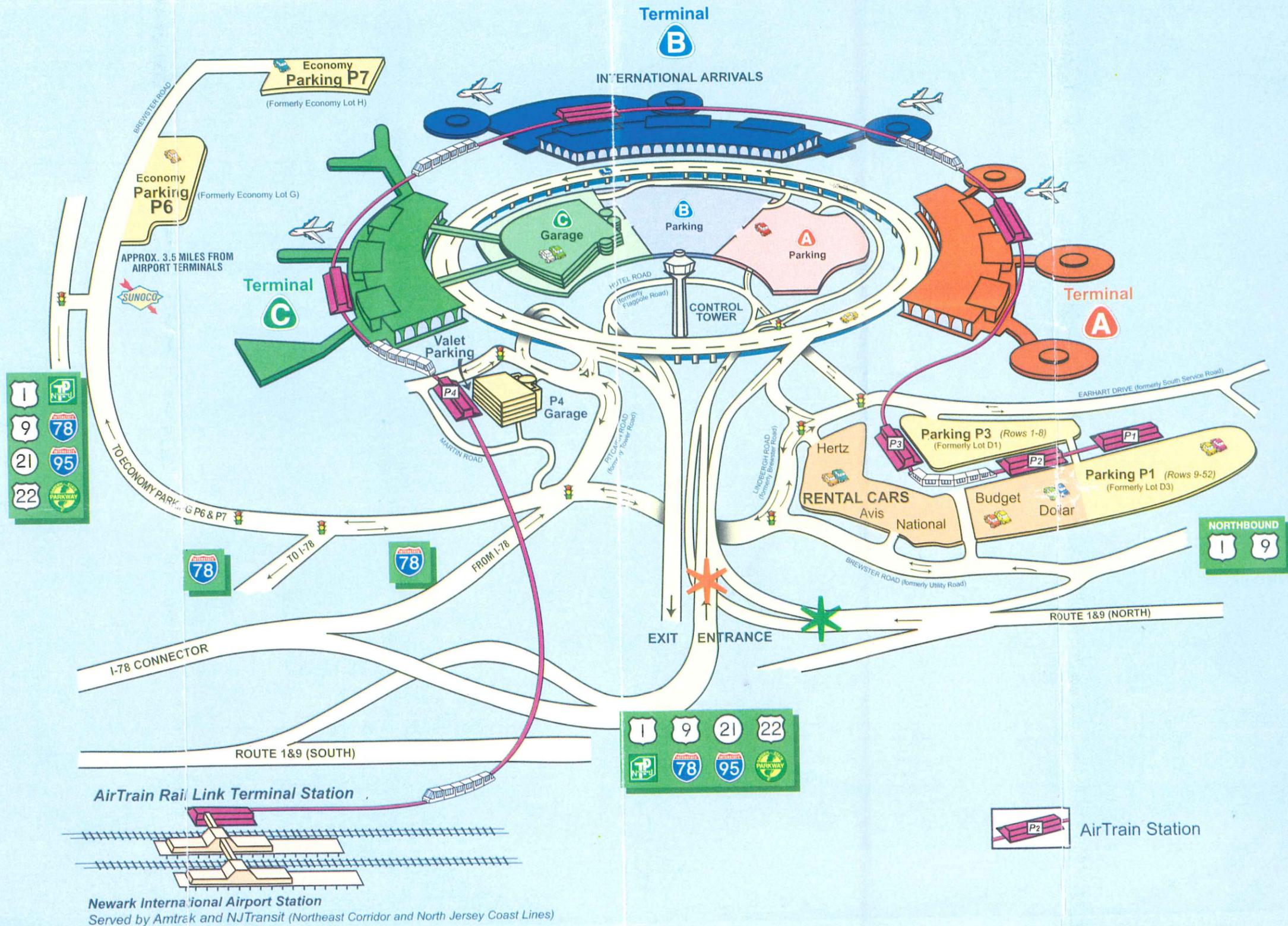
Exit GSP at Exit 142 onto I-78 East
Exit I-78 East at Exit 57
Follow signs for "Newark Airport"

Garden State Pkwy South

Exit GSP at Exit 142 onto I-78 West
Exit I-78 West at Exit 50A "Union" and follow
signs onto I-78 East
Exit I-78 at Exit 57 "Newark Airport"



Map 2 - Terminals A, B, C, Patron Parking Lots and On-Airport Rental Cars



- Restrooms
- Escalators

Follow Green Signs when leaving

- Ground Transportation
- Parking

Follow Signs with this symbol

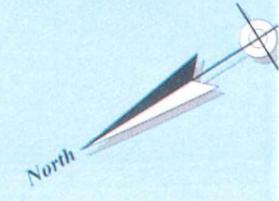


Newark Airport Entrance Roadways
 Drivers must decide whether to go to the terminals or to parking. Look for these signs

A B C Parking **Terminals A B C**

at the locations indicated by these symbols * *

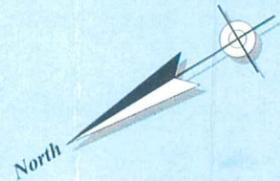
- * Indicates the point at which drivers on US 1&9 North must decide to go to the Terminals or Parking.
- * Indicates the point at which drivers on US 1&9 South Local and the I-78 Connector must decide whether to go to the Terminals or Parking



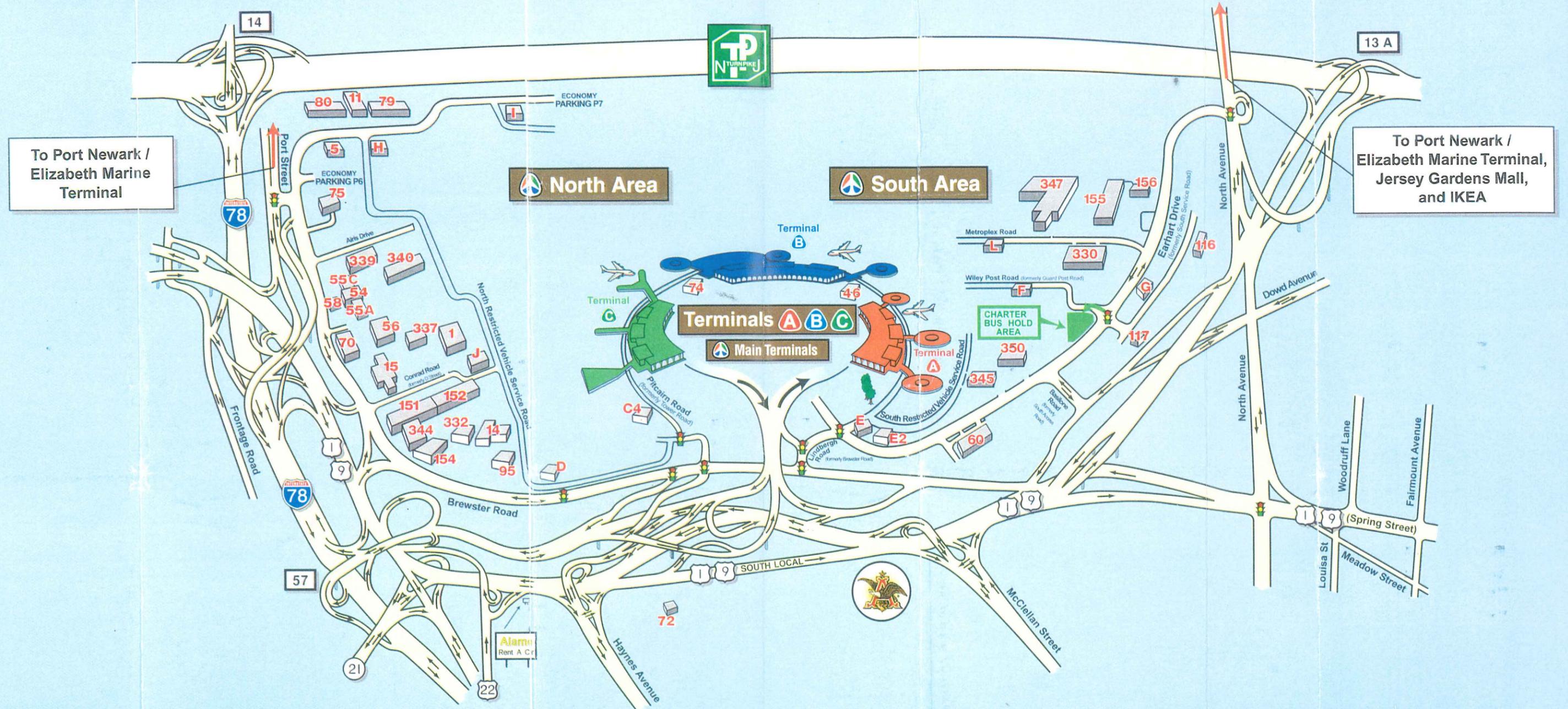
Map 3 - Off-Airport Hotels, Parking and Rental Cars



- Off-Airport Hotels
- ★ Off-Airport Parking Facilities
- Off-Airport Rental Car Facilities



Map 4 - North and South Areas

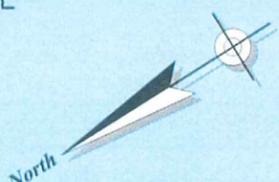


North Area Buildings

- | | |
|---------------------------------|--------------------------------------|
| 1 Port Authority Administration | 72 NJ Airports Project Management |
| 5 Port Authority Building | 74 PA Resident Engineer's Office |
| 11 PA Automotive Garage | 75 Sunoco Service Station |
| 14 United Hangar | 79 PA Maintenance Garage |
| 15 Signature Flight Support | 80 PA Maintenance Building |
| 54 Brewster Hangar | 95 Sky Chef, Inc. |
| 55 Brewster Hangar | 151 Air Cargo Buildings |
| 56 Continental Hangar | 152 Air Cargo Buildings |
| 58 Pumphouse | 154 Continental Maintenance Building |
| 70 EWR Redevelopment Program | 332 United Cargo Building |

South Area Buildings

- | | | |
|--------------------------------------|---------------------------------------|------------------|
| 337 Continental De-icing Facility | 46 Central Heating & Ref. Plant | E Guard Post E |
| 339 International Air Cargo Building | 60 AirTrain Maint. & Control Facility | E2 Guard Post E2 |
| 340 International Air Cargo Building | 116 Ogden Maintenance Building | F Guard Post F |
| 344 Continental Cargo Building | 117 Fuel Storage Control Building | G Guard Post G |
| C4 Guard Post C4 | 155 Federal Express Cargo | L Guard Post L |
| D Guard Post D | 156 Federal Express Cargo | |
| H Guard Post H | 330 Chelsea Flight Kitchen | |
| I Guard Post I | 345 U.S. Postal Service Building | |
| J Guard Post J | 347 Federal Express Metroplex | |
| | 350 United Parcel Service Building | |



living our values



OUR VALUES

Service

We will provide the best possible energy service.
We will never forget that what we do, and the way we do it,
vitaly affects the millions of people who depend on our service.

Honesty

We will conduct our business with honesty and integrity, and communicate openly.

Concern

We will show concern for the welfare of our customers, our fellow employees,
and the men and women who invest their savings in our Company.
We will protect the environment in which we live. We will make the safety of our employees
and the public a top priority.

Courtesy

We will be courteous to our customers, to each other, and to all those whose lives we touch.

Excellence

We will strive for excellence in all that we do.
We will never be satisfied with less than the highest standards of performance.

Teamwork

We will work together in harmony as a team, combining our best thinking and efforts
to make Con Edison the finest energy service company in the nation.

OUR MISSION

Con Edison's mission is to provide energy services to our customers safely, reliably, efficiently,
and in an environmentally sound manner; to provide a workplace that allows employees
to realize their full potential; to provide a fair return to our investors;
and to improve the quality of life in the communities we serve.



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STANDARD CONTRACT TERMS AND CONDITIONS

PART I GENERAL DEFINITIONS

To avoid undue repetition, the following terms, as used in this Agreement, shall be construed as follows:

Authority or Port Authority - shall mean the Port Authority of New York and New Jersey.

Contract, Document or Agreement - shall mean the writings setting forth the scope, terms, conditions and Specifications for the procurement of Goods and/or Services, as defined hereunder and shall include, but not be limited to: Invitation for Bid (IFB), Request for Quotation (RFQ), Request for Proposal (RFP), Purchase Order (PO), Cover Sheet, executed Signature Sheet, AND PRICING SHEETS with Contract prices inserted," "STANDARD CONTRACT TERMS AND CONDITIONS," and, if included, attachments, endorsements, schedules, exhibits, or drawings, the Authority's acceptance and any written addenda issued over the name of the Assistant Director, Commodities and Services Division, Procurement Department..

Days or Calendar Days - shall mean consecutive calendar days, Saturdays, Sundays, and holidays, included.

Week - unless otherwise specified, shall mean seven (7) consecutive calendar days, Saturdays, Sundays, and holidays.

Month - unless otherwise specified, shall mean a calendar month.

Director - shall mean the Director of the Department which operates the facility of the Port Authority at which the services hereunder are to be performed, for the time being, or his/her successor in duties for the purpose of this Contract, or one of his/her authorized representatives for the purpose of this Contract.

Manager - shall mean the Manager of the Facility for the time being, or his successor in duties for the purpose of this Contract, or his duly authorized representative for the purpose of this Contract.

No person shall be deemed a representative of the Director or Manager except to the extent specifically authorized in an express written notice to the Contractor signed by the Director or Manager, as the case may be. Further, no person shall be deemed a successor in duties of the Director unless the Contractor is so notified in writing signed by the Assistant Director, Commodities & Services Division, Procurement Department. No person shall be deemed a successor in duties of the Manager unless the Contractor is so notified in a writing signed by the Director.

Minority Business Enterprise (MBE) - shall mean a business entity which is at least 51% owned and controlled by one or more members of one or more minority groups, or, in the case of a publicly held corporation, at least 51% of the stock of which is owned by one or more minority groups, and whose management and daily business operations are controlled by one or more such individuals who are citizens or permanent resident aliens.

"Minority Group" means any of the following racial or ethnic groups:

- (a) Black persons having origins in any of the Black African racial groups not of Hispanic origin;
- (b) Hispanic persons of Mexican, Puerto Rican, Dominican, Cuban, Central or South American culture or origin, regardless of race;
- (c) Asian and Pacific Islander persons having origins in any of the original peoples of the Far East, Southeast Asia, The Indian Subcontinent, or the Pacific Islands;

- (d) Native American or Alaskan native persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification.

Site of the Work - or words of similar import shall mean the Facility and all buildings and properties associated therewith as described in this Contract.

Small Business Enterprise (SBE) - The criteria for a Small Business Enterprise are:

- o The principal place of business must be located in New York or New Jersey;
- o The firm must have been in business for at least three years with activity;
- o Average gross income limitations by industry as established by the Port Authority.

Subcontractor - shall mean anyone who performs work (other than or in addition to the furnishing of materials, plant or equipment) in connection with the services to be provided hereunder, directly or indirectly for or on behalf of the Contractor (and whether or not in privity of contract with the Contractor), but shall not include any person who furnished merely his own personal labor or his own personal services. "Subcontractor", however, shall exclude the Contractor or any subsidiary or parent of the Contractor or any person, firm or corporation which has a substantial interest in the Contractor or in which the Contractor or the parent or the subsidiary of the Contractor, or an officer or principal of the Contractor or of the parent of the subsidiary of the Contractor has a substantial interest, provided, however, that for the purpose of the clause hereof entitled "Assignments and Subcontracts" the exclusion in this paragraph shall not apply to anyone but the Contractor itself.

Women-Owned Business Enterprise (WBE) - shall mean a business enterprise which is at least 51% owned by one or more women, or, in the case of a publicly held corporation, at least 51% of the stock of which is owned by one or more women and whose management and daily business operations are controlled by one or more women who are citizens or permanent or resident aliens.

Work - shall mean all services, equipment and materials (including materials and equipment, if any, furnished by the Authority) and other facilities and all other things necessary or proper for, or incidental to the services to be performed or goods to be furnished in connection with the service to be provided hereunder.

PART II GENERAL PROVISIONS

1. Facility Rules and Regulations of The Port Authority

- a. The Contractor shall observe and obey (and compel its officers, employees, guests, invitees, and those doing business with it, to observe and obey) the facility Rules and Regulations of the Port Authority now in effect, and such further reasonable Rules and Regulations which may from time to time during the term of this Agreement be promulgated by the Port Authority for reasons of safety, health, preservation of property or maintenance of a good and orderly appearance and efficient operation of the Facility. The Port Authority agrees that, except in case of emergency, it shall give notice to the Contractor of every Rule and Regulation hereafter adopted by it at least five days before the Contractor shall be required to comply therewith.
- b. A copy of the facility Rules and Regulations of the Port Authority shall be available for review by the Contractor at the Office of the Secretary of the Port Authority.

2. Contractor Not An Agent

This Agreement does not constitute the Contractor the agent or representative of the Port Authority for any purpose whatsoever except as may be specifically provided in this Agreement. It is hereby specifically acknowledged and understood that the Contractor, in performing its services hereunder, is and shall be at all

times an independent Contractor and the officers, agents and employees of the Contractor shall not be or be deemed to be agents, servants or employees of the Port Authority.

3. Contractor's Warranties

The Contractor represents and warrants:

- a. That it is financially solvent, that it is experienced in and competent to perform the requirements of this Contract, that the facts stated or shown in any papers submitted or referred to in connection with the solicitation are true, and, if the Contractor be a corporation, that it is authorized to perform this Contract;
- b. That it has carefully examined and analyzed the provisions and requirements of this Contract, and that from its own investigations it has satisfied itself as to the nature of all things needed for the performance of this Contract, the general and local conditions and all other matters which in any way affect this Contract or its performance, and that the time available to it for such examination, analysis, inspection and investigation was adequate;
- c. That the Contract is feasible of performance in accordance with all its provisions and requirements and that it can and will perform it in strict accordance with such provisions and requirements;
- d. That no Commissioner, officer, agent or employee of the Port Authority is personally interested directly or indirectly in this Contract or the compensation to be paid hereunder;
- e. That, except only for those representations, statements or promises expressly contained in this Contract, no representation, statement or promise, oral or in writing, of any kind whatsoever by the Port Authority, its Commissioners, officers, agents, employees or consultants has induced the Contractor to enter into this Contract or has been relied upon by the Contractor, including any with reference to: (1) the meaning, correctness, suitability, or completeness of any provisions or requirements of this Contract; (2) the nature, quantity, quality or size of the materials, equipment, labor and other facilities needed for the performance of this Contract; (3) the general or local conditions which may in any way affect this Contract or its performance; (4) the price of the Contract; or (5) any other matters, whether similar to or different from those referred to in (1) through (4) immediately above, affecting or having any connection with this Contract, the bidding thereon, any discussions thereof, the performance thereof or those employed therein or connected or concerned therewith.

Moreover, the Contractor accepts the conditions at the Site of the Work as they may eventually be found to exist and warrants and represents that it can and will perform the Contract under such conditions and that all materials, equipment, labor and other facilities required because of any unforeseen conditions (physical or otherwise) shall be wholly at its own cost and expense, anything in this Contract to the contrary notwithstanding.

Nothing in the Specifications or any other part of the Contract is intended as or shall constitute a representation by the Port Authority as to the feasibility of performance of this Contract or any part thereof.

The Contractor further represents and warrants that it was given ample opportunity and time and by means of this paragraph was requested by the Port Authority to review thoroughly all documents forming this Contract prior to opening of Bids on this Contract in order that it might request inclusion in this Contract of any statement, representation, promise or provision which it desired or on which it wished to place reliance; that it did so review said documents, that either every such statement, representation, promise or provision has been included in this Contract or else, if omitted, that it expressly relinquishes the benefit of any such omitted statement, representation, promise or provision and is willing to perform this Contract without claiming reliance thereon or making any other claim on account of such omission.

The Contractor further recognizes that the provisions of this numbered clause (though not only such provisions) are essential to the Port Authority's consent to enter into this Contract and that without such provisions, the Authority would not have entered into this Contract.

4. Personal Non-Liability

Neither the Commissioners of the Port Authority nor any of them, nor any officer, agent or employee thereof, shall be charged personally by the Contractor with any liability, or held personally liable to the Contractor under any term or provision of this Agreement, or because of its execution or attempted execution, or because of any breach, or attempted or alleged breach, thereof.

5. Equal Employment Opportunity, Affirmative Action, Non-Discrimination

- a. The Contractor is advised to ascertain and comply with all applicable federal, State and local statutes, ordinances, rules and regulations and, federal Executive Orders, pertaining to equal employment opportunity, affirmative action, and non-discrimination in employment.
- b. Without limiting the generality of any other term or provision of this Contract, in the event of the Contractor's non-compliance with the equal opportunity and non-discrimination clause of this Contract, or with any of such statutes, ordinances, rules, regulations or Orders, this Contract may be cancelled, terminated or suspended in whole or in part.

6. Rights and Remedies of the Port Authority

The Port Authority shall have the following rights in the event the Contractor is deemed guilty of a breach of any term whatsoever of this Contract:

- a. The right to take over and complete the Work or any part thereof as agent for and at the expense of the Contractor, either directly or through others.
- b. The right to cancel this Contract as to any or all of the Work yet to be performed.
- c. The right to specific performance, an injunction or any appropriate equitable remedy.
- d. The right to money damages.

For the purpose of this Contract, breach shall include but not be limited to the following, whether or not the time has yet arrived for performance of an obligation under this Contract: a statement by the Contractor to any representative of the Port Authority indicating that the Contractor cannot or will not perform any one or more of its obligations under this Contract; any act or omission of the Contractor or any other occurrence which makes it improbable at the time that it will be able to perform any one or more of its obligations under this Contract; any suspension of or failure to proceed with any part of the Work by the Contractor which makes it improbable at the time that it will be able to perform any one or more of its obligations under this Contract.

The enumeration in this numbered clause or elsewhere in this Contract of specific rights and remedies of the Port Authority shall not be deemed to limit any other rights or remedies which the Authority would have in the absence of such enumeration; and no exercise by the Authority of any right or remedy shall operate as a waiver of any other of its rights or remedies not inconsistent therewith or to estop it from exercising such other rights or remedies.

7. Rights and Remedies of the Contractor

Inasmuch as the Contractor can be adequately compensated by money damages for any breach of this Contract which may be committed by the Port Authority, the Contractor expressly agrees that no default, act or omission of the Port Authority shall constitute a material breach of this Contract, entitling the Contractor to cancel or rescind this Contract or to suspend or abandon performance.

8. Submission To Jurisdiction

The Contractor hereby irrevocably submits itself to the jurisdiction of the Courts of the State of New York and New Jersey, in regard to any controversy arising out of, connected with, or in any way concerning this Contract.

The Contractor agrees that the service of process on the Contractor in relation to such jurisdiction may be made, at the option of the Port Authority, either by registered or certified mail addressed to it at the address

of the Contractor indicated on the signature sheet, or by actual personal delivery to the Contractor, if the Contractor is an individual, to any partner if the Contractor be a partnership or to any officer, director or managing or general agent if the Contractor be a corporation.

Such service shall be deemed to be sufficient when jurisdiction would not lie because of the lack of basis to serve process in the manner otherwise provided by law. In any case, however, process may be served as stated above whether or not it might otherwise have been served in a different manner.

9. Harmony

- a. The Contractor shall not employ any persons or use any labor, or use or have any equipment, or permit any condition to exist which shall or may cause or be conducive to any labor complaints, troubles, disputes or controversies at the Facility which interfere or are likely to interfere with the operation of the Port Authority or with the operations of lessees, licensees or other users of the Facility or with the operations of the Contractor under this Contract.

The Contractor shall immediately give notice to the Port Authority (to be followed by written notices and reports) of any and all impending or existing labor complaints, troubles, disputes or controversies and the progress thereof. The Contractor shall use its best efforts to resolve any such complaint, trouble, dispute or controversy. If any type of strike, boycott, picketing, work stoppage, slowdown or other labor activity is directed against the Contractor at the Facility or against any operations of the Contractor under this Contract, whether or not caused by the employees of the Contractor, and if any of the foregoing, in the opinion of the Port Authority, results or is likely to result in any curtailment or diminution of the services to be performed hereunder or to interfere with or affect the operations of the Port Authority, or to interfere with or affect the operations of lessees, licensees, or other users of the Facility or in the event of any other cessation or stoppage of operations by the Contractor hereunder for any reason whatsoever, the Port Authority shall have the right at any time during the continuance thereof to suspend the operations of the Contractor under this Contract, and during the period of the suspension the Contractor shall not perform its services hereunder and the Port Authority shall have the right during said period to itself or by any third person or persons selected by it to perform said services of the Contractor using the equipment which is used by the Contractor in its operations hereunder as the Port Authority deems necessary and without cost to the Port Authority. During such time of suspension, the Contractor shall not be entitled to any compensation. Any flat fees, including management fees, shall be prorated. Prior to the exercise of such right by the Port Authority, it shall give the Contractor notice thereof, which notice may be oral. No exercise by the Port Authority of the rights granted to it in the above subparagraph shall be or be deemed to be a waiver of any rights of termination or revocation contained in this Contract or a waiver of any rights or remedies which may be available to the Port Authority under this Contract or otherwise.

- b. During the time that the Contractor is performing the Contract, other persons may be engaged in other operations on or about the worksite including Facility operations, pedestrian, bus and vehicular traffic and other Contractors performing at the worksite, all of which shall remain uninterrupted.

The Contractor shall so plan and conduct its operations as to work in harmony with others engaged at the site and not to delay, endanger or interfere with the operation of others (whether or not specifically mentioned above), all to the best interests of the Port Authority and the public as may be directed by the Port Authority.

10. Claims of Third Persons

The Contractor undertakes to pay all claims lawfully made against it by subcontractors, suppliers and workers, and all claims lawfully made against it by other third persons arising out of or in connection with or because of the performance of this Contract and to cause all subcontractors to pay all such claims

lawfully made against them.

11. No Third Party Rights

Nothing contained in this Contract is intended for the benefit of third persons, except to the extent that the Contract specifically provides otherwise by use of the words "benefit" or "direct right of action."

12. Provisions of Law Deemed Inserted

Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included therein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party, the Contract shall forthwith be physically amended to make such insertion.

13. Costs Assumed By The Contractor

It is expressly understood and agreed that all costs of the Contractor of whatever kind or nature and whether imposed directly upon the Contractor under the terms and provisions hereof or in any other manner whatsoever because of the requirements of the operation of the service or otherwise under this Agreement shall be borne by the Contractor or without compensation or reimbursement from the Port Authority, except as specifically set forth in this Agreement. The entire and complete cost and expense of the Contractor's services and operations hereunder shall be borne solely by the Contractor and under no circumstances shall the Port Authority be liable to any third party (including the Contractor's employees) for any such costs and expenses incurred by the Contractor and under no circumstances shall the Port Authority be liable to the Contractor for the same, except as specifically set forth in this Section.

14. Default, Revocation or Suspension of Contract

a. If one or more of the following events shall occur:

1. If fire or other cause shall destroy all or a substantial part of the Facility.
2. If any governmental agency shall condemn or take a temporary or permanent interest in all or a substantial part of the Facility, or all of a part of the Port Authority's interest herein;

then upon the occurrence of such event or at any time thereafter during the continuance thereof, the Port Authority shall have the right on twenty-four (24) hours written notice to the Contractor to revoke this Contract, such revocation to be effective upon the date and time specified in such notice.

In such event this Contract shall cease and expire on the effective date of revocation as if said date were the date of the expiration of this Contract. Such revocation shall not, however, relieve the Contractor of any liabilities or obligations hereunder which shall have accrued on or prior to the effective date of revocation.

b. If one or more of the following events shall occur:

1. The Contractor shall become insolvent, or shall take the benefit of any present or future insolvency statute, or shall make a general assignment for the benefit of creditors, or file a voluntary petition in bankruptcy or a petition or answer seeking an arrangement or its reorganization or the readjustment of its indebtedness under the federal bankruptcy laws or under any other law or statute of the United States or of any State thereof, or consent to the appointment of a receiver, trustee, or liquidator of all or substantially all its property; or
2. By order or decree of a court the Contractor shall be adjudged bankrupt or an order shall be made approving a petition filed by any of the creditors, or, if the Contractor is a corporation, by any of the stockholders of the Contractor, seeking its reorganization or the readjustment of

its indebtedness under the federal bankruptcy laws or under any law or statute of the United States or of any State thereof; or

3. A petition under any part of the federal bankruptcy laws or an action under any present or future insolvency law or statute shall be filed against the Contractor and shall not be dismissed within thirty (30) days after the filing thereof; or
4. The interest of the Contractor under this Contract shall be transferred to, passed to or devolve upon, by operation of law or otherwise, any other person, firm or corporation, or
5. The Contractor, if a corporation, shall, without the prior written approval of the Port Authority, become a surviving or merged corporation in a merger, a constituent corporation in a consolidation, or a corporation in dissolution; or
6. If the Contractor is a partnership, and the said partnership shall be dissolved as the result of any act or omission of its copartners or any of them, or by operation of law or the order or decree of any court having jurisdiction, or for any other reason whatsoever; or
7. By or pursuant to, or under authority of any legislative act, resolution or rule, or any order or decree of any court or governmental board, agency or officer having jurisdiction, a receiver, trustee, or liquidator shall take possession or control of all or substantially all of the property of the Contractor and such possession or control of all or substantially all of the property of the Contractor and shall continue in effect for a period of fifteen (15) days;

then upon the occurrence of any such event or at any time thereafter during the continuance thereof, the Port Authority shall have the right upon five (5) days notice to the Contractor to terminate this Contract and the rights of the Contractor hereunder; termination to be effective upon the date and time specified in such notice as if said date were the date of the expiration of this Contract. Termination shall not relieve the Contractor of any liabilities or obligations hereunder which have accrued on or prior to the effective date of termination.

c. If any of the following shall occur:

1. The Contractor shall cease, abandon any part of the service, desert, stop or discontinue its services in the premises for any reason whatsoever and regardless of the fault of the Contractor; or
2. The Contractor shall fail to keep, perform and observe each and every other promise, covenant and agreement set forth in this Contract on its part to be kept, performed or observed, within five (5) days after receipt of notice of default thereunder from the Port Authority (except where fulfillment of its obligations requires activity over a greater period of time, and the Contractor shall have commenced to perform whatever may be required for fulfillment within five (5) days after receipt of notice and continues such performance without interruption except for causes beyond its control);

then upon the occurrence of any such event or during the continuance thereof, the Port Authority shall have the right on twenty four (24) hours notice to the Contractor to terminate this Contract and the rights of the Contractor hereunder, termination to be effective upon the date and time specified in such notice. Termination shall not relieve the Contractor of any liabilities which shall have accrued on or prior to the effective date of termination.

d. If any of the events enumerated in this Section shall occur prior to commencement date of this Contract the Port Authority upon the occurrence of any such event or any time thereafter during the continuance thereof by twenty-four (24) hours notice may terminate or suspend this Contract and the rights of the Contractor hereunder, such termination or suspension to be effective upon the date specified in such notice.

e. No payment by the Port Authority of any monies to the Contractor for any period or periods after

default of any of the terms, covenants or conditions hereof to be performed, kept and observed by the Contractor and no act or thing done or omitted to be done by the Port Authority shall be deemed to be a waiver of the right of the Port Authority to terminate this Contract or of any other right or remedies to which the Port Authority may be entitled because of any breach thereof. No waiver by the Port Authority of any default on the part of the Contractor in the performance of any of the terms, covenants and conditions hereof to be performed, kept or observed by the Contractor shall be or be construed to be a waiver by the Port Authority of any other subsequent default in the performance of any of the said terms, covenants and conditions.

- f. In addition to all other rights of revocation or termination hereunder and notwithstanding any other provision of this Contract the Port Authority may terminate this Contract and the rights of the Contractor hereunder without cause at any time upon five (5) days written notice to the Contractor and in such event this Contract shall cease and expire on the date set forth in the notice of termination as fully and completely as though such dates were the original expiration date hereof and if such effective date of termination is other than the last day of the month, the amount of the compensation due to the Contractor from the Port Authority shall be prorated when applicable on a daily basis. Such cancellation shall be without prejudice to the rights and obligations of the parties arising out of portions already performed but no allowance shall be made for anticipated profits.
- g. Any right of termination contained in this paragraph, shall be in addition to and not in lieu of any and all rights and remedies that the Port Authority shall have at law or in equity consequent upon the Contractor's breach of this Contract and shall be without prejudice to any and all such other rights and remedies. It is hereby specifically agreed and understood that the exercise by the Port Authority of any right of termination set forth in this paragraph shall not be or be deemed to be an exercise by the Port Authority of an election of remedies so as to preclude the Port Authority from any right to money damages it may have for the period prior to the effective date of termination to the original expiration date of the Contract, and this provision shall be deemed to survive the termination of this Contract as aforesaid.
- h. If (1) the Contractor fails to perform any of its obligations under this Contract or any other agreement between the Port Authority and the Contractor (including its obligation to the Port Authority to pay any claim lawfully made against it by any supplier, subcontractor or worker or other person which arises out of or in connection with the performance of this Contract or any other agreement with the Port Authority) or (2) any claim (just or unjust) which arises out of or in connection with this Contract or any other agreement between the Port Authority and the Contractor is made against the Port Authority or (3) any subcontractor under this Contract or any other agreement between the Port Authority and the Contractor fails to pay any claims lawfully made against it by any supplier, subcontractor, worker or other third person which arises out of or in connection with this Contract or any other agreement between the Port Authority and the Contractor or if in the opinion of the Port Authority any of the aforesaid contingencies is likely to arise, then the Port Authority shall have the right, in its discretion, to withhold out of any payment (final or otherwise) such sums as the Port Authority may deem ample to protect it against delay or loss or to assure the payment of just claims of third persons, and to apply such sums in such manner as the Port Authority may deem proper to secure such protection or satisfy such claims. All sums so applied shall be deducted from the Contractor's compensation. Omission by the Port Authority to withhold out of any payment, final or otherwise, a sum for any of the above contingencies, even though such contingency has occurred at the time of such payment, shall not be deemed to indicate that the Port Authority does not intend to exercise its right with respect to such contingency. Neither the above provisions for rights of the Port Authority to withhold and apply monies nor any exercise or attempted exercise of, or omission to exercise, such rights by the Port Authority shall create any obligation of any kind to such supplier, subcontractors, worker or other third persons. If, however, the payment of any amount due the Contractor shall be improperly delayed, the Port Authority shall pay the Contractor interest thereon at the rate of 6% per annum for the period of the

delay, it being agreed that such interest shall be in lieu of and in liquidation of any damages to the Contractor because of such delay.

- i. If the Port Authority has paid any sum or has incurred any obligation or expense which the Contractor has agreed to pay or reimburse the Port Authority, or if the Port Authority is required or elects to pay any sum or sums or incurs any obligations or expense by reason of the failure, neglect or refusal of the Contractor to perform or fulfill any one or more of the conditions, covenants, or agreements contained in this Contract, or as a result of an act of omission of the Contractor contrary to the said conditions, covenants and agreements, the Contractor shall pay to the Port Authority the sum or sums so paid or expense so incurred, including all interests, costs and damages, promptly upon the receipt of the Port Authority's statement therefore. The Port Authority may, however, in its discretion, elect to deduct said sum or sums from any payment payable by it to the Contractor.
- j. If the Port Authority pays any installment to the Contractor without reducing said installment as provided in this Contract, it may reduce any succeeding installment by the proper amount, or it may bill the Contractor for the amount by which the installment paid should have been reduced and the Contractor shall pay to the Port Authority any such amount promptly upon receipt of the Port Authority's statement therefore.
- k. The Port Authority shall also have the rights set forth above in the event the Contractor shall become insolvent or bankrupt or if his affairs are placed in the hands of a receiver, trustee or assignee for the benefit of creditors.

15. Sales or Compensating Use Taxes

Purchases of services and tangible personal property by the Port Authority in the States of New York and New Jersey are generally exempt from state and local sales and compensating use taxes, and from most federal excises (Taxes). Therefore, the Port Authority's purchase of the Contractor's services under this Contract is exempt from Taxes. Accordingly, the Contractor must not include Taxes in the price charged to the Port Authority for the Contractor's services under this Contract. The Contractor certifies that there are no such taxes included in the prices for this Contract. The Contractor shall retain a copy of this Contract to substantiate the exempt sale.

The compensation set forth in this Agreement is the complete compensation to the Contractor, and the Port Authority will not separately reimburse the Contractor for any taxes unless specifically set forth in this Agreement.

16. No Estoppel or Waiver

The Port Authority shall not be precluded or estopped by any payment, final or otherwise, issued or made under this Contract, from showing at any time the true amount and character of the services performed, or from showing that any such payment is incorrect or was improperly issued or made; and the Port Authority shall not be precluded or estopped, notwithstanding any such payment, from recovering from the Contractor any damages which it may sustain by reason of any failure on its part to comply strictly with this Contract, and any moneys which may be paid to it or for its account in excess of those to which it is lawfully entitled.

No cancellation, rescission or annulment hereof, in whole or as to any part of the services to be provided hereunder, or because of any breach hereof, shall be deemed a waiver of any money damages to which the Port Authority may be entitled because of such breach. Moreover, no waiver by the Authority of any breach of this Contract shall be deemed to be a waiver of any other or any subsequent breach.

17. Records and Reports

The Contractor shall set up, keep and maintain (and shall cause its subcontractors to set up, keep and maintain) in accordance with generally accepted accounting practice during the term of this Agreement and

any extensions thereof and for three years after the expiration, termination or revocation thereof, records, payroll records and books of account (including, but not limited to, records of original entry and daily forms, payroll runs, cancelled checks, time records, union agreements, contracts with health, pension and other third party benefit providers) recording all transactions of the Contractor (and its subcontractors), at, through or in any way connected with or related to the operations of the Contractor (and its subcontractors) hereunder, including but not limited to all matters relating to the charges payable to the Contractor hereunder, all wages and supplemental benefits paid or provided to or for its employees (and its subcontractors' employees) and such additional information as the Port Authority may from time to time and at any time require, and also including, if appropriate, recording the actual number of hours of service provided under the Contract, and keeping separate records thereof which records and books of account shall be kept at all times within the Port District. The Contractor shall permit (and cause its subcontractors to permit) in ordinary business hours during the term of this Agreement including any extensions thereof and for three years thereafter the examination and audit by the officers, employees and representatives of the Port Authority of such records and books of account and also any records and books of account of any company which is owned or controlled by the Contractor, or which owns or controls the Contractor if said company performs services similar to those performed by the Contractor anywhere in the Port District. However, if within the aforesaid three year period the Port Authority has notified the Contractor in writing of a pending claim by the Port Authority under or in connection with this Contract to which any of the aforesaid records and documents of the Contractor or of its subcontractors relate either directly or indirectly, then the period of such right of access shall be extended to the expiration of six years from the date of final payment with respect to the records and documents involved.

Upon request of the Port Authority, the Contractor shall furnish or provide access to the federal Form I-9 (Employment Eligibility Verification) for each individual performing work under this Contract. This includes citizens and noncitizens.

The Contractor (and its subcontractors) shall, at its own expense, install, maintain and use such equipment and devices for recording the labor hours of the service as shall be appropriate to its business and necessary or desirable to keep accurate records of the same and as the general manager or the Facility Manager may from time to time require, and the Contractor (and its subcontractors) shall at all reasonable times allow inspection by the agents and employees of the Port Authority of all such equipment or devices.

- a. The Contractor hereby further agrees to furnish to the Port Authority from time to time such written reports in connection with its operations hereunder as the Port Authority may deem necessary or desirable. The format of all forms, schedules and reports furnished by the Contractor to the Port Authority shall be subject to the continuing approval of the Port Authority.
- b. No provision in this Contract giving the Port Authority a right of access to records and documents is intended to impair or affect any right of access to records and documents which they would have in the absence of such provision. Additional record keeping may be required under other sections of this Contract.

18. General Obligations

- a. Except where expressly required or permitted herein to be oral, all notices, requests, consents and approvals required to be given to or by either party shall be in writing and all such notices, requests, consents and approvals shall be personally delivered to the other party during regular business hours or forwarded to such party by United States certified mail, return receipt requested, addressed to the other party at its address hereinbefore or hereafter provided. Until further notice the Contractor hereby designates the address shown on the bottom of the Contractors Signature Sheet as their address to which such notices, requests, consents, or approvals may be forwarded. All notices, requests, consents, or approvals of the Contractor shall be forwarded to the Manager at the Facility.
- b. The Contractor shall comply with the provisions of all present and future federal, state and municipal laws, rules, regulations, requirements, ordinances, orders and directions which pertain to its operations

under this Contract and which affect the Contract or the performance thereof and those engaged therein as if the said Contract were being performed for a private corporation, except where stricter requirements are contained in the Contract in which case the Contract shall control. The Contractor shall procure for itself all licenses, certificates, permits or other authorization from all governmental authorities, if any, having jurisdiction over the Contractor's operations hereunder which may be necessary for the Contractor's operations. The Contractor's obligation to comply with governmental requirements are not to be construed as a submission by the Port Authority to the application to itself of such requirements.

- c. The Contractor shall pay all taxes, license, certification, permit and examination fees and excises which may be assessed on its property or operations hereunder or income therefrom, and shall make all applications, reports and returns required in connection therewith.
- d. The Contractor shall, in conducting its operations hereunder, take all necessary precautions to protect the general environment and to prevent environmental pollution, contamination, damage to property and personal injury. In the event the Contractor encounters material reasonably believed to be asbestos, polychlorinated biphenyl (PCB) or any other hazardous material, in conducting its operations hereunder, the Contractor shall immediately stop Work in the area affected and report the condition in writing to the Manager. Work in the affected area shall not thereafter be resumed by the Contractor except upon the issuance of a written order to that effect from the Manager.
- e. The Contractor shall promptly observe, comply with and execute the provisions of any and all present and future rules and regulations, requirements, standard orders and directions of the American Insurance Association, the Insurance Services Office, National Fire Protection Association, and any other body or organization exercising similar functions which may pertain or apply to the Contractor's operations hereunder.

The Contractor shall not do or permit to be done any act which:

- 1. will invalidate or be in conflict with any fire insurance policies covering the Facility or any part thereof or upon the contents of any building thereon; or
 - 2. will increase the rate of any fire insurance, extended coverage or rental insurance on the Facility or any part thereof or upon the contents of any building thereon; or
 - 3. in the opinion of the Port Authority will constitute a hazardous condition, so as to increase the risk normally attendant upon the operations contemplated by this Contract; or
 - 4. may cause or produce in the premises, or upon the Facility any unusual, noxious or objectionable smoke, gases, vapors, odors; or
 - 5. may interfere with the effectiveness or accessibility of the drainage and sewerage system, fire protection system, sprinkler system, alarm system, fire hydrants and hoses, if any, installed or located or to be installed or located in or on the Facility; or
 - 6. shall constitute a nuisance in or on the Facility or which may result in the creation, commission or maintenance of a nuisance in or on the Facility.
- f. If by reason of the Contractor's failure to comply with the provisions of this Section and provided the Port Authority has given the Contractor five (5) days written notice of its failure and the Contractor shall not have cured said failure within said five (5) days, any fire insurance, extended coverage or rental insurance rate on the Facility or any part thereof or upon the contents of any building thereon shall at any time be higher than it otherwise would be, then the Contractor shall on demand pay the Port Authority that part of all fire insurance, extended coverage or rental insurance premiums paid or payable by the Port Authority which shall have been charged because of such violations by the Contractor.
 - g. The Contractor shall conduct its operations hereunder so as not to endanger, unreasonably interfere with, or delay the operations or activities of any tenants or occupants on the premises or the Facility and, moreover, shall use the same degree of care in performance on the premises as would be required by law of the Port Authority and shall conduct operations hereunder in a courteous, efficient and safe manner.
 - h. The Contractor shall provide such equipment and medical facilities as may be necessary to supply first

aid service in case of accidents to its personnel who may be injured in the furnishing of service hereunder. The Contractor shall maintain standing arrangements for the removal and hospital treatment of any of its personnel who may be injured.

19. Assignments and Subcontracting

- a. The Contractor shall not sell, transfer, mortgage, pledge, subcontract or assign this Contract or any part thereof or any of the rights granted hereunder or any moneys due or to become due to it hereunder or enter into any contract requiring or permitting the doing of anything hereunder by an independent Contractor, without the prior written approval of the Port Authority, and any such sale, transfer, mortgage, pledge, subcontract, assignment or contract without such prior written approval shall be void as to the Port Authority.
- b. All subcontractors who provide permanent personnel to the Contractor for work under this Contract shall be given written notice to comply with all requirements of the Contract. The Contractor shall be responsible and liable for the performance and acts of each subcontractor.
- c. All persons to whom the Contractor sublets services shall be deemed to be its agents and no subletting or approval thereof shall be deemed to release this Contractor from its obligations under this Contract or to impose any obligations on the Port Authority to such subcontractor or to give the subcontractor any rights against the Port Authority.

20. Indemnification and Risks Assumed By The Contractor

To the extent permitted by law, the Contractor shall indemnify and hold harmless the Port Authority, its Commissioners, officers, representatives and employees from and against all claims and demands, just or unjust, of third persons (including Contractor's employees, employees, officers, and agents of the Port Authority) arising out of or in any way connected or alleged to arise out of or alleged to be in any way connected with the Contract and all other services and activities of the Contractor under this Contract and for all expenses incurred by it and by them in the defense, settlement or satisfaction thereof, including without limitation thereto, claims and demands for death, for personal injury or for property damage, direct or consequential, whether they arise from the acts or omissions of the Contractor, the Port Authority, third persons (including Contractor's employees, employees, officers, and agents of the Port Authority), or from the acts of God or the public enemy, or otherwise, including claims and demands of any local jurisdiction against the Port Authority in connection with this Contract.

The Contractor assumes the following risks, whether such risks arise from acts or omissions (negligent or not) of the Contractor, the Port Authority or third persons (including Contractor's employees, employees, officers, and agents of the Port Authority) or from any other cause, excepting only risks occasioned solely by affirmative willful acts of the Port Authority done subsequent to the opening of proposals on this Contract, and shall to the extent permitted by law indemnify the Port Authority for all loss or damage incurred in connection with such risks:

- a. The risk of any and all loss or damage to Port Authority property, equipment (including but not limited to automotive and/or mobile equipment), materials and possessions, on or off the premises, the loss or damage of which shall arise out of the Contractor's operations hereunder. The Contractor shall if so directed by the Port Authority, repair, replace or rebuild to the satisfaction of the Port Authority, any and all parts of the premises or the Facility which may be damaged or destroyed by the acts or omissions of the Contractor, its officers, agents, or employees and if the Contractor shall fail so to repair, replace, or rebuild with due diligence the Port Authority may, at its option, perform any of the foregoing work and the Contractor shall pay to the Port Authority the cost thereof.
- b. The risk of any and all loss or damage of the Contractor's property, equipment (including but not limited to automotive and/or mobile equipment) materials and possessions on the Facility.
- c. The risk of claim, whether made against the Contractor or the Port Authority, for any and all loss or damages occurring to any property, equipment (including but not limited to automotive and/or mobile

equipment), materials and possessions of the Contractor's agents, employees, materialmen and others performing work hereunder.

- d. The risk of claims for injuries, damage or loss of any kind just or unjust of third persons arising or alleged to arise out of the performance of work hereunder, whether such claims are made against the Contractor or the Port Authority.

If so directed, the Contractor shall at its own expense defend any suit based upon any such claim or demand, even if such suit, claim or demand is groundless, false or fraudulent, and in handling such shall not, without obtaining express advance permission from the General Counsel of the Port Authority, raise any defense involving in any way the jurisdiction of the tribunal over the person of the Port Authority, the immunity of the Port Authority, its Commissioners, officers, agents or employees, the governmental nature of the Port Authority or the provision of any statutes respecting suits against the Port Authority.

Neither the requirements of the Port Authority under this Contract, nor of the Port Authority of the methods of performance hereunder nor the failure of the Port Authority to call attention to improper or inadequate methods or to require a change in the method of performance hereunder nor the failure of the Port Authority to direct the Contractor to take any particular precaution or other action or to refrain from doing any particular thing shall relieve the Contractor of its liability for injuries to persons or damage to property or environmental impairment arising out of its operations.

21. Approval of Methods

Neither the approval of the Port Authority of the methods of furnishing services hereunder nor the failure of the Port Authority to call attention to improper or inadequate methods or to require a change in the method of furnishing services hereunder, nor the failure of the Port Authority to direct the Contractor to take any particular precautions or to refrain from doing any particular thing shall relieve the Contractor of its liability for injuries to persons or damage to property or environmental impairment arising out of its operations.

22. Safety and Cleanliness

- a. The Contractor shall, in the furnishing of services hereunder, exercise every precaution to prevent injury to person or damage to property or environmental impairment and avoid inconvenience to the occupants of or any visitors to the Facility. The Contractor shall, without limiting the generality hereof, place such personnel, erect such barricades and railings, give such warnings, display such lights, signals or signs, place such cones and exercise precautions as may be necessary, proper or desirable.
- b. The Contractor shall in case of unsafe floor conditions due to construction, wetness, spillage, sickness and all other types of hazardous conditions proceed to rope off the unsafe area and place appropriate warnings signs to prevent accidents from occurring. The Contractor shall clean said area to the satisfaction of the Manager.
- c. The Contractor shall at all times maintain in a clean and orderly condition and appearance any and all facilities provided by the Port Authority for the Contractor's operations, and all fixtures, sink closets, equipment, and other personal property of the Port Authority which are located in said facilities.

23. Accident Reports

The Contractor shall promptly report in writing to the Manager of the Facility and to the Deputy Chief, Litigation Management of the Port Authority all accidents whatsoever arising out of or in connection with its operations hereunder and which result in death or injury to persons or damage to property, setting forth such details thereof as the Port Authority may desire. In addition, if death or serious injury or serious damage is caused, such accidents shall be immediately reported by telephone to the aforesaid representatives of the Port Authority.

24. Trash Removal

The Contractor shall remove daily from the Facility by means provided by the Contractor all garbage, debris and other waste material (solid or liquid) arising out of or in connection with its operations hereunder, and any such garbage, debris and other waste material not immediately removed shall be temporarily stored in a clear and sanitary condition, approved by the Facility Manager and shall be kept covered except when filling or emptying them. The Contractor shall exercise care in removing such garbage, debris and other waste materials from the Facility. The manner of such storage and removal shall always be subject in all respects to the continual approval of the Port Authority. No equipment or facilities of the Port Authority shall be used in such removal unless with its prior consent in writing. No such garbage, debris or other waste materials shall be or be permitted to be thrown, discharged or disposed into or upon the waters at or bounding the Facility.

25. Lost and Found Property

The Contractor shall instruct its personnel that all items of personal property found by the Contractor's employees at the Site must be turned in to the Port Authority and a receipt will be issued therefor.

26. Property of the Contractor

- a. All property of the Contractor at the Site by virtue of this Contract shall be removed on or before the expiration or sooner termination or revocation of this Contract.
- b. If the Contractor shall fail to remove its property upon the expiration, termination or revocation of this Contract the Port Authority may, at its option, dispose of such property as waste or as agent for the Contractor and at the risk and expense of the Contractor, remove such property to a public warehouse, or may retain the same in its own possession, and in either event after the expiration of thirty (30) days may sell the same in accordance with any method deemed appropriate; the proceeds of any such sale shall be applied first, to the expenses of sale and second, to any sums owed by the Contractor to the Port Authority; any balance remaining shall be paid to the Contractor. Any excess of the total cost of removal, storage and sale and other costs incurred by the Port Authority as a result of such failure of performance by the Contractor over the proceeds of sale shall be paid by the Contractor to the Port Authority upon demand.

27. Modification of Contract

This Contract may not be changed except in writing signed by the Port Authority and the Contractor. The Contractor agrees that no representation or warranties shall be binding upon the Port Authority unless expressed in writing in this Contract.

28. Invalid Clauses

If any provision of this Contract shall be such as to destroy its mutuality or to render it invalid or illegal, then, if it shall not appear to have been so material that without it the Contract would not have been made by the parties, it shall not be deemed to form part thereof but the balance of the Contract shall remain in full force and effect.

29. Approval of Materials, Supplies and Equipment

Only Port Authority approved materials, supplies, and equipment are to be used by the Contractor in performing the Work hereunder. Inclusion of chemical containing materials or supplies on the Port Authority Approved Products List – Environmental Protection Supplies constitutes approval. The list may be revised from time to time and at any time by the Port Authority and it shall be incumbent upon the Contractor to obtain the most current list from the Manager of the Facility.

At anytime during the Solicitation, pre-performance or performance periods, the Contractor may propose the use of an alternate product or products to those on the Approved Products List – Environmental Protection Supplies, which product(s) shall be subject to review and approval by the Port Authority. Any alternate

product so approved by the Port Authority may be used by the Contractor in performing the Services hereunder. Until such approval is given, only products on the Approved Products List – Environmental Protection Supplies may be used.

30. Intellectual Property

The right to use all patented materials, appliances, processes of manufacture or types of construction, trade and service marks, copyrights and trade secrets, collectively hereinafter referred to as “Intellectual Property Rights”, in the performance of the work, shall be obtained by the Contractor without separate or additional compensation. Where the services under this Agreement require the Contractor to provide materials, equipment or software for the use of the Port Authority or its employees or agents, the Port Authority shall be provided with the Intellectual Property Rights required for such use without further compensation than is provided for under this Agreement.

The Contractor shall indemnify the Port Authority against and save it harmless from all loss and expense incurred as a result of any claims in the nature of Intellectual Property Rights infringement arising out of the Contractor’s or Port Authority’s use, in accordance with the above immediately preceding paragraph, of any Intellectual Property. The Contractor, if requested, shall conduct all negotiations with respect to and defend such claims. If the Contractor or the Port Authority, its employees or agents be enjoined either temporarily or permanently from the use of any subject matter as to which the Contractor is to indemnify the Port Authority against infringement, then the Port Authority may, without limiting any other rights it may have, require the Contractor to supply temporary or permanent replacement facilities approved by the Manager, and if the Contractor fails to do so the Contractor shall, at its expense, remove all such enjoined facilities and refund the cost thereof to the Port Authority or take such steps as may be necessary to insure compliance by the Contractor and the Port Authority with said injunction, to the satisfaction of the Port Authority.

In addition, the Contractor shall promptly and fully inform the Director in writing of any intellectual property rights disputes, whether existing or potential, of which it has knowledge, relating to any idea, design, method, material, equipment or any other matter related to the subject matter of this Agreement or coming to its attention in connection with this Agreement.

31. Contract Records and Documents – Passwords and Codes

When the performance of the contract services requires the Contractor to produce, compile or maintain records, data, drawings, or documents of any kind, regardless of the media utilized, then all such records, drawings, data and documents which are produced, prepared or compiled in connection with this contract, shall become the property of the Port Authority, and the Port Authority shall have the right to use or permit the use of them and any ideas or methods represented by them for any purpose and at any time without other compensation than that specifically provided herein.

When in the performance of the contract services the Contractor utilizes passwords or codes for any purpose, at any time during or after the performance of such services, upon written request by the Authority, the Contractor shall make available to the designated Authority representative all such passwords and codes.

32. Designated Secure Areas

Services under the Contract may be required in designated secure areas, as the same may be designated by the Manager from time to time (“Secure Areas”). The Port Authority shall require the observance of certain security procedures with respect to Secure Areas, which may include the escort to, at, and/or from said high security areas by security personnel designated by the Contractor or any subcontractor’s personnel required to

work therein. All personnel that require access to designated secure areas who are not under positive escort by an authorized individual will be required to undergo background screening and personal identity verification.

Forty-eight (48) hours prior to the proposed performance of any work in a Secure Area, the Contractor shall notify the Manager. The Contractor shall conform to the procedures as may be established by the Manager from time to time and at any time for access to Secure Areas and the escorting of personnel hereunder. Prior to the start of work, the Contractor shall request a description from the Manager of the Secure Areas which will be in effect on the commencement date. The description of Secure Areas may be changed from time to time and at any time by the Manager during the term of the Contract.

33. Notification of Security Requirements

The Authority has the responsibility of ensuring safe, reliable and secure transportation facilities, systems, and projects to maintain the well-being and economic competitiveness of the region. Therefore, the Authority reserves the right to deny access to certain documents, sensitive security construction sites and facilities (including rental spaces) to any person that declines to abide by Port Authority security procedures and protocols, any person with a criminal record with respect to certain crimes or who may otherwise poses a threat to the construction site or facility security. The Authority reserves the right to impose multiple layers of security requirements on the Contractor, its staff and subcontractors and their staffs depending upon the level of security required, or may make any amendments with respect to such requirements as determined by the Authority.

These security requirements may include but are not limited to the following:

- Execution of Port Authority Approved Non-disclosure Agreements

At the direction of the Port Authority, the Contractor shall be required to have its principals, staff and/or subcontractor(s) and their staff, execute Port Authority approved non-disclosure agreements.

- Contractor/ Subcontractor identity checks and background screening

The Port Authority's designated background screening provider may require inspection of not less than two forms of valid/current government issued identification (at least one having an official photograph) to verify staff's name and residence; screening federal, state, and/or local criminal justice agency information databases and files; screening of any terrorist identification files; access identification to include some form of biometric security methodology such as fingerprint, facial or iris scanning, or the like.

The Contractor may be required to have its staff, and any subcontractor's staff, material-men, visitors or others over whom the Contractor/subcontractor has control, authorize the Authority or its designee to perform background checks, and a personal identity verification check. Such authorization shall be in a form acceptable to the Authority. The Contractor and subcontractors may also be required to use an organization designated by the Authority to perform the background checks.

As of January 29, 2007, the Secure Worker Access Consortium (S.W.A.C.) is the only Port Authority approved provider to be used to conduct background screening and personal identity verification, except as otherwise required by federal law and/or regulation (such as the Transportation Worker Identification Credential for personnel performing in secure areas at Maritime facilities). Information about S.W.A.C., instructions, corporate enrollment, online applications, and location of processing centers can be found at <http://www.secureworker.com>, or S.W.A.C. may be contacted directly at (877) 522-7922 for more information and the latest pricing. The cost for said background checks for staff that pass and are granted a credential shall be reimbursable to the Contractor (and its subcontractors) as an out-of-pocket expense as provided herein. Staff that are rejected for a credential for any reason are not reimbursable.

- Issuance of Photo Identification Credential

No person will be permitted on or about the Authority construction site or facility (including rental spaces) without a facility-specific photo identification credential approved by the Authority. If the authority requires facility-specific identification credential for the Contractor's and the subcontractor's

staff, the Authority will supply such identification at no cost to the Contractor or its subcontractors. Such facility-specific identification credential shall remain the property of the Authority and shall be returned to the Authority at the completion or upon request prior to completion of the individual's assignment at the specific facility. It is the responsibility of the appropriate Contractor or subcontractor to immediately report to the Authority the loss of any staff member's individual facility-specific identification credential. The Contractor or subcontractor shall be billed for the cost of the replacement identification credential. Contractor's and subcontractor's staff shall display Identification badges in a conspicuous and clearly visible manner, when entering, working or leaving an Authority construction site or facility.

Employees may be required to produce not less than two forms of valid/current government issued identification having an official photograph and an original, un laminated social security card for identify and SSN verification. Where applicable, for sensitive security construction sites or facilities, successful completion of the application, screening and identify verification for all employees of the Contractor and subcontractors shall be completed prior to being provided a S.W.A.C. ID Photo Identification credential.

- Access control, inspection, and monitoring by security guards

The Authority may provide for Authority construction site or facility (including rental spaces) access control, inspection and monitoring by Port Authority Police or Authority retained contractor security guards. However, this provision shall not relieve the Contractor of its responsibility to secure its equipment and work and that of its subconsultant/subcontractor's and service suppliers at the Authority construction site or facility (including rental spaces). In addition, the Contractor, subcontractor or service provider is not permitted to take photographs, digital images, electronic copying and/or electronic transmission or video recordings or make sketches on any other medium at the Authority construction sites or facilities (including rental spaces), except when necessary to perform the Work under this Contract, without prior written permission from the Authority. Upon request, any photograph, digital images, video recording or sketches made of the Authority construction site or facility shall be submitted to the Authority to determine compliance with this paragraph, which submission shall be conclusive and binding on the submitting entity.

- Compliance with the Port Authority Information Security Handbook

The Contract may require access to Port Authority information considered Protected Information ("PI") as defined in the Port Authority Information Security Handbook ("Handbook"), dated October, 2008, corrected as of November 14, 2013, and as may be further amended. The Handbook and its requirements are hereby incorporated into this agreement and will govern the possession, distribution and use of PI if at any point during the lifecycle of the project or solicitation it becomes necessary for the Contractor to have access to PI. Protecting sensitive information requires the application of uniform safeguarding measures to prevent unauthorized disclosure and to control any authorized disclosure of this information within the Port Authority or when released by the Port Authority to outside entities. The following is an outline of some of the procedures, obligations and directives contained in the Handbook:

- (1) require that the Contractor and subcontractors, when appropriate, sign Non-Disclosure Agreements (NDAs), or an Acknowledgment of an existing NDA, provided by the Authority as a condition of being granted access to Protected Information categorized and protected as per the Handbook;
- (2) require that individuals needing access to PI be required to undergo a background check, pursuant to the process and requirements noted in § 3.2 of the Information Security Handbook.
- (3) require Contractors and commercial enterprises to attend training to ensure security awareness regarding Port Authority information;
- (4) specific guidelines and requirements for the handling of PI to ensure that the storage and protection of PI;
- (5) restrictions on the transfer, shipping, and mailing of PI;
- (6) prohibitions on the publication, posting, modifying, copying, reproducing, republishing, uploading, transmitting, or distributing PI on websites or web pages. This may also include

- restricting persons, who either have not passed a pre-screening background check, or who have not been granted access to PI, from viewing such information;
- (7) require that PI be destroyed using certain methods, measures or technology pursuant to the requirements set forth in the Handbook;
 - (8) require the Contractor to mandate that each of its subcontractors maintain the same levels of security required of the Contractor under any Port Authority awarded contract.
 - (9) prohibit the publication, exchange or dissemination of PI developed from the project or contained in reports, except between Contractors and subcontractors, without prior approval of the Port Authority;
 - (10) require that PI only be reproduced or copied pursuant to the requirements set forth in the Handbook.

- Audits for Compliance with Security Requirements

The Port Authority may conduct random or scheduled examinations of business practices under this section entitled “NOTIFICATION OF SECURITY REQUIREMENTS” and the Handbook in order to assess the extent of compliance with security requirements, Protected Information procedures, protocols and practices, which may include, but not be limited to, verification of background check status, confirmation of completion of specified training, and/or a site visit to view material storage locations and protocols.

34. Construction In Progress

The Contractor recognizes that construction may be in progress at the Facility and may continue throughout the term of this Contract. Notwithstanding, the Contractor shall at all times during the term hereof maintain the same standards of performance and cleanliness as prevails in non-affected areas as required by the standards hereunder.

35. Permit-Required Confined Space Work

Prior to commencement of any work, the Contractor shall request and obtain from the Port Authority a description of all spaces at the facility which are permit-required confined spaces requiring issuance of an OSHA permit.

Prior to the commencement of any work in a permit-required confined space at a Port Authority facility requiring issuance of an OSHA permit, the Contractor shall contact the Manager to obtain an Authority Contractor Permit-Required Confined Space Notification form. The notification form must be filled out and submitted prior to commencing permit-required confined space work. All confined space work shall be performed in accordance with all applicable OSHA requirements. The Contractor shall provide its employees with a copy of its own company permit and shall furnish the Port Authority with a copy of the permit upon completion of the work. The Contractor must supply all equipment required for working in a confined space.

36. Signs

Except with the prior written approval of the Port Authority, the Contractor shall not erect, maintain or display any signs or posters or any advertising on or about the Facility.

37. Vending Machines, Food Preparation

The Contractor shall not install, maintain or operate on the Facility, or on any other Port Authority property, any vending machines without the prior written approval of the Port Authority. No foods or beverages shall be prepared or consumed at the Facility by any of the Contractor's employees except in areas as may be specifically designated by the Port Authority for such purpose.

38. Confidential Information/Non-Publication

a. As used herein, confidential information shall mean all information disclosed to the Contractor or the personnel provided by the Contractor hereunder which relates to the Authority's and/or PATH's past, present, and future research, development and business activities including, but not limited to, software and documentation licensed to the Authority or proprietary to the Authority and/or PATH and all associated software, source code procedures and documentation. Confidential information shall also mean any other tangible or intangible information or materials including but not limited to computer identification numbers, access codes, passwords, and reports obtained and/or used during the performance of the Contractor's Services under this Contract.

b. Confidential information shall also mean and include collectively, as per *The Port Authority of New York & New Jersey Information Security Handbook (October 15, 2008, corrected as of November 14, 2013)*, Protected Information, Confidential Proprietary Information, Confidential Privileged Information and information that is labeled, marked or otherwise identified by or on behalf of the Authority so as to reasonably connote that such information is confidential, privileged, sensitive or proprietary in nature. Confidential Information shall also include all work product that contains or is derived from any of the foregoing, whether in whole or in part, regardless of whether prepared by the Authority or a third-party or when the Authority receives such information from others and agrees to treat such information as Confidential.

c. The Contractor shall hold all such confidential information in trust and confidence for the Authority, and agrees that the Contractor and the personnel provided by the Contractor hereunder shall not, during or after the termination or expiration of this Contract, disclose to any person, firm or corporation, nor use for its own business or benefit, any information obtained by it under or in connection with the supplying of services contemplated by this Contract. The Contractor and the personnel provided by the Contractor hereunder shall not violate in any manner any patent, copyright, trade secret or other proprietary right of the Authority or third persons in connection with their services hereunder, either before or after termination or expiration of this Contract. The Contractor and the personnel provided by the Contractor hereunder shall not willfully or otherwise perform any dishonest or fraudulent acts, breach any security procedures, or damage or destroy any hardware, software or documentation, proprietary or otherwise, in connection with their services hereunder. The Contractor shall promptly and fully inform the Director in writing of any patent, copyright, trade secret or other intellectual property rights or disputes, whether existing or potential, of which the Contractor has knowledge, relating to any idea, design, method, material, equipment or other matter related to this Contract or coming to the Contractor's attention in connection with this Contract.

d. The Contractor shall not issue nor permit to be issued any press release, advertisement, or literature of any kind, which refers to the Port Authority or to the fact that goods have been, are being or will be provided to it and/or that services have been, are being or will be performed for it in connection with this Agreement, unless the vendor first obtains the written approval of the Port Authority. Such approval may be withheld if for any reason the Port Authority believes that the publication of such information would be harmful to the public interest or is in any way undesirable.

39. Time is of the Essence

Time is of the essence in the Contractor's performance of this Contract inasmuch as the Work to be performed will affect the operation of public facilities.

40. Holidays

The following holidays will be observed at the Site:

New Year's Day	Labor Day
Martin Luther King Jr. Day	Columbus Day
Presidents Day	Veterans Day
Memorial Day	Thanksgiving Day
Independence Day	Day After Thanksgiving
Christmas Day	

This list is subject to periodic revision and the Contractor shall be responsible for obtaining all updated lists from the office of the Manager. If any such holiday falls on a Sunday then the next day shall be considered the holiday and/or if any such holiday falls on a Saturday then the preceding day shall be considered the holiday.

41. Personnel Standards

In addition to any specific personnel requirements that may be required under the clause entitled “Personnel Requirements” in the Specifications, the Contractor (and any Subcontractor) shall furnish competent and adequately trained personnel to perform the Work hereunder. If, in the opinion of the Manager, any employee so assigned is performing their functions unsatisfactorily, they shall be replaced by the Contractor within twenty-four (24) hours following the Contractor’s receipt of the Manager’s request for such replacement.

All Contractor's employees performing Work hereunder shall have the ability to communicate in the English language to the extent necessary to comprehend directions given by either the Contractor's supervisory staff or by the Manager's staff. Any employee operating a motor vehicle must have a valid driver's license.

The Contractor shall verify that employees working under this Contract in the United States are legally present in the United States and authorized to work by means of the federally required I-9 program

42. General Uniform Requirements for Contractor’s Personnel

In addition to any specific uniform requirements that may be required by the Specifications, uniforms must be worn at all times during which the Services are being performed hereunder. The Contractor agrees that his/her employees will present a neat, clean and orderly appearance at all times. Uniforms shall include the Contractor’s identification badge with picture ID bearing the employee’s name. All uniforms, colors, types and styles shall be subject to the prior approval of the Manager. The Contractor will also be responsible for ensuring that its employees are wearing shoes appropriate for the tasks performed. The Manager shall have the right to require removal of any employee who shall fail to wear the proper uniform and shoes, and the exercise of this right shall not limit the obligation of the Contractor to perform the Services or to furnish any required number of employees at a specific location at the Site as specified.

43. Labor, Equipment and Materials Supplied by the Contractor

The Contractor shall, at all times during the performance of this Contract, furnish all necessary labor, supervision, equipment and materials necessary for the prompt and efficient performance of the Work, whether such materials and equipment are actually employed in the furnishing of the Work or whether incidental thereto.

All materials used by the Contractor in furnishing Work hereunder shall be of such quality as to accomplish the purposes of this Contract and the Services to be furnished hereunder in such manner so as not to damage any part of the Site.

The Port Authority by its officers, employees and representatives shall have the right at all times to examine the supplies, materials and equipment used by the Contractor, to observe the operations of the Contractor, its

agents, servants and employees and to do any act or thing which the Port Authority may be obligated or have the right to do under this Contract or otherwise.

All equipment, materials and supplies used in the performance of this Contract required hereunder shall be used in accordance with their manufacturer's instructions.

Materials and supplies to be provided by the Contractor hereunder shall comply with OSHA and all applicable regulations.

44. Contractor's Vehicles – Parking - Licenses

At the discretion of the Manager, the Port Authority may permit the Contractor during the effective period of this Contract to park vehicle(s) used by it in its operations hereunder in such location as may from time to time or at any time be designated by the Manager. The Contractor shall comply with such existing rules, regulations and procedures as are now in force and such reasonable future rules, regulations and procedures as may hereafter be adopted by the Port Authority for the safety and convenience of persons who park automotive vehicles in any parking area at the Site or for the safety and proper persons who park automotive vehicles in any parking area at the Site or for the safety and proper identification of such vehicles, and the Contractor shall also comply with any and all directions pertaining to such parking which may be given from time to time and at any time by the Manager. Any vehicle used by the Contractor hereunder shall be marked or placarded, identifying it as the Contractor's vehicle.

45. Manager's Authority

In the performance of the Work hereunder, the Contractor shall conform to all orders, directions and requirements of the Manager and shall perform the Work hereunder to the satisfaction of the Manager at such times and places, by such methods and in such manner and sequence as he/she may require, and the Contract shall at all stages be subject to his/her inspection. The Manager shall determine the amount, quality, acceptability and fitness of all parts of the Work and shall interpret the Specifications and any orders for Extra Work. The Contractor shall employ no equipment, materials, methods or staff or personnel to which the Manager objects. Upon request, the Manager shall confirm in writing any oral order, direction, requirement or determination.

The Manager shall have the authority to decide all questions in connection with the Services to be performed hereunder. The exercise by the Manager of the powers and authorities vested in him/her by this section shall be binding and final upon the Port Authority and the Contractor.

46. Price Preference

If this solicitation has not been set aside for the purposes of making an award based on bids solicited from Port Authority certified Minority Business, Women Business or Small Business Enterprises as indicated by the bidder pre-requisites in Part II hereof, for awards of contracts, not exceeding \$1,000,000, for:

- (a) Services, a price preference of 5% is available for New York or New Jersey Small Business Enterprises (SBE); or
- (b) Services (excluding Janitorial/Cleaning Services), a price preference of 10% is available for New York or New Jersey Minority or Women Business Enterprises (M/WBE),

certified by the Port Authority by the day before the bid opening.

If the Bidder is a Port Authority certified MBE, WBE or SBE, enter the applicable date(s) certification was obtained in the space provided on the Signature Sheet attached hereto.

47. M/WBE Good Faith Participation

If specified as applicable to this Contract, the Contractor shall use every good-faith effort to provide for participation by certified Minority Business Enterprises (MBEs) and certified Women-owned Business Enterprises (WBEs) as herein defined, in all purchasing and subcontracting opportunities associated with this Contract, including purchase of equipment, supplies and labor services.

Good Faith efforts to include participation by MBEs/WBEs shall include the following:

- a. Dividing the services and materials to be procured into small portions, where feasible.
- b. Giving reasonable advance notice of specific contracting, subcontracting and purchasing opportunities to such MBEs/WBEs as may be appropriate.
- c. Soliciting services and materials from a Port Authority certified MBE/WBE or seeking MBEs/WBEs from other sources. To access the Port Authority's Directory of MBE/WBE Certified Firms go to www.panynj.gov/supplierdiversty
- d. Ensuring that provision is made to provide progress payments to MBEs/WBEs on a timely basis.
- e. Observance of reasonable commercial standards of fair dealing in the respective trade or business.

Subsequent to Contract award, all changes to the M/WBE Participation Plan must be submitted via a modified M/WBE Participation Plan to the Manager for review and approval by the Authority's Office of Business Diversity and Civil Rights. For submittal of modifications to the M/WBE Plan, Contractors are directed to use form PA3749C, which may be downloaded at <http://www.panynj.gov/business-opportunities/become-vendor.html>. The Contractor shall not make changes to its approved M/WBE Participation Plan or substitute M/WBE subcontractors or suppliers for those named in their approved plan without the Manager's prior written approval. Unauthorized changes or substitutions, including performing the work designated for a subcontractor with the Contractor's own forces, shall be a violation of this section. Progress toward attainment of M/WBE participation goals set forth herein will be monitored throughout the duration of this Contract.

The Contractor shall also submit to the Manager, along with invoices, the Statement of Subcontractor Payments as the M/WBE Participation Report, which may be downloaded at <http://www.panynj.gov/business-opportunities/become-vendor.html>. The Statement must include the name and business address of each M/WBE subcontractor and supplier actually involved in the Contract, a description of the work performed and/or product or service supplied by each such subcontractor or supplier, the date and amount of each expenditure, and such other information that may assist the Manager in determining the Contractor's compliance with the foregoing provisions.

If, during the performance of this Contract, the Contractor fails to demonstrate good faith efforts in carrying out its M/WBE Participation Plan and the Contractor has not requested and been granted a full or partial waiver of the M/WBE participation goals set forth in this Contract, the Authority will take into consideration the Contractor's failure to carry out its M/WBE Participation Plan in its evaluation for award of future Authority contracts.

PART III CONTRACTOR'S INTEGRITY PROVISIONS

1. Certification of No Investigation (criminal or civil anti-trust), Indictment, Conviction, Debarment, Suspension, Disqualification and Disclosure of Other Information

By bidding on this Contract, each Bidder and each person signing on behalf of any Bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, that the Bidder and each parent and/or affiliate of the Bidder has not

- a. been indicted or convicted in any jurisdiction;
- b. been suspended, debarred, found not responsible or otherwise disqualified from entering into any contract with any governmental agency or been denied a government contract for failure to meet standards related to the integrity of the Bidder;
- c. had a contract terminated by any governmental agency for breach of contract or for any cause

- based in whole or in part on an indictment or conviction;
- d. ever used a name, trade name or abbreviated name, or an Employer Identification Number different from those inserted in the Bid;
 - e. had any business or professional license suspended or revoked or, within the five years prior to bid opening, had any sanction imposed in excess of fifty thousand dollars (\$50,000) as a result of any judicial or administrative proceeding with respect to any license held or with respect to any violation of a federal, state or local environmental law, rule or regulation;
 - f. had any sanction imposed as a result of a judicial or administrative proceeding related to fraud, extortion, bribery, bid rigging, embezzlement, misrepresentation or anti-trust regardless of the dollar amount of the sanctions or the date of their imposition; and
 - g. been, and is not currently, the subject of a criminal investigation by any federal, state or local prosecuting or investigative agency and/or a civil anti-trust investigation by any federal, state or local prosecuting or investigative agency, including an inspector general of a governmental agency or public authority.

2. Non-Collusive Bidding, and Code of Ethics Certification, Certification of No Solicitation Based On Commission, Percentage, Brokerage, Contingent or Other Fees

By bidding on this Contract, each Bidder and each person signing on behalf of any Bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, that

- a. the prices in its bid have been arrived at independently without collusion, consultation, communication or agreement for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;
- b. the prices quoted in its bid have not been and will not be knowingly disclosed directly or indirectly by the Bidder prior to the official opening of such bid to any other bidder or to any competitor;
- c. no attempt has been made and none will be made by the Bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition;
- d. this organization has not made any offers or agreements or taken any other action with respect to any Authority employee or former employee or immediate family member of either which would constitute a breach of ethical standards under the Code of Ethics dated March 11, 2014, or as may be revised, (a copy of which is available upon request) nor does this organization have any knowledge of any act on the part of an Authority employee or former Authority employee relating either directly or indirectly to this organization which constitutes a breach of the ethical standards set forth in said Code;
- e. no person or selling agency other than a bona fide employee or bona fide established commercial or selling agency maintained by the Bidder for the purpose of securing business, has been employed or retained by the Bidder to solicit or secure this Contract on the understanding that a commission, percentage, brokerage, contingent, or other fee would be paid to such person or selling agency; and
- f. the Bidder has not offered, promised or given, demanded or accepted, any undue advantage, directly or indirectly, to or from a public official or employee, political candidate, party or party official, or any private sector employee (including a person who directs or works for a private sector enterprise in any capacity), in order to obtain, retain, or direct business or to secure any other improper advantage in connection with this Contract.
- g. no person or organization has been retained, employed or designated on behalf of the Bidder to impact any Port Authority determination with respect to (i) the solicitation, evaluation or award of this Contract, or (ii) the preparation of specifications or request for submissions in connection with this Contract.

The foregoing certifications in this Part III, Sections 1 and 2, shall be deemed to have been made by the Bidder as follows:

- * if the Bidder is a corporation, such certification shall be deemed to have been made not only with respect to the Bidder itself, but also with respect to each parent, affiliate, director, and officer of the Bidder, as well as, to the best of the certifier's knowledge and belief, each stockholder of the Bidder with an ownership interest in excess of 10%;
- * if the Bidder is a partnership, such certification shall be deemed to have been made not only with respect to the Bidder itself, but also with respect to each partner.

Moreover, the foregoing certifications, if made by a corporate Bidder, shall be deemed to have been authorized by the Board of Directors of the Bidder, and such authorization shall be deemed to include the signing and submission of the bid and the inclusion therein of such certification as the act and deed of the corporation.

In any case where the Bidder cannot make the foregoing certifications, the Bidder shall so state and shall furnish with the signed bid a signed statement which sets forth in detail the reasons therefor. If the Bidder is uncertain as to whether it can make the foregoing certifications, it shall so indicate in a signed statement furnished with its bid, setting forth in such statement the reasons for its uncertainty. With respect to the foregoing certification in paragraph "2g", if the Bidder cannot make the certification, it shall provide, in writing, with the signed bid: (i) a list of the name(s), address(es), telephone number(s), and place(s) of principal employment of each such individual or organization; and (ii) a statement as to whether such individual or organization has a "financial interest" in this Contract, as described in the Procurement Disclosure Policy of the Authority (a copy of which is available upon request to the Chief Procurement Officer of the Procurement Department of the Authority). Such disclosure is to be updated, as necessary, up to the time of award of this Contract. As a result of such disclosure, the Port Authority shall take appropriate action up to and including a finding of non-responsibility.

Failure to make the required disclosures shall lead to administrative actions up to and including a finding of non-responsiveness or non-responsibility.

Notwithstanding that the Bidder may be able to make the foregoing certifications at the time the bid is submitted, the Bidder shall immediately notify the Authority in writing during the period of irrevocability of bids and the term of the Contract, if Bidder is awarded the Contract, of any change of circumstances which might under this clause make it unable to make the foregoing certifications, might render any portion of the certifications previously made invalid, or require disclosure. The foregoing certifications or signed statement shall be deemed to have been made by the Bidder with full knowledge that they would become a part of the records of the Authority and that the Authority will rely on their truth and accuracy in awarding and continuing this Contract. In the event that the Authority should determine at any time prior or subsequent to the award of this Contract that the Bidder has falsely certified as to any material item in the foregoing certifications, has failed to immediately notify the Port Authority of any change in circumstances which might make it unable to make the foregoing certifications, might render any portion of the certifications previously made invalid, or require disclosure, or has willfully or fraudulently furnished a signed statement which is false in any material respect, or has not fully and accurately represented any circumstance with respect to any item in the foregoing certifications required to be disclosed, the Authority may determine that the Bidder is not a responsible Bidder with respect to its bid on the Contract or with respect to future bids on Authority contracts and may exercise such other remedies as are provided to it by the Contract with respect to these matters. In addition, Bidders are advised that knowingly providing a false certification or statement pursuant hereto may be the basis for prosecution for offering a false instrument for filing (see e.g. New York Penal Law, Section 175.30 et seq.). Bidders are also advised that the inability to make such certification will not in and of itself disqualify a Bidder, and that in each instance the Authority will evaluate the reasons therefor provided by the Bidder. Under certain circumstances the Bidder may be required as a condition of Contract award to enter into a Monitoring Agreement under which it will be required to take certain specified actions, including compensating an independent Monitor to be selected by the Port Authority, said Monitor to be charged with, among other things, auditing the actions of the Bidder to determine whether its business practices and

relationships indicate a level of integrity sufficient to permit it to continue business with the Port Authority.

3. Bidder Eligibility for Award of Contracts - Determination by an Agency of the State of New York or New Jersey Concerning Eligibility to Receive Public Contracts

Bidders are advised that the Authority has adopted a policy to the effect that in awarding its contracts it will honor any determination by an agency of the State of New York or New Jersey that a Bidder is not eligible to bid on or be awarded public contracts because the Bidder has been determined to have engaged in illegal or dishonest conduct or to have violated prevailing rate of wage legislation.

The policy permits a Bidder whose ineligibility has been so determined by an agency of the State of New York or New Jersey to submit a bid on a Port Authority contract and then to establish that it is eligible to be awarded a contract on which it has bid because (i) the state agency determination relied upon does not apply to the Bidder, or (ii) the state agency determination relied upon was made without affording the Bidder the notice and hearing to which the Bidder was entitled by the requirements of due process of law, or (iii) the state agency determination was clearly erroneous or (iv) the state determination relied upon was not based on a finding of conduct demonstrating a lack of integrity or violation of a prevailing rate of wage law.

The full text of the resolution adopting the policy may be found in the Minutes of the Authority's Board of Commissioners meeting of September 9, 1993.

4. Contractor Responsibility, Suspension of Work and Termination

During the term of this Contract, the Contractor shall at all times during the Contract term remain responsible. The Contractor agrees, if requested by the Port Authority to present evidence of its continuing legal authority to do business in the States of New Jersey or New York, integrity, experience, ability, prior performance, and organizational and financial capacity.

The Port Authority, in its sole discretion, reserves the right to suspend any or all activities under this Contract, at any time, when it discovers information that calls into question the responsibility of the Contractor. In the event of such suspension, the Contractor will be given written notice outlining the particulars of such suspension. Upon issuance of such notice, the Contractor must comply with the terms of the suspension order. Contract activity may resume at such time as the Port Authority issues a written notice authorizing a resumption of performance under the Contract.

Upon written notice to the Contractor, and an opportunity to be heard with appropriate Port Authority officials or staff, the Contract may be terminated by Port Authority at the Contractor's expense where the Contractor is determined by the Port Authority to be non-responsible. In such event, the Port Authority or its designee may complete the contractual requirements in any manner he or she may deem advisable and pursue available legal or equitable remedies for breach, including recovery of costs from Contractor associated with such termination.

5. No Gifts, Gratuities, Offers of Employment, Etc.

At all times, the Contractor shall not offer, give or agree to give anything of value either to a Port Authority employee, agent, job shopper, consultant, construction manager or other person or firm representing the Port Authority, or to a member of the immediate family (i.e., a spouse, child, parent, brother or sister) of any of the foregoing, in connection with the performance by such employee, agent, job shopper, consultant, construction manager or other person or firm representing the Port Authority of duties involving transactions with the Contractor on behalf of the Port Authority, whether or not such duties are related to this Contract or any other Port Authority contract or matter. Any such conduct shall be deemed a material breach of this Contract.

As used herein "anything of value" shall include but not be limited to any (a) favors, such as meals, entertainment, transportation (other than that contemplated by the Contract or any other Port Authority contract),

etc. which might tend to obligate the Port Authority employee to the Contractor, and (b) gift, gratuity, money, goods, equipment, services, lodging, discounts not available to the general public, offers or promises of employment, loans or the cancellation thereof, preferential treatment or business opportunity. Such term shall not include compensation contemplated by this Contract or any other Port Authority contract. Where used herein, the term "Port Authority" shall be deemed to include all subsidiaries of the Port Authority.

The Contractor shall insure that no gratuities of any kind or nature whatsoever shall be solicited or accepted by it and by its personnel for any reason whatsoever from the passengers, tenants, customers or other persons using the Facility and shall so instruct its personnel.

In the event that the Contractor becomes aware of the occurrence of any conduct that is prohibited by this section entitled "No Gifts, Gratuities, Offers of Employment, Etc.", it shall report such occurrence to the Port Authority's Office of Inspector General within three (3) business days of obtaining such knowledge. (See "<http://www.panynj.gov/inspector-general>" for information about to report information to the Office of Inspector General). Failing to report such conduct shall be grounds for a finding of non-responsibility.

In addition, during the term of this Contract, the Contractor shall not make an offer of employment or use confidential information in a manner proscribed by the Code of Ethics and Financial Disclosure dated March 11, 2014, or as may be revised (a copy of which is available upon request to the Office of the Secretary of the Port Authority).

The Contractor shall include the provisions of this clause in each subcontract entered into under this Contract.

6. Conflict of Interest

During the term of this Contract, the Contractor shall not participate in any way in the preparation, negotiation or award of any contract (other than a contract for its own services to the Authority) to which it is contemplated the Port Authority may become a party, or participate in any way in the review or resolution of a claim in connection with such a contract if the Contractor has a substantial financial interest in the contractor or potential contractor of the Port Authority or if the Contractor has an arrangement for future employment or for any other business relationship with said contractor or potential contractor, nor shall the Contractor at any time take any other action which might be viewed as or give the appearance of conflict of interest on its part. If the possibility of such an arrangement for future employment or for another business arrangement has been or is the subject of a previous or current discussion, or if the Contractor has reason to believe such an arrangement may be the subject of future discussion, or if the Contractor has any financial interest, substantial or not, in a contractor or potential contractor of the Authority, and the Contractor's participation in the preparation, negotiation or award of any contract with such a contractor or the review or resolution of a claim in connection with such a contract is contemplated or if the Contractor has reason to believe that any other situation exists which might be viewed as or give the appearance of a conflict of interest, the Contractor shall immediately inform the Chief Procurement Officer in writing of such situation giving the full details thereof. Unless the Contractor receives the specific written approval of the Chief Procurement Officer, the Contractor shall not take the contemplated action which might be viewed as or give the appearance of a conflict of interest. The Chief Procurement Officer may require the Contractor to submit a mitigation plan addressing and mitigating any disclosed or undisclosed conflict, which is subject to the approval of the Chief Procurement Officer and shall become a requirement, as though fully set forth in this Contract. In the event the Chief Procurement Officer shall determine that the performance by the Contractor of a portion of its Services under this Agreement is precluded by the provisions of this numbered paragraph, or a portion of the Contractor's said Services is determined by the Chief Procurement Officer to be no longer appropriate because of such preclusion, then the Chief Procurement Officer shall have full authority on behalf of both parties to order that such portion of the Contractor's Services not be performed by the Contractor, reserving the right, however, to have the Services performed by others and any lump sum compensation payable hereunder which is applicable to the deleted work shall be equitably adjusted by the parties. The Contractor's execution of this document shall constitute a representation by the Contractor that at the time of such execution the Contractor knows of no circumstances, present or anticipated, which come within the provisions of this paragraph or which might otherwise be viewed as or give the appearance of a conflict of

interest on the Contractor's part. The Contractor acknowledges that the Authority may preclude it from involvement in certain disposition/privatization initiatives or transactions that result from the findings of its evaluations hereunder or from participation in any contract, which results, directly or indirectly, from the Services provided by the Contractor hereunder. The Port Authority's determination regarding any questions of conflict of interest shall be final.

7. Definitions

As used in this section, the following terms shall mean:

Affiliate - Two or more firms are affiliates if a parent owns more than fifty percent of the voting stock of each of the firms, or a common shareholder or group of shareholders owns more than fifty percent of the voting stock of each of the firms, or if the firms have a common proprietor or general partner.

Agency or Governmental Agency - Any federal, state, city or other local agency, including departments, offices, public authorities and corporations, boards of education and higher education, public development corporations, local development corporations and others.

Investigation - Any inquiries made by any federal, state or local criminal prosecuting and/or law enforcement agency and any inquiries concerning civil anti-trust investigations made by any federal, state or local governmental agency. Except for inquiries concerning civil anti-trust investigations, the term does not include inquiries made by any civil government agency concerning compliance with any regulation, the nature of which does not carry criminal penalties, nor does it include any background investigations for employment, or Federal, State, and local inquiries into tax returns.

Officer - Any individual who serves as chief executive officer, chief financial officer, or chief operating officer of the Bidder by whatever titles known.

Parent - An individual, partnership, joint venture or corporation which owns more than 50% of the voting stock of the Bidder.

If the solicitation is a Request for Proposal:

Bid - shall mean Proposal;

Bidder - shall mean Proposer;

Bidding - shall mean submitting a Proposal.

In a Contract resulting from the taking of bids:

Bid - shall mean bid;

Bidder - shall mean Bidder; except and until the Contract has been awarded, then it shall mean Contractor

Bidding - shall mean executing this Contract.

In a Contract resulting from the taking of Proposals:

Bid - shall mean Proposal;

Bidder - shall mean Proposer;

Bidding - shall mean executing this Contract.