CITY OF HARRISONBURG
FINANCE & PURCHASING

409 SOUTH MAIN STREET, 3RD FLOOR
HARRISONBURG, VA 22801
FINANCE OFFICE (540) 432-7702 • FAX (540) 432-7779
PURCHASING OFFICE (540) 432-7794 • FAX (540) 432-7779

INVITATION TO BID (ITB) COVER PAGE

ISSUE DATE: March 17, 2022	**INVITATION TO BID NUMBER:** 2022023-PU-B	**FOR:** Repairing & Repainting the Washington Street Storage Tank RE-BID
DEPARTMENT: Public Utilities	**DATE/TIME OF CLOSING:** March 31, 2022 on or before 3:00pm local time	**CONTRACT ADMINISTRATOR:** David Gray, Engineering Manager
DATE/TIME LAST DAY FOR QUESTIONS: March 24, 2022 at 12:00pm (noon) local time	**DATE/TIME PRE-BID MEETING:** N/A	**PRE-BID MEETING MANDATORY:** ☐ Yes ☐ No ☑ N/A

Bids - In accordance with the following and in compliance with all terms and conditions, unless otherwise noted, the undersigned offers and agrees, if the bid is accepted, to furnish items or services for which prices are quoted, delivered or furnished to designated points within the time specified. It is understood and agreed that this entire ITB and any addenda shall constitute a contract.

Sealed bids, subject to terms and conditions of this Invitation to Bid will be received by the City of Harrisonburg Purchasing Office, 409 South Main Street, Third Floor, Harrisonburg, Virginia 22801 until the date/ time specified above for furnishing items or services delivered or furnished to specified destinations within the time specified or stipulated by the vendor(s).

The City does not discriminate against small and minority businesses or faith-based organizations.

VENDOR INFORMATION

Name of Vendor:_____ Telephone #:_____

Address: _____ Federal Employer Identification #:_____

_____

Contact Name: _____ Contact Email Address:_____

By signing this bid, Vendor(s) certifies, acknowledges, understands and agrees to be bound by the conditions set forth in this ITB.

_____ _____
VENDOR'S LEGALLY AUTHORIZED SIGNATURE **DATE**

_____ _____
PRINT NAME **TITLE**

Please take a moment to let us know how you found out about this Invitation to Bid (ITB) – Check one:

☐ eVA Website ☐ Bid Room (Please List) _____

☐ The Daily News Record Newspaper ☐ Notified by City Directly ☐ Other (Please List) _____

This document shall be completed & returned with bid submission.

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Table of Contents

0001 INVITATION TO BIDDERS

1. PROJECT

Repairing and Repainting the Washington Street Tank for the City of Harrisonburg, VA

2. DESCRIPTION OF WORK

The work generally consists of the repairing and repainting the interior and exterior of one 2,500,000 gallon steel ground storage tank "Washington Street Tank" which includes the complete cleaning and repainting of the tank on the interior surfaces, and the complete cleaning and repainting of the exterior surfaces with containment. Additional Work items include: repair of concrete; replacement of the cathodic protection system, sealant between the bottom plate and grout, shell manhole davits, roof manhole bolts and nuts, and cathodic protection system rectifier; installation of elastomeric check valve for overflow pipe; including other miscellaneous repair and incidental items. Work must be completed by October 15, 2022.

3. BACKGROUND

The City of Harrisonburg is an independent city located in the central Shenandoah Valley region of Virginia. It is the county seat of Rockingham County and encompasses 17.3 square miles, serving a population of approximately 54,000. Harrisonburg is located right along Interstate 81 and is only two hours away from both Richmond, Virginia and Washington, D.C. Harrisonburg is home to two university campuses – James Madison University and Eastern Mennonite University – as well as numerous other businesses, non-profit organizations and a vibrant downtown.

The Department of Public Utilities is responsible for providing water and sewer services to residences and businesses in the City of Harrisonburg and some in neighboring Rockingham County. Currently, this department manages approximately 16,000 accounts. This department not only provides water for drinking, bathing, cleaning, recreational use, industrial supply, and fire protection but also provides waste disposal in the form of sewer services. More than 50 employees work for the Department of Public Utilities to answer questions, respond to emergency situations, and provide services to both current and prospective customers.

4. SECURING DOCUMENTS

Bid documents are available for viewing on the internet on the City's website at www.harrisonburgva.gov/bids-proposals.

5. PRE-BID CONFERENCE

No pre-bid conference will be held for this solicitation.

6. BID SECURITY

A bid security in the amount of five percent (5%) of the bid value will be required with the bid submittal. Bid security must be in the form of a cashier's check, certified check or a bid bond issued by a surety.

7. BIDS DUE

Bids shall be received at the City of Harrisonburg, Purchasing Office, 409 South Main Street, Third Floor, Harrisonburg VA, 22801. Bids shall be received no later than the date and time indicated on the cover page of this ITB. Bids will be opened and read publicly.

8. BID OPENING

Bids will be opened and read publicly at City Hall, 409 South Main Street, Room 011, Harrisonburg, VA 22801.

9. QUESTIONS

Questions shall be submitted in writing via email to Mr. Shane B. Smith, Procurement Manager, at Questions@harrisonburgva.gov. Oral questions will not be permitted. All questions must be received no later than the date and time indicated on the cover page of this ITB. Questions will be answered in Addendum format and posted on the City's website at www.harrisonburgva.gov/bids-proposals. It is the responsibility of all Bidders to ensure that they have received all addenda and to include signed copies of any and all addenda with their bid submission.

10. OWNER

City of Harrisonburg, 409 South Main Street, Harrisonburg, VA, 22801

11. CONTRACT ADMINISTRATOR

David Gray, Engineering Manager, Harrisonburg Public Utilities, 2155 Beery Road, Harrisonburg, VA 22801

12.COVID-19

City contractors shall adhere to all aspects of the VOSH COVID-19 Permanent Standard 16VAC25-220 to include, but not limited to: face covering requirements, social distancing practices, VDH/VOSH notification procedures, and screening methods to ensure individuals who are known or suspected to be infected with COVID-19 shall not enter any City work site until they are cleared to return to work as specified by the VOSH COVID-19 Permanent Standard. City contractors shall also immediately notify the City's Contract Administrator if one of their employees is known or suspected to be infected with COVID-19 and was present at a City worksite within two (2) days prior to symptom onset.

0100 INSTRUCTIONS TO BIDDERS

1. BIDDER ELIGIBILITY & QUALIFICATIONS

Bids will only be accepted from Contractors who are experienced in and actively engaged in the type of construction of the item(s) called for in the bid.

No bid will be accepted from or contract awarded to any person, firm, or corporation that is in arrears or is in default to the City upon any debt or contract, or that is a defaulter, as surety or otherwise, upon any obligation to said City or had failed to perform faithfully any previous contract with the City.

A. Bidders are required under Chapter 11, Title 54, Code of Virginia, to show evidence of certificate of registration before bid may be received and considered. Contractor's number must be clearly shown on the envelope of the bid submission. Bidders shall also complete and return Section 0302 Contractor Eligibility and Registration.

B. By signing the Bid Form, Bidders certify that they are not currently barred from bidding on contracts by any agency of the Commonwealth of Virginia or any federal agency.

C. Bidders are required to submit their OSHA 300A Summary reports for the past 5 years (2015 – 2020) regarding the bidder's Health and Safety Record, to be utilized during the evaluation process to help determine bidders responsibility.

D. To demonstrate their qualification to perform the Work, each Bidder shall be prepared to submit further written satisfactory evidence that the Bidder has sufficient experience, necessary capital, materials, machinery and skilled workers to complete the Work. If financial statements are required, they shall be of such date as the Owner shall determine and shall be prepared on forms acceptable to the Owner. The Owner may make such investigations as deemed necessary to determine the ability of the Bidder to perform the Work. The Owner's decision or judgment on these matters shall be final, conclusive and binding. Each Bidder must be prepared to submit within ten (10) calendar days of Owner's request, written evidence:

    a. That he/she has the requisite organization, capital, equipment, ability, personnel, evidence of the authority to conduct business in the jurisdiction where the project is located, and at least five (5) years' experience in municipal type work for which he/she has submitted a bid. A list of references may be required to be submitted for current or recent clients as well as clients who have terminated service with your company. A financial statement and/or reference from a banking institution may be required.

    b. Of at least five (5) representative projects in the range of $100,000 that were completed within the last five (5) years, giving project title, location, dollar value, year completed and the name(s) of the owner(s) and Engineer(s).

    c. Of current work, giving project title, location, dollar value, anticipated completion date and the name(s) of the owner(s) and Engineer(s).

    d. That he/she has sufficient and qualified personnel to provide for the contract work and has the ability to provide the necessary materials and/or equipment.

E. Failure by the lowest bidder(s) to sufficiently satisfy the City on his/her ability, qualifications and experience will serve as grounds for rejection of the bid.

F. The Bidder is advised that all materials, except as noted, shall be provided by the Contractor.

2. BID FORM AND SUBMISSION

In order to receive consideration, submit bids in accordance with the following:

A. Make bids upon the forms provided herewith, properly completed and signed where required. Do not change the wording of the bid form, and do not add words to the bid form. Unauthorized conditions, limitations, or provisions attached to the bid may be cause for rejection of the bid. Prices or changes shown on the outside of an envelope will not be considered in determination of low bid.

B. Address bids to the Owner and deliver to the address specified in Section 0001 of this ITB. Enclose each bid in an opaque sealed envelope, or box bearing the title of the Work, the project number(s), the ITB number, the name of the bidder, Virginia contractor registration number and the date and hour of the bid opening.

A. Bids shall be delivered on or before the day and hour set for opening the bids as indicated in Section 0001 of this ITB. The City of Harrisonburg is not responsible for delays in the delivery of the mail by the U.S. Postal Service, private couriers, or the inter-office mail system. It is the sole responsibility of the bidder to see that his bid is received on time. No bids received after the time fixed for receiving them will be considered. Late or incomplete bids may be returned to the bidder.

B. Submit only the original signed copy of the bid. No faxed or emailed bid will be considered. All expenses for making bids to the City shall be borne by the bidder. All documents contained within the bid submission shall be completed in their entirety and signed and dated where required.

C. Indicate receipt of issued addenda. All Bidders are cautioned to check at www.harrisonburgva.gov/bids-proposals to assure that all Addenda have been received and that the cost consequences thereof have been included in the bid. Signed addenda must be returned with bid submission.

D. The following documents fully completed and signed where appropriate are required for a responsive bid:

- ☐ Signed Cover Sheet
- ☐ 0300 Bid Form
- ☐ Actual Bid Security
- ☐ 0301 Contractor Eligibility and Registration
- ☐ 0302 State Corporation Commission (SCC) Form
- ☐ 0303 Non-Collusion Affidavit
- ☐ 0304 Insurance Requirements Form
- ☐ 0305 Notice of Exceptions
- ☐ 0306 Escrow Election Form
- ☐ OSHA 300A Summary reports
- ☐ Signed Addenda, if applicable

3. ORDER OF PRECEDENCE OF TERMS & CONDITIONS

A. Order of Precedence for Terms and Conditions; refer to EJCDC C-800 SC 18.14
B. Order of Precedence for work requirements; refer to EJCDC C-800 SC 18.14

4. AVAILABILITY OF EJCDC DOCUMENTS

All EJCDC documents, including the C-700 General Conditions of the Construction Contract, C-800 Supplementary Conditions of the Construction Contract, C-520 Agreement between Owner and Contractor for Construction Contract, and exceptions shall be available upon written request only. Please contact the City's Purchasing Office at Purchasing@harrisonburgva.gov. **BY SIGNING AND SUBMITTING THIS BID, BIDDER CERTIFIES THEY HAVE RECEIVED COPIES OF ALL EJCDC DOCUMENTS AND EXCEPTIONS AS IT RELATES TO THIS PROJECT. IT IS THE BIDDERS RESPONSIBILITY TO REQUEST THE EJCDC DOCUMENTS FROM THE CITY PROCUREMENT OFFICE.**

5. AWARD OF CONTRACT

A. The City intends to award to the lowest responsive and responsible bidder, meeting all specifications, subject to the Owner's right to reject any or all bids and to waive or not waive any informality and irregularity in the bids and in the bidding process.

B. The bid award is based upon Item #7 BASIS OF AWARD amount as listed on the Bid Form. It is the Bidder's responsibility to understand the components in order to establish a bid price.

C. Award may be immediate or up to 60 days from the date of bids received. All contractor bids and surety shall remain in effect throughout this period or up until time of Award, if sooner.

D. The successful bidder shall respond to the City Purchasing via email (Purchasing@harrisonburgva.gov) or fax (540-432-7779) within fourteen (14) calendar days of contract award date by returning:
    a. Fully executed City Standard Contract Form
    b. A recent W-9 form (available from the Purchasing Office)
    c. City of Harrisonburg Business License at an amount equal to or greater than the awarded Contract value. For information on City Business Licenses contact the Harrisonburg Commissioner of Revenue office at 540-432-7704.

E. Upon receipt of all items under Item D above, Owner shall provide the following documents to the Awarded Bidder:
    a. EJCDC Performance and Payment Bonds
    b. EJCDC C-520 Agreement

F. The Awarded Bidder shall fully execute the documents provided in E above along with providing Certificates of Insurance and Endorsement as required by the Contract Documents. All documents shall be returned to the City of Harrisonburg Purchasing Office.

G. Upon receipt of Items under F above, Owner shall release all bid securities from all Bidders pursuant to EJCDC C-700. Owner shall schedule and hold a pre-construction meeting with "Awarded Bidder" where fully executed Agreement and Notice to Proceed will be issued. Agreement may be provided prior to the Pre-Construction Conference if requested. It is anticipated that the Contractor be prepared for a Notice to Proceed issuance not later than July 1, 2022 and no sooner than April 15, 2022.

For this project, see Special Conditions of the Agreement include:

a. Contract Times: EJCDC 4.02

The Work will be substantially complete no later than October 15, 2022.

b. Liquidated Damages: EJCDC 4.03

Liquidated damages for delay (but not as a penalty) shall pay Owner $250 for each day that expires after the time for Substantial Completion.

END INSTRUCTIONS TO BIDDERS

0300 BID FORM

The undersigned herein acknowledges having opportunity to examine the ITB including EJCDC documents that are available upon request only, the Project Specifications any Addenda (if issued); opportunity to visit the site; and opportunity to submit questions for clarification. The undersigned offers the bid for the following sums of money:

Item #1 BASE BID Lump Sum: Include in this item all labor, material, services and equipment necessary for the completion of the work in the Detailed Technical Specifications and in the Addenda (if issued); exception; *do not include labor; materials, services and equipment provided under Items #2, #3, #4, #5 and #6.*

The lump sum amount herein is guaranteed payment in full amount upon completion of items to be provided; exception of amount shall be by change order procedures. Partial payments shall be made pursuant to an approved schedule of values as coordinated to project schedule activities as required in the Payment Procedures per the EJCDC C-520 Agreement.

_____($_____)
Insert Bid Value in Written WORDS (Supersedes Numerical Bid) Insert Numerical Bid Value

Item #2: Repair Welding Unit Price; **estimated 30 man-hours:** Include in this item all labor, material, services and equipment necessary to complete repair welding as defined **in Section H.6 of the Detailed Technical Specifications**. There is no guarantee of any payment under this item, but will be paid at actual quantities and the unit price as determined by dividing the amount submitted for Item #2 by 30 man-hours.

_____($_____)
Insert Bid Value in Written WORDS (Supersedes Numerical Bid) Insert Numerical Bid Value

Item #3: Pit Filling & Surfacing Unit Price; estimated 5 gallons: Include in this item all labor, material, services and equipment necessary to complete pit filling and surfacing as defined in **Section H.7 of the Detailed Technical Specifications**. There is no guarantee of any payment under this item, but will be paid at actual quantities and the unit price as determined by dividing the amount submitted for Item #3 by 5 gallons.

_____($_____)
Insert Bid Value in Written WORDS (Supersedes Numerical Bid) Insert Numerical Bid Value

Item #4: Interior Chipping and Grinding Unit Price; estimated 80 man-hours: Include in this item all labor, material, services and equipment necessary to complete interior chipping and grinding as defined in **Section H.8 of the Detailed Technical Specifications**. There is no guarantee of any payment under this item, but will be paid at actual quantities and the unit price as determined by dividing the amount submitted for Item #4 by 80 man-hours.

_____($_____)
Insert Bid Value in Written WORDS (Supersedes Numerical Bid) Insert Numerical Bid Value

Item #5: Additional Work Unit Price; estimated 60 man-hours: Include in this item all labor, welding, rigging and equipment necessary to complete additional work as defined in **Section N of the Detailed Technical Specifications**. There is no guarantee of any payment under this item, but will be paid at actual quantities and the unit price as determined by dividing the amount submitted for Item #5 by 60 man-hours.

_____ ($_____)
Insert Bid Value in Written WORDS (Supersedes Numerical Bid) Insert Numerical Bid Value

Item #6: Signs and Logos Unit Price; estimated 2: Include in this item all labor, material, services and equipment necessary to complete install 2 signs and 2 logos on the northwest and southeast sides of the tank shell as defined in **Section J.10 of the Detailed Technical Specifications**. There is no guarantee of any payment under this item, but will be paid at actual quantities and the unit price as determined by dividing the amount submitted for Item #6 by 2.

_____ ($_____)
Insert Bid Value in Written WORDS (Supersedes Numerical Bid) Insert Numerical Bid Value

Item #7: BASIS OF AWARD (Sum of Items 1 through 6). The bid amount inserted under this item shall be the basis of award as for lowest responsive and responsible bid as set forth in the Instructions to Bidders part 5. Item #7 shall be the sum of items #1, #2, #3, #4, #5 and #6.

_____ ($_____)
Insert Bid Value in Written WORDS (Supersedes Numerical Bid) Insert Numerical Bid Value

Subcontractors: By submitting a bid, Bidder acknowledges that subcontracting is not allowed for the cleaning and/or painting portion of the work (per Section F 6 of the Detailed Technical Specifications); however, if the Bidder intends to utilize a subcontractor(s) on other portions of the work, the name and address of each subcontractor and the work they will be providing shall be provided on the Bid Form.

_____
_____
_____
_____

This Bid submitted by (name of firm) _____

Authorized Representative _____

Representative Signature _____

Date of Signature _____

Complete & return this document with bid submission.

0301 CONTRACTOR ELIGIBILITY AND REGISTRATION

This is to certify that I (we) are not currently barred from bidding on contracts by any agency of The Commonwealth of Virginia, nor am I (we) a part of any firm/corporation that is currently barred from bidding on contracts by any agency of The Commonwealth of Virginia.

Check one:

_____I am currently registered as a contractor in the Commonwealth of Virginia.

_____My registration number is _____

_____I am currently not required to register as a contractor in the Commonwealth of Virginia per Chapter 11, Title 54 of the Code of Virginia.

_____
Contractor

[SEAL]

_____
Address

_____

_____

_____
Attest

By:_____
Signature

_____
Title

_____
Date

Complete & return this document with bid submission.

0302 State Corporation Commission Form

STATE CORPORATION COMMISSION IDENTIFICATION NUMBER: Pursuant to Code of Virginia 2.2-4311.2 subsection B, a bidder/offeror organized or authorized to transact business in the Commonwealth pursuant to Title 13.1 or Title 50 is required to include in its bid/proposal the identification number issued to it by the State Corporation Commission (SCC) and shall not allow the identification number to lapse, be revoked or cancelled at any time during the term of the contract. Any bidder/offeror that is not required to be authorized to transact business in the Commonwealth as a foreign business entity under Title 13.1 or Title 50 or as otherwise required by law is required to include in its bid/proposal a statement describing why the bidder/offeror is not required to be so authorized. A link to the SCC site is at http://www.scc.virginia.gov.

Select one of the following boxes. **The undersigned Bidder :**

☐ is a corporation or other business entity with the following SCC identification number: _____ .

☐ is not a corporation, limited liability company, limited partnership, registered limited liability partnership, or business trust.

☐ is an out-of-state business entity that does not regularly and continuously maintain as part of its ordinary and customary business any employees, agents, offices, facilities, or inventories in Virginia (not counting any employees or agents in Virginia who merely solicit orders that require acceptance outside Virginia before they become contracts, and not counting any incidental presence of the Offeror in Virginia that is needed in order to assemble, maintain, and repair goods in accordance with the contracts by which such goods were sold and shipped into Virginia from bidder's out-of-state location).

☐ is an out-of-state business entity that is including with this bid an opinion of legal counsel which accurately and completely discloses the undersigned Offeror's current contacts with Virginia and describes why those contacts do not constitute the transaction of business in Virginia within the meaning of § 13.1-757 or other similar provisions in Titles 13.1 or 50 of the Code of Virginia. ***Attach opinion of legal counsel to this form.***

☐ has not completed any of the foregoing options but currently has pending before the SCC an application for authority to transact business in the Commonwealth of Virginia and wishes to be considered for a waiver to allow them to submit the SCC identification number after the due date for bids/proposals. The City reserves the right to determine in its sole discretion whether to allow such waiver.

Signature: _____ **Date:** _____

Name: _____ **Title:** _____
(Print)

Name of Firm: _____

****Complete & return this document with bid submission.***

303 NON-COLLUSION AFFIDAVIT

Under oath, I hereby affirm under penalty of perjury:

(1) That I am the bidder or a partner of the bidder, or an officer or employee of the bidding corporation with authority to sign on its behalf;

(2) That the attached bid or bids have been arrived at by the bidder and have been arrived at and submitted without collusion or any design to limit bidding or competition;

(3) That the contents of the bid or bids have not been communicated to any person not an employee or agent of the bidder on any bid furnished with the bid or bids, and will not be communicated to any such person prior to the official opening of the bid or bids; and

(4) That I have fully informed myself regarding the accuracy of the statements made in this affidavit.

Signed_____

Title_____

Firm Name _____

CITY/COUNTY OF_____,

STATE OF _____, to wit:

I, _____, a Notary Public, do certify that

_____whose name is signed to the foregoing has

this date acknowledged the same before me in my City foresaid.

Given under my hand this_____day of_____, 20___.

My Commission expires_____.

_____
Notary Public

Complete & return this document with bid submission.

0304

INSURANCE REQUIREMENTS FOR THE CITY OF HARRISONBURG

By signing and submitting a bid or proposal the contractor certifies that if awarded the contract, they will have the following insurance coverages at the time the contract is awarded. If any subcontractors are involved, the subcontractor will have the same insurance. The contractor further certifies that they or any subcontractor will maintain these coverages during the entire term of the contract.

1.) The contractor will maintain a general liability policy with $1,000,000 combined single limits with a $2,000,000 aggregate. Coverage is to be on an occurrence basis with an insurer licensed to conduct business in the Commonwealth of Virginia. The insurer must have an A. M. Best rating of A- or better. **The insurer must list the City of Harrisonburg as an additional insured. The endorsement must be issued by the insurance company. A notation on the certificate of insurance is not sufficient.**

2.) The contractor will maintain automobile liability insurance with limits of at least $1,000,000. The coverage is to be written with a symbol "1". The insurer must be licensed to conduct business in the Commonwealth of Virginia. The insurer must have an A. M. Best rating of A- or better.

3.) The contractor will maintain workers' compensation coverage in compliance with the laws of the Commonwealth of Virginia. The coverage must have statutory limits and be with an insurer licensed to conduct business in the Commonwealth of Virginia. The insurer must have an A. M. Best rating of A- or better. As an alternative, it is acceptable for the contractor to be insured by a group self insurance association that is licensed by the Virginia Bureau of Insurance. The contractor will also carry employers liability insurance with a limit of at least $100,000 bodily injury by accident/$500,000 bodily injury by disease policy limit/$100,000 bodily injury by disease each employee.

Please provide the City with two (2) documents upon request:

1.) Certificate of Insurance (COI) for the City of Harrisonburg, 409 South Main St, Harrisonburg, VA 22801. COI must show the Additional Insured status.

2.) Additional Insured Endorsement issued by the insurance company to show the Additional Insured addition was made to the policy.

BIDDER/OFFEROR STATEMENT

We understand the Insurance Requirements of these specifications and will comply in full if awarded this contract.

Signature: _____ Date: _____

Name:_____Title:_____

(Print)

Name of Firm: _____

Complete & return this document with bid submission.

0305 NOTICE OF EXCEPTIONS

Name of Bidder/Offeror:_____

List exceptions to any portions of ITB/RFP (i.e. General Terms & Conditions, Federal Terms & Conditions, Special Terms & Conditions):

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

☐ Check this box if there are none.

NOTE: THIS FORM IS NOT REQUIRED OR REQUESTED TO BE COMPLETED IN THE FOLLOWING INSTANCES. IF YOU FEEL THIS FORM DOES NOT APPLY TO YOUR SOLICITATION, PLEASE SELECT ONE OF THE FOLLOWING BOXES AND RETURN THIS FORM WITH YOUR BID/PROPOSAL SUBMISSION.

☐ Per Virginia Code § 2.2-4302.2 (3): "In the case of a **proposal for information technology**, as defined in § 2.2-2006, a public body shall not require an offeror to state in a proposal any exception to any liability provisions contained in the Request for Proposal. Negotiations shall then be conducted with each of the offerors so selected. The offeror shall state any exception to any liability provisions contained in the Request for Proposal in writing at the beginning of negotiations, and such exceptions shall be considered during negotiation."

☐ Per Virginia Code § 2.2-4302.2 (4): "**For architectural or engineering services**, the public body shall not request or require offerors to list any exceptions to proposed contractual terms and conditions, unless such terms and conditions are required by statute, regulation, ordinance, or standards developed pursuant to § 2.2-1132, until after the qualified offerors are ranked for negotiations."

Complete & return this document with bid submission.

0306 ESCROW ACCOUNT ELECTION

ELECTION OF ESCROW ACCOUNT PROCEDURE FOR RETAINAGE

If determined to be the successful low bidder(s), the below signed elects to use the Escrow Account Procedure for retainage.

_____

Write "Yes" or "No" on above line

If the successful bidder elects to use the Escrow Account Procedure for Retainage, an "Escrow Agreement" form will be provided by the City and shall be executed and submitted to the City within fifteen (15) calendar days after notification. If the "Escrow Agreement" form is not submitted within the fifteen (15) day period, the Contractor shall forfeit his rights to the use of the Escrow Account Procedure.

Company_____

Authorized Signature_____

Complete & return this document with bid submission.

0307 ESCROW AGREEMENT
CITY OF HARRISONBURG, VIRGINIA

THIS AGREEMENT ("Agreement"), made and entered into this _____ day of _____, 20_____ by, between and among the City of Harrisonburg, Virginia ("City" or Owner"), _____("Contractor"), _____(Name of Escrow Agent) _____(Address of Escrow Agent) a trust company, bank, or savings and loan institution (hereinafter referred to collectively as "Escrow Agent") with its principal office located in the Commonwealth of Virginia ("Commonwealth") and _____("Surety") provides:

I.

The City and the Contractor have entered into a contract dated _____ with respect to City of Harrisonburg ITB No. _____ , for _____ _____("Contract"). This Agreement is pursuant to, but in no way amends or modifies, the Contract. Payments made hereunder or the release of funds from escrow shall not be deemed approval or acceptance of performance by the Contractor. Payments should be made to _____ and mailed to _____ _____(Name and Address of Escrow Agent).

II.

In order to assure full and satisfactory performance by the Contractor of its obligations under the Contract, the City is required thereby to retain certain amounts otherwise due the Contractor. The Contractor has, with the approval of the City, elected to have these retained amounts held in escrow by the Escrow Agent. This agreement sets forth the terms of the escrow. The Escrow Agent shall not be deemed a party to, bound by, or required to inquire into the terms of the Contract or any other instrument or agreement between the City and the Contractor.

III.

The City shall from time to time pursuant to the Contract pay to the Escrow Agent amounts retained by it under the Contract. Except as to amounts actually withdrawn from escrow by the City, the Contractor shall look solely to the Escrow Agent for the payment of funds retained under the Contract and paid by the City to the Escrow Agent.

The risk of loss by diminution of the principal of any funds invested under the terms of the Contract shall be solely upon the Contractor.

Funds and securities held by the Escrow Agent pursuant to this Escrow Agreement shall not be subject to levy, garnishment, attachment, lien, or other process whatsoever. Contractor agrees not to assign, pledge, discount, sell or otherwise transfer or dispose of his interest in the escrow account or any part thereof, except to the Surety.

IV.

Upon receipt of checks drawn by the City and made payable to the Escrow Agent under this agreement, the Escrow Agent shall promptly notify the Contractor, negotiate the same and deposit or invest and reinvest the proceeds in approved securities in accordance with the written instructions of the Contractor. In no event shall the Escrow Agent invest the escrowed funds in any security not approved, as set forth in Section V. below.

V.

The following securities, and none other, are approved securities for all purposes of this Agreement:

(1) United States Treasury Bonds, United States Treasury Notes, United States Treasury Certificates of Indebtedness or United States Treasury Bills,

(2) Bonds, notes and other evidences of indebtedness unconditionally guaranteed as to the payment of principal and interest by the United States,

(3) Bonds or notes of the Commonwealth of Virginia,

(4) Bonds of any political subdivision of the Commonwealth of Virginia, if such bonds carried, at the time of purchase by the Escrow Agent or deposit by the Contractor, a Standard and Poor's or Moody's Investor Service rating of at least "A", and

(5) Certificates of deposit issued by commercial Banks located within the Commonwealth of Virginia, including, but not limited to, those insured by the Escrow Agent and its affiliates.

(6) Any bonds, notes, or other evidences of indebtedness listed in Sections (1) through (3) may be purchased pursuant to a repurchase agreement with a bank, within or without the Commonwealth of Virginia having a combined capital, surplus and undivided profit of not less than $25,000,000, provided the obligation of the bank to repurchase is within the time limitations established for investments as set forth herein. The repurchase agreement shall be considered a purchase of such securities even if title, and/or possession of such securities is not transferred to the Escrow Agent, so long as the repurchase obligation of the bank is collateralized by the securities themselves, and the securities have on the date of the repurchase agreement a fair market value equal to at least 100% of the amount of the repurchase obligation of the bank, and the securities are held by a third party, and segregated from other securities owned by the bank.

No security is approved hereunder which matures more than five (5) years after the date of its purchase by the Escrow Agent or deposit by the Contractor.

VI.

The Contractor may from time to time withdraw the whole or any portion of the escrowed funds by depositing with the Escrow Agent approved securities as set forth in Section V. above in an amount equal to, or in excess of, the amount so withdrawn. Any securities so deposited or withdrawn shall be valued at such time of deposit or withdrawal at the lower of par or market value, the latter as determined by the Escrow Agent. Any securities so deposited shall thereupon become a part of the escrowed fund.

Upon receipt of a direction signed by the City of Harrisonburg Director of Finance or designee, the Escrow Agent shall pay the principal of the fund, or any specified amount thereof, to the City or the Contractor as the City may direct. If payment is to be made to the Harrisonburg City Treasurer, it shall be made in cash or cash equivalent. However, if payment has been authorized to be made to the Contractor, the Contractor may specify to the Escrow Agent if payment is to be made in cash or in kind. Any such payment and delivery required hereunder shall be made as soon as is practicable after receipt of the direction.

VII.

For its services hereunder, the Escrow Agent shall be entitled to a reasonable fee in accordance with its published schedule of fees or as may be agreed upon by the Escrow Agent and the Contractor. Such fee and any other costs of administration of this Agreement shall be paid from the income earned upon the escrowed fund and, if such income is not sufficient to pay the same, by the Contractor.

VIII.

The net income earned and received upon the principal of the escrowed fund shall be paid over to the Contractor in quarterly or more frequent installments. Until so paid or applied to pay the Escrow Agent's fee or any other costs of administration, such income shall be deemed a part of the principal of the fund.

IX.

The Surety undertakes no obligation hereby but joins in this Agreement for the sole purpose of acknowledging that its obligations as surety for the Contractor's performance of the contract are not affected hereby.

X.

This Escrow Agreement shall be governed by, and construed in accordance with, the laws of the Commonwealth of Virginia, without application of Virginia’s conflict of law provisions. Venue and any actions for any litigation, suits, and claims arising from or connected with this Escrow Agreement and/or Contract referred to herein shall only be proper in the Rockingham County Circuit Court, or in the Rockingham County General District Court if the amount in controversy is within the jurisdictional limit of such court, and all parties to this Escrow Agreement and/or such Contract voluntarily submit themselves to the jurisdiction and venue of such courts, regardless of the actual location of such parties.

SIGNATURE PAGE TO FOLLOW

IN WITNESS WHEREOF, the parties hereto have signed this Escrow Agreement by their authorized representatives.

Typed Name of Contractor

Attest: (if corporation)
Witness: (if individual)

President/Vice-President;
Partner or Owner (Seal

Typed Name of Escrow Agent

Attest:

Bank Officer

Vice President

Witness:

Typed Name of Surety Company

By:_____
Attorney-In-Fact

Attest:

City of Harrisonburg, Virginia

City Clerk

City Manager/Deputy City Manager

Approved as to form:

City Attorney

Approved as to execution:

City Attorney

0400
CITY OF HARRISONBURG
STANDARD CONTRACT

CONTRACT #: _____

This Contract entered into [Date], by [Company] hereinafter called the "Contractor" and the City of Harrisonburg, VA, called the "Owner".

WITNESSETH that the Contractor and the Owner, in consideration of the mutual covenants, promises and agreements herein contained, agree as follows:

SCOPE OF CONTRACT: The Contractor shall provide [the goods/services] to the Owner as set forth in the Contract Documents.

PERIOD OF PERFORMANCE: From [Effective Date] to [Initial Term Expiration Date] with [X] renewal options.

The contract documents shall consist of:

(1) This signed form;

(2) The entire City of Harrisonburg's Official solicitation (no revisions by the Contractor) dated: [Date]. If applicable, any Official City Addenda: #1, dated: [Date]; [if applicable - #2, dated…]

(3) The Contractor's Bid/Proposal response dated [Date on Cover Page of Proposal Response] and the following negotiated modifications to the Bid/Proposal (if applicable), all of which are incorporated herein.
   a. ABC

IN WITNESS WHEREOF, the parties have caused this Contract to be duly executed intending to be bound thereby.

CONTRACTOR:	CITY OF HARRISONBURG (OWNER):
By: _____ (Signature)	By: _____ (Signature)
_____ (Printed Name)	_____ (Printed Name)
Title: _____	Title: _____

SECTION 0401

A copy of the EJCDC C-520 document and City exceptions may be furnished to interested Bidders upon request. Copies will not be furnished after the last day and time for questions, as noted in Section 0001.

Please contact the Purchasing Office at Questions@harrisonburgva.gov.

0500

GENERAL TERMS AND CONDITIONS OF THE CITY OF HARRISONBURG, VA (REV. 09-20-19)

These General Terms & Conditions shall apply to all purchases and be a part of every contract awarded by the City of Harrisonburg unless otherwise specified in writing. Bidders/Offerors are expected to inform themselves fully as to the conditions, requirements and specifications before submitting bids/proposals. Procurement by the City is subject to the Virginia Public Procurement Act (VPPA) Title 2.2, Chapter 43 of the Code of Virginia and the provisions of The Purchasing and Contracting Policy Manual for the City of Harrisonburg and any revisions thereto. If an inconsistency exists between the VPPA and the Purchasing and Contracting Policy Manual for the City, the VPPA Virginia Code sections take precedence.

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DEFINITIONS

ADDENDUM/ADDENDA: Addition(s) or supplement(s) to a solicitation to clarify, modify or support information which becomes part of the contract.

BID: The offer of a prospective vendor/supplier to an Invitation To Bid to provide specific goods or services at specified prices and/or other conditions specified in the solicitation.

BIDDER/OFFEROR: Any individual, company, firm, corporation, partnership or other organization who submits a response to an Invitation to Bid or a Request for Proposal and offering to enter into a contract with the City.

COLLUSION: A secret agreement or cooperation between two or more parties to accomplish a fraudulent, deceitful, or unlawful purpose.

CONFLICT OF INTEREST: An actual or potential situation in which the personal interests of a vendor, employee or public official are, or appear to be, in conflict with the best interests of the City.

CONTRACTOR: The entity that has a direct contract with the City to furnish goods, services or construction for a certain price.

CITY or OWNER: City of Harrisonburg, Virginia.

DAY(S): Defined as calendar days unless otherwise specified as business days.

INFORMALITY: A minor defect or variation of a bid or proposal from the exact requirements of the Invitation to Bid or Request for Proposal which does not affect the price, quality, quantity or delivery schedule for the goods, services or construction being procured.

INVITATION TO BID (ITB): A formal request which is made to prospective suppliers (bidders) for their quotation on goods, services, or construction desired by the City. The issuance of an ITB will contain or incorporate by reference the specifications and contractual terms and conditions applicable to the procurement.

PROFESSIONAL SERVICES: Any type of professional service performed by an independent contractor within the practice of accounting, actuarial services, architecture, dentistry, land surveying, landscape architecture, law, medicine, optometry, pharmacy, or professional engineering (which shall be procured as set forth in the Code of Virginia). **2.2-4301**

PROPOSAL: The document submitted by the offeror in response to the RFP to be used as the basis for negotiations for entering into a contract.

PURCHASING AGENT: The individual employed and given authority by the Harrisonburg City Council by adoption of the City of Harrisonburg Purchasing and Contracting Policy Manual. Purchasing Agent may also be referred to as Procurement Manager.

REQUEST FOR PROPOSAL (RFP): A formal request for a proposal from prospective offerors which will indicate the general terms which are sought to be procured from the offeror and where negotiations are conducted to come to a final contract. The RFP will specify the evaluation criteria to be used and will contain or incorporate by reference other contractual terms and conditions applicable to the procurement.

RESPONSIBLE BIDDER/OFFEROR: An individual, company, firm, corporation, partnership or other organization having the capability in all respects to perform fully the contract requirements, and also having the moral and business integrity and reliability which will assure good faith performance.

RESPONSIVE BIDDER/OFFEROR: An individual, company, firm, corporation, partnership or other organization having submitted a bid/proposal which conforms in all material respects to the ITB or RFP.

SOLICITATION: A formal document issued by the City with the intent to purchase goods, services or construction. Can be either an Invitation To Bid or a Request For Proposal.

SWAM: Small, Women, and Minority-owned businesses.

SUBCONTRACTOR: A business entity that has a contract to supply labor or materials to the prime contractor to whom the contract was awarded or to any subcontractor in the performance of the work provided for in such contract.

CONDITIONS OF BIDDING

BID PRICE CURRENCY: Unless stated otherwise in the solicitation, bidders/offerors shall state bid/proposal prices in US dollars.

BID/PROPOSAL ACCEPTANCE PERIOD: Unless otherwise specified, all bids/proposals submitted shall be binding and may not be withdrawn for sixty (60) days following the bid/proposal opening date and time, unless extended by mutual consent of all parties. If the bid/proposal is not withdrawn at that time it remains in effect until an award is made or the solicitation is cancelled.

CANCELLATION OF SOLICITATIONS: 2.2-4319 An ITB, RFP or any other solicitation may be cancelled or rejected, but shall not be cancelled or rejected solely to avoid awarding a contract to a particular responsive and responsible bidder/offeror. The reasons for cancellation shall be made part of the contract file.

CITY HALL CLOSURE: If City Hall is closed for business at the time scheduled for the bid opening, for whatever reasons, sealed bid/proposal will be accepted and opened on the next business day of the City, at the original scheduled hour.

CLARIFICATION of TERMS: 2.2-4316 If any prospective bidder/offeror has questions about the specifications or other solicitation documents, the prospective bidder/offeror should contact the person identified in the solicitation no later than five (5) business days before the due date. Any revisions to the solicitation will be made only by addendum issued by the City.

CONFLICT OF INTEREST/COLLUSION: Contractor certifies by signing their bid/proposal submission to the City, that no conflict of interest or collusion exists between the Contractor and City that interferes with fair competition and no conflict of interest or collusion exists between Contractor and any other person or organization that constitutes a conflict of interest with respect to the contract with the City.

DEBARMENT STATUS: By signing their bid/proposal, the bidders/offerors certify that they are not currently debarred from submitting bids/proposals on contracts from any agency, public entity/locality or authority of the Commonwealth of Virginia.

DISCRIMINATION PROHIBITED: **2.2-4310** In the solicitation or awarding of a contract the City shall not discriminate against a bidder/offeror because of race; religion; color; sex; national origin; age; disability; status as a small, women-owned, minority-owned, or service disabled veteran-owned; employment services organization; or any other basis prohibited by state law relating to discrimination in employment. The City encourages the participation of these entities in public procurement activities. Towards that end, the City encourages contractors to provide for the participation of these entities through partnerships, joint ventures, subcontracts, and other contractual opportunities.

ERRORS IN BIDS/PROPOSALS: When an error is made in extending total prices, the unit price will govern. Bidders/Offerors are cautioned to recheck their bids/proposals for possible errors prior to submission.

ETHICS IN PUBLIC CONTRACTING: 2.2-4371 By submitting their bids/proposals, the bidders/offerors certify that their bids/proposals are made without collusion or fraud and that they have not offered or received any kickbacks or inducements from any other bidder/offeror, supplier, manufacturer or subcontractor in connection with their bid/proposal, and that they have not conferred on any public employee having official responsibility for this procurement transaction any payment, loan, subscription, advance, deposit of money, services or anything of more than nominal or minimal value, present or promised, unless consideration of substantially equal or greater value was exchanged.

EXCUSABLE DELAY: The City shall not be in default of any failure in performance of this agreement in accordance with its terms if such failure arises out of causes beyond its reasonable control and without the fault of or negligence of the City. Such causes may include, but are not restricted to acts of God or the public enemy, fires, flood, epidemics, quarantine restrictions, strikes, freight embargoes, and unusually severe weather, but in every case the failure to perform must be beyond the reasonable control and without the fault or negligence of the City.

LICENSES, PERMITS and FEES: All proposals submitted shall have included in price the cost of any business or professional licenses, permits or fees required by the City of Harrisonburg or the Commonwealth of Virginia. At or prior to delivery of the signed contract, the bidder/offeror to whom the contract is awarded shall deliver to the City a copy of their City Business License (if applicable). The bidder/offeror shall ensure that the Business License indicates a basis amount equal to or greater than the awarded Contract value. For information on City Business Licenses contact the Harrisonburg Commissioner of the Revenue's office at 540-432-7704. The bidder/offeror must have all necessary licenses to perform the services in the Commonwealth of Virginia and, if practicing as other than an individual, be authorized to do business in the Commonwealth of Virginia.

MANDATORY USE of CITY FORMS AND TERMS and CONDITIONS for ITBs AND RFPs: Failure to submit a bid/proposal on the official City form(s) provided or in the format identified, for that purpose shall be a cause for rejection of the bid/proposal. Unauthorized modification of or additions to any portion of the ITB or RFP may be cause for rejection of the bid/proposal. The City reserves the right to decide, on a case by case basis, in it's sole discretion, whether to reject any bid/ proposal which has been modified. As a precondition to its acceptance of an ITB response, the City may, in its sole discretion, request that the bidder withdraw or modify nonresponsive portions of a bid which do not affect quality, quantity, price, or delivery. No modification to the provisions of the contract shall be effective unless the modification is incorporated into the contract document.

MODIFICATION & WITHDRAWAL OF BIDS/PROPOSALS: 2.2-4330

1. A bidder for a public construction contract, other than a contract for construction or maintenance of public highways, may withdraw his bid from consideration if the price bid was substantially lower than the other bids due solely to a mistake in the bid, provided the bid was submitted in good faith, and the mistake was a clerical mistake as opposed to a judgment mistake, and was actually due to an unintentional arithmetic error or an unintentional omission of a quantity of work, labor or material made directly in the compilation of a bid, which unintentional arithmetic error or unintentional omission can be clearly shown by objective evidence drawn from inspection of original work papers, documents and materials used in the preparation of the bid sought to be withdrawn.

   If a bid contains both clerical and judgment mistakes, a bidder may withdraw his bid from consideration if the price bid would have been substantially lower than the other bids due solely to the clerical mistake, that was an unintentional arithmetic error or an unintentional omission of a quantity of work, labor or material made directly in the compilation of a bid that shall be clearly shown by objective evidence drawn from inspection of original work papers, documents and materials used in the preparation of the bid sought to be withdrawn.
2. The bidder shall give notice in writing of his claim of right to withdraw his bid within two business days after the conclusion of the bid opening procedure and shall submit original work papers with such notice.
3. No bid shall be withdrawn under this section when the result would be the awarding of the contract on another bid of the same bidder or of another bidder in which the ownership of the withdrawing bidder is more than five percent.
4. If a bid is withdrawn in accordance with this section, the lowest remaining bid shall be deemed to be the low bid.
5. No bidder who is permitted to withdraw a bid shall, for compensation, supply any material or labor to or perform any subcontract or other work agreement for the person or firm to whom the contract is awarded or otherwise benefit, directly or indirectly, from the performance of the project for which the withdrawn bid was submitted.
6. The public body shall notify the bidder in writing within five business days of its decision regarding the bidder's request to withdraw its bid. If the public body denies the withdrawal of a bid under the provisions of this section, it shall state in such notice the reasons for its decision and award the contract to such bidder at the bid price, provided such bidder is a responsible and responsive bidder. At the same time that the notice is provided, the public body shall return all work papers and copies thereof that have been submitted by the bidder.
7. These procedures also apply for the withdrawal of bids for other than construction contracts.
8. A bidder/offeror may modify or withdraw his bid/proposal, either personally or by written request to the Purchasing office at any time prior to the scheduled time for opening of bids/proposals.

PUBLIC INSPECTION OF CERTAIN RECORDS: 2.2-4342 Public inspection of all records is strictly governed by Code of Virginia 2.2-4342 and in accordance with the Virginia Freedom of Information Act (VA Code 2.2-3700 et seq). Any inspection of procurement transactions shall be subject to reasonable restrictions to ensure the security and integrity of the records. Cost estimates relating to a proposed procurement transaction prepared by or for a public body shall not be open to public inspection.

REVISIONS to the OFFICIAL ITB/RFP: No bidder/offeror shall modify, revise, edit or make any unauthorized change(s) to the original official ITB/RFP. ~~The official solicitation document and the Addenda(um) are the documents posted on the eVA website (www.eva.virginia.gov).~~ Due to the eVA upgrade and subsequent system shut down, all official solicitation documentation will temporarily be posted on the City's website (www.harrisonburgva.gov/bids-proposals). Any such violation as stated above may result in rejection of the ITB/RFP response. In addition, violations may result in the debarment of the bidder/offeror by the City of Harrisonburg.

TAXES: Sales to the City of Harrisonburg are normally exempt from State sales tax. Virginia Sales and Use Tax Certificate of Exemption, Form ST-12, will be issued upon request. The City may also be exempt from other taxes and fees.

AWARD

CONTRACT AWARD

For ITB: The award(s) made in response to an ITB will be made to the lowest responsive and responsible bidder(s) for each item, or group of items indicated in the bid. The City reserves the right to make the sole determination of whether the product and/or options offered meet the minimum specifications and is acceptable in accordance with the specifications. The City's decision shall be final. The City reserves the right to make a separate award for each item, a group of items or all items, and to make awards either in whole or in part, whichever is deemed by the City to be in its best interest. Delivery time lines may be a factor in making an award.

For RFP: The award(s) made in response to an RFP will be made to the highest qualified offeror whose proposal is determined to be the most advantageous to the City, taking into consideration the evaluation criteria set forth in the RFP. After negotiations, the offeror who has made the best proposal and provides the best value shall be awarded the contract.

Professional services shall be procured and awarded by competitive negotiation as set forth in **2.2-4302.2 A 4.**

The City reserves the right to cancel a solicitation at any time and to reject any or all bids/proposals, in whole or in part, to waive any informality and to delete items prior to making the award(s), whenever it is deemed in the sole opinion of the City to be in its best interest.

NEGOTIATION WITH THE LOWEST BIDDER: 2.2-4318 Unless all bids are canceled or rejected, the City reserves the right to negotiate with the lowest responsive and responsible bidder to obtain a contract price within the funds available to the City whenever such low bid exceeds the City's available funds for the project. The City shall initiate such negotiations by written notice to the lowest responsive, responsible bidder that its bid exceeds the available funds and the City wishes to negotiate a lower contract price. The times, places and manner of negotiating shall be agreed to by the City and the lowest responsive, responsible bidder.

PRECEDENCE of TERMS: General Terms and Conditions shall apply in all instances with the exceptions for projects funded by the Federal Highway Administration (FHWA) and by the Federal Transportation Administration (FTA). In the event there is a conflict between the General Terms and Conditions and any Federal, Special, Standard, or Supplementary Terms and Conditions in this solicitation, the Federal, Special, Standard, or Supplementary Terms and Conditions shall apply.

QUALIFICATIONS of BIDDERS/OFFERORS: The City may make such reasonable investigations as deemed proper and necessary to determine the responsibility and ability of the bidder/offeror to perform the services/furnish the goods and the bidder/offeror shall furnish to the City all such information and data for this purpose as may be requested. The City reserves the right to inspect bidder's/offeror's physical facilities prior to award to satisfy questions regarding the bidder's/offeror's capabilities. The City further reserves the right to reject any bid/proposal if the evidence submitted by, or investigations of, such bidder/offeror fails to satisfy the City that such bidder/offeror is properly qualified to carry out the obligations of the contract and to provide the services and/or furnish the goods contemplated therein.

SELECTION PROCESS/NOTICE OF AWARD: Upon the award or the announcement of the decision to award a contract as a result of this solicitation, the Purchasing Office will publicly post such notice and/or will notify all responsive bidders/offerors and records are available for public inspection in accordance with the VA Freedom of Information Act (VA Code 2.2-3700 et seq). ~~The City posts all Notice of Awards on eVA at www.eva.virginia.gov~~. Due to the eVA upgrade and subsequent system shut down, all Notice of Award documentation will temporarily be posted on the City's website (www.harrisonburgva.gov/bids-proposals).

CONTRACT PROVISIONS

ANTI-DISCRIMINATION: 2.2-4311 By submitting their bids/proposals, bidders/offerors certify to the City that they will conform to the provisions of the Federal Civil Rights Act of 1964, as amended, as well as the Virginia Fair Employment Contracting Act of 1975, as amended, where applicable, the Virginians With Disabilities Act, the Americans With Disabilities Act.
In every contract over $10,000 the provisions below apply:

1. During the performance of this contract, the contractor agrees as follows:
   a. The contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the contractor. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
   b. The contractor, in all solicitations or advertisements for employees placed by or on behalf of the contractor, will state that such contractor is an equal opportunity employer.
   c. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting these requirements.
2. The contractor will include the provisions of 1. above in every subcontract or purchase order over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

ANTITRUST: By entering into a contract, the contractor conveys, sells, assigns, and transfers to the City all rights, title and interest in and to all causes of action it may now have or hereafter acquire under the antitrust laws of the United States and the Commonwealth of Virginia, relating to the particular goods or services purchased or acquired by the City under said contract.

APPLICABLE LAWS and COURTS: This solicitation and any resulting contract shall be governed in all respects by the laws of the Commonwealth of Virginia, excluding its conflict of laws provisions, and venue for litigation with any respect thereto shall be proper only in the Circuit Court of Rockingham County, Virginia. The contractor shall comply with all applicable federal, state and local laws, rules and regulations.

ASSIGNMENT of CONTRACT: A contract shall not be assignable by the contractor in whole or in part without the written consent of the City.

CHANGES to the CONTRACT: Changes can be made to the contract in any of the following ways:

1. The parties by mutual agreement in writing, to modify the terms, conditions or scope of the contract subject to item 2. below. Any additional goods or services to be provided shall be of a sort that is ancillary to the contract goods or services, or within the same broad product or service categories as were included in the contract award. Any increase or decrease in the price of the contract resulting from such modification shall be agreed to by the parties as a part of their written agreement to modify the scope of the contract.
2. A public contract may include provisions for modification of the contract during performance, but no fixed-price contract may be increased by more than twenty-five percent (25%) of the amount of the contract or $50,000, whichever is greater, without the advance written approval of the Harrisonburg City Council. In no event may the amount of any contract, without adequate consideration, be increased for any purpose, including, but not limited to, relief of a bidder/offeror from the consequences of an error in its (bid/offer). **2.2-4309**
3. The Procurement Manager (or City delegated agent) may order changes within the general scope of the contract at any time by written notice to the contractor. Changes within the scope of the contract include, but are not limited to, things such as services to be performed, the method of packing or shipment, and the place of delivery or installation. The contractor shall comply with the notice upon receipt unless the contractor intends to claim an adjustment to compensation, schedule, or other contractual impact that would be caused by complying with such notice, in which case the contractor shall, in writing, promptly notify the City of the adjustment to be sought, and before proceeding to comply with the notice, shall await the City's written decision affirming, modifying, or revoking the prior written notice. If the City decides to issue a notice that requires an adjustment to compensation, the contractor shall be compensated for any additional costs incurred as the result of such order and shall give the City a credit for any savings. Said compensation shall be determined by one of the following methods:
   a. By mutual agreement between the parties in writing; or
   b. By agreeing upon a unit price or using a unit price set forth in the contract, if the work to be done can be expressed in units, and the contractor accounts for the number of units of work performed, subject to the City's right to audit the contractor's records and/or to determine the correct number of units independently; or
   c. By ordering the contractor to proceed with the work and keep a record of all costs incurred and savings realized. A markup for overhead and profit may be allowed if provided by the contract. The same markup shall be used for determining a decrease in price as the result of savings realized. The contractor shall present the City with all vouchers and records of expenses incurred and savings realized. The City shall have the right to audit the records of the contractor as it deems necessary to determine costs or savings. Any claim for an adjustment in price under this provision must be asserted by written notice to the City within thirty (30) days from the date of receipt of the written order from the City. If the parties fail to agree on an amount of adjustment, the question of an increase or decrease in the contract price or time for

performance shall be resolved in accordance with the procedures for resolving disputes provided by the Disputes Clause of this contract or, if there is none, in accordance with the disputes provisions of the City of Harrisonburg Purchasing and Contracting Policy Manual. Neither the existence of a claim nor a dispute resolution process, litigation or any other provision of this contract shall excuse the contractor from promptly complying with the changes ordered by the City or with the performance of the contract generally.

CONTRACT EXECUTION: Per City Code (Sec 3-1-2, 3-1-1), the City Manager and the Deputy City Manager shall have authority to execute all contracts and agreements on behalf of the City except as otherwise directed by the Harrisonburg City Council in specific instances.

CONTRACTUAL DISPUTES: Contractual claim procedures shall be as per Code of VA **2.2-4363**.

COOPERATIVE PROCUREMENT: 2.2-4304 This procurement is being conducted in accordance with the provisions of 2.2-4304 Code of VA. Except for contracts for architectural and engineering services, if agreed to by the contractor, other public bodies may utilize this contract. The Contractor shall deal directly with any public body it authorizes to use the contract. The City, its officials and staff are not responsible for placement of orders,invoicing, payments, contractual disputes, or any other transactions between the Contractor and any other public bodies, and in no event shall the City, its officials or staff be responsible for any costs, damages or injury resulting to any party from use of a City Contract. The City assumes no responsibility for any notification of the availability of the contract for use by other public bodies, but the Contractor may conduct such notification. Other public bodies desiring to use this contract must make their own legal determination as to whether the use of this contract is consistent with their laws, regulations, and other policies

DEFAULT: In case of failure to deliver goods or services in accordance with the contract terms and conditions, the City, after due oral or written notice, may procure items of a comparable quality from other sources and hold the contractor responsible for any resulting additional costs above the contract price when purchases are made in the open market. This remedy shall be in addition to any other remedies, which the City may have.

DRUG-FREE WORKPLACE: 2.2-4312 During the performance of this contract, the contractor agrees to: (i) provide a drug-free workplace for the contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the contractor that the contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

IMMIGRATION REFORM and CONTROL ACT OF 1986: 2.2-4311.1 By submitting their bids/proposals, bidders/offerors certify that they do not and will not during the performance of this contract employ illegal alien workers or otherwise violate the provisions of the federal Immigration Reform and Control Act of 1986.

INDEMNIFICATION: Contractor agrees to indemnify, defend and hold harmless the City, its officers, agents, volunteers, and employees against any and all liability, losses, damages, claims, causes of action, suits of any nature, cost, and expenses, including attorney's fees, resulting from or arising out of Contractor's or it's agent's and subcontractor's negligent activities or omissions, or from which the Contractor would have legal liability outside of contract.

INSURANCE: By signing and submitting a bid/proposal under this solicitation, the bidder/offeror certifies that if awarded the contract, it will have insurance coverages per the solicitation document at the time of contract execution. For construction contracts, if any subcontractors are involved, the subcontractor will have workers' compensation insurance in accordance with **2.2-4332** and **65.2-800** et seq. of the Code of Virginia. The bidder/offeror further certifies that the contractor and any subcontractors will maintain these insurance coverages during the entire term of the contract and that all insurance coverages will be provided by insurance companies authorized to sell insurance in Virginia by the Virginia State Corporation Commission.

LIABILITY AND LITIGATION: The City shall not indemnify or hold harmless any contractor or other third party. The City does not waive any right or release any party from liability, whether on its own behalf or on behalf of any boards, employees or agents. The City does not waive the right to trial by jury for any cause of action arising from the contract and shall not submit any contract claim to binding arbitration or mediation. The City shall not be liable to contractor for any special, punitive or exemplary damages arising from the performance of the contract, including, but not limited to, incidental damages, and lost profit and lost wages, even if such special damages are reasonably foreseeable. Any provision(s) in the contract contrary to these statements is/are hereby deleted and rendered void.

NONDISCRIMINATION OF CONTRACTORS: 2.2-4343.1H A bidder, offeror, or contractor shall not be discriminated against in the solicitation or award of this contract because of race, religion, color, sex, national origin, age, disability, faith-based

organizational status, any other basis prohibited by state law relating to discrimination in employment or because the bidder or offeror employs ex-offenders unless the state agency, department or institution has made a written determination that employing ex-offenders on the specific contract is not in its best interest. If the award of this contract is made to a faith-based organization and an individual, who applies for or receives goods, services, or disbursements provided pursuant to this contract objects to the religious character of the faith-based organization from which the individual receives or would receive the goods, services, or disbursements, the public body shall offer the individual, within a reasonable period of time after the date of his objection, access to equivalent goods, services, or disbursements from an alternative provider.

PAYMENT: 2.2-4352 – 2.2-4354

1. To Prime Contractor:
   Invoices for items ordered, delivered and accepted shall be submitted by the contractor directly to the payment address shown on the purchase order/contract. Any payment terms requiring payment in less than 45 days will be regarded as requiring payment 45 days after invoice or delivery, whichever occurs last. This shall not affect offers of discounts for payment in less than 45 days, however. All goods or services provided under this contract or purchase order, that are to be paid for with public funds, shall be billed by the contractor at the contract price.

   The following shall be deemed to be the date of payment: the date of postmark in all cases where payment is made by mail, or the date of offset when offset proceedings have been instituted as authorized under the Virginia Debt Collection Act. Individual contractors shall provide their social security numbers, and proprietors, partnerships, and corporations shall provide the City with a federal employer identification number, prior to receiving any payment from the City. The City requires an updated IRS Form W-9 be filed with the Purchasing Office at or before the contract is signed.

   Unreasonable Charges: Under certain emergency procurements and for most time and material purchases, final job costs cannot be accurately determined at the time orders are placed. In such cases, contractors should be put on notice that final payment in full is contingent on a determination of reasonableness with respect to all invoiced charges. Charges which appear to be unreasonable will be researched and challenged, and that portion of the invoice held in abeyance until a settlement can be reached. Upon determining that invoiced charges are not reasonable, the City shall promptly notify the contractor, in writing, as to those charges which it considers unreasonable and the basis for the determination. A contractor may not institute legal action unless a settlement cannot be reached within thirty (30) days of notification.

   The provisions of this section do not relieve the City of its prompt payment obligations with respect to those charges which are not in dispute **(2.2.4363).**

2. To Subcontractors:
   A contractor awarded a contract under this solicitation is hereby obligated to pay the subcontractor(s) within seven (7) days of the contractor's receipt of payment from the City for the proportionate share of the payment received for work performed by the subcontractor(s) under the contract; or;

   Notify the City and the subcontractor(s), in writing, of the contractor's intention to withhold payment and the reason.
   The contractor is obligated to pay the subcontractor(s) interest at the rate of one percent per month (unless otherwise provided under the terms of the contract) on all amounts owed by the contractor that remain unpaid seven (7) days following receipt of payment from the City, except for amounts withheld as stated in (2) above. The date of mailing of any payment by U. S. Mail is deemed to be payment to the addressee. These provisions apply to each sub-tier contractor performing under the primary contract. A contractor's obligation to pay an interest charge to a subcontractor may not be construed to be an obligation of the City. Any such contract awarded shall further require the contractor to include in each of its subcontracts a provision requiring each subcontractor to include or otherwise be subject to the same payment and interest requirements with respect to each lower-tier subcontractor. A contractor's obligation to pay an interest charge to a subcontractor may not be construed to be an obligation of the City.

SAFETY and OSHA STANDARDS: All parties performing services for the City shall comply with all Occupational Safety and Health Administration (OSHA), State Occupational Health Standards, and any other applicable rules and regulations. All parties shall be held responsible for the training, supervision, and safety of their employees. Any unsafe acts or hazardous conditions that may cause injury or damage to any persons or property within and around the work site areas under this contract shall be remedied per the regulatory agency's guidelines.

TERMINATION: Subject to the provisions below, the contract may be terminated by the City upon thirty (30) days advance written notice to the other party. Any contract cancellation notice shall not relieve the contractor of the obligation to deliver and perform on all outstanding orders issued prior to the effective date of cancellation.

1. Termination for Convenience: In the event that the contract is terminated upon request and for the convenience of the City, without the required thirty (30) days advance notice, then the City shall be responsible for payment of services up to the termination date.

2. Termination for Cause: Termination by the City for cause, default or negligence on the part of the contractor shall be excluded from the foregoing provision; termination costs, if any shall not apply. However, the City may hold the contractor responsible for any resulting additional purchase and administrative costs. The thirty (30) day advance notice requirement is waived in the event of Termination for Cause.
3. Termination Due to Unavailability of Funds: Agreements are made subject to the appropriation of funds (including grant funds, gifts or donations) by the Harrisonburg City Council and are null and void in the event of non-appropriation by the City Council. Non-appropriation of funds shall not be deemed a cancellation and shall terminate this agreement without recourse and with no liability on the part of the City.

SPECIFICATIONS

CONDITION OF ITEMS: Unless otherwise specified in the solicitation, all items shall be new, latest edition/model in first class condition.

FORMAL SPECIFICATIONS: When a solicitation contains a specification which states no substitutes, no deviation therefrom will be permitted and the bidder will be required to furnish articles in conformity with that specification.

USE OF BRAND NAMES: 2.2-4315 Unless otherwise provided in this solicitation, the name of a certain brand, make or manufacturer does not restrict bidders/offerors to the specific brand, make or manufacturer named, but conveys the general style, type, character, and quality of the article desired. Any article which the public body, in its sole discretion, determines to be the equal of that specified, considering quality, workmanship, economy of operation, and suitability for the purpose intended, shall be accepted. The bidder/offeror is responsible to clearly and specifically identify the product being offered and to provide sufficient descriptive literature, catalog cuts and technical detail to enable the City to determine if the product offered meets the requirements of the solicitation. This is required even if offering the exact brand, make or manufacturer specified. Normally in competitive sealed bidding only the information furnished with the bid will be considered in the evaluation. Failure to furnish adequate data for evaluation purposes may result in declaring a bid nonresponsive. Unless the bidder/offeror clearly indicates in its bid/proposal that the product offered is an "equal" product, such bid/proposal will be considered to offer the brand name product referenced in the solicitation. The City reserves the right to determine the suitability of substituted items for those specified and to accept in whole or in part any and all bids/proposals received.

DELIVERY

DEFECTS OR IMPROPRIETIES: In instances where there is a defect or impropriety in an invoice or in the goods or services received, the City shall notify the supplier of the defect or impropriety, if the defect or impropriety would prevent payment by the payment date. The notice shall be sent within (30) thirty days after receipt of the invoice or the goods or services.

TESTING AND INSPECTION: 2.2-4302.1 The City reserves the right to conduct any test/inspection it may deem advisable to assure goods and services conform to the specifications. Materials or components that have been rejected by the City, in accordance with the terms of the contract, shall be replaced by the Contractor at no cost to the City.

TRANSPORTATION AND PACKAGING: All materials shipped to the City must be shipped Free On Board (FOB) Destination unless otherwise stated in the contract. By submitting their bids/proposals, all bidders/offerors certify and warrant that the price offered for FOB destination includes only the actual freight rate costs at the lowest and best rate and is based upon the actual weight of the goods to be shipped. Except as otherwise specified herein, standard commercial packaging, packing and shipping containers shall be used. All shipping containers shall be legibly marked or labeled on the outside with purchase order number, commodity description, and quantity.

0600 APPLICATION FOR PAYMENT

1. Applications for progress payment shall be made on forms identical/similar to those shown on pages 0600-2 and 0600-3. The following application for payment is an excel spreadsheet and will be made available for the contractor's use.

2. A draft of the application for progress payment shall be emailed to the Project Manager and Project Coordinator for review. After review and approval by the City, the contractor shall **mail two signed applications** for progress payment to: 2155 Beery Road, Harrisonburg, VA 22801.

3. The Contractor shall submit daily quantities for review to the Project Manager and Project Coordinator no later than 10:00 AM on the following day. After reviewing, the City will sign-off on the submitted quantities and return to the Contractor.

4. Any quantity issues will be handled by the inspector an/or Project Manager and will be discussed with the Contractor. Any change in quantities, based on their final decision, will be noted on the submitted quantity sheet and returned to the Contractor.

0600 APPLICATION AND CERTIFICATE FOR PAYMENT

To Owner:	City of Harrisonburg 2155 Beery Road Harrisonburg, VA 22801	Project:	Application No.: Period To:
From Contractor:			Contract Date:

1. Original Contract Sum	$
2. Net Change by Change Order	$
3. Contract Sum To Date (line 1 + line 2)	$
4. Total Completed and Stored To Date (column G)	$
5. Retainage:	
a. ___% of Completed Work (column D + column E)	$
b. ___% of Stored Materials (column F)	$
6. Total Earned Less Retainage (line 4 less line 5)	$
7. Less Previous Applications for Payment	$
8. Current Payment Due	$
9. Balance to Finish, Plus Retainage	$

CHANGE ORDER SUMMARY	Additions	Deductions
Total Changes Approved Previously		
Total Approved this Month		
Totals		
Net Changes by Change Order		

The undersigned contractor hereby swears and under penalty of perjury that (1) all previous progress payments received from the owner on account of work performed under the contract referred to above have been applied by the undersigned to discharge in full all obligations of the undersigned incurred in connection with work covered by prior applications for payment under said contract, being Applications for Payment 1 through _____ inclusive; and (2) all materials and equipment incorporated in said project or otherwise listed in or covered by this application for payment are free and clear of all liens, claims, security and encumbrances.

Signature _____ Date _____

Printed Name _____ Title _____

State of _____ County of _____

Before me this _____ day of _____, 20 __ personally appeared _____ known to me, who being duly sworn, did depose and say that he/she is the _____ of the contractor above mentioned, that he/she executed the above application for payment on behalf of said contractor and that all of the statements contained herein are true, correct and complete.

Notary Public _____ Registration No. _____

My Commission Expires _____

APPLICATION NO.: PERIOD TO: PROJECT:

A	B	C				D		E		F	G			H
LINE NO.	WORK DESCRIPTION	SCHEDULED VALUE				COMPLETED WORK PREVIOUS PERIOD		COMPLETED WORK THIS PERIOD		STORED MATERIAL (not in D or E)	TOTAL WORK COMPLETED TO DATE		% (G/C)	BALANCE TO COMPLETION (C-G)
		Unit	Qty.	Unit Price	Amount	Qty.	Total	Qty.	Total		Qty	Total		
1	MOBILIZATION	LS	1	$200.00	$200.00	0.50	$100.00	0.50	$100.00		1.00	$200.00	100%	$0.00
2					$0.00				$0.00		0.00	$0.00	#DIV/0!	$0.00
3					$0.00				$0.00		0.00	$0.00	#DIV/0!	$0.00
4					$0.00				$0.00		0.00	$0.00	#DIV/0!	$0.00
5					$0.00				$0.00		0.00	$0.00	#DIV/0!	$0.00
6					$0.00				$0.00		0.00	$0.00	#DIV/0!	$0.00
7					$0.00				$0.00		0.00	$0.00	#DIV/0!	$0.00
8					$0.00				$0.00		0.00	$0.00	#DIV/0!	$0.00
9					$0.00				$0.00		0.00	$0.00	#DIV/0!	$0.00
10					$0.00				$0.00		0.00	$0.00	#DIV/0!	$0.00
11					$0.00				$0.00		0.00	$0.00	#DIV/0!	$0.00
12					$0.00				$0.00		0.00	$0.00	#DIV/0!	$0.00
13					$0.00				$0.00		0.00	$0.00	#DIV/0!	$0.00
14					$0.00				$0.00		0.00	$0.00	#DIV/0!	$0.00
15					$0.00				$0.00		0.00	$0.00	#DIV/0!	$0.00
16					$0.00				$0.00		0.00	$0.00	#DIV/0!	$0.00
17					$0.00				$0.00		0.00	$0.00	#DIV/0!	$0.00
18					$0.00				$0.00		0.00	$0.00	#DIV/0!	$0.00
19					$0.00				$0.00		0.00	$0.00	#DIV/0!	$0.00
20					$0.00				$0.00		0.00	$0.00	#DIV/0!	$0.00
21					$0.00				$0.00		0.00	$0.00	#DIV/0!	$0.00
22					$0.00				$0.00		0.00	$0.00	#DIV/0!	$0.00
TOTALS		$200.00					$100.00	$100.00		$0.00		$200.00		$0.00

SPECIFICATIONS

for

Repairing and Repainting the Interior and Exterior of

One 2,500,000 Gallon Steel Ground Storage Tank

"Washington Street Tank"

Harrisonburg, Virginia

for

City of Harrisonburg
2155 Beery Road
Harrisonburg, Virginia 22801

January 12, 2021

Engineer

Tank Industry Consultants
7740 West New York Street
Indianapolis, Indiana 46214

Certified by:

Gregory R. "Chip" Stein, P.E.
Licensed Professional Engineer, No. 023688
Commonwealth of Virginia

TIC 20.152.E450.001

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DETAILED TECHNICAL SPECIFICATIONS

Repairing and Repainting the Interior and Exterior of One 2,500,000 Gallon Steel Ground Storage Tank "Washington Street Tank" Harrisonburg, Virginia

A. Description of Tank

The 2,500,000 gallon steel ground storage tank is located near the intersection of Washington Street and Vine Street in Harrisonburg, Virginia. The tank has a shell height of approximately 68 ft 9 in. and is approximately 80 ft in diameter. The ground storage tank is of welded steel construction with a dome roof. The tank was erected by PDM Hydrostorage, Inc. in 1980 under contract number H0142.

B. Scope of Work

Bids will be solicited for the complete cleaning and repainting of the tank on the interior surfaces, and the complete cleaning and repainting of the exterior surfaces with containment. Additional Work items include: repair of concrete; replacement of the cathodic protection system, sealant between the bottom plate and grout, shell manhole davits, roof manhole bolts and nuts, and cathodic protection system rectifier; installation of elastomeric check valve for overflow pipe; including other miscellaneous repairs and incidental items such as coordination with the OWNER, first anniversary evaluation, disposal of debris, site restoration, etc. The above description shall serve as general information only and shall not be construed to limit the contractor's responsibility or obligation to comply with the Contract Documents and Detailed Technical Specifications. The Bidder is referred to the following Detailed Technical Specifications for the complete scope of Work.

C. Definition of Parties

The term OWNER in this specification shall mean the City of Harrisonburg, 409 S. Main Street, Harrisonburg, Virginia 22801.

The term PROJECT REPRESENTATIVE in this specification shall mean Mr. David H. Gray, P.E., City of Harrisonburg, 2155 Beery Road, Harrisonburg, Virginia 22801, telephone 540/434-9959, FAX 540/434-9769. The OWNER may be contacted through the PROJECT REPRESENTATIVE.

The term ENGINEER in this specification shall mean Tank Industry Consultants - Headquarters: 7740 West New York Street, Indianapolis, Indiana 46214-2988, telephone 317/271-3100, FAX 317/271-3300.

The term FIELD OBSERVER in this specification shall mean Tank Industry Consultants - Headquarters: 7740 West New York Street, Indianapolis, Indiana 46214-2988, telephone 317/271-3100, FAX 317/271-3300; or another designated representative of the OWNER.

The term CONTRACTOR'S COMPETENT PERSON(S) in this specification shall mean a representative of the CONTRACTOR who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them. The name(s) of the CONTRACTOR'S COMPETENT PERSON(S) shall be submitted for review prior to performing any Work.

D. Evaluation Report and Site Inspection by Bidder

A Summarized Tank Information Sheet shall be made available to all Bidders. An evaluation report of the 2,500,000 gallon steel elevated tank dated December, 2017, complete with color photographs, shall be provided for review. Interpretation of this data is the responsibility of the Bidder. Although reasonable care was used in making and reporting this evaluation and the Summarized Tank Information Sheet, conditions may be encountered which vary from those as reported therein. **Submitting a Bid on the forms bound with the Contract Documents shall acknowledge that the tank and site have been inspected by the Bidder and the evaluation report has been reviewed by the Bidder or that the right to do so has been waived**. Any Bidder wishing to setup a date and time for inspection of the site must contact the PROJECT REPRESENTATIVE.

E. Additional Insured

The CONTRACTOR shall list 1) City of Harrisonburg; 2) Tank Industry Consultants; and each of their officers, agents, and employees as additional insured on all insurance policies (except worker's compensation and employers' liability) and coverage which are required by the OWNER as specified in the Contract Documents. CONTRACTOR must provide Certificate of Insurance and copy of the actual endorsement to the OWNER.

F. General Specifications for Repairing and Repainting the Tank

1. Submittals: Five sets of Submittals shall be submitted to the PROJECT REPRESENTATIVE for review at least two weeks prior to performing any Work. Submittals shall at a minimum include the items listed on the Submittal Check List included with these Specifications. A separate cover sheet such as the form bound in these Specifications, including the Item Number from the Submittal Check List, the Specification Section of reference for each submittal, and a brief description of each submittal included, shall be provided by the CONTRACTOR for each separate item submitted. Review of these submittals shall not relieve the CONTRACTOR from responsibility for compliance with the

specifications or for the adequacy of the repair, cleaning, and/or painting methods. The CONTRACTOR shall incorporate the submittal review process time and make the necessary scheduling adjustments so that completion of the Work within the Contract Time is not affected.

2. Repair Standards: All design and repairs shall be in accordance with the local building code. All design and welding shall be done in accordance with AWWA D100-11 Standard for Welded Steel Tanks for Water Storage. Where tolerances, stresses, details, and modifications are not limited or provided by the AWWA Standard, the applicable sections of the following American Petroleum Institute (API) Standards shall apply. Unless otherwise specified, all steel structural and bar components shall be fabricated from new ASTM A-36 material, all steel plate components shall be fabricated from new ASTM A-36 material, and all steel pipe shall be fabricated from new ASTM A-53 material.

   a. API Standard 650, Welded Tanks for Oil Storage, Twelfth Edition, Includes Errata 1 (2013), Errata 2 (2014), and Addendum 1 (2014) and Addendum 2 (2016)

   b. API Standard 653, Tank Inspection, Repair, Alteration, and Reconstruction, Fifth Edition (2014)

3. Painting Standards: All Work shall be done in accordance with the following requirements. The SSPC-Vis 1-02, the SSPC-Vis 3-04, and the SSPC-Vis 4-01 shall also be used taking into account staining from prior paint applications. The SSPC Standards SSPC-SP 6, Commercial Blast Cleaning and SSPC-SP 10, Near-White Blast Cleaning shall be modified to apply to each square inch instead of the approximately 9 square inch area indicated in paragraph 2.6 of each of these standards and shall be referred to hereinafter as SSPC-SP 6, Commercial Blast Cleaning (modified) and SSPC-SP 10, Near-White Blast Cleaning (modified). Where the foregoing standards, recommendations, and specifications are conflicting, said conflicts shall be brought to the attention of the ENGINEER. Manufacturer's published product data shall be adhered to unless changed in writing by the home office of the manufacturer.

   a. SSPC: The Society for Protective Coatings (SSPC)

      (1) Steel Structures Painting Manual (Volume 1, 4th Edition and Volume 2, 2012 Edition, including Commentary Sections and Appendices).

      (2) SSPC-AB 1 "Mineral and Slag Abrasives"

      (3) SSPC-AB 2 "Specification for Cleanliness of Recycled Ferrous Metallic Abrasives"

      (4) SSPC-AB 3 "Newly Manufactured or Re-Manufactured Steel Abrasives"

      (5) SSPC-VIS 1-02 "Visual Standard for Abrasive Blast Cleaned Steel"

(6) SSPC-VIS 3-04 "Visual Standard for Power- and Hand-Tool Cleaned Steel"

(7) SSPC-VIS 4-01 "Guide and Reference Photographs for Steel Surfaces Prepared by Waterjetting"

(8) SSPC-VIS 5-01 "Guide and Reference Photographs for Steel Surfaces Prepared by Wet Abrasive Blast Cleaning"

(9) SSPC-Guide 6 (CON) "Guide for Containing Debris Generated During Paint Removal Operations"

(10) SSPC-PA 2 "Measurement of Dry Paint Thickness with Magnetic Gages"

(11) SSPC-PA Guide 10 "Guide to Safety and Health Requirements for Industrial Painting Projects"

(12) SSPC-SP 12, Surface Preparation and Cleaning of Steel and Other Hard Materials by High- and Ultrahigh-Pressure Water Jetting Prior to Recoating

(13) SSPC-SP 13, Surface Preparation of Concrete

(14) SSPC-SP 14, Industrial Blast Cleaning

(15) SSPC-SP 15, Commercial Grade Power Tool Cleaning

b. American Water Works Association Standards

(1) AWWA D100-11, Standard for Welded Steel Tanks for Water Storage

(2) AWWA D102-17, Standard for Coating Steel Water-Storage Tanks

(3) AWWA C652-19, Disinfection of Water-Storage Facilities

c. NSF International (NSF)

(1) ANSI/NSF Standard 61 "Drinking Water System Components - Health Effects"

d. the paint manufacturer's published product data

e. these Detailed Technical Specifications

4. Welder's Certification: All welders and welding operators shall be certified in accordance with ASME, Section IX or AWS D1.1 (tests as described in AWS B2.1) to the procedures and processes required to accomplish the Work. Welder's certification papers shall be furnished to the FIELD OBSERVER for review prior to the commencement of welding on the tank.

5. Verification of Dimensions: CONTRACTOR shall verify all dimensions prior to fabrication or ordering any materials or parts needed for this Project. No additional compensation will be made to the CONTRACTOR for items that have to be modified, cut, or replaced because of inadequate dimensions used in ordering or fabricating items.

6. Subcontracting: Subcontracting of the cleaning and/or painting shall not be allowed. If a SUBCONTRACTOR is used for other Work, the name and address of the proposed SUBCONTRACTOR shall be stated in the **Bid Form**.

7. Schedule Submittal: Within two weeks after receipt of the Notice to Proceed and prior to starting the Work, the CONTRACTOR shall submit a bar chart or progress schedule indicating the anticipated schedule of the following functions:

   a. move onto site and rig tank, including containment
   b. repair Work (concrete and steel)
   c. cleaning and priming interior surfaces
   d. intermediate painting interior surfaces
   e. finish painting interior surfaces
   f. cleaning and priming exterior surfaces
   g. intermediate painting exterior surfaces
   h. finish painting exterior surfaces
   i. tank disinfection
   j. site clean-up.

   Also indicated on the bar chart or progress schedule shall be the anticipated progress payment schedule of values. The bar chart and payment request schedule shall be updated monthly and submitted with the payment request. **No separate payment shall be made for bonds, insurance, design, drawings, mobilization, containment of the cleaning and/or painting debris, or paint materials not incorporated into the Work**.

8. Notification: The CONTRACTOR shall notify the OWNER and the ENGINEER at least seven (7) days before starting the Work at the site. The CONTRACTOR shall reconfirm the commencement of Work with the OWNER and ENGINEER twenty-four (24) hours prior to starting Work at the site.

9. Work Schedule: The repairing, cleaning and painting of the tank shall be accomplished in such a way as to minimize the length of time the tank is out of service and to minimize the number of days required for observing the repairing, cleaning and painting operations. **The CONTRACTOR'S attention is directed to the Agreement concerning Contract Time and Liquidated Damages.**

10. Times for Work: No repairing, cleaning or painting is to be done in the night period between sunset and sunrise. The times for Work shall also comply with local, state, and federal regulations and laws regarding days of week, noise, and interference with activities of surrounding property owners. The following exceptions may apply:

a. Repair Work: Should tank interior temperatures be excessive for personnel welfare during daylight hours or should other job conditions make nighttime Work beneficial to the CONTRACTOR and OWNER, written permission may be granted by the ENGINEER and OWNER to conduct repair Work at night. This permission shall only be granted if the CONTRACTOR provides the proper lighting and safety equipment and informs the neighboring occupants and property owners.

b. Cleaning and Painting Work: Should tank interior temperatures be excessive for paint application or personnel welfare during daylight hours or should other job conditions make nighttime Work beneficial to the CONTRACTOR and OWNER, written permission may be granted by the ENGINEER and OWNER to conduct Work at night. This permission shall only be granted if the necessary steel temperature, air temperature, humidity and dew point conditions are present and recorded during the application and initial drying or curing of the coatings. Also, the CONTRACTOR must provide the proper lighting and safety equipment and informs the neighboring occupants and property owners.

11. Tank Empty for Painting: The tank shall be empty during all surface preparation, application, and curing of the coating.

12. Operation of Valves and Equipment: All operations which would include closing valves, switching, starting, stopping, or removal from service of any equipment shall be done by the OWNER'S personnel. If the CONTRACTOR desires the OWNER to close valves, operate switches, start, stop, or remove any equipment from service, the CONTRACTOR shall submit a written request to the OWNER, and if the OWNER determines that such action will not adversely affect the operations of the OWNER to provide water, then the OWNER may close valves, operate switches, start, stop, or remove the equipment from service. Such requests shall be directed to the PROJECT REPRESENTATIVE so interruptions, if any, of the OWNER'S operations or systems will be no longer than necessary. The CONTRACTOR shall have a full complement of personnel working on a daily basis until the Work causing the interruption is completed. All Work performed under this Agreement shall be performed in close cooperation with the OWNER.

13. Site Security: When not working on the tank or site (such as during the evening, weekends, holidays, or rain days), the CONTRACTOR shall secure all openings in the tank (greater than 8 in.), the exterior ladder, and access or rigging devices. Openings in the tank needed during ventilation of the tank shall be secured with bars, grating, or other means to allow sufficient air flow through the opening. The CONTRACTOR shall lock the site fence to prevent unauthorized personnel from gaining access to the site, the interior of the tank, and the CONTRACTOR'S equipment and supplies. The CONTRACTOR shall be solely responsible for the security of the site, tank, equipment, and supplies during both working and non-working hours.

14. Public Safety: CONTRACTOR shall protect the public from harm caused by the CONTRACTOR'S actions and performance of the work. Prior to start of work or

mobilization on site, the CONTRACTOR shall submit a site-specific Public Safety Plan based on the CONTRACTOR'S selected work methods. The Public Safety Plan shall include necessary plans and procedures to protect the general public from harm. The Plan should include such items, but not be limited to, requirements for safety exclusion zones, warning sign type and placements, protective barriers, safety and warning devices, devices for daylight and nighttime protection, and all devices required by state and local requirements. CONTRACTOR shall include a site plan summarizing the requirements of the Public Safety Plan for the specific work on the tank. CONTRACTOR'S Plan shall include the name of the Competent Person responsible for enforcing the Public Safety Plan.

15. Traffic Control Plan: The CONTRACTOR shall permit traffic to pass around the Project site with the least possible inconvenience or delay. The CONTRACTOR shall maintain existing roads and streets within the Project limits, keeping them open, and in good, clean, and safe condition at all times. If any traffic lane closures are necessary, the CONTRACTOR shall provide all flaggers, signs, and other traffic control devices necessary to warn and protect the public at all times from injury or damage as a result of the CONTRACTOR'S operations that may occur on highways, roads, and streets. The CONTRACTOR shall submit a traffic control plan to the PROJECT REPRESENTATIVE for review and approval. If no disruption of traffic is anticipated, then the CONTRACTOR shall submit a statement indicating this.

16. Water Supply: Water for the purpose of this contract, other than filling the tank upon completion, must be obtained by the CONTRACTOR through direct local arrangements with the OWNER. The CONTRACTOR shall furnish and install all necessary temporary piping and valves in connection with such water supply. Water shall be furnished from the OWNER at no cost to the CONTRACTOR as long as the amount of water used remains within reason. All connections to the public water system shall contain a back-flow prevention device approved by the OWNER. One tank of water for the disinfection shall be furnished by the OWNER at no charge to the CONTRACTOR. Additional water for disinfection shall be furnished at current municipal water rates charged by the OWNER and shall be paid for by the CONTRACTOR.

17. Electrical Supply: The CONTRACTOR shall pay all fees, obtain necessary permits, and have meters installed for power and lights as may be required for the prosecution of this Work. The CONTRACTOR shall furnish and install all necessary temporary service drops, wiring, connections, etc. necessary for temporary service required by the CONTRACTOR. All costs associated with any temporary electric service required by the CONTRACTOR shall be included in the Base Bid.

18. OWNER Performed Repairs: The CONTRACTOR shall cooperate with the OWNER who may be conducting other operations on or near the tank. The CONTRACTOR shall clean and paint all areas added or disturbed by the OWNER on the tank and attached accessories.

19. Furnishing and Installation of Items: Any reference in these specifications to furnishing an item or installing an item shall mean the item shall be both furnished and installed by the

CONTRACTOR, unless specifically stated otherwise. Replacement shall mean the removal and legal disposal of the existing items, and furnishing and installation of the new items specified.

20. Contractor Supervision: The CONTRACTOR shall provide a competent superintendent, satisfactory to the OWNER, for the Work at all times during working hours with full authority to act for him/her. The on-site superintendent shall not be replaced without prior written notification and written approval of the PROJECT REPRESENTATIVE. The CONTRACTOR shall also provide an adequate staff for the proper coordination and expedition of his/her Work. Should, in the opinion of the OWNER, any language barrier exist between the on-site superintendent and the OWNER or FIELD OBSERVER, the CONTRACTOR shall employ a qualified full-time interpreter or provide a new on-site superintendent at no additional cost to the OWNER. The on-site superintendent shall be bi-lingual if any workers are not proficient in English.

21. Observation: The OWNER plans to engage Tank Industry Consultants or another designated representative of the OWNER, to perform full-time observation of the repair Work, cleaning, and painting. However, the OWNER reserves the right to engage only intermittent observation services. The CONTRACTOR shall notify and make available to the FIELD OBSERVER for observation of the fit-up of any new and/or replacement parts prior to welding and following post-weld cleanup. The CONTRACTOR shall notify and make available to the FIELD OBSERVER for observation all surfaces to be coated. The dry film thickness (DFT) of each coat shall be measured in accordance with SSPC Paint Application Specification No. 2 (SSPC-PA 2-97). However, if it is determined to be in the best interest of the OWNER, the FIELD OBSERVER may make DFT measurements in excess of the amounts stated in SSPC-PA 2.

22. Destructive Testing of Coatings: If disputes arise concerning the quality of the applied coatings, adhesion tests, Tooke Gage analysis, or some other form of destructive testing may be used to resolve the dispute.

23. Accessibility for Observation: All Work shall be made accessible to the FIELD OBSERVER using the CONTRACTOR'S rigging and equipment. If assistance is required for the FIELD OBSERVER to safely access the Work, the CONTRACTOR shall furnish labor to assist the FIELD OBSERVER. The cost of this labor shall be included in the base contract amount.

24. First Anniversary Inspection: A First Anniversary Inspection shall be performed. The CONTRACTOR'S Performance Bond or a separate Maintenance Bond shall be in force until after any remedial work is performed. The First Anniversary Inspection as described in Section 5.2 of AWWA D102-17 shall apply. The CONTRACTOR shall perform the following duties at the First Anniversary Inspection:

    a. The CONTRACTOR shall perform the inspection, and shall furnish an experienced foreman, laborer, and rigging for the inspection.

    b. Washout: The CONTRACTOR shall washout the interior of the container for the one year evaluation the day prior to the evaluation. All debris from the interior of the container shall be legally disposed of by the CONTRACTOR at no additional cost to the OWNER.

    c. The CONTRACTOR shall be prepared to perform minor touch-up operations.

    d. The CONTRACTOR shall have at least one gallon of each of the exterior primer, intermediate coating, and finish coating at the time of the inspection along with power cleaning tools and "Scotch-Brite" abrasive disks for spot cleaning.

    e. The CONTRACTOR shall also have at least one new, unopened, quart kit of AquataPoxy A-61 Paint (manufactured by Raven Lining Systems, Tulsa, Oklahoma, telephone 800/324-2810) to touch up the interior surfaces. The FIELD OBSERVER shall determine if the coating failures are extensive enough to require the use of the specified epoxy coatings to touch up the interior surfaces.

    f. Repairs: Spot repairs shall be made by the CONTRACTOR before returning the tank to service. Repairs requiring extensive Work and rigging may be delayed until a time mutually agreeable to the OWNER and CONTRACTOR.

    g. Disinfection: It is the CONTRACTOR'S responsibility to disinfect the tank in accordance with AWWA C652-19 until two consecutive satisfactory water samples (collected at least 24 hours apart) are reported from the OWNER'S selected laboratory. Method Two (Part III, Article 5, Section 12 VAC 5-590-1080, Paragraph O 1 b) or Method Three (Part III, Article 5, Section 12 VAC 5-590-1080, Paragraph O 1 c) of the Virginia Department of Health Waterworks Regulations shall be used. The OWNER shall take and send in the samples to the laboratory, but shall assume no responsibility for the sampling technique or the care of the samples. The stored tank water shall comply with current VDH and USEPA standards for organic, inorganic, and biological contaminants as influenced by the operations of the CONTRACTOR.

    h. Costs: All costs associated with the First Anniversary Inspection, including the wash-out and disinfection, shall be included in the Base Bid price. The performance of this inspection and/or any remedial work shall not relieve the CONTRACTOR of any

responsibility for defects in materials or workmanship that may or may not be evident during the anniversary inspection.

i. Date of Inspection: Failure of OWNER to establish a First Anniversary Inspection date will not relieve the CONTRACTOR of the responsibility to repair the interior and exterior coating system.

25. Welding Repairs: All welding to the interior or exterior of the tank is to be made prior to all painting operations. Any resulting burrs, weld spatter, sharp edges, corners, or rough welds which would cause difficulty in applying a holiday-free coating shall be ground smooth. This grinding is considered incidental to the welding work and is to be included in the Base Bid. After grinding, these areas shall be cleaned to produce the profile recommended by the manufacturer of the coating system. (See Welding and Cutting Precautions paragraph in the GENERAL HEALTH, SAFETY, AND ENVIRONMENTAL REQUIREMENTS Section of these specifications for more requirements on welding.)

26. Cleaning Areas of Welding and/or Grinding: It shall be necessary to remove the coating prior to the welding of the new items to the tank. All areas that have been welded and/or ground smooth shall be cleaned prior to painting to provide proper profile for the coating system. Areas to be welded shall be welded prior to the final cleaning and painting of surfaces within the heat-affected zone. The heat-affected zone includes the opposite side of the plate or member being welded. Even if not specifically mentioned as a part of the Work under this Agreement, those areas of paint or coatings in the heat-affected zone of areas not specified to be painted shall be cleaned and painted in accordance with the requirements listed in these Detailed Technical Specifications.

27. Quality of Paint Application: All cleaning and painting shall be done in a workmanlike manner. **Curing times and ventilation requirements of the paint manufacturer shall be strictly adhered to by the CONTRACTOR**. In addition to the minimum and maximum dry film requirements, all sags, runs, dry spray, pinholes, craters, roller nap, or other irregularities shall be removed and repaired. CONTRACTOR shall perform all necessary inspections and quality control required by the coating manufacturer and obtain certification from the coating manufacturer for honoring coating manufacturer warranties.

28. Protection of Cabinets and Pump House: Before cleaning on any portion of the tank, all cabinets on the site and the pump house attached to the tank shall be covered to prevent the entry of blasting abrasive, dust or paint and so they can continue to function as required. Any cabinets which cannot be covered will be designated by the OWNER. Any blasting, cleaning, or paint debris inside these cabinets shall be removed by the CONTRACTOR prior to completion of the Work.

29. Protecting Equipment: The telemetry, other electrical apparatus, and other equipment in the valve vault, on the tank, and on the site, including all wiring, shall be protected from all damage and dust or other deleterious material infiltration during the operations of the CONTRACTOR. The obstruction lights on the roof of the tank shall be protected from

damage. Any items damaged by the operations of the CONTRACTOR shall be replaced in kind or acceptably repaired by the CONTRACTOR at no cost to the OWNER.

30. Fire Watch: All equipment and wiring shall be protected from sparks, fire, weld spatter or other potential heat and/or ignition sources. CONTRACTOR shall have a trained employee equipped with proper fire suppression equipment stationed on the ground at all times that personnel are cutting, welding, or grinding on the tank or structure.

31. Painting Environment: All temperature and humidity requirements of the paint manufacturer's published product data shall be followed. In addition, no painting shall be done when: 1) the relative humidity is greater than 85%; or 2) the temperature of the steel is or is expected to be less than 5°F above the dew point temperature during the application and until the coating has cured to resist moisture in accordance with the manufacturer's published product data; or 3) the ambient or steel temperature is below 35°F or is expected to drop below 35°F during the initial cure of the coating. The CONTRACTOR shall have wet bulb-dry bulb measuring equipment and steel temperature measuring equipment on the job at all times. Readings shall be recorded at the beginning and end of each painting session and at no less than 2-hour intervals. Wind velocities during exterior painting shall be compatible for the quality application of the exterior coatings.

32. Minimum Temperature of Coatings to be Mixed: Prior to mixing, each component shall be a minimum of 75° F. The mixed coatings shall also be maintained at a minimum of 65° F during application. All costs associated with keeping the coating material at the minimum specified temperature shall be included in the Base Bid.

33. Mixing of Coatings: Each component shall be thoroughly mixed on-site with a power agitator to ensure no solids or settled material remains on the bottom of the container before combining the components together. Accurate measuring apparatus shall be used to carefully measure each component by volume into a clean container in accordance with the manufacturer's published product data. The container shall be large enough to hold all components to be mixed, including thinner. **The combined material shall be thoroughly mixed with a power agitator to achieve a uniform consistency. Adherence to proper induction times for the combined coating material in accordance with the manufacturer's published product data shall be accomplished by the CONTRACTOR. No coating shall be applied until the minimum induction time has been reached**.

34. Application and Damages: The materials shall be applied in accordance with the manufacturer's published product data and such that the end results are in compliance with these specifications (including all others inferred by reference). Application equipment (including air and airless sprayers, rollers and brushes) shall be good quality, in good condition and shall be as recommended by the coating manufacturer. Techniques shall be used which will not allow coating droplets, etc. to travel more than 30 ft from the base of the tank. **Spray painting of exterior surfaces shall be utilized only with the containment fully raised and the roof covered, and only when the wind velocity and direction, and temperature and humidity are such that paint damage will not occur to real estate or**

personal property. Brush or roller painting of the exterior surfaces shall be done only with the containment fully raised (with or without the roof covered) and shall be performed only when the wind velocity and direction, and temperature and humidity are such that paint damage will not occur to real estate or personal property. Prior to the cleaning or coating of any surface, the CONTRACTOR shall present a written plan for review by the ENGINEER and PROJECT REPRESENTATIVE concerning how abrasive and/or paint damage to automobiles and property will be handled, including a process for quick removal of the abrasive or paint, and who will do the Work. This review in no way shall relieve the CONTRACTOR from the responsibility of settling claims for damage, but is intended as an avenue to expedite and minimize said claims.

35. Approval of Coatings: All coatings shall be acceptable to the US EPA, VDH, and/or the controlling local health and environmental regulatory agencies. All interior coating materials, solvents, and other additives shall comply with the ANSI/NSF Standard 61 "Drinking Water System Components - Health Effects." If the manufacturer's product data sheets indicate that the interior coating materials comply with ANSI/NSF Standard 61, then a separate letter from the manufacturer is not required. All coatings to be used shall be listed as to manufacturer and number or description on the Listing of Suppliers, which shall be included with the Bid. The interior and exterior coatings shall be furnished by the same manufacturer unless specifically stated otherwise in these Detailed Technical Specifications. Only thinners recommended and furnished by the paint manufacturer shall be used. The specified coatings are intended to be standards of quality. Alternate coatings, materials, and manufacturers will only be considered after award of the Contract in accordance with the Instructions to Bidders. If alternate coatings are submitted for review, the submittal shall include the following information:

    a. A complete description of the proposed substitute,
    b. The material for which it is to be substituted,
    c. A letter from the coating manufacturer certifying that the coating meets or exceeds the coatings specified,
    d. Price,
    e. Performance and test data from the laboratory and field (including QUV/UVB testing for the exterior finish coat),
    f. Coverage,
    g. Life,
    h. Manufacturer's field support capabilities.

36. Coating Materials and Thinners: All coatings and thinners shall be new and furnished for this job. They shall be delivered from the coating manufacturer to the job site in the original factory sealed containers which are clearly and properly labeled by the coating manufacturer showing the manufacturer's name, product number, type of coating, batch number, and expiration date. The materials shall be stored, handled, and used in accordance with all manufacturer's published product data, including all requirements listed on the Safety Data

Sheets (SDS). Provide adequate storage facilities. Store coating materials within minimum and maximum ambient temperatures in accordance with the manufacturer's recommendations. Temperature of the coating prior to and during mixing shall be within the range stated in the manufacturers published product data. The amounts delivered shall provide the proper coverage rates, taking into account normal application loss.

37. Coating Thickness: The thickness of each type coating is essential to the system's integrity. The addition of mils in a succeeding coat of a different generic type or formulation to make up for thin preceding coat(s) shall not be allowed. If a thicker finish coat is needed to hide the underlying darker color on the exterior of the tank, a thicker coat may be applied, but it shall not exceed the maximum allowable thickness recommended by the coating manufacturer. When undercoats or other conditions show through the final coat, additional coats shall be applied until the coating film is of uniform finish, color, and appearance. Under no circumstances shall the dry film thickness of an individual coat or of the total coating system exceed the coating manufacturer's maximum allowable thickness limit. Dry mil thickness greater than the coating manufacturer's maximum allowable thickness shall be considered unacceptable and shall be removed by the CONTRACTOR at no additional cost to the OWNER.

38. Lead and Other Heavy Metal Restrictions in Coatings: Coatings which contain more than 0.025% by weight of lead (or any lead compounds), cadmium, or chromium in the cured coating for each coat applied shall not be used. The CONTRACTOR shall submit documentation from the coating manufacturer stating that their coatings are in compliance with this requirement in addition to other requirements of these specifications.

39. Surface Conditions: The surfaces to be painted shall be free from mud, oil, grease, dust, moisture, salts, and other foreign material which would cause adhesion or other problems in the finished product. The manufacturer's published product data concerning the time between coats and the preparation of the previously painted surfaces shall be followed. If field tests by the FIELD OBSERVER find questionable amounts of contamination on the steel surfaces or painted surfaces to be topcoated, a representative of the home office of the paint manufacturer may be called to examine the surfaces in question and determine if the surfaces are in accordance with these Detailed Technical Specifications and the manufacturer's published product data.

40. Schedule of Coating Application: The primer shall not be applied closer than 6 in. to the edge of an uncleaned surface. If the recoat cycle of the primer prevents completely cleaning and priming the tank before applying the intermediate coat, then the CONTRACTOR shall submit, in writing, a schedule for coating application which will avoid damage to the intermediate and finish coats when applied close to uncleaned surfaces.

41. Restoration: The CONTRACTOR shall restore and/or replace paving, curbing, sidewalks, gutters, shrubbery, fences, sod, or other disturbed surfaces and structures to a condition equal to that before the Work began and to the satisfaction of the PROJECT REPRESENTATIVE and shall furnish all labor and materials incidental thereto.

42. Closeout Procedures: Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for ENGINEER'S observation. Provide submittals to ENGINEER that are required by governing or other authorities. The CONTRACTOR shall submit all documentation to OWNER and ENGINEER necessary for proper completion of the Project. This documentation shall include, but not be limited to, all manifests, abrasive testing results, soil testing results, etc. Submit Application for Final Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

G. General Health, Safety, and Environmental Requirements

1. Compliance with Requirements: The CONTRACTOR shall comply with all applicable requirements of the Occupational Safety and Health Act of 1970 (Public Law 91-596) and will hold the OWNER and ENGINEER harmless from any civil or criminal penalties imposed as a result of the CONTRACTOR'S noncompliance with such requirements. No additional compensations for changes in the laws, regulations, or the interpretation thereof shall be granted by the OWNER. The CONTRACTOR shall be responsible for complying with all laws and regulations, even if not specifically listed in these Specifications.

2. Emergency Information: The CONTRACTOR shall construct a plywood sign covered with a weatherproof, clear plastic cover and supported by wood posts. The CONTRACTOR shall post information on the plywood sign concerning emergency medical, fire, rescue and hazardous waste phone numbers from which personnel on the site can obtain information if needed. The CONTRACTOR shall also list the name and number of a representative of the CONTRACTOR who can be reached 24 hours a day in case of an emergency. The emergency information shall be in a central position, located so it is visible and accessible 24 hours a day. The emergency information shall be posted the entire length of time that the CONTRACTOR is performing Work at the tank site.

3. Confined Space Entry: The CONTRACTOR shall comply with and have documented Confined Entry Space Procedures available at the tank site at all times as required by OSHA 29 CFR 1926 Subpart AA. The CONTRACTOR shall also comply with any state and/or local requirements which are more restrictive than the federal requirements.

4. Safety Data Sheets: Safety Data Sheets (SDS) shall be posted at the job site for each chemical product on the job site, including but not limited to coatings, thinners, other solvents, disinfecting agents, abrasives, welding materials, and flexible sealant material.

5. Safety and Health: The CONTRACTOR shall comply with safe working practices for abrasive blasting, cleaning, burning, welding, and handling lead-based and nonlead-based coated steel, and all health and safety regulations and requirements of Federal OSHA (specifically OSHA Standard for Construction Industry, 29 CFR 1926.62, "Lead Exposure in Construction; Interim Final Rule," regarding occupational exposure to lead), state and local health regulatory agencies, Safety Data Sheets (SDS), SSPC-PA Guide 10, and the

paint and abrasive manufacturers. This compliance shall be accomplished without supervision from the OWNER, ENGINEER, FIELD OBSERVER, or other direct or indirect agents of the OWNER. Should vents, holes, rigging attachments, or any other modification, cutting, or welding be required to meet safety standards or otherwise accomplish the Work, they may be accomplished at the expense of the CONTRACTOR upon submitting of details in writing to, and with subsequent permission by the ENGINEER.

6. Rigging Attachments: All rigging attachments present on the tank shall be carefully evaluated by the CONTRACTOR immediately prior to use for the type and magnitude of loads which CONTRACTOR intends to impose on them. Any rigging attachments installed on the tank by the CONTRACTOR shall be removed at the completion of Work and areas damaged by the removal of these attachments shall be cleaned and painted in accordance with these specifications. The CONTRACTOR assumes all responsibility for use of any existing or added attachments.

7. Welding and Cutting Precautions: No welding or flame cutting through the existing coating system shall be permitted, unless adequate worker protection is provided in accordance with the instructions in ANSI Z49.1, "Safety in Welding and Cutting."

8. Compliance with Environmental Regulations: Compliance with local, state and federal regulations concerning emissions, transportation or disposal of solid, particulate, liquid, or gaseous matter as a result of the cleaning, painting, or other operations under this Agreement shall be the responsibility of the CONTRACTOR. This compliance shall be accomplished without supervision from the OWNER, ENGINEER, FIELD OBSERVER, or other direct or indirect agents of the OWNER. No additional compensations for changes in the laws, regulations, or the interpretation thereof shall be granted by the OWNER. No burning of trash (including abrasive bags or other paper or wood products) on the site shall be permitted. All shielding, abrasive retrieval, or other methods of using precautions required by the regulating agencies shall also be accomplished at no additional cost to the OWNER unless otherwise provided herein. **Any fines or damages imposed on the OWNER, ENGINEER, or FIELD OBSERVER by any regulatory agency or court as a result of the CONTRACTOR'S noncompliance with environmental or nuisance regulations or any other applicable standard shall be paid or reimbursed by the CONTRACTOR**.

9. Attractive Nuisances and Cleanup: The job site shall be kept in a clean and safe condition at all times. Hazards or attractive nuisances shall be protected at all times. Upon completion of the Work, the job site and all nearby sites impacted by the Work activities shall be left clean of all debris, cleaning residue, or any other items resulting from the operations of the CONTRACTOR. The cost of any cleanup that must be done by the OWNER shall be deducted from funds due the CONTRACTOR. Impervious drip pans or double layers of plastic sheeting (each at least 6 mil thick) shall be placed under any compressors, generators, paint pumps, mixers, welding machines, etc. to prevent oils, solvents, organic compounds, or other contaminants from leaching into the soil. Fuel storage tanks, thinners, and other potentially hazardous materials shall be placed inside secondary containment structures to prevent contaminants from leaching into the soil. **Any oils, solvents, organic compounds,**

or contaminants spilled on the site during the process of the Work shall be immediately removed and cleaned up by the CONTRACTOR. Any earth contaminated by a spill shall also be removed and replaced with new certified clean material to the satisfaction of the OWNER and the ENGINEER. If the OWNER has to remove the oils, solvents, organic compounds, contaminants, or earth, the OWNER may deduct the costs of removal and clean-up from the total contract amount owed the CONTRACTOR.

10. Authority of CONTRACTOR'S COMPETENT PERSON(S): The CONTRACTOR'S COMPETENT PERSON(S) shall have the complete support of top management and written authority to ensure these operations are carried out in accordance with compliance plans and governmental regulations, independent of production pressures. The CONTRACTOR'S COMPETENT PERSON(S) may have additional responsibilities and carry out other work assignments, but shall not routinely be a member of the crew that actually performs paint removal work.

11. Responsibility of CONTRACTOR'S COMPETENT PERSON(S): The CONTRACTOR'S COMPETENT PERSON(S) shall be responsible for overseeing job site safety and paint removal operations without supervision of the OWNER, ENGINEER, and/or FIELD OBSERVER. Responsibilities shall include:

    a. Ensuring that a hazard communication program has been conducted for the CONTRACTOR'S personnel on site.

    b. Ensuring that the Confined Entry Space Procedures are followed.

    c. Ensuring that employees are wearing personal protective equipment and are trained in the use of such equipment in accordance with all OSHA and EPA regulations.

    d. Ensuring that employees are utilizing fall protection and are trained in accordance with all OSHA regulations.

    e. Daily inspection and approval of the rigging equipment and scaffolding utilized.

    f. Ensuring that the engineering controls in use are in operating condition and functioning properly.

    g. Ensuring that fugitive emissions to air, water, or soil are minimized and that handling of all waste streams is in compliance with applicable regulations and contract specifications.

    h. Controlling access to the work site and ensuring that contaminated control boundaries are marked off.

    i. Maintaining project documentation.

12. Safety Analysis Forms and Meetings: The CONTRACTOR is required to thoroughly review all phases of the project and complete and submit the "Job Safety Analysis" and the "Contractor Safety Checklist" prior to mobilizing to the site. Each subcontractor shall submit these forms for their work at the site as well. The CONTRACTOR shall update the forms as the project progresses or if there is a change of personnel at the site. Once the site work begins, the CONTRACTOR'S COMPETENT PERSON shall complete the "Daily Jobsite Safety Survey Report" and a "Contractor Daily Sign-in Form" to be presented to the FIELD OBSERVER at the end of each day. The CONTRACTOR shall hold daily safety meetings to discuss specific activities and events for the day and the safety ramifications. This shall be recorded each day, with a list of the attendees.

13. Sanitary Facilities: The CONTRACTOR shall, at the beginning of the Work, provide on the premises suitable temporary sanitary toilet, wash-up, and changing facilities for the use of workers and shall maintain same in a sanitary condition and remove same when directed by the OWNER. The cost of these sanitary facilities shall be included in the Base Bid. The CONTRACTOR is advised that the OWNER is in the business of providing potable water and the CONTRACTOR'S sanitary arrangements shall not endanger the OWNER'S facilities.

14. Electrical Hazards: The CONTRACTOR shall at a minimum take the following safety measures to prevent accidents due to electrical hazards:

    a. Electric Service Deactivation: The OWNER shall deactivate and lock out the electric service to the tank. Electric service for the obstruction light shall be reactivated by the CONTRACTOR each evening before sunset and deactivated by the CONTRACTOR in the morning before starting Work. Proper lock-out, tag-out procedures shall be performed by the CONTRACTOR each time the obstruction light is reactivated or deactivated. The CONTRACTOR shall verify the deactivated status of the electric service to the tank prior to beginning each day's Work functions and throughout the work day. The verification of the electric service deactivation is the sole responsibility of the CONTRACTOR and shall be accomplished without supervision from the OWNER, ENGINEER, FIELD OBSERVER, or other direct or indirect agents of the OWNER.

    b. Electric Service Wiring: The CONTRACTOR shall be aware of the electric service wiring located adjacent to the tank. The CONTRACTOR shall relocate, deactivate, or provide necessary electric shock hazard protective devices to prevent exposure of workers and/or equipment to electric shock hazards. The CONTRACTOR shall verify that there is sufficient electric shock hazard protection for the workers and equipment prior to and throughout each working period on the job. The verification of the electric shock hazard protection is the sole responsibility of the CONTRACTOR and shall be accomplished without supervision from the OWNER, ENGINEER, FIELD OBSERVER, or other direct or indirect agents of the OWNER.

15. Abrasive: The approved abrasive for cleaning shall meet the following requirements:

    a. The abrasive for the **exterior** and **interior** surfaces shall be a commercially available, non-metallic, expendable abrasive **or** a re-usable abrasive (such as steel grit).

    b. All expendable abrasives shall meet the minimum requirements of SSPC-AB 1, and all abrasives shall meet the requirements of Class A (of SSPC-AB 1) for silica content (crystalline silica less than 1% by weight before blasting). The crystalline silica content shall be determined by the use of infrared spectroscopy or by other analytical procedures, such as wet chemical or X-ray diffraction analyses. The abrasive shall also be of a grit size to produce a 1.5 mil to 2.5 mil profile. The prime coat shall be applied to achieve the specified dry mil thickness above the actual profile and to prevent the peaks in the profile from rusting. However, the maximum coating thickness applied shall be in accordance with the coating manufacturer's recommendations. The abrasive shall be properly stored, and it shall be free from contaminants, including but not limited to excessive fine particles, paint, earth, regulated heavy metals, moisture, oil, or chlorides, which can cause premature failure of the coating. Use of abrasive on the exterior of the tank shall be based not only on its compliance with the technical application of the coatings, but also on its lack of nuisance to surrounding property. The CONTRACTOR shall submit manufacturer's published product data sheets for the type of abrasive, grade, and the resulting profile of the abrasive to be used for review prior to the start of any cleaning operations. The CONTRACTOR shall also submit a letter from the coating manufacturer certifying that the resulting profile of the abrasive is acceptable for their coating product.

    c. All expendable abrasive shall be new and furnished for this job. All abrasive shall be properly stored on skids or in a covered container. The abrasive shall be covered to protect the abrasive from water and weather. Do not allow abrasive to rest directly in contact with the ground.

    d. The steel grit shall meet the requirements of SSPC-AB 3, Newly Manufactured or Re-Manufactured Steel Abrasives, and be approved for use by the manufacturer of the blasting, media recovery, and separation equipment. The initial quantity of grit shall consist of an artificial working mix determined by the CONTRACTOR to produce an acceptable profile in accordance with these specifications. **Any used steel grit used on this Project shall be sampled before use by the FIELD OBSERVER and the CONTRACTOR and the CONTRACTOR shall have the samples sent to a laboratory for inductively coupled plasma-atomic emission spectrometry analyses for total lead. The steel grit shall not be used until the results of the inductively coupled plasma-atomic emission spectrometry analyses testing are submitted to the OWNER and indicate that the total lead levels are less than 250 ppm (<0.025%)**.

Blast Media Recovery and Separation System:

(1) Equipment Requirements: The equipment provided for the spent abrasive recovery and media separation shall be a portable commercial recycling abrasive blast machine. The re-used abrasive shall comply with the requirements of SSPC-AB 2, Specification for Cleanliness of Recycled Ferrous Metallic Abrasives. The system shall be capable of recovering the abrasive, and returning the spent cleaning debris to a dust separator which shall be an integrated part of the machine. The waste material shall be placed in hazardous container drums in accordance with the Removal and Disposal of Cleaning Residue paragraph of this specification.

(2) Equipment Characteristics: As a minimum, the vacuum system used to recover the spent blasting material shall contain the following:

i. A double-chambered ASME pressure vessel, which can effectively recycle blast media on a continuous basis, with no interruption, except for air filter back-flushing, media loading to the machine, and removal of collected dust and spent cleaning debris.

ii. A dust filter back-flushing system.

iii. An air drying system consisting of an air-cooled aftercooler, sling separator, and desiccant drier.

16. Containing Cleaning Debris and Overspray: The CONTRACTOR shall ensure that no spent cleaning/blasting debris, dust, overspray, coating droplets, or emissions of any kind escape to the atmosphere and travel farther than 30 ft from the base of the tank, or any lesser distance required to avoid contamination of adjacent buildings, work sites and parking lots.

a. The containment system shall at a minimum meet the emission control requirements of a **Class 2 system**, as specified in Section 4.2.2.2 of the SSPC-Guide 6 (CON), Guide for Containing Debris Generated During Paint Removal Operations, dated February 2012. The ground surrounding the tank shall be protected from all dust, emissions, debris, and other materials generated in the cleaning operations with a minimum of two layers of an impervious membrane covered with plywood.

b. The CONTRACTOR shall be responsible for all materials that are used and for any apparatus used to contain dust, emissions, debris, overspray, and coating droplets. **The containment system attachments to the tank shall be designed by a Professional Engineer registered in the Commonwealth of Virginia not to impose excessive loading on the tank and tank appurtenances. The CONTRACTOR shall submit the P.E. designed, stamped, and signed details of the containment system and the attachment details for review prior to installation of the containment system on the tank. The containment system will place additional loads on the tank which the tank was not originally designed for. The**

CONTRACTOR shall reinforce the tank as necessary to assure no damage or permanent deformation occurs to the tank. Any damage done to the tank as a direct or indirect result of the containment system shall be repaired or sections replaced by the CONTRACTOR at no additional cost to the OWNER. Neither the ENGINEER or the OWNER assume any responsibility for the structural ability of the tank to support the containment system.

c. If tarps are used as part of the containment system, the tarps shall be an impervious, solid, flame-resistant material, reinforced with a fiber mesh and shall allow as much light as possible to pass through the material.

d. If complete containment of the tank is utilized to contain all cleaning dust, emissions, debris, paint overspray, and paint droplets, the complete containment shall include a full roof bonnet.

e. If robotic or creeper-type cleaning devices are used, the robotic or creeper-type cleaning device shall meet the same containment criteria (primarily lack of emissions) as that of other types of containment. All overspray and paint droplets shall be contained on the tank site within the distance listed above.

f. The OWNER reserves the right to stop work or to require additional or different containment methods if the CONTRACTOR'S operations create a nuisance beyond the tank site property line in the sole opinion of the OWNER, the ENGINEER, the OWNER'S designated representative, any regulatory agency, or neighbor. All costs of providing an adequate containment system shall be included by the CONTRACTOR in the **Base Bid**.

g. Review of the containment system for containing the spent cleaning dust, emissions, debris, overspray, and coating droplets shall not warrant the structural integrity of the containment system and shall not warrant the structural integrity of the tank to support the containment system. Nor shall review of the containment system warrant the ability of the system to contain spent cleaning dust, emissions, debris, overspray, and coating droplets.

h. All attachments to the tank shall include a "reinforcing" pad designed to distribute the loads and prevent damage to the tank. The reinforcing pad may remain on the tank at the completion of the Project as long as the pad is completely seal welded, all edges ground to 1/8 in. minimum radius, and all corners rounded to 1 in. minimum radius. All other components of the containment system shall be removed by the CONTRACTOR at the completion of the exterior cleaning and painting, being careful to avoid damage to the coatings on the opposite side of steel plates. The containment submittal shall include, at a minimum, the following details and descriptions:

(1) Brackets (outriggers) to be attached to tank including size, material, etc.
(2) Bracket attachments to tank,

(3) Number of outriggers and spacing on tank container,
(4) Center roof "tree" and attachment details,
(5) Reinforcing pad between structure and attachments,
(6) Any additional roof support to prevent damage to or deformation of the tank roof or shell,
(7) Size of cables to be used and location,
(8) Anchorage details of hoist and location,
(9) Ground anchors,
(10) Catalog cuts of screen (tarp) material,
(11) Screen material connections & overlap,
(12) Operating/design parameters of containment, such as wind speed when containment shall be lowered or not used,
(13) Ground cover, material, etc.
(14) Other engineering controls & dust collection, and
(15) Any items desired to be left on the structure at the completion of the Project (subject to approval by OWNER).

17. Dust Collection: The CONTRACTOR shall furnish, operate, and maintain adequate dust collection during the Project to achieve negative pressure within the containment or adequate air flow within the tank interior. The dust collection system shall at a minimum meet the requirements of a **Type J1 Air Filtration system**, as specified in Section 5.4.5.1 of the SSPC-Guide 6 (CON), Guide for Containing Debris Generated During Paint Removal Operations, dated February 2012. The dust collection shall be operated during all abrasive blast cleaning and after abrasive blast cleaning until the area is clean enough for coating application. The CONTRACTOR shall be responsible for all sizing, design of ductwork, etc., based upon the CONTRACTOR'S operations, number of blasters, duration of blasting, etc. The CONTRACTOR shall also take precautions to avoid a vacuum from developing inside the tank, as even a slight vacuum inside the tank may cause damage to the roof or shell.

18. Removal and Disposal of Cleaning Residue: The cleaning debris shall be cleaned up and stored daily in leak-proof covered dumpsters/containers lined with polyethylene. Each cover shall be designed and installed to keep all rainwater from entering the dumpster/container or the contents. All operations associated with this project shall be in conformance with the Occupational Safety and Health Act (OSHA) of 1970 and all regulations and standards promulgated under this Act, as well as all applicable state and local standards and regulations governing worker safety and health.

    a. The material shall be legally disposed of by the CONTRACTOR in accordance with local, state, and federal laws. The CONTRACTOR shall be responsible for removing and properly transporting all the material from the project site. The material shall be transported in containers approved by the United States Environmental Protection Agency (USEPA) and local, state, and federal regulations. Bidders should prepare their **Base Bid** to include the cost of the transporting of the combined paint and spent cleaning material to a landfill and any disposal costs at that facility. All testing

required by regulations or by the selected waste hauler or landfill, including any follow-up testing and the collection of the samples, shall be done at the CONTRACTOR'S expense. Copies of all manifests, testing results and treatment procedure documents shall be sent to the ENGINEER and OWNER.

b. All dumpsters/containers and labeling of the dumpsters/containers shall adhere to the US Department of Transportation's regulations (49 CFR Part 172) and the HMTA.

H. Specifications for Repairs and Additions to the Tank

1. Construction Drawing Submittals: Five sets of Construction Drawings (or other information) of all fabricated items shall be submitted for review. Drawings submitted shall at a minimum include the following:

   a. Details of the overflow pipe elastomeric check valve if different from that shown in Drawing OF.

2. Welding: Any welding and modifications made to the tank shall take into account that the shell appears to have been constructed with high-strength steel.

3. Temporary Construction Openings (Door Sheet): If the CONTRACTOR desires to cut a temporary opening through the permanent structure (including the roof) for equipment and personnel access, the CONTRACTOR shall submit the following information for review by the OWNER and ENGINEER **prior** to cutting or welding on the shell. If the submittal is favorably reviewed by the OWNER and ENGINEER, the CONTRACTOR shall remove and replace the shell plate in accordance with American Petroleum Institute (API) Standard 653, API Standard 650, and AWWA D100. All required temporary stiffening shall be installed by the CONTRACTOR prior to cutting the temporary shell opening. The CONTRACTOR shall remove the temporary stiffening after the door sheet is welded back in place and repair any surface imperfections prior to coating those areas of the tank surfaces. **The details of the opening and temporary stiffening shall be designed, stamped, and signed by a Professional Engineer registered in the Commonwealth of Virginia.** The CONTRACTOR shall submit for review the following minimum information prior to performing any cutting or welding on the shell or pressure boundary:

   a. A detailed drawing showing the size and configuration of the proposed opening, including details at the intersections with the existing weld seams, corners of the opening, and cut back of corner welds or girth seams.

   b. Details of the location of the proposed opening relative to existing shell openings or penetrations, weld seams, or other attachments to the shell, such as anchor bolts chairs (if any).

c. A detail drawing of the proposed temporary stiffening along each side and across the top of the opening, including the weld details.

d. The proposed method (i.e. plasma arc, saw, flame cut, carbon arc-gouge, etc.) and sequence for cutting the opening in the shell and making cut backs. The corner weld between the shell and the bottom shall be gouged on each side at least 12 in. beyond the opening.

e. Details of the weld joint preparation for the shell and door sheet, including process for grinding and beveling (how the bevel will be made).

f. Description of weld procedures of all joints and attachment welds, including any preheating or post weld heat treating requirements, rod size, etc.

g. Description of weld sequence for reinstalling the door sheet.

h. Details of the proposed non-destructive examination (NDE) plan with the number and location of x-rays, magnetic particle testing, visual testing, dye penetrant testing, etc.

i. Welder credentials and certifications.

j. Weld qualification procedures.

4. Man-Hours: For unit price work paid for per single man-hour, only time worked performing the specified action, i.e. welding or grinding, and only the time of the person performing the specified action shall be recorded as man-hours to be paid under the unit price item. Costs for all equipment, supplies, normal rigging and associated time required, supervision, Competent Person, overhead, insurance, and profit shall be included in the Base Bid or distributed within the unit price Bid Item to be based upon man-hours used in actual performance of the specified action.

5. Initial Abrasive Blast Cleaning for Evaluation of Pitting: All areas of apparent pitting shall be initially abrasive blast cleaned for evaluation of pitting by the FIELD OBSERVER. The cost of this initial abrasive blast cleaning shall be included in the **Base Bid**.

6. Repair Welding: After the initial abrasive blast cleaning, any pits defined for pit welding by the FIELD OBSERVER shall be repaired by welding. All areas of apparent seam deterioration shall be initially abrasive blast cleaned, and any seam corrosion or undercut defined by the FIELD OBSERVER shall be repaired by arc-gouging or grinding the deteriorated weld seam (if determined necessary by the FIELD OBSERVER) and welding. **The number of man-hours of repair welding shall be paid for by the unit price in Bid Item 2**.

7. Pit Filling and Surfacing: After the specified surface preparation, any pits, rough areas or seams defined for pit filling or surfacing by the FIELD OBSERVER shall be filled with solventless polyamide epoxy seam sealer of the type recommended by the supplier of the

interior paint system. The epoxy seam sealer shall be applied neatly and smoothly to the steel surfaces and any rough areas of the seam sealer shall be sanded smooth prior to the application of the coating system. Costs for all labor, equipment, supplies, rigging, and other associated costs for application of the solventless polyamide epoxy seam sealer shall be included in the unit price per gallon. **The number of gallons of pit filling shall be paid for by the unit price in Bid Item 3**.

8. Interior Chipping and/or Grinding: Any irregular surfaces defined by the FIELD OBSERVER, including but not limited to surface protrusions, burrs, fitting scars, sharp edges or corners, weld spatter, weld overlap and rough weld beads shall be removed from the interior surfaces of the tank, including appurtenances, by chipping and/or grinding these irregular surfaces to a smooth curve. The protruding parts of lugs or brackets shall be removed and ground flush. The objective of chipping and/or grinding is to eliminate irregular surfaces to provide a surface that is sufficiently smooth for the application of a uniform thickness coating without voids and free from defects. This chipping and/or grinding is also intended to make it easier for the interior coating to pass the holiday test. **The number of chipping and/or grinding man-hours on the tank interior shall be paid for by the unit price in Bid Item 4**.

9. Legal Disposal/Recycling of Removed Steel or Appurtenances: Any existing steel plate, members, or appurtenances of the tank specified to be removed or replaced shall be removed and legally disposed of or recycled by the CONTRACTOR.

10. Concrete Repair: Any chipped concrete corners (greater than 1 in. loss), cracks (greater than 1/16 in. wide), and other failed areas of concrete indicated by the FIELD OBSERVER shall be chipped to sound concrete so that the edge of the chipped-out area is at least 60° with the surface of the concrete. Then these areas shall be prepared by cleaning to remove all paint, coating materials, dust, laitance, grease, or other bond-inhibiting materials. The CONTRACTOR shall apply a patch of Emaco R350 from Master Builders, Euco Verticote from Euclid Chemical Company, SikaRepair 223 from Sika Corporation, or equal allowed in writing by the ENGINEER. The materials shall be prepared and applied in accordance with the manufacturer's instructions. The patched areas shall conform to the original contour of the concrete foundation $\pm$ 1/8 in. After the patching material has hardened sufficiently for the removal of any forms, etc., a water-based curing compound shall be applied to the surfaces of the repaired area. The curing compound shall be a water-based material such as Kure-N-Seal W, Aqua-Cure from Euclid Chemical Company, or equal allowed in writing by the ENGINEER. This concrete repair shall be performed a minimum of 28 days prior to the cleaning and painting of the concrete to allow the concrete patching material to cure in accordance with the manufacturer's recommendations. The CONTRACTOR shall protect the existing grout during the rehabilitation of the tank.

11. Grout Repair: The grout which is between the bottom plate and the concrete foundation shall be tested by the CONTRACTOR under the observation of the FIELD OBSERVER by using a sharp 16 oz. hammer. Any missing or loosened portions of grout shall be replaced with a nonshrinking, nonstaining, high-strength structural grout material. The material shall

be Master Builders' MASTERFLOW 928, Euclid Chemical Company's EUCO N-S Grout, L&M Construction Chemicals' DURAGROUT, Sika Corporation's SikaGrout 212, or equal allowed in writing by the ENGINEER. The final contour of the grout shall be vertical and flush with the outer edge of the bottom plate, and shall not overlap the outer edge of the bottom plate. After the grout has hardened sufficiently for the application of a curing compound, a water-based curing compound shall be applied to the exposed grout surfaces. The curing compound shall be a water-based material such as MASTERKURE 200W from Master Builders, AQUA-CURE from Euclid Chemical Company, L & M CURE from L&M Construction Chemicals, Inc., or equal allowed in writing by the ENGINEER. After cleaning and painting, any separation between the bottom plate and the grout greater than 1/32 in. shall be filled with Sikaflex-1a from Sika Corporation, or equal allowed in writing by the ENGINEER.

12. Nameplate: The nameplate shall be removed for cleaning and painting operations. The areas behind the nameplate and the existing mounting bracket shall be cleaned and painted in accordance with the exterior painting section of these specifications. Any paint on the nameplate shall be removed by solvent cleaning or other methods which will not damage the surface of the nameplate. The nameplate shall be reattached to the existing mounting bracket after the finish coat has cured. The nameplate shall be protected from the application of paint on the exposed surface.

13. Overflow Pipe Elastomeric Check Valve: The section of the overflow pipe above the bottom brackets shall be cut and the overflow pipe discharge raised such that once an elastomeric check valve is installed, the air break above the existing drain basin would be 12 in. to 24 in. A new elastomeric check valve shall be furnished and installed on the termination of the overflow pipe as shown in Drawing OF. The check valve shall be installed to allow the overflow effluent to be directed into the existing concrete drainage basin. The backup ring, bolts, and nuts used to secure the check valve to the end of the overflow pipe shall be stainless steel. The check valve shall be constructed from Hypalon or EPDM. The steel flange holding the check valve shall be cleaned and painted, and the paint shall be cured, before final assembly.

14. Existing Roof Safety Railing Self-Closing Gate: The CONTRACTOR shall protect the existing roof safety railing self-closing gate during the rehabilitation of the tank.

15. Roof Manhole Lock Holes and Bolts: The fit of the padlock furnished by the OWNER shall be verified by the CONTRACTOR. The CONTRACTOR shall remove and legally dispose the existing bolts and nuts from the existing flanged and bolted roof manhole. 8 new 3/4 in. diameter x 2 in. long galvanized steel bolts and nuts shall be furnished and installed in the existing flanged and bolted manhole (CONTRACTOR shall verify bolt size and number). In addition, galvanized steel washers shall be furnished and installed between the bolt and the manhole, and between the nut and the manhole.

16. Manhole Gaskets: After the completion of the application and curing of the interior paint, a new 3/8 in. thick gaskets shall be furnished and installed in the two existing 36 in. diameter single crab shell manholes. The gaskets shall be made from commercial grade neoprene, meeting ASTM D2000-86E, Type BC, with a 70A durometer rating, and black color.

17. Locking Manholes and Ladder Vandal Deterrent: The roof manholes entering the container and the ladder vandal deterrent shall be locked at the completion of the Work, using padlocks furnished by the OWNER.

I. Specifications for Cathodic Protection System Installation

The CONTRACTOR shall remove and legally dispose of the existing cathodic protection system including all existing clamps, all cathodic protection wiring, hardware, accessories, control cabinet, and all abandoned cathodic protection conduits from the tank prior to any cleaning, repairing or painting operations. The CONTRACTOR shall have Corrpro (1055 W. Smith Road, Medina, OH 44256, P.O. Box 721, Medina, OH 44258, telephone 330/725-6681, FAX 330/723-6065) furnish and install a new cathodic protection system. All welded brackets and fittings required shall be furnished and installed prior to the cleaning and painting. Described herein are specifications for providing and installing automatic and permanent cathodic protection apparatus in the tanks heretofore described. Unless otherwise defined in these Detailed Technical Specifications, the materials and installation shall comply with the American Water Works Association (AWWA) D104-17 "Standard for Automatically Controlled, Impressed-Current Cathodic Protection for the Interior of Steel Water Tanks" and the National Association of Corrosion Engineers (NACE) Standard RP0388-01 Recommended Practice "Impressed Current Cathodic Protection of Internal Submerged Surfaces of Steel Water Storage Tanks". The rectifier control cabinet shall be mounted in the pump house adjoined to the tank, and wiring shall be furnished and pulled by CONTRACTOR through existing conduit.

1. Objective: The object of these specifications is to provide the materials and workmanship necessary to produce a first class job. All Work shall be done strictly in accordance with the specifications and shall be performed in a manner satisfactory to the PROJECT REPRESENTATIVE.

2. Installation Schedule: Installation shall be done at specific times as approved by the PROJECT REPRESENTATIVE to ensure no serious problems with coordination of the repairs and repainting of the tank. Any cutting, welding, or burning shall be done prior to the cleaning and painting operations. The anodes shall be installed after the paint has cured. The system shall not be energized until after the First Anniversary Inspection of the painting has been conducted. The cathodic protection system shall be guaranteed for two years after the date of substantial completion of the tank project (i.e. one year after the cathodic protection system is energized).

3. Scope of Work: The anode system on the tank shall be a year-round anode system and shall have a ten year minimum design life based on a 25% bare tank. The rectifier and potential control unit shall control the potential at the steel surface in three manners: manual, automatic potential control, and an IR drop free circuit. The connection to power on the job site is also included.

4. Design Requirements: The internal anode system shall provide a ten year minimum design life based on a 25% bare tank, accommodating changes in the water chemistry and paint conditions while maintaining a protective voltage. The anodes shall be designed so as to perform in an icing tank without disruption of service or changing protection capability. The anodes shall be capable of providing an "IR" drop free potential of -.90 volts with respect to a copper - copper sulfate electrode. Current density requirements of the rectifier/power unit shall be based upon providing 2.5 milliamps per square foot to 50% of the water contact area of the container and 50% of the water contact area of the riser. All systems shall be installed with copper - copper sulfate reference electrodes with a minimum of five year design life. The electrodes shall be installed in such a manner that they do not contact the tank structure at any time. The design consumption rate of the anodes shall be as follows:

   (1) platinum coated niobium wire – 25 mg/amp year

   (2) precious metal oxide coated niobium wire – 25 mg/amp year

   (3) "Hi-Si" silicon-chromium cast iron – 250 g/amp year

5. Delivery, Storage, and Handling: The cathodic protection systems, components, and parts shall be transported to the job site and handled and stored in such a manner as to prevent permanent distortion of any part or other damages affecting their structural, mechanical, or electrical integrity. Damaged items shall be replaced by the CONTRACTOR at no additional cost to the OWNER. All items which would suffer operational degradation by exposure to the ambient atmosphere shall be stored off the ground, in a well drained location, protected from the weather and accessible for inspection and handling.

6. Shop Drawing Submittals: Five (5) sets of Shop Drawings (or other information) of all fabricated items shall be submitted to the ENGINEER for written approval. Drawings submitted shall at a minimum include the following:

   (1) Details of the anode size, types, placement, locations, suspension, metal gauges of cabinet, installation details and other details of construction.

   (2) Service costs, as described in the Service Costs paragraph of this section.

   (3) Copies of the warranty, as described in the Warranty paragraph of this section.

(4) Shop Drawings of the Cathodic Protection System including literature covering the proposed installation and all materials proposed for use in the installation shall be submitted to the ENGINEER three (3) weeks prior to actual installation of the cathodic protection system.

7. Qualification of the CATHODIC PROTECTION CONTRACTOR or SUBCONTRACTOR: The CATHODIC PROTECTION CONTRACTOR or SUBCONTRACTOR shall be a supplier and installer of the Cathodic Protection System having a minimum of five (5) years successful experience in the installation and servicing of automatic potential control systems. Cathodic protection shall be by Corrpro, 1055 W. Smith Road, Medina, OH 44256, P.O. Box 721, Medina, OH 44258, telephone 330/725-6681, FAX 330/723-0244; or equal approved in writing by the ENGINEER. The CATHODIC PROTECTION CONTRACTOR or SUBCONTRACTOR shall state in his/her Bid the annual service charge for the Bidder's system. The name and address of the CATHODIC PROTECTION CONTRACTOR or SUBCONTRACTOR shall be listed in the **Bid Form**.

8. Warranty: The CATHODIC PROTECTION CONTRACTOR or SUBCONTRACTOR shall provide the OWNER with a written two year warranty that the system is controlling corrosion. Copies of the warranty shall be submitted to the ENGINEER prior to final acceptance. A physical inspection of the controller/rectifier, anode system, and protected surfaces shall be conducted at the end of the one year warranty period. Any defective components shall be replaced by the CATHODIC PROTECTION CONTRACTOR or SUBCONTRACTOR at no cost to the OWNER. If revision in design is necessary to perform the intended function, said revisions shall be incorporated into the system at no additional cost to the OWNER. It is anticipated that the annual inspection be conducted approximately one year later than the painting First Anniversary Inspection referenced in the First Anniversary Inspection paragraph of the GENERAL SPECIFICATIONS FOR REPAIRING AND REPAINTING THE TANK section of these Specifications.

9. Service Costs: The CATHODIC PROTECTION CONTRACTOR or SUBCONTRACTOR shall submit on the cathodic protection supplier's standard format, the costs for inspecting and maintaining the resulting system after the one year warranty, on an inspection only basis and on an inspection plus parts and labor basis.

10. Sequence of Work: CATHODIC PROTECTION CONTRACTOR or SUBCONTRACTOR is to do all preliminary Work which will involve cutting, burning, welding, or other functions which would damage the paint coating prior to the tank being cleaned and painted. The balance of the installation shall be done at a time which will coincide with the completion of the painting and the filling of the tank. The anodes shall be installed after the paint has cured.

11. OWNER'S Manuals: The OWNER shall be provided with four (4) sets of operation and maintenance manuals by the CATHODIC PROTECTION CONTRACTOR or SUBCONTRACTOR after the installation of the system is completed.

12. Specifications for Anode Systems:

(1) The system shall utilize "Hi-Si" silicon-chromium cast iron long life anodes (1 in. minimum diameter) of a configuration designed to protect the anodes from ice damage or platinum coated niobium wire anodes (0.062 in. minimum diameter) or precious metal oxide coated titanium wire anodes (0.063 in. minimum diameter) placed in the tank container in such a manner as to not be damaged by icing conditions in the tank container. Copies of drawings depicting the anode size, placement, and suspension details shall be submitted with the Bid to the ENGINEER.

(2) The anodes shall be designed so as to have a ten year life in an icing tank, accommodating rotating and fluctuating ice formations without interruption of cathodic protection current based on supplying adequate current to the tank. The anodes shall accommodate changes in water chemistry and paint conditions while maintaining a protective voltage. If inspection and installation hand holes are utilized, they shall be provided with gasketed covers to prevent the entry of water on the roof from entering the potable water container.

(3) All wires leading from the point of entrance to the tank container to the anodes shall be new copper wires designed to take 150% of the design current, with high molecular weight polyethylene insulation.

(4) The anodes shall be continuous sections of platinum coated niobium wire. No platinum coated niobium wire shall be less than 0.062 inches in diameter. No precious metal oxide coated titanium wire shall be less than 0.063 inches in diameter. If high silicon cast iron anodes are used, the anodes shall be continuous sections or segmented strings of Durichlor 51 Alloy, as manufactured by the Duriron Company, or approved equal. No segmented cast iron anode diameter shall be less than one (1) inch. The anodes and the connecting wiring shall be designed to have a ten year life based on supplying adequate current to the tank. The anodes shall be installed to provide optimum current distribution to provide continuous year-round protection.

(5) Suspension insulators shall be installed.

(6) The tank is to be fitted with an automatic potential control power unit.

13. Specifications for New Cathodic Protection Rectifier and Control Unit:

(1) General: Under this contract the system is to be equipped with an automatic potential control unit or units. The unit or units shall be capable of independently controlling the current to the tank container in a coated or 50% uncoated condition by three modes of operation:

(a) An automatic mode in which the reference anode(s), immediately adjacent to the tank container surfaces, regulates protection current (for use when tank coatings are new).

Alternate modes of providing protection for a newly coated tank will be considered upon satisfactory proof of field data for systems in service ten (10) years or more.

(b) An automatic mode in which the reference anode(s) is (are) located remote from the steel surface, offering IR-drop free potential measurement, continuously compensating for coating or water resistance, and automatically adjusting the rectifier current to maintain the half cell potential voltage at a desired value. This method shall provide optimum protection over the entire submerged portion of the container.

(c) A manual override mode.

(2) Power Supply: A separate 30 ampere circuit breaker protected circuit shall be included in the cathodic protection portion of this Work. The CATHODIC PROTECTION CONTRACTOR or SUBCONTRACTOR shall use the existing conduit from this panel to supply power for the cathodic protection system.

(3) Power Unit: The control unit shall consist of the necessary rectifier, transformer, control circuitry, meters, wiring and appurtenances of adequate capacity to meet the protection requirements of the tank.

(4) Efficiency: The overall efficiency of the power unit shall exceed 50% and the power factor shall exceed 90% at full load and rated voltage of the unit, in the conversion of AC to DC.

(5) Transformer: The transformer shall have a primary winding of proper design for 117.5 volt operation. The transformer shall be air cooled and shall be housed so that an adequate air cooling environment is provided. The transformer shall be covered with at least three coats of moisture and atmospheric resistant dielectric varnish.

(6) Rectifier: The rectifier stacks shall be the silicon or selenium type, as manufactured by Federal Telephone and Radio Corporation, General Instrument Corporation, or equal allowed in writing by the ENGINEER. The rectifier stacks shall have adequate cooling fins so that the normal temperature rise at rated capacity will not exceed that specified by the National Electrical Manufacturers Association (NEMA) and by the manufacturer of the rectifier stacks for cathodic protection service. The rectifier stacks shall be air cooled. The rectifier shall be of the automatic potential control type. The rectifier shall have a manual override mode.

(7) Terminal Board: The terminal board shall be of an electrical insulating material or isolated from other electrical components having suitable thickness and mechanical strength. There shall be included as a part of the unit a circuit breaker for the AC supply and a rectifier overload relay. Accurate DC meters shall be mounted on the panel board for indicating the output of the rectifier.

(8) Power Unit Wiring: The wire used shall meet the requirements of the National Electrical Code for the allowable carrying capacities of copper wires.

(9) Cabinet: The entire power unit and automatic potential control circuitry shall be mounted in a 14 gauge stainless steel cabinet suitable for outdoor use, (NEMA #3R or better), adequately ventilated and with provisions for locking.

(10) Electrodes: The number, type, and location of reference electrodes shall be indicated on the drawings furnished for approval.

(11) Positive Wire: Rubber or synthetic covered wire run in galvanized heavy wall rigid steel conduit shall be used from the power unit to the tank roof. This wiring shall be in a separate conduit from any other electrical item. The conduit shall be secured to the ladder brackets using Steel City (Kindorf) Number 247 universal beam clamps at intervals of not less than 10 ft. (The CATHODIC PROTECTION CONTRACTOR or SUBCONTRACTOR should install the conduit after the cleaning and painting.) The conduit shall not be installed so as to obstruct the hands of ladder climbing personnel sliding along the ladder rails. The copper wire shall be of sufficient size to conduct an amperage equal to at least 150% of the rated amperage of the power unit. The size used shall be as established by the National Electrical Code for the allowable current carrying capacity.

(12) Ground Wire: The negative lead from the power unit shall be grounded to the tank.

14. Tests: The CATHODIC PROTECTION CONTRACTOR or SUBCONTRACTOR shall make tests showing changes in metal potential for all wetted surfaces of the tank interior measured against a conventional $Cu/CuSO_4$ reference electrode. All tests shall be performed in the presence of the FIELD OBSERVER. A potentiometer/voltmeter shall be used for the tests. A structure to reference electrode potential of -0.90 volts shall be the minimum and -1.1 volts the maximum standard requirements for the tests when measured with reference to a $Cu/CuSO_4$ reference electrode held adjacent to the tank walls or bottom. Measurements shall be made vertically along the tank wall at intervals of not exceeding three (3) feet throughout the entire height of the tank wall from the base to the high water line. Measurements shall be made horizontally along the tank wall at intervals of not exceeding 3 ft throughout the entire area of the tank bottom. The CATHODIC PROTECTION CONTRACTOR or SUBCONTRACTOR shall submit copies of the tabulated results of the test to the ENGINEER.

15. Miscellaneous Materials: All other materials necessary to complete a first-class installation shall be new materials and workmanship shall be in keeping with local electrical codes and practices and subject to the approval by the ENGINEER.

16. Indirect Water Additives: All items in contact with potable water or in the condensation vapor zone of the container shall be in compliance with the ANSI/NSF Standard 61 "Drinking Water System Components - Health Effects".

17. Debris Removal: All construction debris shall be removed from the tank, properly stored in containers at the job site and legally disposed of by the CONTRACTOR in accordance with these Detailed Technical Specifications.

J. Specifications for Cleaning and Painting the Tank Exterior

1. Surfaces to be Cleaned and Painted: All exterior surfaces of the tank, including (but not limited to) the roof, shell, bottom plate projection, all piping and appurtenances, and all threads, bolts, nuts, pins, brackets, seams, corners, etc. including the manhole neck of the roof vent, but excluding the aluminum vent, aluminum vandal deterrent, nameplate, and the ladder safe-climbing device, shall be cleaned and painted in accordance with the paragraphs in this section. The portion of the tank located inside the pump house shall also be cleaned and painted in accordance with the paragraphs in this section. The piping inside the pump house shall not be painted during this project.

2. Irregular Surfaces: Any burrs, weld spatter, rough welds, weld overlap, bolts, sharp edges, or corners or any areas disturbed or installed by the CONTRACTOR'S operations which would cause difficulty in achieving a defect-free coating shall be chipped and/or ground smooth. Any pinholes or voids in exterior welds (such as the overflow brackets, ladder brackets, etc.) shall be filled with an epoxy seam sealer. It is not the intent to have these irregular surfaces chipped and/or ground flush. The objective of the chipping, grinding and/or seam sealing is to eliminate irregular surfaces to provide a surface that is sufficiently smooth for the application of a uniform thickness coating without voids. This chipping, grinding and/or seam sealing is considered incidental to the exterior painting and is to be included in the Base Bid.

3. Cleaning and Debris Removal: The surfaces mentioned above in paragraph 1 of this Section shall be cleaned to a degree of cleanliness equivalent to SSPC-SP 6, Commercial Blast Cleaning (modified) by a method approved by the ENGINEER and OWNER. The paint and cleaning debris shall be promptly stored in leak-proof covered dumpsters/containers on the site and disposed of in accordance with the Removal and Disposal of Cleaning Residue paragraph of the GENERAL HEALTH, SAFETY, AND ENVIRONMENTAL REQUIREMENTS Section of these Detailed Technical Specifications. The exterior debris shall be kept separate from the interior paint and cleaning debris.

4. Priming: Not later than during the same day and before the forming of rust, the cleaned surfaces (SSPC-SP 6) shall be primed with the specified primer.

5. Stripe Coat: After the application of the first coat, all seams, edges, riser rods, lapped joints, rough areas, deviations from smooth surfaces, bolt heads and nuts, remains of erection lugs and scars, corners (including the intersection of the ladder rungs and the side rails), member intersections, and other deviations from smooth surfaces shall be primed by brush and/or roller using 10% thinned material in a contrasting color to the primer. The 10% thinned

material shall be worked sufficiently into all cracks, crevices, and seams. Initial spray application of this stripe coat shall not be permitted.

6. Priming Inaccessible Areas: Should any areas exist where the intersection of two members does not allow the complete cleaning of the intersection and the members cannot be separated for cleaning (such as anchor bolt chairs, bottom plate-to-grout intersection, etc.), these intersections shall be post-primed with a material suitable for marginally cleaned surfaces. The material shall be recommended by the manufacturer of the exterior paint system and shall be as follows:

   a. Induramastic 85,
   b. Sherwin-Williams Epoxy Mastic Aluminum II,
   c. Tnemec 135 Chembuild,
   d. or other material favorably reviewed in writing by the ENGINEER.

7. Intermediate Coat: The surfaces mentioned above in paragraph 1 of this Section shall then be given one intermediate coat of paint. The color shall differ from the prime coat and shall be slightly darker than that chosen for the finish coat, being dark enough to visually assure application of the finish coat, and light enough to allow proper hiding. (An intermediate coat lighter than the finish coat shall not be permitted due to the inability to distinguish between the lighter intermediate and the highlights of the gloss finish.) The coating manufacturer shall recommend a darker color for the intermediate coat and this color shall be submitted for review.

8. Finish Coat: The surfaces mentioned above in paragraph 1 of this Section shall then be given a final coat of the selected paint in a color selected by the OWNER.

9. Coatings: Acceptable coating manufacturers and specifications for the exterior surfaces of the steel water storage tank follow; however, the CONTRACTOR is advised that all manufacturers presented below must certify that the coatings furnished are in compliance with these Specifications.

   a. **Induron Coatings, Inc., Birmingham, AL 35201**

(1)	Perma-Clean II Epoxy	2.0 - 3.0 mils
(2)	Perma-Clean II Epoxy	2.0 - 3.0 mils
(3)	Indurethane Plus (semi-gloss)	2.0 - 3.0 mils
	Total System Dry Thickness	6.0 - 9.0 mils

   b. **The Sherwin-Williams Company, Cleveland, OH 44101**

(1)	Macropoxy 646	2.0 - 3.0 mils
(2)	Macropoxy 646	2.0 - 3.0 mils
(3)	Acrolon Ultra (semi-gloss)	2.0 - 3.0 mils
	Total System Dry Thickness	6.0 - 9.0 mils

c. **Tnemec Company, Inc., Kansas City, MO 64141**

(1)	Series N69 Hi-Build Epoxoline II	2.0 - 3.0 mils
(2)	Series N69 Hi-Build Epoxoline II	2.0 - 3.0 mils
(3)	Series 1075U Endura-Shield II (semi-gloss)	2.0 - 3.0 mils
	Total System Dry Thickness	6.0 - 9.0 mils

10. Signs and Logos: **As an additive alternate bid item, the OWNER may choose to add signs and logos on the tank. This will be Alternate Bid Item Number 6**. The CONTRACTOR shall install two (2) signs, CITY OF HARRISONBURG PUBLIC UTILITIES, and two (2) logos on the northwest and southeast sides of the tank shell. The signs and logos shall be in accordance with the "Appendix – Sign and Logo" section of this specification. After the proper curing of the finish exterior coat, the signs and logos shall be applied in two additional coats of fluorourethane in the appropriate thickness for the fluorourethane used. The OWNER shall approve the final size and locations of the signs and logos and shall approve the final colors for the signs and logos from color charts submitted by the CONTRACTOR. Acceptable manufacturers and specifications follow:

a. **Induron Coatings, Inc., Birmingham, AL 35201**

(4)	Perma-Gloss Fluorourethane	2.0 - 3.0 mils
(5)	Perma-Gloss Fluorourethane	2.0 - 3.0 mils
	Total System Dry Thickness	11.0 - 17.0 mils

b. **Sherwin-Williams Company, Cleveland, OH 44115**

(4)	FlouorKem / Ply-Thane 1200	2.0 - 3.0 mils
(5)	FlouorKem / Ply-Thane 1200	2.0 - 3.0 mils
	Total System Dry Thickness of Sign	11.0 - 17.0 mils

c. **Tnemec Company, Inc., Kansas City, MO 64141**

(4)	Series 700 HydroFlon	2.0 - 3.0 mils
(5)	Series 700 HydroFlon	2.0 - 3.0 mils
	Total System Dry Thickness of Sign	11.0 - 17.0 mils

K. Specifications for Cleaning and Painting the Tank Interior

1. Surfaces to be Cleaned and Painted: All interior surfaces of the container, including (but not limited to) the roof, shell, bottom plate, manholes, weir box, threads, bolts, nuts, pins, brackets, seams, corners, etc., and the inside of the roof vent flange (with the exception of all surfaces of the vent interior and exterior, all screens, and all clog-resistant pallet materials, i.e. polyethylene, teflon, etc.), shall be cleaned and painted in accordance with the paragraphs in this Section. The exterior of the attachment flange to the roof shall be cleaned and painted in accordance with Specifications for Cleaning and Painting the Tank Exterior. The vent screens and the clog-resistant pallet materials shall be protected from the application of all coatings.

2. Cleaning Tank and Debris Removal: The OWNER will remove all water from the tank which will drain by gravity through the drain line. The CONTRACTOR shall remove all standing water, mud, and debris from the tank prior to starting work. All loose rust, loose paint, and dirt shall be removed from the tank interior prior to the beginning of cleaning operations. This debris shall be promptly stored in leak-proof covered dumpsters/containers on the site and disposed of in accordance with the Removal and Disposal of Cleaning Residue paragraph of the GENERAL HEALTH, SAFETY, AND ENVIRONMENTAL REQUIREMENTS Section of these Detailed Technical Specifications. This debris shall be kept separate from the exterior paint and cleaning debris. Any water that enters the tank through leaking valves throughout the course of the Project shall be collected and removed from the tank by the CONTRACTOR at no additional cost to the OWNER.

3. Cleaning and Painting: The interior surfaces mentioned above in paragraph 1 of this Section shall be cleaned to a degree of cleanliness equivalent to SSPC-SP 10, Near-White Blast Cleaning (modified) by a method approved by the ENGINEER and OWNER. The paint and cleaning debris shall be promptly stored in leak-proof covered dumpsters/containers on the site and disposed of in accordance with the Removal and Disposal of Cleaning Residue paragraph of the GENERAL HEALTH, SAFETY, AND ENVIRONMENTAL REQUIREMENTS Section of these Detailed Technical Specifications. This debris shall be kept separate from the exterior paint and cleaning debris. The sequencing and timing of the areas to be cleaned and painted shall be done in a manner to complete the Work in accordance with these Detailed Technical Specifications and within Contract Time.

   a. Prime Coat: Before the formation of rust and after observation of the surface by the FIELD OBSERVER, all cleaned surfaces shall be primed with the first coat specified below.

   b. Stripe Coat: After the application of the first coat, all seams, all edges, rods, rough areas, deviations from smooth surfaces, bolt heads and nuts, remains of erection lugs and scars, and corners shall be primed by brush and/or roller using 10% thinned material in a contrasting color to the primer. The 10% thinned material shall be worked sufficiently into all cracks, crevices, and seams. Initial spray application of the stripe coat shall not be permitted.

c. Intermediate Coat: After the recommended curing period of the prime coat and stripe coat, a second full intermediate coat shall be applied.

d. Finish Coat: After the recommended curing period for the intermediate coat, a third full finish coat shall be applied.

4. Seam Sealer: After cleaning, seam sealer is to be applied to the roof vent intersection, and roof manhole to seal these intersections from moisture. It shall be applied in a workmanlike manner, being beveled at approximately 45°. **The cost of this seam sealing is to be included in the Base Bid, separate from other applications using seam sealer which may be listed in the SPECIFICATIONS FOR REPAIRS AND ADDITIONS TO THE TANK section of these Detailed Technical Specifications and included as a separate bid item**. At the CONTRACTOR'S option, the Tnemec Series 215 Surfacing Epoxy may be applied after the priming of the surface, providing no rust has formed on any uncoated surfaces (such as crevices between plates). This material shall be recommended by the manufacturer of the interior paint system.

   a. Aquatapoxy,
   b. Sherwin Williams Steel-Seam FT910,
   c. Tnemec Series 215 Surfacing Epoxy,
   d. or other material favorably reviewed in writing by the ENGINEER.

5. Compliance with ANSI/NSF Standard 61: The approval of potable water tank interior coatings and sealers shall be based on written certification of compliance with ANSI/NSF Standard 61 and compliance with the requirements of state agencies. Adequate manufacturer's published product data concerning the transportation, storage, mixing, thinning, pot life, application, and curing shall be furnished to ensure that the finished product complies with ANSI/NSF Standard 61.

6. Certification: Manufacturers presented below must certify that their coatings furnished are in compliance with the Specifications.

7. Coatings: Acceptable coating manufacturers and specifications for the interior wet surfaces of the steel water storage tank follow, and are intended to comply with the requirements of AWWA D102-17 Inside System No. 2, Three-Coat, Two-Component Catalyzed High Build Epoxy System with the exception that the brush post-priming of the seams and potential holiday areas is required.

   a. **Induron Coatings, Inc., Birmingham, AL 35201**

(1)	PE-70 (White)	4.0 - 6.0 mils
(2)	PE-70 (Beige)	3.0 - 5.0 mils
(3)	PE-70 (White)	5.0 - 6.0 mils
	Total System Dry Thickness	12.0 - 17.0 mils

b. **Sherwin Williams Company, Cleveland, OH 44115**

(1)	Macropoxy 646 PW (White)	4.0 - 6.0 mils
(2)	Macropoxy 646 PW (Blue)	3.0 - 5.0 mils
(3)	Macropoxy 646 PW (White)	5.0 - 6.0 mils
	Total System Dry Thickness	12.0 - 17.0 mils

c. **Tnemec Company, Inc., Kansas City, MO 64141**

(1)	N140F-15BL (Tank White) Pota-Pox Plus	4.0 - 6.0 mils
(2)	N140F-1255 (Beige) Pota-Pox Plus	3.0 - 5.0 mils
(3)	N140F-15BL (Tank White) Pota-Pox Plus	5.0 - 6.0 mils
	Total System Dry Thickness	12.0 - 17.0 mils

8. Underwater Epoxy: The following manufacturer's underwater curing epoxy paints/gels for use at the First Anniversary Inspection are acceptable for this Project:

a. **Raven Lining Systems, Tulsa, OK 74106**

(1)	AquataPoxy A-6 Paint (White)	8.0 - 12.0 mils

9. Flexible Sealant: After the curing of the finish coat of paint, Sikaflex-1a flexible polyurethane sealant (or equal allowed in writing by the ENGINEER) shall be applied to the unwelded lapped container roof seams, the roof stiffener-to-roof plate intersections, roof-to-shell junctions, and shell angle. It shall be applied in a workmanlike manner, being beveled at approximately 45°. The color of the sealant shall be white. The sealant shall have the approval for use in potable water from the US EPA, ANSI/NSF, and any applicable local health regulatory agency.

10. Holiday Testing: All interior coatings, including those above the top capacity level, shall be checked with a holiday detector by the CONTRACTOR. Testing shall be done in accordance with Section 5.1.3 of AWWA D102-17 and NACE SP0188 in the presence of the FIELD OBSERVER and shall be performed utilizing a surfactant. Any voids indicated shall be repaired by applying more of the finish coat of paint by brush or roller. The repaired areas shall be retested after the appropriate curing time. The coating system must pass the holiday test regardless of the mil thickness existing.

11. Curing: **Each coat shall be properly cured before the application of any subsequent coats**. The interior area coating shall be completely cured and the tank shall not be filled with water until approved by the ENGINEER and OWNER. The exterior coating on the opposite side of water bearing surfaces shall be completely cured and the tank shall not be filled with water until approved by the ENGINEER and OWNER. CONTRACTOR shall perform solvent rub tests, pencil hardness tests, or other industry recognized testing procedures recommended by the coating manufacturer to determine the coatings have cured prior to filling the tank. A letter from the CONTRACTOR certifying their testing results and that the interior wet coating has cured such that it is ready for immersion service shall be

submitted to the ENGINEER and OWNER prior to filling the tank. The CONTRACTOR shall monitor the tank bottom plate temperature during the interior coating curing to verify that minimum steel temperature requirements are satisfied.

12. Ventilation: Forced ventilation shall be supplied to the interior of the tank for a period of time equal to the paint manufacturer's recommended recoat times for the prime coat and again after the intermediate coat and for a continuous period of at least 48 hours after the final coat has been applied. Adequate ventilation of the container bottom and other low lying areas of the tank and container shall be provided by the CONTRACTOR as required for solvent release and coating cure. This ventilation shall, at a minimum, be in accordance with AWWA D102 and shall be submitted for review. The CONTRACTOR shall furnish, install, and operate the equipment that is necessary to provide forced ventilation to aid curing. If supplementary heating or dehumidification is required to effect curing, the CONTRACTOR shall furnish, install, and operate the equipment to perform the supplementary heating or dehumidification required at no additional cost to the OWNER.

13. Diesel Powered Equipment: Due to possible contamination of the surfaces to be painted, diesel powered equipment shall not be used inside the tank.

14. Recoat Cycle: The CONTRACTOR shall review the manufacturer's published product data for minimum and maximum recoat times for the interior coating system selected for use. No succeeding coat shall be applied prior to the minimum recoat time of the preceding coat. If the maximum recoat window is exceeded **prior** to application of the succeeding coat, then the CONTRACTOR shall prepare the interior surfaces in accordance with the manufacturer's published product data prior to the application of the next coat. The cost for this additional surface preparation shall be borne by the CONTRACTOR with no additional cost to the OWNER. The Contract Time shall not be increased as a result of this additional surface preparation.

15. Inlet/Outlet, Drain, and Overflow Piping: The CONTRACTOR shall be responsible for assuring that no foreign material including, but not limited to paint, abrasive, rags, or tools enter the inlet/outlet, drain, or overflow piping during the execution of the Work. Any material found in this piping at the time the tank is placed back into service shall be removed at the expense of the CONTRACTOR. To aid in preventing the entrance of foreign material, the CONTRACTOR shall drain the pipe and either tack weld a plate over the pipe or place an expandable plug in the pipe. If a plate is tack welded over the pipe, the plate shall completely cover the pipe and shall not be removed until the interior and exterior painting is complete. After the plate is removed the damaged areas of coating and weld burrs shall be ground smooth and recoated in accordance with the applicable paragraphs in these **Detailed Technical Specifications**. If an expandable plug is inserted in the pipe, the plug shall be placed approximately 18 in. down in the pipe to allow for proper coating of the inlet/outlet pipe. The inlet/outlet pipe interior shall be cleaned and painted approximately 1 pipe diameter below the top of the pipe.

L. Specifications for Cleaning and Painting the Concrete Foundation

1. Preparation: The CONTRACTOR shall dig down around the foundation to expose approximately 4 in. more of the concrete than is normally exposed (at least 10 in. from the top of concrete). Prior to any digging, the CONTRACTOR shall contact the utility hot line, Virginia Miss Utility 1-800/552-7001, to have all utilities marked on the site. All concrete areas thus exposed (from the excavated ground to the bottom plate) shall be cleaned by blast cleaning to SSPC-SP 13, Surface Preparation of Concrete for Severe Service. Any existing coatings and other contaminants shall be removed without entirely removing the surface concrete. The aggregate shall not be exposed by the blasting operations. All efflorescence and laitance shall be removed from the surface. The cleaning operation shall be performed to open subsurface holes and voids and to produce a profile for the proper adherence of the specified coating system (equivalent to 40-60 grit sand paper). The abrasive used for the blast cleaning operations shall be a nonmetallic type abrasive. The color shall be approximately equivalent to the concrete surface to be cleaned.

2. Coating Application: All cleaned concrete areas (SSPC-SP 13) shall be given two roller-applied coats of the specified coating.

3. Approved Coatings: Acceptable coating manufacturers and specifications for the concrete surfaces follow; however, the CONTRACTOR is advised that all manufacturers presented below must certify that the coatings furnished are in compliance with these Specifications. The finish coat shall be in a color matching the Tnemec color listed below.

   a. **Induron Coatings, Inc., Birmingham, AL 35201**

(1)	Perma-Clean II Epoxy	3.0 - 5.0 mils
(2)	Perma-Clean II Epoxy	4.0 - 6.0 mils
	Total System Dry Thickness	7.0 - 11.0 mils

   a. **Sherwin Williams Company, Cleveland, OH 44115**

(1)	Macropoxy 646	3.0 - 5.0 mils
(2)	Macropoxy 646	4.0 - 6.0 mils
	Total System Dry Thickness	7.0 - 11.0 mils

   b. **Tnemec Company, Inc., Kansas City, MO 64141**

(1)	N140-15BL (Tank White) Pota-Pox Plus or Series N69 Hi-Build Epoxoline II	3.0 - 5.0 mils
(2)	N140-15BL (Tank White) Pota-Pox Plus or Series N69 Hi-Build Epoxoline II	4.0 - 6.0 mils
	Total System Dry Thickness	7.0 - 11.0 mils

4. Backfill: After the coatings have cured and been approved by the ENGINEER, the earth is to be backfilled to the original grade or left as required by the OWNER.

M. Disinfection of the Tank and Piping

1. Standards: The disinfection of the tank and piping shall comply with the following standards:

   a. American Water Works Association (AWWA) - ANSI/AWWA C652-19, "Disinfection of Water-Storage Facilities."

   b. Virginia Department of Health (VDH), "Waterworks Regulations," - Article 5, Section 12 VAC 5-590-1080, Paragraphs O. through O.2.

2. Cleaning: After curing and prior to disinfecting, the CONTRACTOR shall wash the tank interior with potable water. All equipment, including brooms, brushes, spray equipment, and worker's boots, shall be disinfected before they are used to clean the water storage facility. The CONTRACTOR shall supply an adequate flow of water (20 gpm minimum) with sufficient pressure (60 psi minimum at the nozzle) to wash thoroughly all the interior surfaces, including those surfaces above the top capacity level. All residue shall be removed from the tank and shall be disposed of properly.

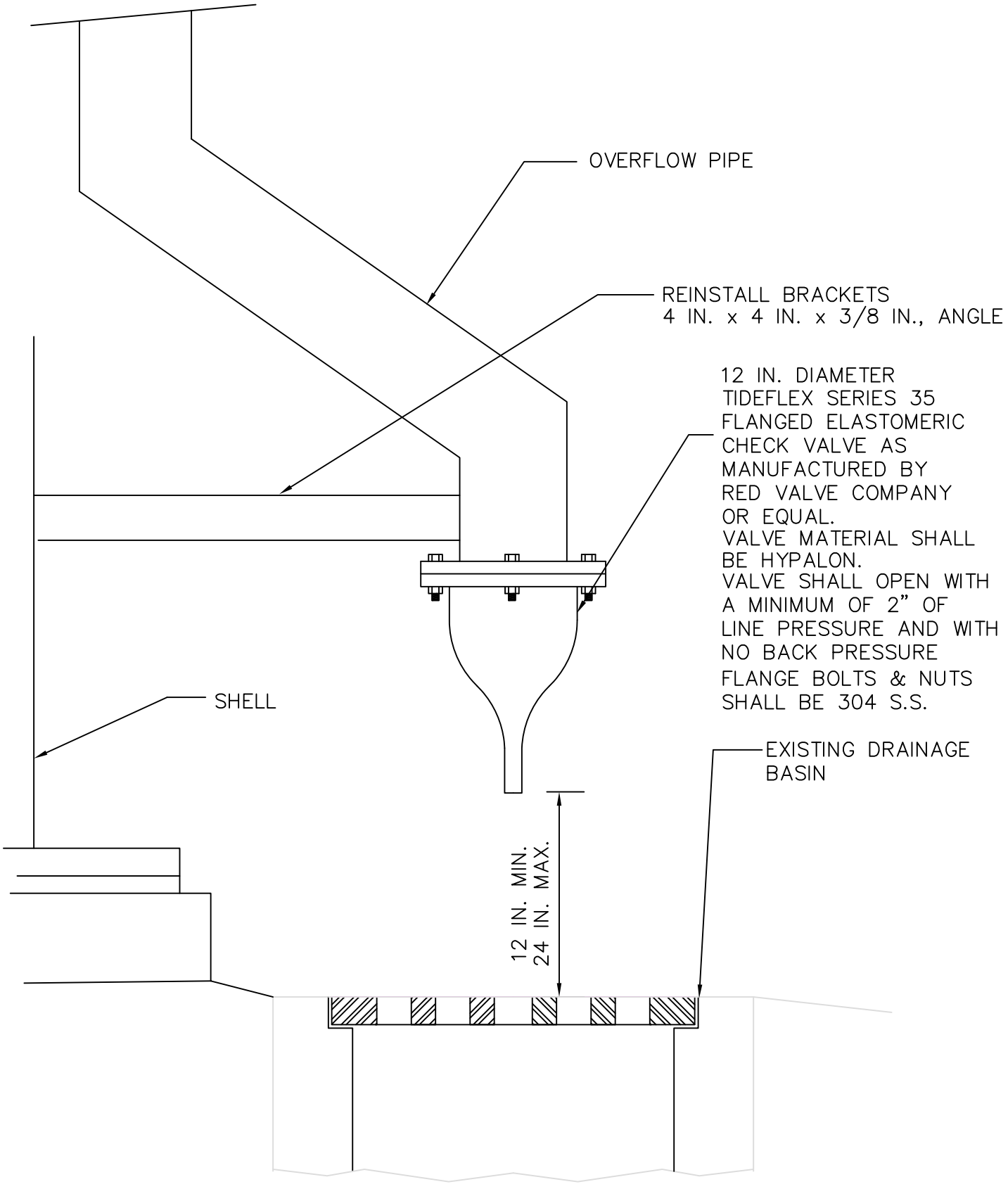
3. Disinfection: It is the CONTRACTOR'S responsibility to flush and disinfect the tank until two consecutive satisfactory water samples (collected at least 24 hours apart) are reported from the OWNER'S selected laboratory. Method Two (Part III, Article 5, Section 12 VAC 5-590-1080, Paragraph O 1 b) or Method Three (Part III, Article 5, Section 12 VAC 5-590-1080, Paragraph O 1 c) of the Virginia Department of Health Waterworks Regulations shall be used. The OWNER shall take and send in the samples to the laboratory, but shall assume no responsibility for the sampling technique or the care of the samples. The stored tank water shall comply with current VDH and USEPA standards for organic, inorganic, and biological contaminants as influenced by the operations of the CONTRACTOR.

N. Unanticipated Additional Work (Bid Item 5)

It is believed that these Detailed Technical Specifications adequately describe the Work to be performed. If during the Work, it is found that additional Work is required and it is authorized in writing by the ENGINEER and OWNER, **this Work shall be paid for per single man-hour, including all welding, equipment, normal rigging, labor, supplies, overhead, insurance, and profit. The number of unanticipated additional work man-hours shall be paid for by the unit price in Bid Item 5**.

END OF DETAILED TECHNICAL SPECIFICATIONS

"TIDEFLEX" CHECK VALVE



NOT TO SCALE

2,500,000 GALLON GROUND STORAGE TANK
"WASHINGTON STREET TANK"
HARRISONBURG, VIRGINIA

DWG. NO. OF
09/30/20
TIC 20.152.E450.001

SUMMARIZED TANK INFORMATION SHEET

"Washington Street Tank"

ENGINEER: Tank Industry Consultants
TANK OWNER: City of Harrisonburg
CAPACITY: 2,500,000 gallons
HEIGHT: approx. 68 ft 9 in.
DIAMETER: approx. 80 ft
TYPE: welded steel ground storage tank with dome roof
ERECTION DATE: 1980, PDM Hydrostorage, Inc.
CONTRACT NUMBER: H0142
TANK LOCATION: near intersection of Washington Street and Vine Street in Harrisonburg, Virginia

Analyses Results:

	Cadmium		Chromium		Lead	
	mg/kg	percent	mg/kg	percent	mg/kg	percent
Exterior	<25	<0.0025%	<250	<0.025%	<250	<0.025%
Interior	<25	<0.0025%	<250	<0.025%	<250	<0.025%

Samples of the exterior and interior coatings were sent to a laboratory for inductively coupled plasma-atomic emission spectrometry analyses only to determine if there is lead, chromium, and cadmium present in the coating samples. To limit the damage to the existing coatings, only small areas were tested. This small number of samples and the difficulty of retrieving all primer from the steel profile may cause the tests performed to not accurately represent the total coating system. Variations in thickness, types of coatings applied, and the interim cleaning and painting operations will also affect the actual readings. The reliability of the results is also dependent on the amount of primer included in the sample.

DISCLAIMER: The information contained in this Summarized Tank Information Sheet is not considered technical in nature. Therefore, the Contractor is not entitled to rely on any information contained in such reports. Interpretation of this data is the responsibility of the Bidder. Such information is made available to the Bidder as a courtesy only. It is further agreed and understood that the Bidder or the Contractor will not use any information made available to him, or obtained by any examination made by him, in any manner as a basis or ground of claim or demand of any nature against the Owner or Engineer arising from or by reason of any variance which may exist between the information offered and the actual materials and structures encountered during the construction work.

REFERENCES: A complete scope of Work can be found in the Detailed Technical Specifications. Additional information about the tank may be found in the evaluation report (TIC 11.104.E450.001) dated August 2, 2012. The information contained in this evaluation report is also not considered technical in nature.

Job Safety Analysis Form

JOB SAFETY ANALYSIS – __(Enter Activity Name Here)_____.

INSTRUCTIONS (see page 2)	TITLE OF PERSON WHO DOES JOB: _____	SUPERVISOR: _____	ANALYSIS BY: _____
COMPANY/ORGANIZATION:	PLANT/LOCATION: _____	DEPARTMENT: _____	REVIEWED BY: _____
REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT: _____			APPROVED BY: _____

SEQUENCE OF BASIC JOB STEPS	POTENTIAL HAZARDS	RECOMMENDED ACTION OR PROCEDURE
1.	1.	1.
2.	2.	2.
3.	3.	3.
4.	4.	4.
5.	5.	5.

INSTRUCTIONS FOR COMPLETING JOB SAFETY ANALYSIS FORM

Job Safety Analysis (JSA) is an important accident prevention tool that works by finding hazards and eliminating or minimizing them *before* the job is performed, and *before* they have a chance to become accidents. Use your JSA for job clarification and hazard awareness, as a guide in new employee training, for periodic contacts and for retraining of senior employees, as a refresher on jobs which run infrequently, as an accident investigation tool, and for informing employees of specific job hazards and protective measures.

Set priorities for doing JSAs: jobs that have a history of many accidents, jobs that have produced disabling injuries, jobs with high potential for disabling injury or death, and new jobs with no accident history.

Here's how to do each of the three parts of a Job Safety Analysis:

SEQUENCE OF BASIC JOB STEPS

Break the job down into steps. Each of the steps of a job should accomplish some major task. The task will consist of a *set* of movements. Look at the first set of movements used to perform a task, and then determine the next logical set of movements. For example, the job might be to move a box from a conveyor in the receiving area to a shelf in the storage area. How does that break down into job steps? Picking up the box from the conveyor and putting it on a handtruck is one logical set of movements, so it is one job step. Everything related to that one logical set of movements is part of that job step.

The next logical set of movements might be pushing the loaded handtruck to the storeroom. Removing the boxes from the truck and placing them on the shelf is another logical set of movements. And finally, returning the handtruck to the receiving area might be the final step in this type of job.

Be sure to list all the steps in a job. Some steps might not be done each time—checking the casters on a handtruck, for example. However, that task is part of the job as a whole, and should be listed and analyzed.

POTENTIAL HAZARDS

Identify the hazards associated with each step. Examine each step to find and identify hazards—actions, conditions, and possibilities that could lead to an accident.

It's not enough to look at the obvious hazards. It's also important to look at the entire environment and discover every conceivable hazard that might exist.

Be sure to list health hazards as well, even though the harmful effect may not be immediate. A good example is the harmful effect of inhaling a solvent or chemical dust over a long period of time.

It's important to list *all* hazards. Hazards contribute to accidents, injuries and occupational illnesses.

In order to do part three of a JSA effectively, you must identify potential and existing hazards. That's why it's important to distinguish between a hazard, an accident and an injury. Each of these items has a specific meaning:

Hazard – A potential *danger*. Oil on the floor is a *hazard*.

Accident – An unintended *happening* that may result in injury, loss or damage. Slipping on the oil is an *accident*.

Injury – the *result* of an accident. A sprained wrist from the fall would be an *injury*.

Some people find it easier to identify possible accidents and illnesses and work back from them to the hazards. If you do that, you can list the accident and illness types in parentheses following the hazard. But be sure you focus on the *hazard* for developing recommended actions and safe work procedures.

RECOMMENDED ACTION OR PROCEDURE

Using the first two columns as a guide, decide what actions are necessary to eliminate or minimize the hazards that could lead to an accident, injury, or occupational illness.

Among the actions that can be taken are: 1) engineering the hazard out; 2) providing personal protective equipment; 3) job instruction training; 4) good housekeeping; and 5) good ergonomics (positioning the person in relation to the machine or other elements in the environment in such a way as to eliminate stresses and strains.)

List recommended safe operating procedures on the form, and also list required or recommended personal protective equipment for each step of the job.

Be specific. Say *exactly* what needs to be done to correct the hazard, such as "lift, using your leg muscles." Avoid general statements like "be careful."

Give a recommended action or procedure for *every* hazard.

If the hazard is a serious one, it should be corrected immediately. The JSA should then be changed to reflect the new conditions.

APPENDIX

CONSTRUCTION - CONTRACTOR SAFETY CHECKLIST

Project: _____

Location: _____

General Contractor: _____

Date: _____

This safety checklist references the Code of Federal Regulations (CFR) Title 29 Part 1926.

Safety Submittals

- The Contractor shall submit the Contractor's Company Safety Plan, Site Specific Safety Plan (IIPP), and Job Safety Analysis.

Worksite Safety

- The Contractor shall provide general and health provisions with environmental controls in accordance with CFR Title 29 Part 1926 Subpart A, Subpart B, Subpart C, Subpart D, and other applicable Subparts, including state and local requirements.

- The Contractor shall provide traffic control in accordance with Public agency requirements as shown on the approved Traffic Control Plan for the project.

- Will the Contractor have a first aid kit on the job site? □ **YES** □ **NO**

- Will the Contractor enforce a drug free workplace? □ **YES** □ **NO**

Personal Safety

- The Contractor shall provide personal protective and life saving equipment in accordance with CFR Title 29 Part 1926 Subpart E and other applicable Subparts, including state and local requirements.

Fire Protection and Prevention

- The Contractor shall provide fire protection and prevention equipment in accordance with CFR Title 29 Part 1926 Subpart F and other applicable Subparts, including state and local requirements.

- Has Contractor developed fire prevention program 29CFR 1926.24 □ **YES** □ **NO**

Electrical Safety

- The Contractor shall ensure all electrical conductors and equipment are approved and in accordance with CFR Title 29 Part 1926 Subpart K and other applicable Subparts, including state and local requirements.

- Will contractor ensure all pull boxes, junction boxes, and fitting are covered. If metal covers are used, they shall be grounded. □ **YES** □ **NO** 29CFR 1926.405(b) (2)

- Will contractor maintain a Lockout and tagging of circuits? □ **YES** □ **NO** 29CFR 1926.417

Hazard Communication

- The contractor shall insure that the hazards of all chemicals produced or imported are evaluated, and that information concerning their hazards is transmitted to employers and employees. This transmittal of information shall include container labeling and other forms of warning, material safety data sheets (MSDS) and employee training.

  Location of contractor MSDS on site: _____.

  The Contractor shall conform with the provisions of CFR Title 29 Part 1910.1200 (e)(1), (e)(2), (f)(1),(g)(1),(h)(1) and (2)(i) through (iii) made applicable to construction by 1926.59,and other applicable Subparts, including state and local requirements.

Signs, Signals, and Barricades

- The Contractor shall provide signs, signals, and barricades in accordance with CFR Title 29 Part 1926 Subpart G and other applicable Subparts, including state and local requirements.

Material and Equipment Safety

- The Contractor shall handle, store, stack, rack, block, interlock, use and dispose of materials in accordance with CFR Title 29 Part 1926 Subpart H and other applicable Subparts, including state and local requirements.

- Will contractor use power industrial trucks (forklifts) on site? □ **YES** □ **NO**

- Have power industrial truck (forklift) operators received training? □ **YES** □ **NO** 29CFR 1910.178(I) (1)

- Where will the Contractor's materials, equipment and vehicles will be stored and parked?

  _____

  Address

  _____

  Address

Hand and Power Tool Safety

- The Contractor shall ensure all hand and power tools and similar equipment, whether furnished by the employer or the employee, shall be maintained in a safe condition in accordance with CFR Title 29 Part 1926 Subpart I and other applicable Subparts, including state and local requirements.

Welding and Cutting Safety

- The Contractor shall ensure suitable fire extinguishing equipment is available and maintained in accordance with CFR Title 29 Part 1926 Subpart J and other applicable Subparts, including state and local requirements.

Scaffolding Safety

- The Contractor shall ensure all scaffolding is designed, erected, and maintained in accordance with CFR Title 29 Part 1926 Subpart L and other applicable Subparts, including state and local requirements.

- Will contractor erect or dismantle scaffolding? □ **YES** □ **NO**
  29CFR 1926.451(e) (9) (i)

- Contractor's scaffolding erection/ dismantling competent person for project is:

  _____
  Name and Phone Number

Confined Space Entry

- The Contractor's working in confined spaces shall comply with CFR Title 29 Part 1926 Subpart AA, Confined Spaces in Construction.

- Contractor working in confined spaces? □ **YES** □ **NO**

- Contractor has a confined space program in place? □ **YES** □ **NO**

- Contractor's confined space competent competent person for project is:

  _____
  Name and Phone Number

Fall Safety

- The Contractor shall provide fall protection in accordance with CFR Title 29 Part 1926 Subpart M and other applicable Subparts, including state and local requirements.

- Has a competent person trained affected employees? □ **YES** □ **NO**
  29CFR 1926.503(a)(2)

- Contractor's fall safety competent person for this project is:

  _____
  Name and Phone Number

Crane, Derricks, Hoists, Elevators, and Conveyor Safety

- The Contractor shall ensure hoisting equipment is inspected, maintained, and operated in accordance with CFR Title 29 Part 1926 Subpart N and other applicable Subparts, including state and local requirements.

- Contractor will use authorized, qualified employees to operate cranes, including mobile and tower cranes or hoisting apparatus. □ **YES** □ **NO**
  8 CCR 5006, 5006.1

Trenching/Excavation Safety

- The Contractor shall conduct all excavations in accordance with CFR Title 29 Part 1926 Subpart P and other applicable Subparts including state and local requirements.

- Will a competent person be on site conducting inspections? □ **YES** □ **NO**
  1926.651(k)(l)

- Contractor's excavation safety competent person for this project is:

  _____

  Name and Phone Number

Steel Erection Safety

- The Contractor shall ensure steel erection is in accordance with CFR Title 29 Part 1926 Subpart R and other applicable Subparts including state and local requirements.

- Has Contractor provided a training program for all employees exposed to fall hazards? 1926.761(b)(2) □ **YES** □ **NO**

Other

- The Contractor shall incorporate all applicable Subparts of the CFR Title 29 Part 1926, including state and local requirements as required for the project.

The topics covered above are intended as generic, non-exhaustive overview of hazards related to plant construction. This checklist does not alter or absolve the Contractor from compliance responsibilities set forth in the OSHA standards themselves, and the Occupational Safety and Health Act. By signing below, the contractor is NOT absolved from full responsibility for complying with all local, state, federal regulations.

_____

Authorized Contractor Representative (Sign and Date)

DAILY JOBSITE SAFETY SURVEY REPORT

To be completed by Contractor and submitted to Resident Project Representative on a daily basis

Job # _____ Job Name/Location _____ Date: _____ Time: _____

Contractor Competent Person (Printed) _____ Contractor Competent Person (signature) _____

	O.K.	Corrective Action Required	Not Inspected, N/A	Corrected
1. Personal Protective Equipment Worn				
Hard Hats				
Eye Protection				
Hearing Protection				
Respirators				
Protective Clothing				
Protective Footwear				
Fall Protection				
2. Housekeeping				
Waste/Hazardous Waste Properly Stored				
Waste testing completed				
Debris Removal				
Daily Site Clean-Up				
3. Ladders/Stairs				
Ladders in good condition				
Ladders tied off				
Extends 36" above landing				
4. Open Floors and sides				
Perimeter guardrail in place				
Floor Openings covered / protected				
5. Scaffolds				
Guardrails, toeboards, access points in place.				
Rigged IAW OSHA requirements				
In good condition and inspect.				

	O.K.	Corrective Action Required	Not Inspected, N/A	Corrected
7. Fire Protection				
Adequate extinguishers in place.				
Flammable material properly stored.				
Fire watch in place for Welding/Cutting.				
8. Tools				
Good condition				
Tool guards in place.				
Power Cords in good condition.				
Temporary Power Boxes in good condition.				
9. Site/Public Protection				
Fences in place.				
Barricades in place.				
Safety signage posted.				
10. Weather Hazard				
High Winds				
Rain				
Temperature (Too High or Too Low)				
10. First Aid				
Trained Personnel on site.				
Kits/Supplies on site and maintained.				
Sanitation/Water available to workforce.				
11. Programs/Information				
JSA Reviewed with workforce.				
New Hire Orientation				
Hazardous Substances identified and MSDS sheets available.				
Safety Meetings conducted weekly.				
Safety Signs Posted.				

6. Electrical				
Adequate Lighting				
Grounded/GFCI protected				
Cords, plugs & receptacles in good condition.				

12. Confined Space Entry:				
Gas testing conducted.				
Permit Required confined space?				
Non permit required confined space?				

Number of Men in Crew: _____

Names of Crew Members:

_____

_____

_____

_____

_____

_____

_____

_____

Work Day Safety Comments:

Any safety accidents/incidents during the work day ?

Were the accidents/incidents reported to the appropriate parties ?

Submittal Cover Sheet

Washington Street Tank

_____
(Name of Contractor)

_____
(Address)

_____
(City, State Zip)

City of Harrisonburg
2155 Beery Road
Harrisonburg, Virginia 22801

Tank Industry Consultants
7740 West New York Street
Indianapolis, Indiana 46214

5 Sets of Each Submittal Included
1 set of reviewed submittals returned to CONTRACTOR
1 set of reviewed submittals forwarded to OWNER

TIC Project No.: ____.__.E450.001

Submittal No.	Date

SUBMITTAL

Checklist Item No.	Specification Section	Description

Review is for General Compliance with Contract Documents and Specifications.
No Responsibility is Assumed for Correctness of Dimensions or Details.

_____ **No Exceptions Noted**

_____ **No Action Required by Engineer or Owner**

_____ **Make Corrections Noted**

_____ **Revise & Resubmit**

_____ **Rejected – See Comments**

Tank Industry Consultants

By:_____ **Date:**_____

SCS

Harrisonburg, Virginia

SUBMITTAL CHECK LIST

TIC __.___.E450.001

Sub. No.	Item	DTS Section	Submit By	Date Received	Date Reviewed	Status
1.	Insurance Certificate	E.	CD			
2.	Proposed Method of Containment w/ P.E. Stamp	G.16.	CD + 15 days			
3.	Details of Reinforcing Pads Between Tank and Attachments	G.16.h.	CD + 15 days			
4.	Name of Competent Person	C.	CD + 15 days			
5.	A letter (on company letterhead) from the Contractor stating/certifying that the Contractor's Competent Person(S) has/have received training in accordance with local, state, and federal regulations	C.	CD + 15 days			
6.	Documentation of Training for Support Personnel	G.	CD + 15 days			
7.	Welder(s) Certification (submitted at site)	F.4.	prior to welding			
8.	Work Safety Program	G.	CD + 15 days			
9.	Personnel Air Monitoring Program	G.	CD + 15 days			
10.	Confined Space Entry Procedure	G.3.	CD + 15 days			
11.	Job Safety Analysis	G.12.	CD + 15 days			
12.	Contractor Safety Checklist	G.12.	CD + 15 days			
13.	Traffic Control Plan	F.15.	CD + 15 days			
14.	Public Safety Plan	F.14.	CD + 15 days			
15.	Bar Chart or Progress Schedule	F.7.	CD + 15 days			
16.	Schedule of Values	F.7.	with Bid			
17.	Submittal for Times of Work	F.10.	CD + 15 days			
18.	Descriptive written plan concerning how abrasive and/or paint damage to automobiles and property will be handled, including a process for quick removal of the abrasive or paint, and who will do the Work	F.34.	CD + 15 days			
19.	Details of repairs if **different** from drawings	H.1.	CD + 20 days			
20.	Temporary Construction Opening (Door Sheet)	H.3.	CD + 20 days			
21.	Documentation demonstrating that steel material was properly recycled	H.9.	prior to completion			
22.	Exterior Prime Coat - Supplier, Type, PDS	J.9.	CD + 20 days			
23.	Exterior Intermediate Coat - Supplier, Type, PDS	J.9.	CD + 20 days			
24.	Exterior Finish Coat - Supplier, Type, PDS	J.9.	CD + 20 days			
25.	Exterior Intermediate Color and Finish Color	J.7.	CD + 20 days			
26.	Interior Prime Coat - Supplier, Type, PDS	K.7.	CD + 20 days			
27.	Interior Intermediate Coat - Supplier, Type, PDS	K.7.	CD + 20 days			
28.	Interior Finish Coat - Supplier, Type, PDS	K.7.	CD + 20 days			
29.	Concrete First Coat - Supplier, Type, PDS	L.3.	CD + 20 days			
30.	Concrete Second Coat - Supplier, Type, PDS	L.3.	CD + 20 days			
31.	Inaccessible Area Prime Coat - Supplier, Type, PDS	J.6.	CD + 20 days			
32.	Seam Sealer - Supplier, Type, PDS	K.4.	CD + 20 days			
33.	Flexible Sealant - Supplier, Type, PDS	K.9.	CD + 20 days			
34.	Solventless, Underwater-Curing Epoxy - Supplier, Type, PDS	K.8.	CD + 20 days			
35.	Thinners - Supplier, Type, MSDS	F.36.	CD + 20 days			
36.	Disinfectant - Supplier, Type, MSDS	M.	CD + 20 days			
37.	Abrasives - Supplier, Type, MSDS, and Size	G.15.	CD + 20 days			
38.	Abrasives - letter from coating manufacturer's HQ stating the Resulting Abrasive Profile is acceptable	G.15.	CD + 20 days			
39.	Concrete Repair Material - Supplier, Type, MSDS	H.10.	CD + 20 days			
40.	Plan for Forced Ventilation for Interior Coating Cure	K.12.	CD + 20 days			

Status Abbreviations ** *NEN = No Exceptions Noted, MCN = Make Corrections Noted, R&R = Revise & Resubmit, REJ = Rejected, See Comments, NAR = No Action Required by Engineer or Owner*

CD = Contract Date --- All Submittals Shall be Received Prior to Contractor Starting Work

Sub. No.	Item	DTS Section	Submit By	Date Received	Date Reviewed	Status
41.	Compliance with ANSI/NSF Standard 61 (if not stated on PDS)	K.5.	CD + 20 days			
42.	Certification from manufacturer that all coating materials contain less than 0.025% by weight of lead (or any lead compounds), cadmium, and chromium in the cured coating for each coat applied	F.38.	CD + 20 days			
43.	Certification from the coating manufacturer for honoring coating manufacturer warranties	F.27.	prior to filling tank			
44.	Cathodic Protection Bracket Location Drawing	I.6.	CD + 20 days			
45.	Cathodic Protection Construction Details	I.6.	CD + 20 days			
46.	Cathodic Protection Warranty	I.6.	CD + 20 days			
47.	Cathodic Protection Service Costs	I.6.	CD + 20 days			
48.	Cathodic Protection Owner's Manual	I.11.	prior to completion			
49.	Steel Grit Total Lead Tests	G.15.d.	CD + 20 days			
50.	Certification that the interior coating has cured such that it is ready for immersion service	K.11.	prior to filling tank			
51.	Written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents	F.42.	prior to filling tank			

Appendix – Sign and Logo

“Washington Street Tank”

Harrisonburg, Virginia

Water Storage Tank Report
2,500,000 Gallon Washington Street Standpipe
Harrisonburg Department of Public Utilities
CorrTech Report No. 12578-FOR-01

Prepared For:

Gannett Fleming
5029 Corporate Woods Dr Suite 301
Virginia Beach, VA 23462

Prepared By:

CorrTech, Inc.
25 South Street
Hopkinton, MA 01748

December 2017

STATEMENT OF LIMITATION

The conclusions presented in this document are based on the services described and not on tasks or procedures beyond the scope of the described procedures or the time and budgetary constraints imposed by the contract limitations.

CorrTech, Inc. has performed this assessment in a professional manner using that degree of skill and care exercised for similar projects under similar conditions by reputable and competent consultants, and in accordance with the procedures established within CorrTech's quality assurance, quality control protocol.

CorrTech, Inc. shall not be responsible for conditions or consequences arising from relevant facts that were concealed, withheld or not fully disclosed at the time the evaluation was performed.

Report Reviewed by: Ted Lund
NACE CIP Level III #050
July 2019

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INTRODUCTION

On December 6, 2017 CorrTech representatives, Scott Leighton and Bob Meskill performed a corrosion and structural assessment of the exterior and interior of the Harrisonburg Department of Public Utilities Washington Standpipe water storage tank for Gannett Fleming. The inspection was conducted to establish the current condition of the tank's coatings and steel substrate. The tank inspected included:

- **2.5 MG Washington Street Standpipe**

This work was completed under Gannett Fleming Project No. 063064 Rev 9-7-17 dated August 2nd, 2017 and referenced under CorrTech Job No. 12578.

The tank was inspected in accordance with the latest version of AWWA D101 53 (86R) standard for water tank inspections, and the M42 AWWA Tank Guidance Manual.

The interior of the reservoir was inspected with the TankRover remotely operated vehicle, while full. The TankRover is the only piece of equipment like it in the United States and was developed by CorrTech. By using the TankRover the interior of the tank was inspected with no special preparation, no additional disinfection and no downtime.

The TankRover is equipped with a surface-cleaning tool used to remove loose rust or debris in order to view the potential metal loss under the coating. The unit has high-powered thrusters, which are used to maneuver throughout the tank and are used to wash away bottom sediment for observations.

The exterior portions of the tank were inspected by walking the roof and shell portions that were accessible from the ground.

The objectives of the assessment were to:

1. Perform field inspections and tests to assess the structural and coating integrity of the tank.
2. Review the safety compliance of tank ladders and access.
3. Review sanitary conditions and protection
4. Provide recommendations for rehabilitation.

EXECUTIVE SUMMARY

Exterior coating is beginning to rust through on the shell and roof. Tank appearance is degrading but no serious corrosion is occurring. Interior coating is performing well with very little corrosion above or below water. Exterior should be left as is until the interior roof requires attention. Active cathodic protection system will protect the interior submerged areas if properly operating.

Small hole through the roof for the level indicator cable should be sealed to prevent insect entry and roof runoff from flowing into the tank. By installing a short collar or pipe section the cable can still pass through and protect the tank from contamination.

Areas where grout has cracked from under the chime should be re-packed to seal the underneath of the floor.

OBSERVATIONS

Photos provided in the report were created from a digital camera and interior pictures were captured in digital format from the interior video. The interior images are as clear as our printed technology will allow. The copies in the report provide a reference for our comments. Keep in mind that for underwater video snaps, the video provides the greatest detail and should be viewed as part of the report.

Narration on the video is done in the field and some of the comments may be different than the written report.

2.5 MG Washington Street Standpipe

Tank is a welded steel stand pipe with a height of 70-ft and a diameter of 78-ft. The structure has a maximum capacity of 2,500,000 gallons and was constructed in 1980 by PDM/Hydrostorage.

The water level during the inspection was approximately 3-ft below the overflow.

INTERIOR

Inspection ROV was deployed through the perimeter roof hatch. Perimeter hatch is a hinged 36-in diameter opening with a 4-in sanitary lip and a 2-in overlapping cover. There is an auxiliary 24-in bolted hatch located near the center vent of the tank.

Roof (ceiling)

Tank roof is a self-supported dome with skip welded radial angle stiffeners. Minor active edge corrosion was observed on the roof to shell seam within the gap between the roof and the shell plate. Sporadic edge corrosion has also formed on the bottom flanges of the roof stiffeners. Minor edge corrosion has also formed on the central compression ring. No serious metal loss was observed during the course of the inspection.

Ladders

This tank is not equipped with an interior ladder.

Shell

The interior coating system has minor sediment staining. No active corrosion and resulting staining could be seen on the weld seams. A few small areas with blistered coating were found but no blisters were broken.

Floor

The tank floor had a 1/16-in thick sediment layer that covered 65% of the tank floor. There was no coating failure or active corrosion observed on the tank floor.

Inlet/ Outlet

The tank has a combination inlet and outlet pipe. Inlet pipe enters above the floor through the bottom shell ring. Flow from the inlet moves sediment away but the height above the floor acts as a sediment ring.

Cathodic Protection

The tank is currently equipped with a functioning impressed current cathodic protection system. Underwater hoop anode is attached and showed no damage. Operational readings from the rectifier show the potential to be within the range required by AWWA D104.

Temperature Survey

A temperature survey was completed utilizing a YSI-600 meter with an extended cable to the probe on the ROV. The ROV was flown from the surface of the water to the floor, sampling in 5-ft intervals for potential stratification.

Location (ft from bottom)	Temp °F	Conductivity M s/cm	pH	ORP*
65	50.65	0.115	9.40	656
60	50.74	0.113	9.14	722
55	50.70	0.113	8.83	727
50	50.70	0.113	8.70	747
45	50.68	0.113	8.62	753
40	50.68	0.113	8.56	763
35	50.67	0.113	8.49	772
30	50.67	0.113	8.46	771
25	50.65	0.112	8.41	770
20	50.65	0.113	8.38	778
15	50.63	0.113	8.35	771
10	50.59	0.112	8.34	760
05	50.58	0.113	8.33	765

Note*- oxidation reduction potential (mV)

No indications of significant stratification were detected during the temperature survey.

EXTERIOR

Roof

General surface corrosion has formed on approximately 5% of the roof plates. Coating is checking and cracking with rust blush coming through.

An ASTM 3359 adhesion test was performed on the roof of the tank beside the hatch. The adhesion was rated a 5B and 5A for the top coat to primer and primer to substrate, see Appendix IV. Areas with visible checking and cracking were not tested.

Dry film thickness readings were taken on the roof. The readings averaged 12.95 mils with a low reading 7.2 mils and a maximum reading of 19.2 mils, see Appendix II.

Exterior level indicator cable enters the tank to connect to the interior float through a small hole. Cable hole is approximately ½-in diameter but is open and would allow roof run off and insects to enter.

Vent

The tank is equipped with a central pressure/vacuum pallet style roof vent. The vent has a diameter of 24-in and is bolted on a 24- in wide flange. Vent hood opening is 22-in above the roof of the tank. The vent has both vertical coarse mesh screening and inner horizontal fine mesh screening. Both sets of screening were intact with no signs of deterioration and the pressure relief plate was functioning properly.

Ladders and Railings

The shell ladder starts 11-ft above grade and is equipped with a locked anti-climb, safety cage, and a notched rail climb. The ladder has a 12-in rung to rung distance, is 16-in wide, and is mounted 6.5-in from the shell of the tank. No metal or section loss was observed on the ladder.

The roof hand railing system runs around the perimeter roof hatch and up around the roof vent. The railing has a top rail that is 42.25-in high, two mid rails that are 30.5-in high and 18.5-in high, with 4.5 in toe kick plate. Light surface corrosion was present, but no metal loss or section loss was observed on the hand railing.

Overflow Pipe

The overflow starts at an internal weir box and runs down the exterior of the tank to discharge in a concrete catch basin from the base of the tank. The overflow has a diameter of 12-in and is equipped with intact coarse screening.

Shell

The exterior coating system has moderate chalking. Surface corrosion was observed on less than 5% of the exterior shell. Coating delamination was observed on less than 1% of overall surface.

Dry film thickness readings were taken on the exterior shell coating system. Thickness readings averaged 13.16 mils with a minor reading of 7.0 mils and a maximum reading of 21.1 mils, see Appendix II.

Foundation

The tank is built on a concrete ring wall. Surface cracking was observed on less than 1% of the foundation.

The chime plate has edge corrosion on 1-2% of the perimeter. There was no visible metal loss on the chime. The concrete grouting was generally intact with separation observed on less than 5% of surface area.

The tank has fifty-four 1.5-in diameter anchor bolts. Each bolt is set in a 4.5-in by 6-in by 12-in chair. Anchor nuts were found to be tight. Edge corrosion has formed on 5% of the anchor bolts, nuts and chairs.

Manhole

Tank has two 36-in diameter dished pressure manholes located in the lowest shell course. The manholes appeared to be properly seated with no signs of leakage.

Paint Analysis

Samples of the interior and exterior paint were collected to test for the presence of Lead (Pb), Cadmium (Cd) and Chromium (Cr) in accordance with EPA Method 6010b. Laboratory results show that the interior and exterior coatings have trace levels of chromium, cadmium and lead. No special action should be required when removing the paint system.

	Pb	Cr	Cd (ppm)
Interior	17.9	300	13.1
Exterior	21.3	11.6	10.1

RECOMMENDATIONS

Small hole through the roof for the level indicator cable should be sealed to prevent insect entry and roof runoff from flowing into the tank. By installing a short collar or pipe section the cable can pass through and protect the tank from contamination.

Areas where grout has cracked from under the chime should be re-packed to seal the underneath of the floor.

Perform inspection again in 5-years per the established inspection interval.

Appendix I
Photographs

Harrisonburg- Washington Tank

DP #01
Overview of the Washington tank

DP #02
Back side of tank

DP #03
Overview of tank with pump house

DP #04
View of pump house

Harrisonburg- Washington Tank

DP #05
Tank foundation to pump house connection

DP #06
Edge corrosion on anchor nut

DP #07
Concrete filler has spalled under chine plate

DP #08
Primary shell manway

Harrisonburg- Washington Tank

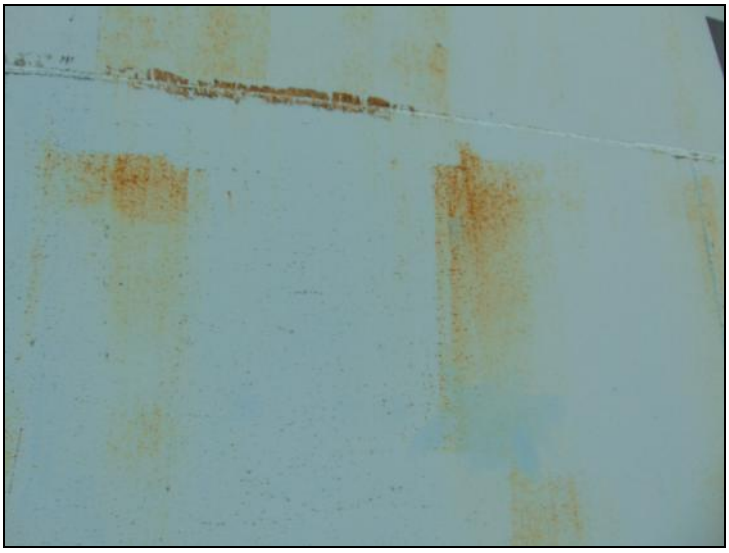
DP #09
Tank data plate

DP #10
View of surface rust on shell

DP #11
Secondary shell manway

DP #12
View of shell ladder

Harrisonburg- Washington Tank



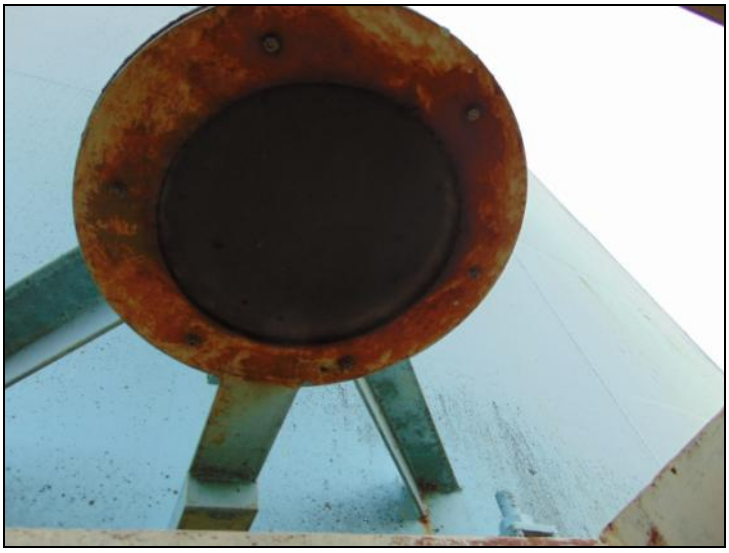
DP #13
Closer view of surface rust

DP #14
Anchor bolt to foundation connection

DP #15
Close up of edge corrosion on chine plate

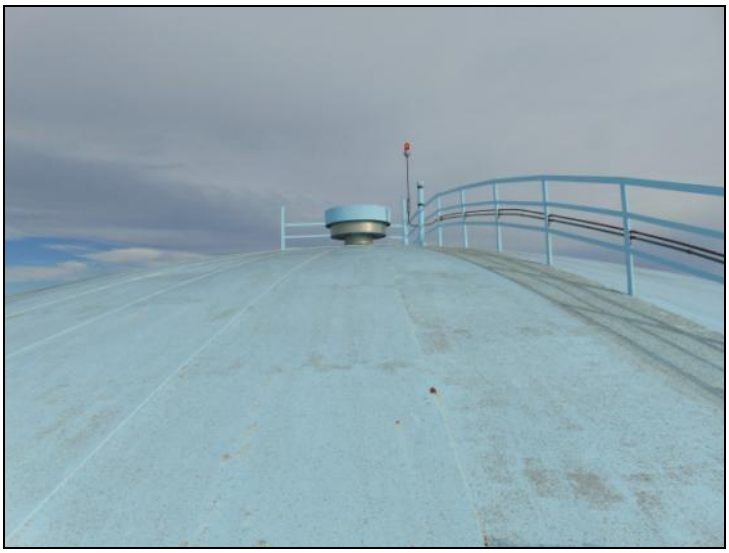
DP #16
Overflow discharge point and catch basin

Harrisonburg- Washington Tank



DP #17
Overflow is equipped with an intact fine screen

DP #18
Catch basin grate

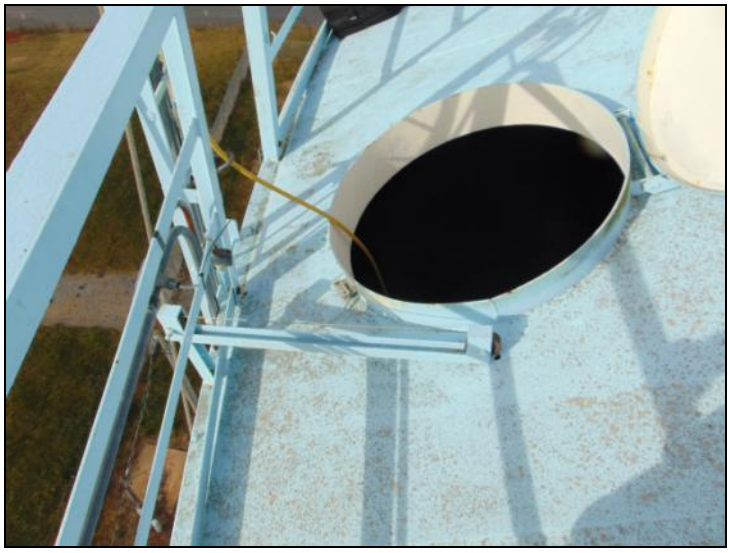


DP #19
Wide view of roof center

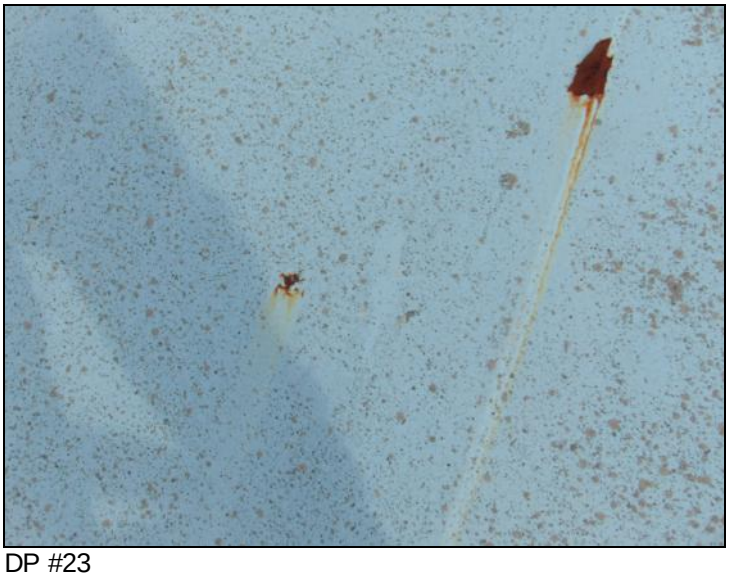
DP #20
Close up of 36-inch diameter primary hinged roof manway

Harrisonburg- Washington Tank

DP #21
Roof edge safety railing



DP #22
Roof manway and safety railing



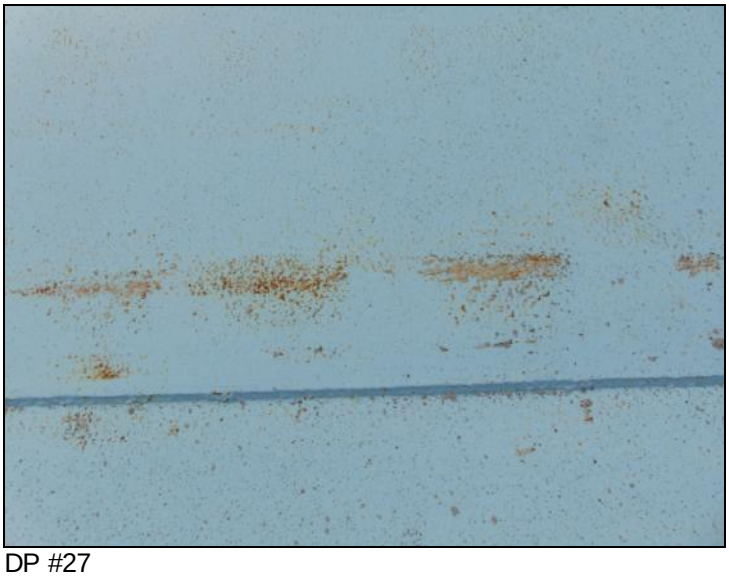
DP #23
Topcoat erosion and isolated corrosion cell

DP #24
Edge corrosion on safety railing welded bracket

Harrisonburg- Washington Tank

DP #25
Center roof and safety railing

DP #26
Wide view of topcoat erosion



DP #27
Edge corrosion near seam

DP #28
Center roof safety railing

Harrisonburg- Washington Tank

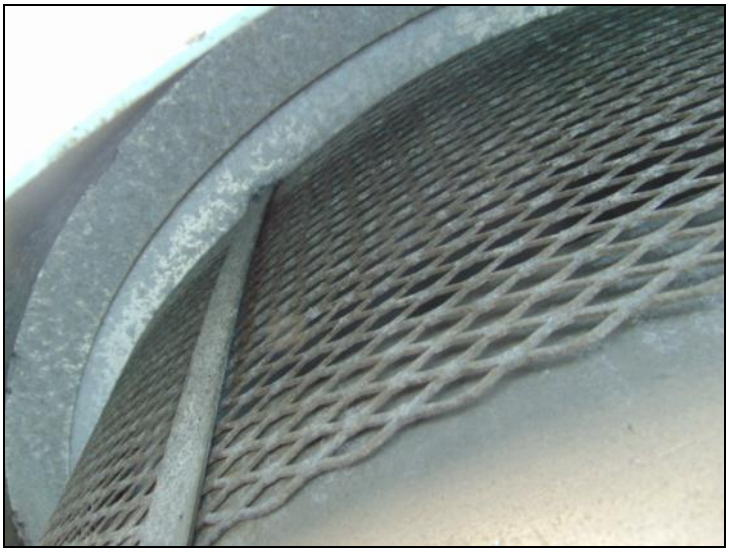
DP #29
24-inch secondary bolted roof manway

DP #30
Edge corrosion on manway flange

DP #31
Overview of vent

DP #32
Vent flange

Harrisonburg- Washington Tank



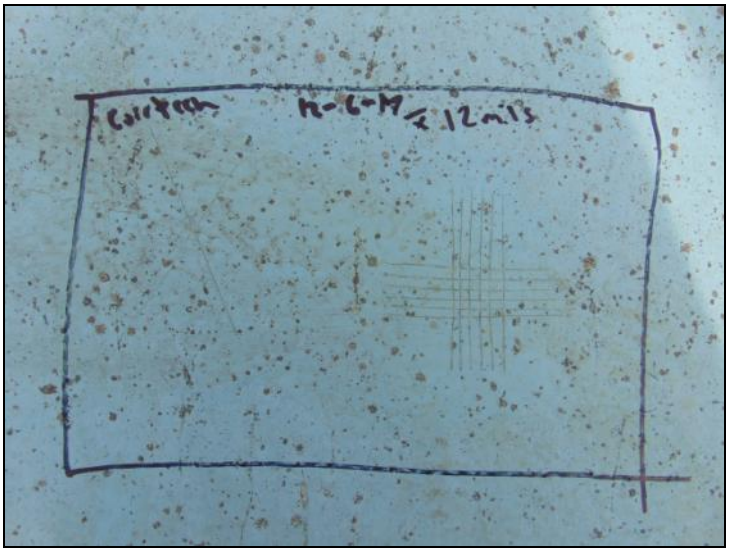
DP #33
Coarse perforated vent screen

DP #34
Pressure relief gasket seated properly

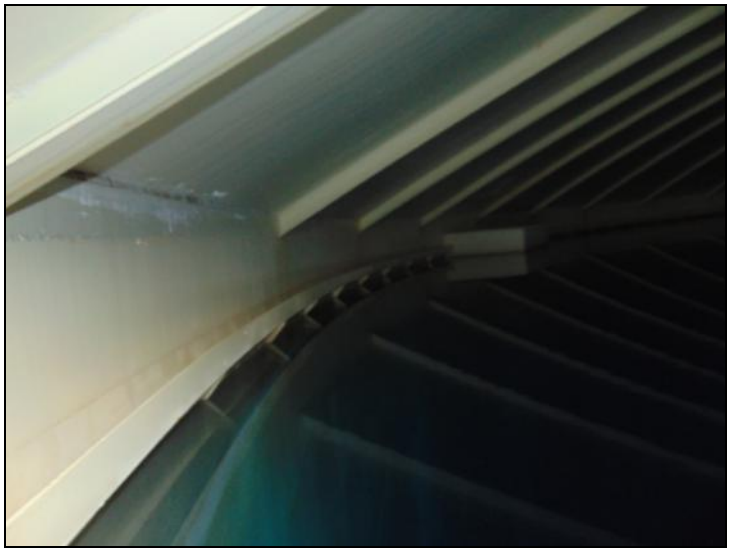
DP #35
Fine screen intact for vent

DP #36
Wide view of roof step off and coating erosion

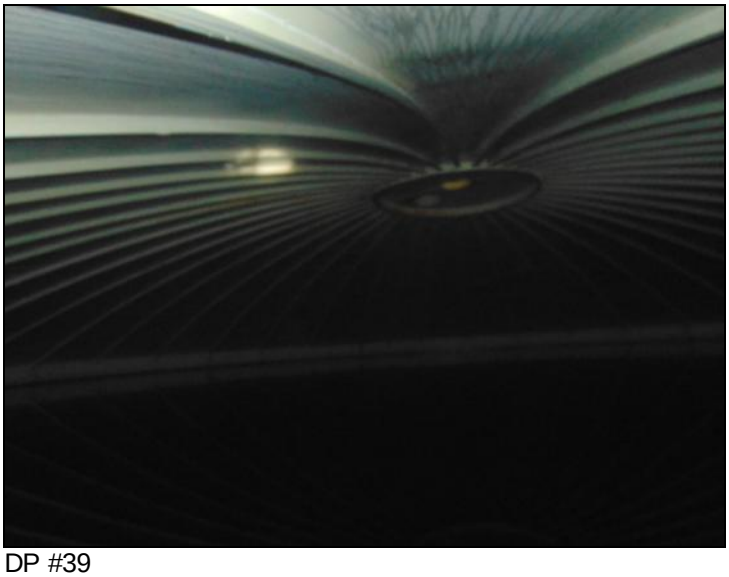
Harrisonburg- Washington Tank



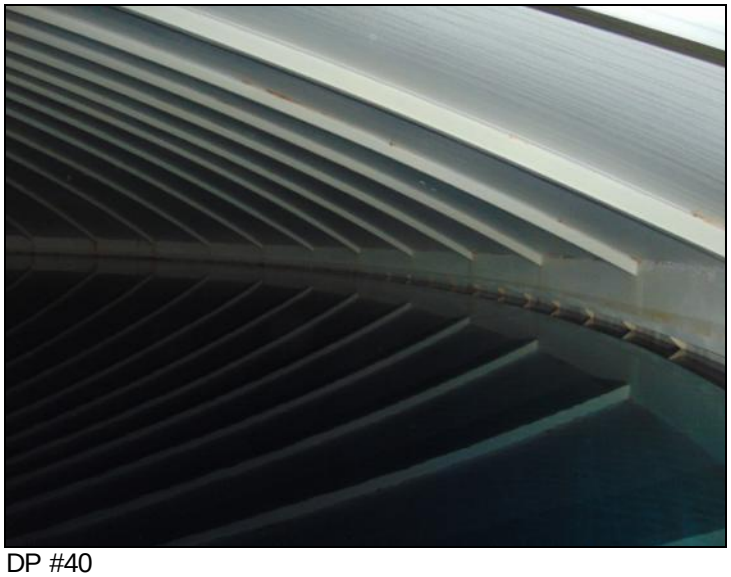
DP #37
ASTM 3359 adhesion test grades 5A & 5B



DP #38
Clockwise view of roof interior



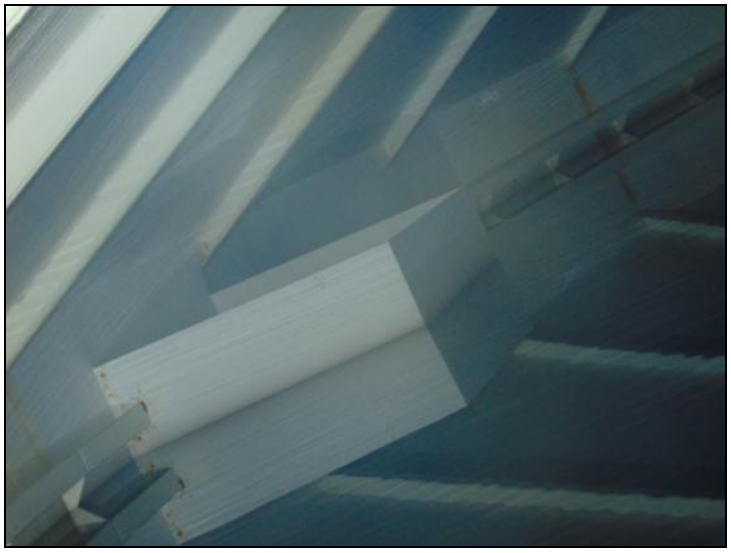
DP #39
Roof beams and vent opening



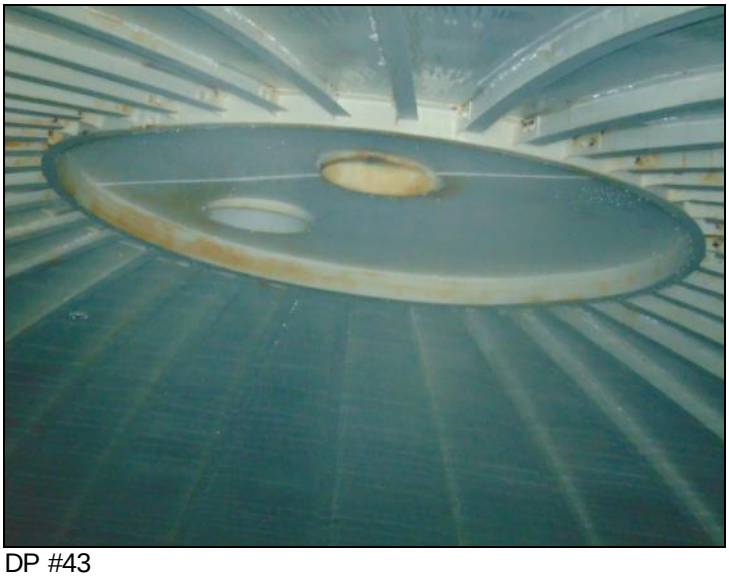
DP #40
Counter-clockwise view of roof to shell

Harrisonburg- Washington Tank

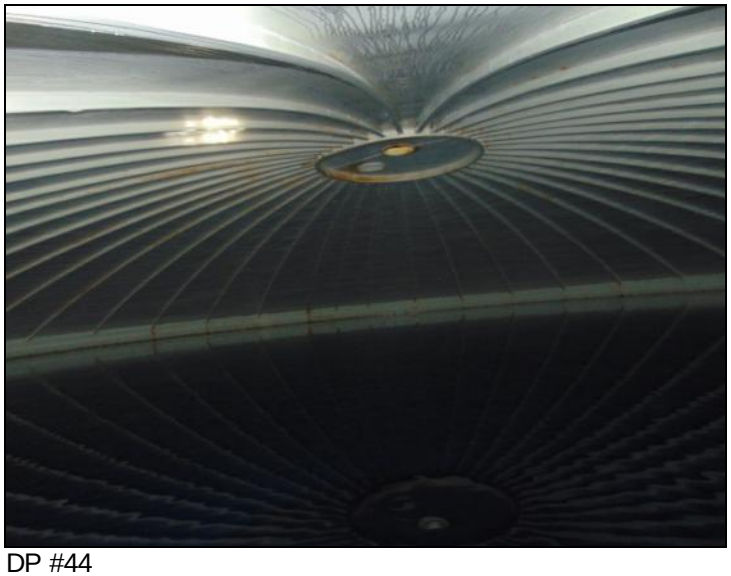
DP #41
Edge corrosion in stiffener beam weld



DP #42
Overflow weir box

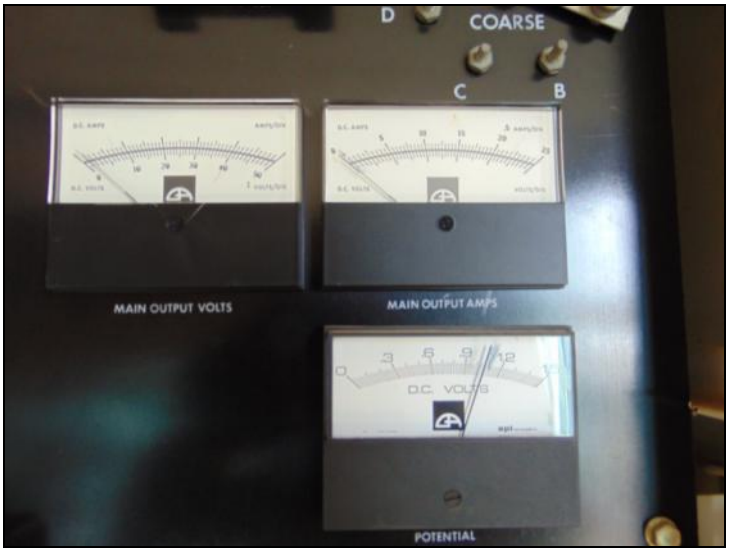


DP #43
Close up of center roof hub



DP #44
Wide view of center roof

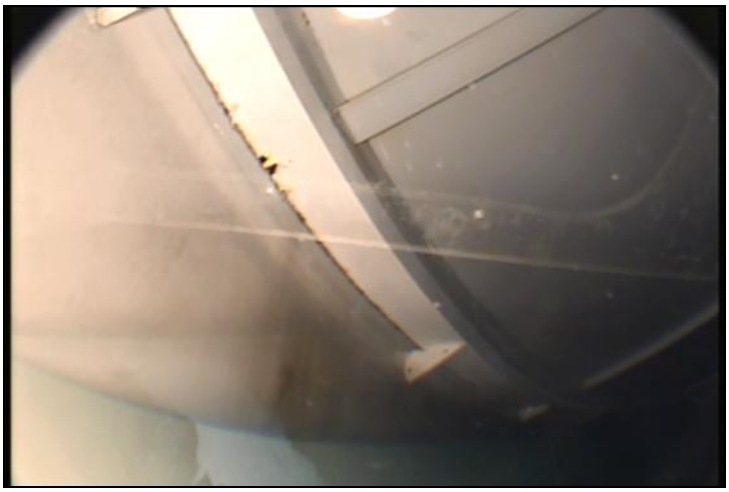
Harrisonburg- Washington Tank



DP #45
Rectifier is functioning

DP #46
Pipe to shell connection point

Harrisonburg- Washington Tank



:27
Uniform edge corrosion on stiffener beam

2:41
Overflow weir box

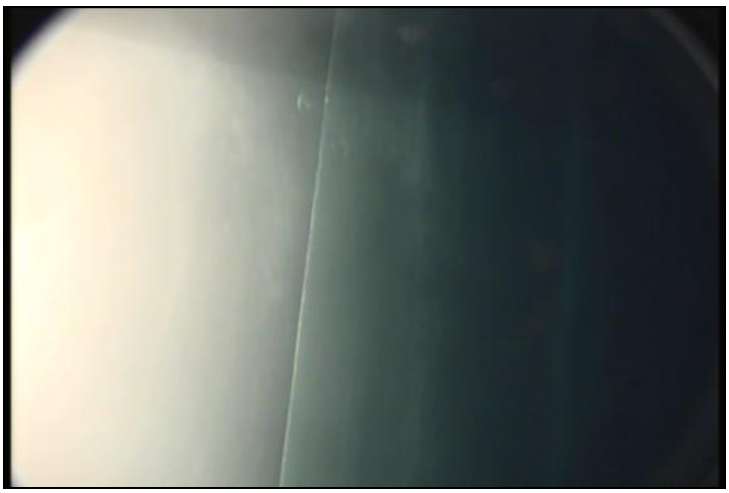
3:38
Edge corrosion on radial beam

4:33
Wide view of radial beams

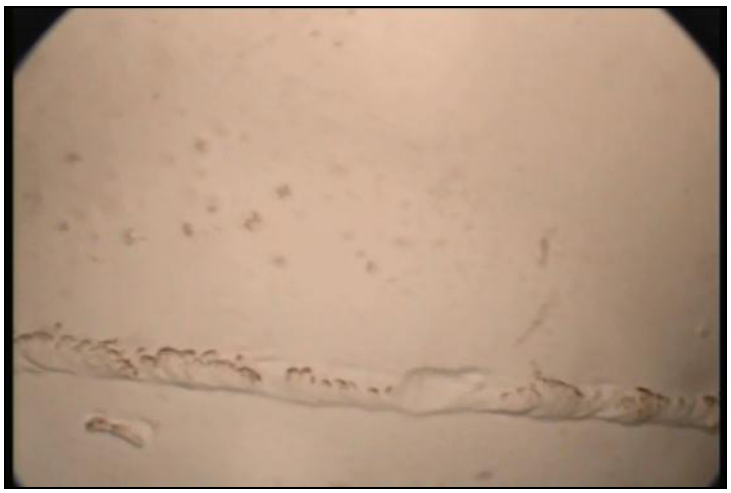
Harrisonburg- Washington Tank

7:01
Center roof hub

7:27
Edge corrosion on dollar plate beam



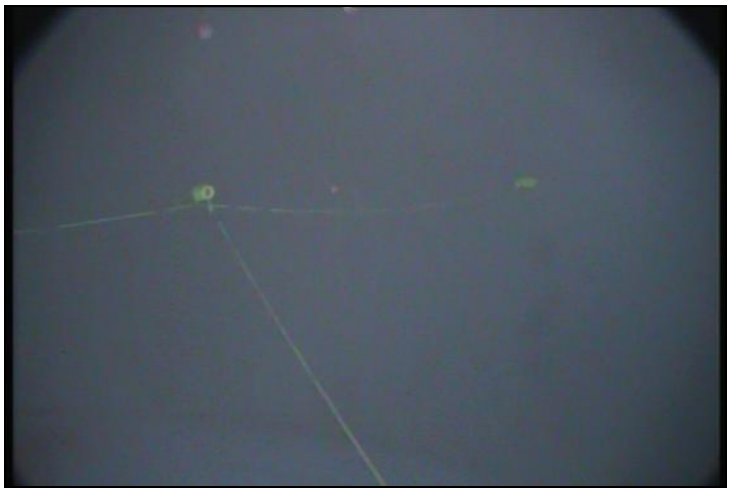
9:45
Shell wall and vertical weld seam



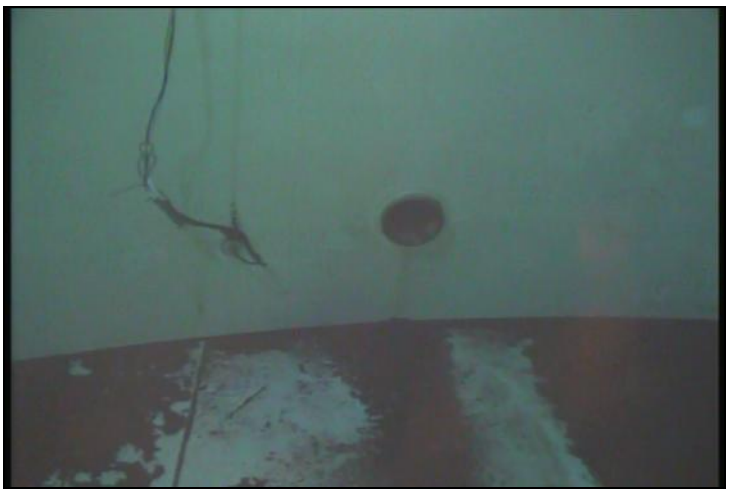
16:58
Horizontal weld seam with sediment staining

Harrisonburg- Washington Tank

22:12
Area of blistering on shell



23:23
Cathodic protection floats



29:10
Inlet/outllet pipe opening on lower shell

29:57
Floor to shell seam and thin film of sediment

APPENDIX II
Dry Film Thickness Readings

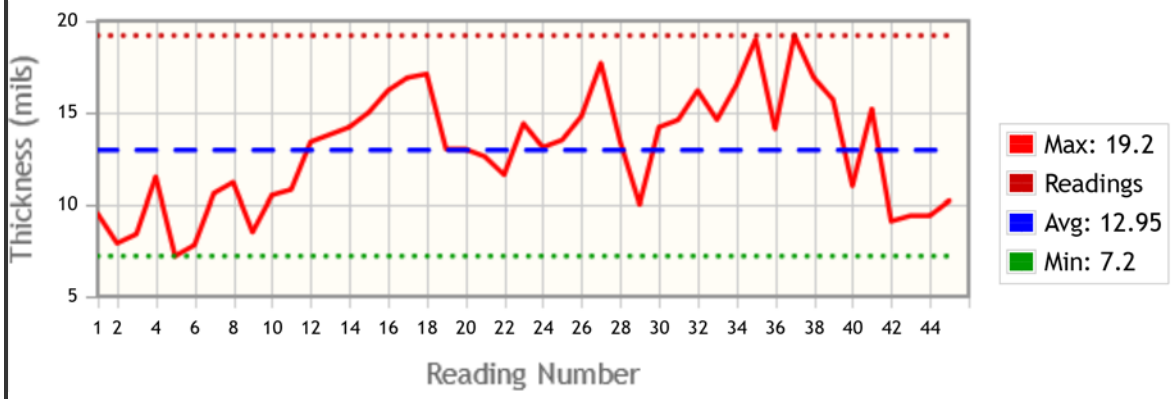
Header

Batch Name:	B2	Batch Date:	2017-12-06 09:34:26
Gage S/N:	711995		
Probe Type:	FS	Probe S/N:	174549
Cal:	Cal 1	Substrate:	F
Batch Notes:	Washington Tank Roof		

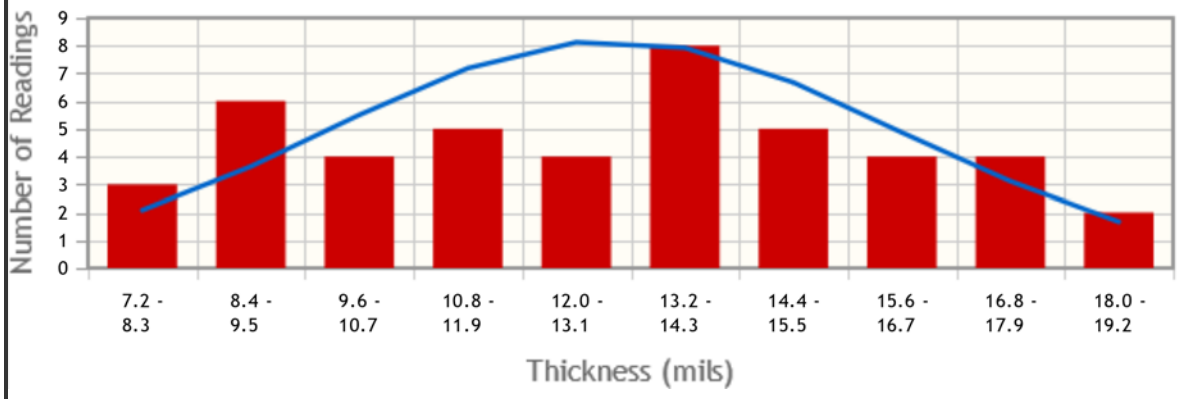
Summary

	#	x̄	σ	↓	↑
B2	45	12.95	3.14	7.2	19.2

Chart



Histogram



Readings

#	Thickness (mils)	Date/Time	Ignore	Notes
1	9.5	2017-12-06 12:08:01	☐	
2	7.9	2017-12-06 12:08:03	☐	
3	8.4	2017-12-06 12:08:04	☐	
4	11.5	2017-12-06 12:08:08	☐	
5	7.2	2017-12-06 12:08:10	☐	
6	7.8	2017-12-06 12:08:11	☐	
7	10.6	2017-12-06 12:08:15	☐	
8	11.2	2017-12-06 12:08:16	☐	
9	8.5	2017-12-06 12:08:18	☐	
10	10.5	2017-12-06 12:08:23	☐	
11	10.8	2017-12-06 12:08:25	☐	
12	13.4	2017-12-06 12:08:27	☐	
13	13.8	2017-12-06 12:08:46	☐	
14	14.2	2017-12-06 12:08:48	☐	
15	15.0	2017-12-06 12:08:50	☐	
16	16.2	2017-12-06 12:08:51	☐	
17	16.9	2017-12-06 12:08:53	☐	
18	17.1	2017-12-06 12:08:55	☐	
19	13.0	2017-12-06 12:08:58	☐	
20	13.0	2017-12-06 12:09:00	☐	
21	12.6	2017-12-06 12:09:05	☐	
22	11.6	2017-12-06 12:09:08	☐	

#	Thickness (mils)	Date/Time	Ignore	Notes
23	14.4	2017-12-06 12:09:13	☐	
24	13.1	2017-12-06 12:09:16	☐	
25	13.5	2017-12-06 12:09:17	☐	
26	14.8	2017-12-06 12:09:19	☐	
27	17.7	2017-12-06 12:09:31	☐	
28	13.4	2017-12-06 12:09:44	☐	
29	10.0	2017-12-06 12:09:46	☐	
30	14.2	2017-12-06 12:09:49	☐	
31	14.6	2017-12-06 12:10:13	☐	
32	16.2	2017-12-06 12:10:16	☐	
33	14.6	2017-12-06 12:10:18	☐	
34	16.5	2017-12-06 12:10:21	☐	
35	19.0	2017-12-06 12:10:26	☐	
36	14.1	2017-12-06 12:10:28	☐	
37	19.2	2017-12-06 12:10:42	☐	
38	16.9	2017-12-06 12:10:43	☐	
39	15.7	2017-12-06 12:10:45	☐	
40	11.0	2017-12-06 12:10:52	☐	
41	15.2	2017-12-06 12:10:54	☐	
42	9.1	2017-12-06 12:10:55	☐	
43	9.4	2017-12-06 12:10:58	☐	
44	9.4	2017-12-06 12:11:00	☐	
45	10.2	2017-12-06 12:11:02	☐	

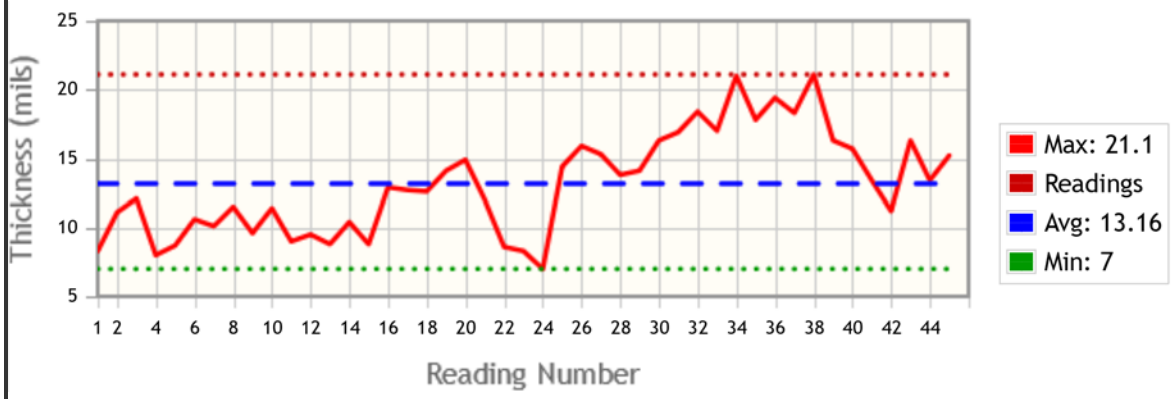
Header

Batch Name:	B1	Batch Date:	2017-12-06 09:31:40
Gage S/N:	711995		
Probe Type:	FS	Probe S/N:	174549
Cal:	Cal 1	Substrate:	F
Batch Notes:	Washington Tank Shell		

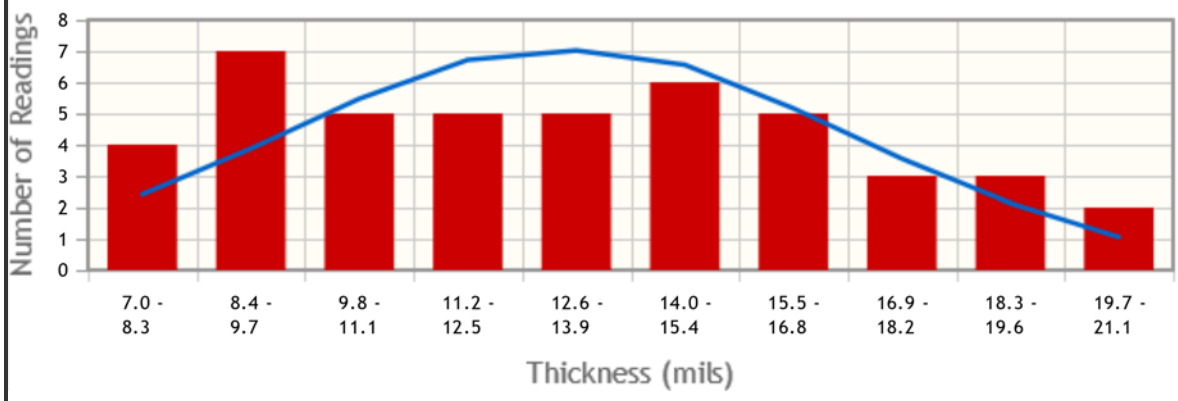
Summary

	#	x̄	σ	↓	↑
B1	45	13.16	3.70	7.0	21.1

Chart



Histogram



Readings

#	Thickness (mils)	Date/Time	Ignore	Notes
1	8.3	2017-12-06 09:31:45	☐	
2	11.1	2017-12-06 09:31:47	☐	
3	12.1	2017-12-06 09:31:49	☐	
4	8.0	2017-12-06 09:31:50	☐	
5	8.7	2017-12-06 09:31:52	☐	
6	10.6	2017-12-06 09:31:54	☐	
7	10.1	2017-12-06 09:31:56	☐	
8	11.5	2017-12-06 09:31:58	☐	
9	9.6	2017-12-06 09:32:00	☐	
10	11.4	2017-12-06 09:32:03	☐	
11	9.0	2017-12-06 09:32:05	☐	
12	9.5	2017-12-06 09:32:07	☐	
13	8.8	2017-12-06 09:32:19	☐	
14	10.4	2017-12-06 09:32:21	☐	
15	8.8	2017-12-06 09:32:23	☐	
16	12.9	2017-12-06 09:32:28	☐	
17	12.7	2017-12-06 09:32:30	☐	
18	12.6	2017-12-06 09:32:31	☐	
19	14.1	2017-12-06 09:32:36	☐	
20	14.9	2017-12-06 09:32:38	☐	
21	12.0	2017-12-06 09:32:40	☐	
22	8.6	2017-12-06 09:32:45	☐	

#	Thickness (mils)	Date/Time	Ignore	Notes
23	8.3	2017-12-06 09:32:46	☐	
24	7.0	2017-12-06 09:32:48	☐	
25	14.4	2017-12-06 09:32:54	☐	
26	15.9	2017-12-06 09:32:56	☐	
27	15.3	2017-12-06 09:32:58	☐	
28	13.8	2017-12-06 09:33:04	☐	
29	14.1	2017-12-06 09:33:06	☐	
30	16.3	2017-12-06 09:33:07	☐	
31	16.9	2017-12-06 09:33:21	☐	
32	18.4	2017-12-06 09:33:23	☐	
33	17.0	2017-12-06 09:33:25	☐	
34	21.0	2017-12-06 09:33:32	☐	
35	17.8	2017-12-06 09:33:33	☐	
36	19.4	2017-12-06 09:33:35	☐	
37	18.3	2017-12-06 09:33:47	☐	
38	21.1	2017-12-06 09:33:49	☐	
39	16.3	2017-12-06 09:33:51	☐	
40	15.7	2017-12-06 09:33:57	☐	
41	13.4	2017-12-06 09:34:00	☐	
42	11.2	2017-12-06 09:34:01	☐	
43	16.3	2017-12-06 09:34:18	☐	
44	13.4	2017-12-06 09:34:21	☐	
45	15.2	2017-12-06 09:34:23	☐	

APPENDIX III
Paint Sample Laboratory Results

PHOENIX
Environmental Laboratories, Inc.

Thursday, December 21, 2017

Attn:
Corrtech
25 South Street
Hopkinton MA 01748

Project ID: HARRISONBURG, VA
Sample ID#s: BZ60823 - BZ60826

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext. 200.

Sincerely yours,

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
VT Lab Registration #VT11301

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

December 21, 2017

FOR: Attn:
Corrtech
25 South Street
Hopkinton MA 01748

Sample Information		Custody Information		Date	Time
Matrix:	BULK	Collected by:		12/14/17	
Location Code:	CORRT-MA	Received by:	LB	12/15/17	11:09
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	12578-2				

Laboratory Data

SDG ID: GBZ60823
Phoenix ID: BZ60825

Project ID: HARRISONBURG, VA
Client ID: WASHIGNTON INT

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Cadmium	13.1	2.5	mg/Kg	1	12/18/17	MA	SW6010C
Chromium	300	2.5	mg/Kg	1	12/18/17	MA	SW6010C
Lead	17.9	2.5	mg/Kg	1	12/18/17	EK	SW6010C
Total Metals Digest	Completed				12/15/17	L/AG	SW3050B

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low

Comments:

Results are reported on an ``as received`` basis, and are not corrected for dry weight.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If there are any questions regarding this data, please call Phoenix Client Services.

Phyllis Shiller, Laboratory Director
December 21, 2017
Reviewed and Released by: Ethan Lee, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

December 21, 2017

FOR: Attn:
Corrtech
25 South Street
Hopkinton MA 01748

Sample Information		Custody Information		Date	Time
Matrix:	BULK	Collected by:		12/14/17	
Location Code:	CORRT-MA	Received by:	LB	12/15/17	11:09
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:	12578-2				

Laboratory Data

SDG ID: GBZ60823
Phoenix ID: BZ60826

Project ID: HARRISONBURG, VA
Client ID: WASHINGTON EXT

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Cadmium	10.1	2.3	mg/Kg	1	12/18/17	MA	SW6010C
Chromium	11.6	2.3	mg/Kg	1	12/18/17	MA	SW6010C
Lead	21.3	2.3	mg/Kg	1	12/18/17	EK	SW6010C
Total Metals Digest	Completed				12/15/17	L/AG	SW3050B

RL/PQL=Reporting/Practical Quantitation Level (Equivalent to NELAC LOQ, Limit of Quantitation) ND=Not Detected at RL/PQL
BRL=Below Reporting Level L=Biased Low

Comments:

Results are reported on an ``as received`` basis, and are not corrected for dry weight.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If there are any questions regarding this data, please call Phoenix Client Services.

Phyllis Shiller, Laboratory Director
December 21, 2017
Reviewed and Released by: Ethan Lee, Project Manager

Thursday, December 21, 2017

Criteria: None

State: VA

Sample Criteria Exceedances Report

GBZ60823 - CORRT-MA

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Comments

December 21, 2017 SDG I.D.: GBZ60823

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report: None.

PHOENIX
Environmental Laboratories, Inc.

CHAIN OF CUSTODY RECORD

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: service@phoenixlabs.com Fax (860) 645-0823
Client Services (860) 645-8726

Temp 20 °C Pg of

Data Delivery:
☐ Fax #:
☐ Email: pmeskill@corrtech-inc.com

Customer: Corr Tech
Address: 25 South St
Hopkinton, MA 01748

Project: Harrisonburg, VA
Report to: Corr Tech
Invoice to: Corr Tech

Project P.O: 12578-2
Phone #: 860 526 2670
Fax #: 860 526 5018

Client Sample - Information - Identification

Sampler's Signature: Peter Meskill Date

Matrix Code:
DW=drinking water **WW**=wastewater **S**=soil/solid **O**=other
GW=groundwater **SL**=sludge **A**=air

Analysis Request: EPA 6010B Lead, Cadmium, Chromium

Phoenix Sample #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled	Soil VOA [ ] Methanol [ ] S. Bisulfate [ ] H20	GL Soil container ( ) oz	GL Soil container ( ) oz	40 ml VOA Vial [ ] As is [ ] HCl	GL Amber 1000ml [ ] As is [ ] H2SO4	PL As is [ ] 250ml [ ] 500ml [ ] 1000ml	PL H2SO4 [ ] 250ml [ ] 500ml	PL HNO3 250ml	PL NaOH 250ml	Bacteria Bottle
1	Ridgewood INT	Paint	NA	NA										
2	Ridgewood EXT	Paint	↓	↓										
3	Washington INT	↓	↓	↓										
4	Washington EXT	↓	↓	↓										
								6	0	8	23			
								6	0	8	24			
								6	0	8	25			
								6	0	8	26			

Relinquished by:	Accepted by:	Date:	Time:
USPS	[signature]	12/15/16	11:09

Comments, Special Requirements or Regulations:

Turnaround:
☐ 1 Day*
☐ 2 Days*
☐ 3 Days*
☒ Standard
☐ Other

* SURCHARGE APPLIES

CT/RI
☐ RCP Cert.
☐ GW Protect.
☐ GA Mobility
☐ GB Mobility
☐ SW Protect.
☐ Res. Vol.
☐ Ind. Vol.
☐ Res. Criteria
☐ Other

MA
☐ MCP Cert.
☐ GW-1
☐ GW-2
☐ GW-3
☐ S-1
☐ S-2
☐ S-3
☐ MWRA eSMART
☐ Other

State where samples were collected: VA

Data Format
☐ Excel
☐ PDF
☐ GIS/Key
☐ EQuIS
☐ Other

Data Package
☐ ASP-A
☐ NJ Reduced Deliv. *
☐ NJ Hazsite EDD
☐ Phoenix Std Report
☐ Other

APPENDIX IV
ASTM 3359 Adhesion Test Procedure

Designation: D3359 – 09ε2

Standard Test Methods for Measuring Adhesion by Tape Test[1]

This standard is issued under the fixed designation D3359; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

ε[1] NOTE—Footnote 5 and 5.2 were corrected editorially in June 2010.
ε[2] NOTE—Footnote 5 and 5.2 were corrected editorially and moved into Note 4 in 5.3 in July 2010.

1. Scope*

1.1 These test methods cover procedures for assessing the adhesion of coating films to metallic substrates by applying and removing pressure-sensitive tape over cuts made in the film.

NOTE 1—This test method has been reported being used to measure adhesion of organic coatings on soft substrates (for example, wood and plastic). Issues with plastic substrates are noted in Appendix X1. A similar test method, ISO 2409, permits tests on soft substrates (for example, wood and plaster). Precision and bias data on the later is lacking. Test Methods D3359 was developed with metal as the substrate and, in the absence of supporting precision and bias data, is so limited.

1.2 Test Method A is primarily intended for use at job sites while Test Method B is more suitable for use in the laboratory. Also, Test Method B is not considered suitable for films thicker than 5 mils (125μm).

NOTE 2—Subject to agreement between the purchaser and the seller, Test Method B can be used for thicker films if wider spaced cuts are employed.

1.3 These test methods are used to establish whether the adhesion of a coating to a substrate is at a generally adequate level. They do not distinguish between higher levels of adhesion for which more sophisticated methods of measurement are required.

NOTE 3—It should be recognized that differences in adherability of the coating surface can affect the results obtained with coatings having the same inherent adhesion.

1.4 This test method is similar in content (but not technically equivalent) to ISO 2409.

1.5 In multicoat systems adhesion failure may occur between coats so that the adhesion of the coating system to the substrate is not determined.

1.6 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.7 *This standard does not purport to address the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D609 Practice for Preparation of Cold-Rolled Steel Panels for Testing Paint, Varnish, Conversion Coatings, and Related Coating Products

D823 Practices for Producing Films of Uniform Thickness of Paint, Varnish, and Related Products on Test Panels

D1000 Test Methods for Pressure-Sensitive Adhesive-Coated Tapes Used for Electrical and Electronic Applications

D1730 Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting

D2092 Guide for Preparation of Zinc-Coated (Galvanized) Steel Surfaces for Painting (Withdrawn 2008)[3]

D2370 Test Method for Tensile Properties of Organic Coatings

D3330/D3330M Test Method for Peel Adhesion of Pressure-Sensitive Tape

D3924 Specification for Environment for Conditioning and Testing Paint, Varnish, Lacquer, and Related Materials

D4060 Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser

[1] These test methods are under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and are the direct responsibility of Subcommittee D01.23 on Physical Properties of Applied Paint Films.

Current edition approved June 1, 2009. Published June 2009. Originally approved in 1974. Last previous edition approved in 2008 as D3359 – 08. DOI: 10.1520/D3359-09E02.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] The last approved version of this historical standard is referenced on www.astm.org.

***A Summary of Changes section appears at the end of this standard**

2.2 *Other Standard:*
ISO 2409 Paint and Varnishes — Cross-cut test[4]

3. Summary of Test Methods

3.1 *Test Method A*—An X-cut is made through the film to the substrate, pressure-sensitive tape is applied over the cut and then removed, and adhesion is assessed qualitatively on the 0 to 5 scale.

3.2 *Test Method B*—A lattice pattern with either six or eleven cuts in each direction is made in the film to the substrate, pressure-sensitive tape is applied over the lattice and then removed, and adhesion is evaluated by comparison with descriptions and illustrations.

4. Significance and Use

4.1 If a coating is to fulfill its function of protecting or decorating a substrate, it must adhere to it for the expected service life. Because the substrate and its surface preparation (or lack of it) have a drastic effect on the adhesion of coatings, a method to evaluate adhesion of a coating to different substrates or surface treatments, or of different coatings to the same substrate and treatment, is of considerable usefulness in the industry.

4.2 The limitations of all adhesion methods and the specific limitation of this test method to lower levels of adhesion (see 1.3) should be recognized before using it. The intra- and inter-laboratory precision of this test method is similar to other widely-accepted tests for coated substrates (for example, Test Method D2370 and Test Method D4060), but this is partly the result of it being insensitive to all but large differences in adhesion. The limited scale of 0 to 5 was selected deliberately to avoid a false impression of being sensitive.

TEST METHOD A—X-CUT TAPE TEST

5. Apparatus and Materials

5.1 *Cutting Tool*—Sharp razor blade, scalpel, knife or other cutting devices. It is of particular importance that the cutting edges be in good condition.

5.2 *Cutting Guide*—Steel or other hard metal straightedge to ensure straight cuts.

5.3 *Tape*—25-mm (1.0-in.) wide semitransparent pressure-sensitive tape with an adhesion strength agreed upon by the supplier and the user is needed. Because of the variability in adhesion strength from batch-to-batch and with time, it is essential that tape from the same batch be used when tests are to be run in different laboratories. If this is not possible the test method should be used only for ranking a series of test coatings.

NOTE 4—Permacel P99 tape, previously identified as suitable for this purpose, was withdrawn from manufacture in July 2009. Current supplies of Permacel 99 on the market at this time have a shelf life that runs out in July 2010. Subcommittee D01.23 is assessing alternative tapes and a new interlaboratory study is planned to take place in 2010. Alternative tapes with specifications similar to that of Permacel P99 tape are available. Users of alternative tapes should check whether the alternative tapes give comparable results to the Permacel P99 tape. If more information is required about the tapes being evaluated in the D01.23 interlaboratory study, please contact the Committee D01 staff manager.

5.4 *Rubber Eraser,* on the end of a pencil.

5.5 *Illumination*—A light source is helpful in determining whether the cuts have been made through the film to the substrate.

6. Test Specimens

6.1 When this test method is used in the field, the specimen is the coated structure or article on which the adhesion is to be evaluated.

6.2 For laboratory use apply the materials to be tested to panels of the composition and surface conditions on which it is desired to determine the adhesion.

NOTE 5—Applicable test panel description and surface preparation methods are given in Practice D609 and Practices D1730 and D2092.

NOTE 6—Coatings should be applied in accordance with Practice D823, or as agreed upon between the purchaser and the seller.

NOTE 7—If desired or specified, the coated test panels may be subjected to a preliminary exposure such as water immersion, salt spray, or high humidity before conducting the tape test. The conditions and time of exposure will be governed by ultimate coating use or shall be agreed upon between the purchaser and seller.

7. Procedure

7.1 Select an area free of blemishes and minor surface imperfections. For tests in the field, ensure that the surface is clean and dry. Extremes in temperature or relative humidity may affect the adhesion of the tape or the coating.

7.1.1 For specimens which have been immersed: After immersion, clean and wipe the surface with an appropriate solvent which will not harm the integrity of the coating. Then dry or prepare the surface, or both, as agreed upon between the purchaser and the seller.

7.2 Make two cuts in the film each about 40 mm (1.5 in.) long that intersect near their middle with a smaller angle of between 30 and 45°. When making the incisions, use the straightedge and cut through the coating to the substrate in one steady motion.

7.3 Inspect the incisions for reflection of light from the metal substrate to establish that the coating film has been penetrated. If the substrate has not been reached make another X in a different location. Do not attempt to deepen a previous cut as this may affect adhesion along the incision.

7.4 At each day of testing, before initiation of testing, remove two complete laps of the pressure-sensitive tape from the roll and discard. Remove an additional length at a steady (that is, not jerked) rate and cut a piece about 75 mm (3 in.) long.

7.5 Place the center of the tape at the intersection of the cuts with the tape running in the same direction as the smaller angles. Smooth the tape into place by finger in the area of the incisions and then rub firmly with the eraser on the end of a pencil. The color under the transparent tape is a useful indication of when good contact has been made.

[4] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

7.6 Within 90 ± 30 s of application, remove the tape by seizing the free end and pulling it off rapidly (not jerked) back upon itself at as close to an angle of 180° as possible.

7.7 Inspect the X-cut area for removal of coating from the substrate or previous coating and rate the adhesion in accordance with the following scale:

5A No peeling or removal,
4A Trace peeling or removal along incisions or at their intersection,
3A Jagged removal along incisions up to 1.6 mm (1⁄16 in.) on either side,
2A Jagged removal along most of incisions up to 3.2 mm (⅛ in.) on either side,
1A Removal from most of the area of the X under the tape, and
0A Removal beyond the area of the X.

7.8 Repeat the test in two other locations on each test panel. For large structures make sufficient tests to ensure that the adhesion evaluation is representative of the whole surface.

7.9 After making several cuts examine the cutting edge and, if necessary, remove any flat spots or wire-edge by abrading lightly on a fine oil stone before using again. Discard cutting tools that develop nicks or other defects that tear the film.

8. Report

8.1 Report the number of tests, their mean and range, and for coating systems, where the failure occurred that is, between first coat and substrate, between first and second coat, etc.

8.2 For field tests report the structure or article tested, the location and the environmental conditions at the time of testing.

8.3 For test panels report the substrate employed, the type of coating, the method of cure, and the environmental conditions at the time of testing.

8.4 If the adhesion strength of the tape has been determined in accordance with Test Methods D1000 or D3330/D3330M, report the results with the adhesion rating(s). If the adhesion strength of the tape has not been determined, report the specific tape used and its manufacturer.

8.5 If the test is performed after immersion, report immersion conditions and method of sample preparation.

9. Precision and Bias[5]

9.1 In an interlaboratory study of this test method in which operators in six laboratories made one adhesion measurement on three panels each of three coatings covering a wide range of adhesion, the within-laboratories standard deviation was found to be 0.33 and the between-laboratories 0.44. Based on these standard deviations, the following criteria should be used for judging the acceptability of results at the 95 % confidence level:

9.1.1 *Repeatability*—Provided adhesion is uniform over a large surface, results obtained by the same operator should be considered suspect if they differ by more than 1 rating unit for two measurements.

9.1.2 *Reproducibility*—Two results, each the mean of triplicates, obtained by different operators should be considered suspect if they differ by more than 1.5 rating units.

9.2 Bias cannot be established for these test methods.

TEST METHOD B—CROSS-CUT TAPE TEST

10. Apparatus and Materials

10.1 *Cutting Tool*[6]—Sharp razor blade, scalpel, knife or other cutting device having a cutting edge angle between 15 and 30° that will make either a single cut or several cuts at once. It is of particular importance that the cutting edge or edges be in good condition.

10.2 *Cutting Guide*—If cuts are made manually (as opposed to a mechanical apparatus) a steel or other hard metal straightedge or template to ensure straight cuts.

10.3 *Rule*—Tempered steel rule graduated in 0.5 mm for measuring individual cuts.

10.4 *Tape,* as described in 5.3.

10.5 *Rubber Eraser,* on the end of a pencil.

10.6 *Illumination,* as described in 5.5.

10.7 *Magnifying Glass*—An illuminated magnifier to be used while making individual cuts and examining the test area.

11. Test Specimens

11.1 Test specimens shall be as described in Section 6. It should be noted, however, that multitip cutters[7] provide good results only on test areas sufficiently plane that all cutting edges contact the substrate to the same degree. Check for flatness with a straight edge such as that of the tempered steel rule (10.3).

12. Procedure

12.1 Where required or when agreed upon, subject the specimens to a preliminary test before conducting the tape test (see Note 5). After drying or testing the coating, conduct the tape test at room temperature as defined in Specification D3924, unless D3924 standard temperature is required or agreed.

12.1.1 For specimens which have been immersed: After immersion, clean and wipe the surface with an appropriate solvent which will not harm the integrity of the coating. Then dry or prepare the surface, or both, as agreed upon between the purchaser and the seller.

12.2 Select an area free of blemishes and minor surface imperfections, place on a firm base, and under the illuminated magnifier, make parallel cuts as follows:

[5] Supporting data have been filed at ASTM International Headquarters and may be obtained by requesting Research Report RR:D01-1008. Contact ASTM Customer Service at service@astm.org.

[6] Multiblade cutters are available from a few sources that specialize in testing equipment for the paint industry.

[7] The sole source of supply of the multitip cutter for coated pipe surfaces known to the committee at this time is Paul N. Gardner Co., 316 NE First St., Pompano Beach, FL 33060. If you are aware of alternative suppliers, please provide this information to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

12.2.1 For coatings having a dry film thickness up to and including 2.0 mils (50 µm) space the cuts 1 mm apart and make eleven cuts unless otherwise agreed upon.

12.2.2 For coatings having a dry film thickness between 2.0 mils (50 µm) and 5 mils (125 µm), space the cuts 2 mm apart and make six cuts. For films thicker than 5 mils (125 µm), use Test Method A.[8]

12.2.3 Make all cuts about 20 mm (¾ in.) long. Cut through the film to the substrate in one steady motion using just sufficient pressure on the cutting tool to have the cutting edge reach the substrate. When making successive single cuts with the aid of a guide, place the guide on the uncut area.

12.3 After making the required cuts brush the film lightly with a soft brush or tissue to remove any detached flakes or ribbons of coatings.

12.4 Examine the cutting edge and, if necessary, remove any flat spots or wire-edge by abrading lightly on a fine oil stone. Make the additional number of cuts at 90° to and centered on the original cuts.

12.5 Brush the area as before and inspect the incisions for reflection of light from the substrate. If the metal has not been reached make another grid in a different location.

12.6 At each day of testing, before initiation of testing, remove two complete laps of tape and discard. Remove an additional length at a steady (that is, not jerked) rate and cut a piece about 75 mm (3 in.) long.

12.7 Place the center of the tape over the grid and in the area of the grid smooth into place by a finger. To ensure good contact with the film rub the tape firmly with the eraser on the end of a pencil. The color under the tape is a useful indication of when good contact has been made.

12.8 Within 90 ± 30 s of application, remove the tape by seizing the free end and rapidly (not jerked) back upon itself at as close to an angle of 180° as possible.

12.9 Inspect the grid area for removal of coating from the substrate or from a previous coating using the illuminated magnifier. Rate the adhesion in accordance with the following scale illustrated in Fig. 1:

5B The edges of the cuts are completely smooth; none of the squares of the lattice is detached.
4B Small flakes of the coating are detached at intersections; less than 5 % of the area is affected.
3B Small flakes of the coating are detached along edges and at intersections of cuts. The area affected is 5 to 15 % of the lattice.
2B The coating has flaked along the edges and on parts of the squares. The area affected is 15 to 35 % of the lattice.
1B The coating has flaked along the edges of cuts in large ribbons and whole squares have detached. The area affected is 35 to 65 % of the lattice.
0B Flaking and detachment worse than Grade 1.

12.10 Repeat the test in two other locations on each test panel.

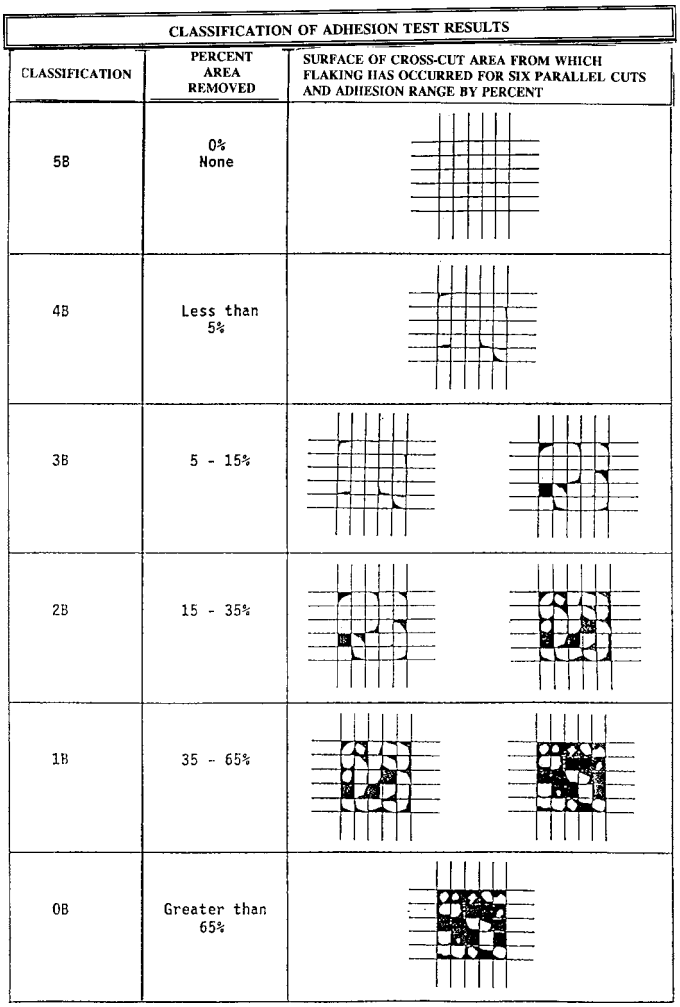


FIG. 1 Classification of Adhesion Test Results

13. Report

13.1 Report the number of tests, their mean and range, and for coating systems, where the failure occurred, that is, between first coat and substrate, between first and second coat, etc.

13.2 Report the substrate employed, the type of coating and the method of cure.

13.3 If the adhesion strength has been determined in accordance with Test Methods D1000 or D3330/D3330M, report the results with the adhesion rating(s). If the adhesion strength of the tape has not been determined, report the specific tape used and its manufacturer.

13.4 If the test is performed after immersion, report immersion conditions and method of sample preparation.

14. Precision and Bias[5]

14.1 On the basis of two interlaboratory tests of this test method in one of which operators in six laboratories made one adhesion measurement on three panels each of three coatings covering a wide range of adhesion and in the other operators in six laboratories made three measurements on two panels each of four different coatings applied over two other coatings, the

[8] Test Method B has been used successfully by some people on coatings greater than 5 mils (0.13 mm) by spacing the cuts 5 mm apart. However, the precision values given in 14.1 do not apply as they are based on coatings less than 5 mils (0.13 mm) in thickness.

pooled standard deviations for within- and between-laboratories were found to be 0.37 and 0.7. Based on these standard deviations, the following criteria should be used for judging the acceptability of results at the 95 % confidence level:

14.1.1 *Repeatability*—Provided adhesion is uniform over a large surface, results obtained by the same operator should be considered suspect if they differ by more than one rating unit for two measurements.

14.1.2 *Reproducibility*—Two results, each the mean of duplicates or triplicates, obtained by different operators should be considered suspect if they differ by more than two rating units.

14.2 Bias cannot be established for these test methods.

15. Keywords

15.1 adhesion; crosscut adhesion test method; tape; tape adhesion test method; X-cut adhesion test method

APPENDIX

(Nonmandatory Information)

X1. COMMENTARY

X1.1 Introduction

X1.1.1 Given the complexities of the adhesion process, can adhesion be measured? As Mittal (**1**)[9] has pointed out, the answer is both yes and no. It is reasonable to state that at the present time no test exists that can precisely assess the actual physical strength of an adhesive bond. But it can also be said that it is possible to obtain an indication of relative adhesion performance.

X1.1.2 Practical adhesion test methods are generally of two types: "*implied*" and "*direct*." "Implied" tests include indentation or scribe techniques, rub testing, and wear testing. Criticism of these tests arises when they are used to quantify the strength of adhesive bonding. But this, in fact, is not their purpose. An "implied" test should be used to assess coating performance under actual service conditions. "Direct" measurements, on the other hand, are intended expressly to measure adhesion. Meaningful tests of this type are highly sought after, primarily because the results are expressed by a single discrete quantity, the force required to rupture the coating/substrate bond under prescribed conditions. Direct tests include the Hesiometer and the Adherometer (**2**). Common methods which approach the direct tests are peel, lap-shear, and tensile tests.

X1.2 Test Methods

X1.2.1 In practice, numerous types of tests have been used to attempt to evaluate adhesion by inducing bond rupture by different modes. Criteria deemed essential for a test to warrant large-scale acceptance are: use of a straightforward and unambiguous procedure; relevance to its intended application; repeatability and reproducibility; and quantifiability, including a meaningful rating scale for assessing performance.

X1.2.2 Test methods used for coatings on metals are: peel adhesion or "tape testing;" Gardner impact flexibility testing; and adhesive joint testing including shear (lap joint) and direct tensile (butt joint) testing. These tests do not strictly meet all the criteria listed, but an appealing aspect of these tests is that in most cases the equipment/instrumentation is readily available or can be obtained at reasonable cost.

X1.2.3 A wide diversity of tests methods have been developed over the years that measure aspects of adhesion (**1-5**). There generally is difficulty, however, in relating these tests to basic adhesion phenomena.

X1.3 The Tape Test

X1.3.1 By far the most prevalent test for evaluating coating "adhesion" is the tape-and-peel test, which has been used since the 1930's. In its simplest version a piece of adhesive tape is pressed against the paint film and the resistance to and degree of film removal observed when the tape is pulled off. Since an intact film with appreciable adhesion is frequently not removed at all, the severity of the test is usually enhanced by cutting into the film a figure *X* or a cross hatched pattern, before applying and removing the tape. Adhesion is then rated by comparing film removed against an established rating scale. If an intact film is peeled cleanly by the tape, or if it debonds just by cutting into it without applying tape, then the adhesion is rated simply as poor or very poor, a more precise evaluation of such films not being within the capability of this test.

X1.3.2 The current widely-used version was first published in 1974; two test methods are covered in this standard. Both test methods are used to establish whether the adhesion of a coating to a substrate is at an adequate level; however they do not distinguish between higher levels of adhesion for which more sophisticated methods of measurement are required. Major limitations of the tape test are its low sensitivity, applicability only to coatings of relatively low bond strengths, and non-determination of adhesion to the substrate where failure occurs within a single coat, as when testing primers alone, or within or between coats in multicoat systems. For multicoat systems where adhesion failure may occur between or within coats, the adhesion of the coating system to the substrate is not determined.

X1.3.3 Repeatability within one rating unit is generally observed for coatings on metals for both methods, with reproducibility of one to two units. The tape test enjoys widespread popularity and is viewed as "simple" as well as low

[9] The boldface numbers in parentheses refer to the list of references at the end of this test method.