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PO/SCT	Submittal	Rev

Job No. 24590

Bechtel National, Inc.

SUPPLIER DOCUMENT STATUS

1. ☑ **Work may proceed.**
2. ☐ **Revise and resubmit. Work may proceed subject to resolution of indicated comments.**
3. ☐ **Revise and resubmit. Work may not proceed.**
4. ☐ **Review not required. Work may proceed.**

Permission to proceed does not constitute acceptance or approval of design details, calculations, analyses, test methods, or materials developed or selected by the supplier and does not relieve supplier from full compliance with contractual obligations.

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Supersedes BNI Document No. 24590-101-TSA-W000-0010-409-880 Rev. 00B
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Accepted by ROBERT VANCE [signature] 9/15/04
Print Name Signature Date

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PURCHASE ORDER SUBMITTAL

Approvals Page

R10367717

RPP-WTP

LAW ADS Pump Procurement Specification

Originator: R. P[illegible] 08.25.04
Date

Reviewed by: [signature] 8/25/04
Date

Approved by: R Barrow
QA Manager 8/25/04
Date

Approved by: [signature]
Design Authority 8/25/04
Date

Approved by: [signature]
Engineering Manager 8/25/04
Date

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA) are regulated at the U. S. Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts that pursuant to AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

24590-QL-HC4-W000-00011-03-00590, Rev. 00A

Revision History

Revision	Date	Comments/Description
0	3/28/03	Original Release.
1	8/25/03	Incorporate customer's 90% design review comments.
2	8/25/04	Incorporate customer's final design review comments

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1. SCOPE

1.1. Project Description and Location

The River Protection Project-Waste Treatment Plant (RPP-WTP) is a facility located on the Department of Energy's Hanford Reservation in southeast Washington State. The facility's purpose is to vitrify radioactive tank waste for permanent disposal.

1.2. Equipment, Material, and Services Required

1.2.1. The purpose of this specification is to provide information for the Vendor to fabricate the Air Displacement Slurry (ADS) pump for the LAW melter feed system. This specification, used along with the attached design drawings, will provide all necessary information for the Vendor to procure all required materials, fabricate parts and provide assemblies. Guidance will be given for non-vendor specific materials such as fasteners and piping.

1.2.2. The Vendor is not responsible for the design of these components.

1.2.3. This specification covers the supply of materials, fabrication, inspection, assembly, disassembly, packing, and delivery to the site.

1.2.4. The Vendor shall be responsible to perform all activities necessary to provide a complete product as specified herein and in the design drawings. If any information contained on the drawings or other contractual documents conflicts with the information contained in this specification, then it must be resolved with the Buyer in writing before commencing work.

1.2.5. The quantity of assemblies shall be identified on the purchase order.

1.2.6. The Vendor may subcontract any portion of the fabrication, manufacturing, or inspections provided it meets the quality assurance requirements of this specification.

1.2.7. The Vendor shall provide any special tools required for assembly, disassembly and reassembly of the components. The latest revision of the drawings shall be listed and controlled by the Buyer documents.

1.3. Work by Others

Vendor's responsibility will terminate with shipment of the assemblies, unless otherwise specified.

1.4. Definitions

LAW Melter	Low Active Waste Melter
Vitrification	The process of joining a waste stream with glass formers at high temperature to produce a stable waste form.
Buyer	Bechtel National, Inc.
Vendor	Company selected by Buyer to fabricate the LAW melter components.
ADS	Air Displacement Slurry

2. REFERENCES

2.1. Codes

The items covered by this specification shall be fabricated in accordance with this specification, the codes and standards listed below and the drawings. The applicable edition of each code and standard shall be the edition in effect at the time of contract. Vendor shall submit a list of codes and standards including year of edition four weeks after contract award.

2.1.1. ASME Boiler and Pressure Vessel Code, Section II, Material Specification.

2.1.2. ASME Boiler and Pressure Vessel Code, Section V, Nondestructive Examination.

2.1.3. ASME Boiler and Pressure Vessel Code, Section VIII, Design & Fabrication of Pressure Vessels.

2.1.4. ASME Boiler and Pressure Vessel Code, Section IX, Qualification Standard For Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators.

2.1.5. ASME B31.3-1996, Process Piping.

2.2. Industry Standards

2.2.1. SSPC-SP NO. 10 NACE NO.2, Joint Surface Preparation Standard Near-White Blast Cleaning.

2.2.2. ANSI/ASME B46.1, Surface Texture.

2.2.3. ANSI/ASME Y14.5M.

2.2.4. AWS A2.4, Symbols for Welding and Nondestructive Testing.

2.2.5. AWS A3.0, Standard Welding Terms and Definitions.

2.2.6. ASTM A-380, Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems.

2.2.7. AWS D1.6, Structural Welding Code, Stainless Steel, 1999.

2.3. Engineering Standards

N/A

2.4. Reference Documents/Drawings

2.4.1. 24590-WTP-3PS-NW00-T0002, Chemical Requirements for Materials Used in Contact with Austenitic Stainless Steel and Nickel-Based Alloys

3. DESIGN REQUIREMENTS

N/A

4. MATERIALS

4.1. Construction

4.1.1. All materials shall be as specified on the relevant drawings and purchased by the Vendor. Any proposed substitutes or concessions shall be agreed to by the Buyer prior to procurement or incorporation into the work. Materials shall be standard products of established manufacturers who have produced the type specified.

4.1.2. Certified Material Test Reports (CMTRs) will be provided to the Vendor for all Buyer Furnished Materials. The test reports will certify that the materials conform to the applicable specification.

4.1.3. Layout and Record Keeping of Buyer Furnished Materials:

4.1.3.1. The Vendor shall keep a record of Buyer Furnished Materials used in fabricating components.

4.1.3.2. The Buyer will supply layout drawings for each supplied item, if uncut plate is supplied.

4.1.3.3. Surplus from the Buyer Furnished Materials shall be returned to the Buyer after completion of the job.

4.1.4. If no references are made in the drawings, provide all materials to complete the work.

4.1.5. All materials provided by the Vendor shall be new and free of defects or mechanical damage.

4.1.6. The Vendor shall submit Certified Material Test Reports (CMTRs) for the following items and shall certify that the test results and materials conform to the applicable specification.

- All base materials.
- All weld filler materials.

4.1.7. Traceability must be maintained to assure material compatibility.

4.1.8. The Vendor shall submit Certificates of Compliance (COC) certifying that the materials conform to the applicable specification.

4.1.9. Carbon steel materials may be cut by thermal or mechanical means. Stainless steel and similar corrosion resistance materials not suitable for standard thermal cutting means may be cut by plasma arc, water jet, laser, mechanical, or equivalent methods. All flame cut and rough edges shall be dressed by grinding or other mechanical methods to remove oxidized materials, burrs, scale, and other impurities that could affect weld quality or subsequent manufacturing operations and/or painting. Stainless steel tooling shall be new or not have been used on carbon steel.

4.1.10. The limits of size and form, including surface texture requirements, of mill stock material (plate, sheet, pipe, tube, etc.) shall, either directly or indirectly, be in accordance with the national standards identified on the drawings. Where stock materials are specified without condition, finish, or temper, the Vendor shall select a commercial grade that is readily available.

4.1.11. Vendor shall submit shop detail drawings for review and approval.

4.2. Prohibited Materials

4.2.1. Materials used in contact with Austenitic stainless steel and nickel-based alloys shall meet the requirements of 24590-WTP-3PS-NW00-T0002, Ref. 2.4.1.

4.3. Special Requirements

N/A

4.4. Storage of Special Materials Prior to Work

4.4.1. The Vendor shall handle and store materials indoors in a locked controlled area to prevent misappropriation and damage or deterioration of the materials. The Vendor shall protect shipping tags and other identifying objects on delivered material for establishing identification and traceability. Heat numbers removed by cutting material shall be transferred to the unused material to maintain traceability.

5. FABRICATION

5.1. Welding

5.1.1. The Vendor shall identify each weld with a unique weld number, providing the following information. In addition the Vendor shall provide weld map format for Buyer approval. A system of control such as "weld travelers" or packages shall be established by the Vendor to control welding activities.

- Purchase Order number
- Weld number
- Welder's name
- Filler metal heat number
- Weld and NDE symbols
- Applicable weld procedure
- Applicable weld inspection procedure(s)

5.1.2. Weld inspection to include:

- Inspector's name
- Accept/Reject statement
- Non-conforming conditions, if any
- Date of Inspection

5.1.3. Welders, Welding Procedure Specifications (WPS) and Procedure Qualification Records (PQR), Qualification of Base Metal, Welding, Inspection, and Inspection Personnel shall be in accordance with AWS D1.6 or ASME BPVC, Section IX. The Vendor shall submit Welding Procedure Specifications and Procedure Qualification Records for Buyer approval.

5.1.4. The Vendor shall be responsible for all welds meeting the requirements of the applicable code, including proper filler metal selection.

5.1.4.1. All structural welds shall be in accordance with AWS D1.6.

5.1.4.2. All pipe welds shall be in accordance with ASME B31.3.

5.1.5. The Vendor shall also have available for review Welder Qualification Records for all welders who will perform welding.

5.1.6. The Vendor shall maintain a record of welds employed at each weld joint, the filler metal heat number and applicable WPS utilized on a weld map, and include in Vendor's data package.

5.1.7. The Vendor shall be responsible for conducting the examination and tests required to qualify the performance of the welders and welding operations and procedures. Welding machines and welding operators shall be currently certified before welding.

5.1.8. Vendor shall use controlled welding techniques to meet final product dimensions and tolerances as provided in the drawings.

5.1.9. Welders shall be requalified when the Buyer determines their work does not meet the performance qualification requirements. Requalification tests shall be the Vendor's responsibility. Welders failing a requalification test shall be removed from work under this specification.

5.1.10. Weld joint symbols shall be interpreted in accordance with AWS A2.4 and AWS A3.0.

5.1.11. Temporary tack-welded attachments: All areas of material where temporary welded attachments have been removed shall be repaired with weld overlay, ground flush, and penetrant inspected to the same acceptance criteria as for VT on welds.

5.2. Assembly

5.2.1. The Vendor shall submit the fabrication plan for Buyer approval. As a minimum the Vendor's fabrication plan shall include the following information.

- Purchase order number
- Sequence of Operation
- Fabrication Techniques
- In-process Inspection
- Handling Techniques

5.2.2. A suggested assembly procedure has been provided as Attachment 1 that has been used to fabricate previous ADS pumps. The Vendor should use this as a basis for the fabrication plan listed in 5.2.1 above.

5.2.3. The Vendor shall inform the Buyer if any aspect of the drawing or specification content is incorrect, or if the application could have an adverse effect on ADS pump life or reliability.

5.2.4. Controls are to be exercised during all stages of fabrication to minimize exposure of stainless steel to contaminants and in particular any chlorides that might cause stress-corrosive cracking. Chloride and halide bearing compounds shall be avoided, however, if used, they must be completely removed by thorough cleaning.

5.2.5. All materials used shall be assembled in a clean condition and provisions to maintain this condition shall be outlined as a part of the fabrication plan.

5.2.6. The Vendor shall assemble components of the ADS pump at the factory. The Vendor shall ship the components to the Hanford site in approved shipping containers.

5.2.7. When equipment must be disassembled into multiple pieces for shipment, the components shall be initially assembled at the Vendor's shop to ensure compatibility. As many components as possible should be fit checked at the Vendor's location first to assure that potential interference and fit up problems are resolved prior to shipment. All items that have been disassembled for shipment should be clearly labeled and tagged.

5.2.8. Where sub-assemblies erected at the shop have to be dismantled for transport to site, then the fasteners holding them together shall be inspected. Fasteners exhibiting distortion, galling, permanent set, or other damage shall, at the discretion of the Buyer, be replaced.

5.2.9. Fasteners shall be tightened in accordance with the torque values in the following table titled "Schedule of Un-Lubricated Bolt Torque" unless otherwise stated on the drawings. ACME nuts and studs shall be lubricated with Bostik Pure Nickel Never-Seez®, Nuclear Grade unless otherwise approved by the Buyer. Torque values for this application are per the drawing requirement. Anti galling compound shall be applied to mating stainless steel threads prior to assembly.

Schedule of Un-Lubricated Bolt Torque

Size	Thds/In		Tensile Stress Area (in2)	50% Yield Load (lbs.)	Torque (ft-lbs)
¼	20	UNC	0.0318	1288	5
3/8	16	UNC	0.0775	3137	20
½	13	UNC	0.1418	5744	48
5/8	11	UNC	0.2259	9148	95
¾	10	UNC	0.3343	13539	169
1	8	UNC	0.6054	24520	409
1-1/8	7	UNC	0.7629	30897	579
1-1/4	7	UNC	0.9686	39229	817
Yield Strength 81000 PSI, Nut Factor – 0.2					

Size	Thds/In		Tensile Stress Area (in2)	50% Yield Load (lbs.)	Torque (ft-lbs)
¼	20	UNC	0.0318	477	2
3/8	16	UNC	0.0776	1162	7
½	13	UNC	0.1418	2127	18
5/8	11	UNC	0.2259	3388	35
¾	10	UNC	0.3343	5014	63
1	8	UNC	0.6054	9082	151
1-1/8	7	UNC	0.7629	11443	215
1-1/4	7	UNC	0.9686	14529	303
Yield Strength 30000 PSI, Nut Factor -0.2					

Size	Thds/In		Tensile Stress Area (in2)	50% Yield Load (lbs.)	Torque (ft-lbs)
¼	20	UNC	0.0318	2385	10
3/8	16	UNC	0.-0775	5809	36
½	13	UNC	0. 1418	10637	89
5/8	11	UNC	0.2259	16942	176
¾	10	UNC	0.3343	25072	313
1	8	UNC	0.6054	45408	757
1-1/8	7	UNC	0.7629	57216	1073
1-1/4	7	UNC	0.9686	72646	1513
Yield Strength 150000 PSI, Nut Factor -0.2					

5.3. Fabrication Hold Points

5.3.1. The Vendor shall provide necessary access to facilities, equipment, records, and personnel to allow performance of required Buyer verifications/inspections. Accomplishment of Buyer source verifications/inspections does not indicate Buyer's final acceptance of the supplied item.

5.4. Heat Treatment

5.4.1. The Vendor shall develop and implement a procedure for heat treatment.

5.4.2. The following components listed in WTP-M-13505 shall be heat treated per AMS 5670:

5.4.2.1. Item 12, nipple

5.4.2.2. Item14, poppet

5.4.2.3. Item 21, rocker arm

5.4.2.4. Item 22, pivot pin

5.4.2.5. Item 23, lift rod pin

5.4.2.6. Item 33, housing

5.4.2.7. Item 36, lift rod assembly comprising of upper and lower lift rods

5.4.3. The heat treatment process shall include solution annealing at an initial temperature of 1,800 degrees Fahrenheit, held at 1,350 degrees Fahrenheit for 8 hours and furnace cooled to 1,150 degrees Fahrenheit for a total time of 18 hours.

5.4.4. The following components listed in WTP-M-13505 also shall be heat-treated.

5.4.4.1. Item 15, actuator magnet target

5.4.4.2. Item 20, lift rod magnet target

5.4.5. The heat treatment process shall include annealing in a wet hydrogen atmosphere at a temperature of 1,550 to 1,600 degrees Fahrenheit for two to four hours and cooled at a rate of 100 to 200 degrees Fahrenheit per hour down to 1,000 degrees Fahrenheit and any rate thereafter.

5.4.6. The Vendor shall maintain heat treatment reports and furnace charts. These shall be include the procedure used for heat treatment and annealing, serial numbers of the temperature measuring devices used to control temperature, and the name of the person responsible for heat treatment and annealing.

5.4.7. The Vendor shall include the heat treatment reports and furnace charts in the documentation package.

5.5. Other Processes

5.5.1. Handling, Cleaning and Maintaining Cleanliness:

5.5.1.1. The Vendor shall submit the procedures for handling, cleaning, and maintaining cleanliness throughout the entire course of this project. Methods and precautions presented in ASTM A380 shall be followed as applicable.

5.5.1.2. Surfaces of each component and its appurtenances shall be visually examined for cleanliness in accordance with ASTM A380, Paragraph 7.2.1. Surfaces not readily accessible to visual examination may be examined by other methods provided in Paragraph 7.2 of ASTM A380 subject to Buyer approval.

5.5.2. Painting:

5.5.2.1. The Vendor shall prepare a painting and inspection procedure for Buyer review.

5.5.2.2. Surfaces shall be prepared for coating in accordance with SSPC-SP-10 and the coating manufacturer's recommendations.

5.5.2.3. Surface finish shall be inspected prior to painting to assure compliance with SSPC-SP-10.

5.5.3. Jigs, Fixtures and Special Tools:

5.5.3.1. Any special tools, jigs, fixtures, tapes, patterns, and tooling prepared for fabrication of the components per this procurement specification for guaranteeing interchangeability or facilitating quantity production shall become the property of the Buyer.

5.5.3.2. The Vendor shall make available to the Buyer during installation and commissioning of the LAW ADS pump, the jigs, fixtures, and special tools used during fabrication and manufacturing of the components.

5.5.3.3. For certifications, implement provisions to ensure that all components used or supplied are not counterfeit or of other suspect origin.

5.5.3.4. Materials and forms of fasteners shall comply with drawings. Any substitutes shall be agreed upon with the Buyer prior to use.

5.5.4. Pipe Thread Sealant:

5.5.4.1. The Vendor shall submit the proposed pipe thread sealant, activator (if necessary) and the applicable Material Safety Data Sheet (MSDS) for each, to the Buyer for review prior to procuring materials.

5.5.4.2. Pipe thread sealant shall be as specified on drawing.

5.5.4.3. The Vendor shall be responsible for submitting materials with properties that meet or exceed those specified. The Vendor shall be responsible for using compatible systems and application methods that are appropriate for the intended service.

5.5.4.4. Pipe thread sealant shall be used as required during assembly of parts in accordance with manufacturer-recommended instructions.

5.5.4.5. All parts to be bonded shall be visually examined for cleanliness in accordance with approved procedures. A report of the inspection results shall be included in the documentation package.

5.5.4.6. Confirm compatibility of sealant with parts to be bonded

5.5.4.7. If aqueous washing systems are used to clean the surfaces before bonding, check for compatibility of washing solution with the adhesive.

5.5.4.8. A determination shall be made as to whether the parts to be bonded are made from an *active* or an *inactive* material.

5.5.4.9. Specific pipe thread sealants will react faster with *active* metals while *inactive* metals will require the use of an activator.

5.5.4.10. If metal is unknown use activator. See pipe thread sealant manufacturer technical data sheet for list of *active* and *inactive* metals.

5.5.4.11. Apply sealant to threads of parts to be bonded following directions for use listed in pipe thread sealant technical data sheet.

6. TESTS AND INSPECTIONS

6.1. General Requirements:

6.1.1. Buyer's representative shall have reasonable access to Vendor's fabrication facilities during normal working hours for source inspection, audit, or surveillance to verify conformance to the specified requirements.

6.2. Personnel Qualifications

6.2.1. Test and inspection personnel qualifications shall be in accordance with National Standards as shown herein.

6.2.2. NDE Personnel Certification: Nondestructive Examination (NDE) personnel performing leak testing and liquid penetrate testing operations shall be certified per the requirements of ASNT SNT-TC-1A. All test reports shall be signed by personnel holding either Level II or Level III certifications that either performed, or witnessed the test. A copy of the individual's current certification(s) shall be provided.

6.3. Non-Destructive Examinations

6.3.1. Visual testing (VT): All welds will be visually inspected to check for absence of cracks, fissures and other surface defects. The Vendor shall submit a VT test procedure for review and approval.

6.3.2. Liquid penetrant testing (PT): Liquid penetrant examination shall be performed on welds as specified in the design drawings and in accordance with ASME BPVC, Section V and accepted to criteria of ASME BPVC, Section VIII, Appendix 8. The Vendor shall submit a PT test procedure for review and approval.

6.4. Shop Tests

6.4.1. The Vendor shall conduct tests in accordance with written procedures approved by the Buyer.

6.4.2. Established (standard/commercial manufacture) items such as fasteners, gearboxes, actuators, and electric motors shall be inspected and tested against manufacturers specifications and industry standards. It shall be supplied with a Certificate of Conformance or test or type certification, unless specified otherwise on drawings or in accompanying contractual documentation.

6.4.3. Prior to acceptance, equipment shall be inspected for leaks of Lubricant and shall be rectified at source.

6.4.4. Hydrostatic Test

The ¾" and ½" pipes including the 6" pipe chamber (items WTP-M-13505-3, -4 and –2) shall be hydrostatically tested to 225 psi per Reference 2.1.5. This can be accomplished by following the steps for hydrostatic test in Attachment 1.

6.4.5. Leak Test

The pump chamber and poppet seat shall be pressure leak tested with the poppet in the lower most position. The test medium shall be potable water and shall be supplied through the quick disconnect fitting to pressurize the chamber. Pressure shall be 35-40 psig and held for a minimum of 10 minutes. Repeat test 3 times and average the leak rate. The acceptable leak rate shall be less than 2 gal/hr. If the leak rate is in excess of this value the Vendor shall consult with Buyer to determine if there is a design or a manufacturing problem that needs correction.

6.4.6. Functional Test

Functionally test the pump actuator assembly by activating the mechanism by hand. All moving parts of the pump and actuator shall work smoothly without binding.

6.4.7. Vertical Balance While Suspended

While suspended vertically by the main bail, the pump shall hang vertically within 5 degrees as measured from the side of the upper tube assembly. The Vendor shall consult with Buyer if counterweights or some other design change is required to meet this requirement.

6.4.8. Load Test of Lifting Bails

Each lifting bail shall be load tested to 125% of the respective component's assembled weight. The bail and connecting hardware shall show no signs of plastic deformation. The Vendor shall consult with Buyer if design changes are required to meet this requirement.

6.5. Site Tests

N/A

6.6. Interpretation of Requirements/Tolerances and Acceptance Criteria

6.6.1. Unless otherwise specifically stated in the detailed drawings, manufacturing and fabrication tolerances for all equipment, accessories, and components shall conform to ASME/ANSI Y14.5M-1994.

6.6.2. Thickness tolerances shall conform to the requirements of the referenced commercial standard. In the absence of such criteria, allowable thickness shall be plus .010 inches, minus .005 inches or as defined on the drawings.

6.6.3. Finishes, thread classes, and edge provisions:

6.6.3.1. Unless otherwise noted, all machined surfaces shall be 125 rms or better in accordance with ASME/ANSI B46.1.

6.6.3.2. Sharp edges and burrs shall be removed from all components, including manufactured assemblies.

6.6.3.3. Internal machined UNC threads shall be class 2B, unless otherwise noted.

6.6.3.4. External machined UNC threads shall be class 2A, unless otherwise noted.

6.6.3.5. All machined thread surface finishes shall be 63 or better in accordance with ANSI B46.1. Burrs shall be removed from the threads.

6.6.4. Fabricated Components

6.6.4.1. Thickness tolerances shall conform to the requirements of the referenced commercial standard applicable to the material being fabricated. When plate thickness is specified herein or in the detailed drawings, it shall be considered to mean minimum thickness.

6.7. Equipment Data Package

On completion of fabrication the Seller shall assemble an equipment data package, which consists of all quality verification documents including but not limited to:

- Welding qualifications verification reports.
- Major repair verification reports (as required).
- Cleaning and coating verification reports.
- Heat-treating reports.
- Material test reports.
- Material certificates of compliance.
- Liquid penetrant examination and verification reports.
- Pressure test reports – hydrostatic and leak tests.
- Visual weld inspection reports.
- Mechanical test reports – functional test.
- Load testing reports

The data package shall be in a three ring binder and include an index of the information contained within. Each pump shall have a separate data package assembled and identified as such. The data package shall be shipped with the applicable pump.

7. ATTACHMENT

7.1. Suggested Assembly ADS Feed Pump

1. Fabricate lower tube assembly (WTP-M-13505-4). NDE and document welds.

2. Check ease of insertion of ¾" feed pipe (WTP-M-13505-13) into socket on cover (WTP-M-13505-6).

3. Weld lower tube assembly to cover. See View H on WTP-M-13500, sheet 3. NDE and document weld.

4. Fabricate tube assembly (WTP-M-13505-3). NDE and document welds.

5. Insert tube assembly into lower tube assembly and ensure that ¾" feed pipe seats in socket on cover assembly. Rotate tube assembly such that, in plan view, the centerline of the ½" vent pipe (WTP-M-13505-24) is centered between two bolt holes (any two) on the cover. Scribe a line on the cover between these two bolt holes. **Verify ¾" feed pipe is still seated in cover socket before welding.** Weld tube assembly to lower tube assembly. See View H on WTP-M-13500, sheet 3. NDE and document weld.

Hydrostatic Test

6. Cut a 1/8" thick rubber disk gasket to 2 7/8" ID x 4 15/16" OD. Position on cover and transfer bolt hole pattern to gasket. Cut 7/16" holes in gasket. Note: holes will cut through the outer edge of the gasket; this is ok.

7. Cut a 12 gauge thick stainless steel disk to 4 1/8" OD.

8. Insert rubber gasket into recess in cover, followed by stainless steel disk. Install housing (WTP-M-13505-33) onto cover and bolt together using studs, lock washers, flat washers and nuts (WTP-M-13500-25, 26, 27 & 28). Uniformly torque in a cross pattern to 7 ft-lb. Note that poppet (WTP-M-13505-14) and screen (WTP-M-13505-10) do not need to be installed at this time.

9. Provide temporary supports for positioning the assembly on an angle with the ¾" and ½" pipes as high as possible. The ½" pipe should be on top. Fit the ¾" pipe for water inlet and ½" pipe for air vent and pressure gauge.

10. Connect the pressure pump and fill with potable water through the ¾" pipe. Continue until all air escapes through the ½" pipe.

11. Install a calibrated 0-250 psig pressure gauge to the ½" pipe.

12. Raise the pressure slowly to 225 psig. Hold the test pressure for at least 10 minutes and view for any areas of deformation. After 10 minutes, visually examine all the pressure containing welds for leaks. (See reference 2.1.5) Note: leaks around the gasket/disk area are acceptable as long as the test pressure is maintained throughout the test duration.

13. Upon successful completion of the test (including retest after repairs, if applicable) document the test results, disassemble and drain the assembly.

14. Fabricate upper tube assembly (WTP-M-13505-31). NDE and document welds.

15. Weld upper tube assembly to lower tube assembly. See elevation view on WTP-M-13500, sheet 2. NDE and document weld.

16. Install nipple (WTP-M-13505-12) into recess in cover.

17. Install poppet (WTP-M-13505-14) into housing. Confirm a smooth sliding fit.

18. Attach rocker arm (WTP-M-13505-21) to housing (capturing poppet) using pivot pin (WTP-M-13505-22) and set screws (WTP-M-13500-19 and WTP-M-13500-15). Attach screen (WTP-M-13505-10) to housing using machine screws and flat washers (WTP-M-13500-23 & 24).

19. Orient housing with cover such that the free end of the rocker arm aligns with the scribe line between the bolt holes on the cover. Attach housing to cover with studs, lock washers, flat washers and nuts (WTP-M-13500-25, 26, 27 & 28).

20. Fabricate flange assembly (WTP-M-13505-1). NDE and document welds.

21. Attach flange assembly to upper tube assembly, sliding the ¾" and ½" pipes through their respective holes in the flange assembly. Seat flange on upper tube assembly. Note: the flange assembly will have to be shifted over about 1" to mate with the upper tube assembly. This will cause the ¾" and ½" pipes to bend slightly. This is ok. However, make sure not to twist the flange assembly relative to the pipes. See Section C-C on WTP-M-13500, sheet 3. TACK WELD ONLY flange assembly to upper tube assembly. (Full welding will be done after lift rod operation is verified).

22. Install bushing (WTP-M-13500-36) in flange assembly.

23. Assemble lift rod assembly (WTP-M-13505-36).

24. Install lift rod assembly through bushing in flange assembly. Slide lift rod guide assembly (WTP-M-13505-40) over lift rod assembly.

25. Attach lift rod assembly to rocker arm using lift rod pin (WTP-M-13505-23), flat washers (WTP-M-13500-20) and roll pin (WTP-M-13500-22).

Functional Test

26. Manually operate the lift rod assembly to check for smooth operation. There should be no binding. Binding will be eliminated with proper orientation of the flange assembly relative to the upper tube assembly.

27. Locate the lift rod guide assembly at the proper elevation and weld to upper tube assembly. NDE and document welds.

28. Weld flange assembly to upper tube assembly. Weld ¾" and ½" pipes to flange assembly. NDE and document welds.

29. Weld round pins to lift rod pin.

30. Attach the lift rod magnet target (WTP-M-13505-20) to the lift rod assembly.

31. Attach the actuator magnet targets (WTP-M-13505-15) to the flange assembly using the threaded studs (WTP-M-13500-11).

32. Attach the vent pipe boot (WTP-M-13505-19) and boot retainer (WTP-M-13505-17) to the flange assembly using the flat washers, lock washers and machine screws (WTP-M-13500-38, 29 & 33).

33. Fabricate the lift bail assembly (WTP-M-13505-5). NDE and document welds.

34. Attach lift bail assembly to flange assembly using shoulder screws, flat washers and nuts (WTP-M-13500-31, 34 & 39).

35. Fabricate the actuator assembly (WTP-M-13510-1).

36. Fabricate the vent valve assembly (WTP-M-13515-1).

Leak Test

37. Attach actuator assembly to magnets on flange assembly.

38. Provide for filling the lower chamber with potable water through the ½" pipe complete with a calibrated pressure gauge 0-60 psig and a valve to regulate pressure up to 40 psig.

39. Cap the ¾" pipe with a stainless steel cap.

40. Position the ADS pump assembly in the vertical position with room at the bottom for a five gallon bucket.

41. Pressurize the air cylinder on the actuator assembly with 35 psig air to push the lift rod into the "down" position (poppet valve in the down position) and pressurize the lower chamber with water to 40 psig.

42. Place the 5 gallon bucket under the pump assembly and begin timing for the leak test per section 6.4.5 of this specification.

43. Drain the test water and disconnect the test apparatus.

44. Attach couplings (WTP-M-13500-37 & 40) to ¾" and ½" pipes.

45. Install O-ring (WTP-M-13500-30) on flange assembly.

46. If leak test is acceptable, tack weld roll pin item (WTP-M-13500-22) to lift rod pin (WTP-M-13505-23).