



PL0193802

RIVER PROTECTION PROJECT – WASTE TREATMENT PLANT

ENGINEERING SPECIFICATION

FOR

ISSUED BY
J.B. 2/26/04
INT DATE

High Integrity Centrifugal Blowers



A. Saguisag
03/03/04

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SPECIFICATION No.
24590-WTP-3PS-MACS-TP004

Rev
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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 the 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.

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1 Scope

1.1 Project Description and Location

The River Protection Project-Waste Treatment Plant (WTP) is a complex of waste treatment facilities where the US Department of Energy's (DOE) Hanford site tank waste will be put into a stable glass form. The WTP Contractor will design, build, and start up the WTP pretreatment and vitrification facilities for the DOE's Office of River Protection (ORP). The waste treatment facilities will pretreat and immobilize the mixed waste (low-activity waste, LAW and high-level waste, HLW) currently stored in underground storage tanks at the Hanford Site.

The Hanford Site occupies an area of about 560 square miles and is located along the Columbia River, north of the city of Richland. The WTP Facility will be constructed at the East End of the 200 East Area of the Hanford Site. Benton, Franklin, and Grant counties surround the Hanford Site.

1.2 Equipment, Material, and Services Required

Design, furnish materials, fabricate, test, and package the High Integrity Centrifugal Blowers (hereinafter called Blower) and accessories in accordance with this specification including:

- 1.2.1 Blowers, each complete with electric motors, adjustable speed drives, and accessories as specified here and in referenced technical specifications and data sheets attached to the Material Requisition (MR).
- 1.2.2 Special tools required for installation and maintenance.
- 1.2.3 Each blower/motor assembly shall include all components and accessories fully assembled, wired, and skid mounted requiring only connection to the Buyer's control systems and ductwork, and to Seller supplied adjustable speed drive. Adjustable speed drives may be shipped separately.
- 1.2.4 Services of an erection and/or startup supervisor, if requested by Buyer.

1.3 Work by Others

- 1.3.1 Material unloading and storage at jobsite
- 1.3.2 Installation labor
- 1.3.3 Foundation and anchor bolts
- 1.3.4 Ductwork external to the unit
- 1.3.5 Electric power supply
- 1.3.6 Wiring external to the blower motor and adjustable speed drive

1.3.7 Field Testing and Inspection

1.4 Definitions

Quality Level	WTP Project's quality classifications of Systems, Structures and Components (SSC's) based on their importance to safety (ITS). Quality levels are 1 (QL-1), 2 (QL-2), 3 (QL-3), and Non-Quality Related. See Supplier Quality Assurance Program Requirements
QL-1	Safety Design Class (SDC) items. Important-To-Safety (ITS) Items and activities for which NQA-1 QA Program and NQA-2 QA Requirements shall be met.
QL-2	Safety Design Significant (SDS) items. Other items and activities for which NQA-1 and NQA-2 compliance is required.
Seismic Category	WTP Project's seismic classifications of SSC's based on their safety function. Seismic categories utilized in this specification are Seismic Category I (SC-1) and Seismic III (SC-III).
C3	Contaminated areas where work requires protective clothing (usually a single set of coveralls, canvas booties, rubber shoe covers, appropriate gloves and head covering). Respiratory protection may, on occasion, be required for specific tasks, but would not normally exceed the requirements for a full face particulate respirator. Also classified as a secondary containment zone.

1.5 Abbreviations

ABMA	American Bearing Manufacturers Association
AMCA	Air Movement and Control Association, Inc.
ASNT	American Society for Nondestructive Testing
ASME	American Society of Mechanical Engineers
AWS	American Welding Society
dB(A)	A-weighted decibel
IPS	International Pipe Standard
NEMA	National Electrical Manufacturers Association
QA	Quality Assurance
OEM	Original Equipment Manufacturer
RTD	Resistance Temperature Detector
SCFM	Standard Cubic Feet per Minute

1.6 Safety/Quality Classifications

Specific Safety Class, Quality Level and Seismic Category classifications of Blowers described in this specification are noted in Blower Data Sheets attached to MR 24590-QL-MRA-MACS-00002.

2 Applicable Documents

The following documents form a part of this specification to the extent specified herein. In the event of conflict between the document referenced herein and the contents of this specification, the Buyer shall be notified of the conflict.

Effective dates of codes and standards shall be as shown in ASME AG-1-1997 with ASME AG-1a Addenda 2000, unless noted otherwise. If effective dates of Codes and Standards to be used by Seller are different from those shown on ASME AG-1-1997 and its addenda, Seller shall provide justification for use of these versions.

2.1 Codes

- 2.1.1 ASME AG-1-1997 with ASME AG-1a Addenda 2000, Code on Nuclear Air and Gas Treatment
- 2.1.2 ASME B & PVC, Section IX, Qualification Standard for Welding and Brazing
- 2.1.3 ASME NQA-1-1989, Quality Assurance Program Requirements for Nuclear Facilities
- 2.1.4 ASME NQA-2-1989, Quality Assurance Requirements for Nuclear Facility Applications
- 2.1.5 AWS D1.1-2000, Structural Welding Code, Steel
- 2.1.6 AWS D1.3-98, Structural Welding Code, Sheet Steel
- 2.1.7 AWS D1.6-99, Structural Welding Code, Stainless Steel
- 2.1.8 AWS D9.1-2000, Sheet Metal Welding Code

2.2 Industry Standards

- 2.2.1 ABMA 9, Load Ratings and Fatigue Life for Ball Bearings
- 2.2.2 ABMA 11, Load Ratings and Fatigue Life for Roller Bearings
- 2.2.3 AMCA 99, Standards Handbook
- 2.2.4 AMCA 99-0401, Classification for Spark Resistant Construction
- 2.2.5 AMCA 99-2404, Drive Arrangement for Centrifugal Fans
- 2.2.6 AMCA 99-2406, Designations for Rotation and Discharge of Centrifugal Fans
- 2.2.7 AMCA 210, Laboratory Methods of Testing Fans for Rating
- 2.2.8 AMCA 300, Reverberant Room Method of Sound Testing of Fans
- 2.2.9 AMCA 301, Method for Calculating Fan Sound Ratings From Laboratory Test Data

- 2.2.10 ASNT-SNT-TC-1A, ASNT Recommended Practice
- 2.2.11 NEMA MG 1, Motors and Generator
- 2.2.12 NFPA 70-1999, National Electric Code

2.3 Engineering Standards

2.4 Reference Documents/Drawings

- 2.4.1 SPEC 24590-WTP-3PS-G000-T0001, "General Specification for Supplier Quality Assurance Program Requirements".
- 2.4.2 SPEC 24590-WTP-3PS-JQ07-T0001, "Instrumentation for Package Systems".
- 2.4.3 SPEC 24590-WTP-3PS-SS90-T0001, "Seismic Qualifications of Seismic Category I/II Equipment and Tanks".
- 2.4.4 SPEC 24590-WTP-3PS-FB01-T0001, "Structural Design Loads for Seismic Category III/IV Equipment and Tanks".
- 2.4.5 SPEC 24590-WTP-3PS-MUMI-T0002, "Low Voltage Induction Motors".
- 2.4.6 SPEC 24590-WTP-3PS-EVV1-T0001, "Adjustable Speed Drives".

3 Design Requirements

3.1 General

Design of the Blowers shall conform to ASME AG-1, Section BA.

3.2 Basic Function

The blowers will provide the motive force required to transport and discharge air and gaseous effluents to atmospheres, as shown in the Blower Data Sheets.

3.3 Performance

- 3.3.1 Blower performance rating shall be based on AMCA-210 standard air conditions and bear the AMCA Certified Rating Seal.
- 3.3.2 Sound Ratings shall conform to AMCA 301, and be tested in conformance to AMCA 300. Sound level data report shall be in accordance with ASME AG-1 BA-4421. Sound pressure level shall not exceed 85 dB(A) at 3-feet. Refer to Appendix A – Noise Requirements for Fans and Blowers. If sound power exceeds 85 dB(A) at 3-feet, Seller shall obtain Buyer permission to proceed in the form of a submittal stating estimated sound power level.

3.4 Design Conditions

- 3.4.1 Design basis performance and capacity data are as listed on the Blower Data Sheets.
- 3.4.2 Air stream properties are shown on Blower Data sheets. Materials of construction used shall be compatible with the effluent being handled.
- 3.4.3 The equipment and appurtenances will be used in a plant that has a design life of 40 years. The design objective for these Blowers shall be based on a useful life expectancy of 40 years with periodic maintenance as recommended by the Seller.

3.5 Environmental Conditions

- 3.5.1 Blowers will be located indoors in plant rooms maintained between 59°F dry-bulb minimum and 95°F dry-bulb maximum temperature during normal operation.
- 3.5.2 Blowers including motor may be stored outdoors at ambient extreme temperature range of minus (-) 23°F dry-bulb to 113°F dry-bulb and relative humidity of 5 to 100%. Adjustable speed drives (ASD) and other electronic components will be stored indoors.

3.6 Mechanical Requirements

- 3.6.1 See Blower Data Sheets.
- 3.6.2 The blower wheel and shaft shall be dynamically balanced in accordance with Section BA-4161 of ASME AG-1. The blower wheel shall be dynamically balanced prior to assembly into the housing. Final balancing shall be performed on the completed assembly. All balancing weights shall be welded in place. All vibration tests shall be in accordance with ASME AG-1, Section BA-4162, with results documented and submitted to Buyer.
- 3.6.3 Blower wheels shall be of the type specified in Blower Data Sheets. Blowers shall be furnished with airtight machined rotary shaft seal or packed stuffing box. Blowers, noted on Blower Data Sheets to be of Spark Resistant Construction, shall be of the AMCA Type in accordance with AMCA 99-0401.
- 3.6.4 Blower wheels shall be fabricated from materials noted in Blower Data Sheets.
- 3.6.5 Housings shall be designed for greater than 125 % of the operating pressure of the blower. Blower inlet and outlet shall include allowances for the full dead weight of any flexible connections connected to the inlet and outlet.
- 3.6.6 Housings shall be designed to prevent any internally propelled missiles from penetrating the housing.
- 3.6.7 Blowers shall be "Gas Tight" in accordance with requirements of Section BA 4142 of ASME AG-1.

- 3.6.8 Seller shall provide a flanged, bolted and gasketed access door, complete with handle, in blower housing to allow inspection. Access door shall be raised design to allow for field installed 2.5 in. thickness insulation when required.
- 3.6.9 Seller shall provide a minimum 1 in. IPS threaded drain coupling welded to housing at low point, with square headed screwed drain plug. Coupling shall be extra-long length to allow extension through 2.5 in. thick insulation, when required.
- 3.6.10 When indicated on the Blower Data Sheets, Seller shall provide and install insulation studs at factory for support of field installed 2.5 in. thick insulation. Studs shall be welded to exterior of blower housing.
- 3.6.11 Seller shall provide lifting eyes or lugs to facilitate lifting and handling of the blowers. If spreader bars or special lifting devices are required, they shall also be furnished. Lifting eyes or lugs and/or spreader bars shall be certified to be suitable for the safe, balanced lifting, and handling of the equipment.
- 3.6.12 Seller shall provide a grounding lug or boss on the blower housing or frame to facilitate attachment of grounding cable by the Buyer.
- 3.6.13 Shaft seals shall be fully capable of withstanding the required test pressures before, during, and after blower operation. Allowable leakage shall be equal to or less than 0.01 % of normal airflow, per inch of blower operating pressure, or 0.5 SCFM, whichever is greater.
- 3.6.14 Shafts shall be stainless steel shaft stock, turned, ground and polished, with machined keyways for attaching impeller and drive and coupling.
- 3.6.15 Bearings shall be heavy-duty pillow block, self-aligning, grease-lubricated ball bearings, or pillow block type, self-aligning, grease-lubricated roller bearings, suitable for the max operating temperature as indicated on the Blower Data Sheets. Seller shall provide a "heat slinger" device, attached to the blower shaft external to the housing, to help in dissipation of heat, for bearing protection, as required. Bearings shall have a minimum L-10 service rating life of at least 200,000 hours. Bearing rating life shall be established in accordance with ABMA 9 or 11, as applicable. Provide seals to prevent loss of lubricant and admission of contaminants. Provide extended lube lines and fittings as required to permit lubrication during operation.
- 3.6.16 Blower drive arrangement shall be as shown on Blower Data Sheets. Drive arrangement shall be per AMCA 99-2404. Designations for rotation and discharge shall be per AMCA 99-2406.
- 3.6.17 All accessible internal welds shall be ground smooth.

3.7 Loadings

- 3.7.1 Blower assemblies shall be self-supporting, capable of carrying the static loads of the blower components and the stress imposed during shipment, installation, and operation.
- 3.7.2 Seismic qualification of the design of blowers shall be in accordance with the methods and procedures described in Specification 24590-WTP-3PS-SS90-T0001, "Seismic Qualification of Seismic Category I/II Equipment and Tanks", or 24590-WTP-3PS-FB01-T0001,

“Structural Design Loads for Seismic Category III/IV Equipment and Tanks”. For Seismic Class I or II blowers, Seller shall submit to the Buyer seismic compliance documentation as required by Specification 24590-WTP-3PS-SS90-T0001.

3.8 Electrical Requirements

3.8.1 Low Voltage Induction Motors

- 3.8.1.1 Induction motors shall be in accordance with Specification 24590-WTP-3PS-MUMI-T0002, Low Voltage Induction Motors, and as indicated on the motor data sheets appended to the Blower Data Sheets except:
 - 3.8.1.1.1 Motors may have cast iron rotor cages.
 - 3.8.1.1.2 Motor space heaters are not required. If provided, they do not have to be removable.
- 3.8.1.2 Electric motors shall be in accordance with NEMA MG-1.
- 3.8.1.3 Drive motors shall be specifically designed and constructed for use with adjustable speed drives in conformance with NEMA MG-1 Part 31 criteria, and shall be matched to the adjustable speed drive. Manufacturer shall provide certification to the Buyer that the motor and adjustable speed drive are compatible and will perform within the specified duty range without incident. Seller shall provide overspeed motor relay protection.
- 3.8.1.4 Motor drive combination shall be suitable for operation for the design conditions shown on the Data Sheets.

3.8.2 Adjustable Speed Drives

- 3.8.2.1 Adjustable speed drives shall be in accordance with Specification 24590-WTP-3PS-EVV1-T0001, Adjustable Speed Drives, except that Seller may provide certification of previous testing at 50°C for 50 hours of ASD circuit boards
- 3.8.2.2 The Adjustable speed drive will be controlled to respond to system operational variations, as specified in the data sheets.
- 3.8.2.3 The adjustable speed drive shall be matched to the drive motor being controlled.
- 3.8.2.4 Switching frequency for the adjustable speed drive shall be selected by the seller to suit the application.
- 3.8.2.5 Adjustable speed drive unit will be mounted in close proximity to the blower drive motor.
- 3.8.2.6 The ASD shall prevent operating the blower at critical speed(s).

3.8.3 Approval of Electrical Equipment

- 3.8.3.1 All electrical equipment and material including fittings, devices, apparatus, fixtures, appliances, utilization equipment, cabinets and control panels, shall be suitable for installation and use in conformity with the NFPA 70-1999.
- 3.8.3.2 Suitability of equipment shall be evidenced by listing or labeling by a nationally recognized testing laboratory (NRTL) as recognized by OSHA. Listing of individual components installed in cabinets and control panels shall not be construed as listing or approval of the assembled cabinet or control panel.
- 3.8.3.3 Alternatives to listing or labeling: With the exceptions to the electrical equipment of types specifically required to be listed by the National Electrical Code, the Authority Having Jurisdiction (AHJ) of RPP-WTP shall accept one of the applicable methods described in Paragraphs 3.8.3.4 and 3.8.3.5 below as an alternative to listing and labeling:
- 3.8.3.4 Equipment and assemblies certified to be safe by a NRTLs "Field Evaluated Product" mark will not be required to be listed or labeled. Internal components and material of "Field Evaluated" equipment and assemblies shall be listed, labeled or recognized if such marking is available.
- 3.8.3.5 Custom made equipment or related installations that are designed, fabricated for, and intended for use by RPP-WTP, and are not marketed to the general public, are not required to be listed or labeled, if they are determined by its manufacturer to be safe for its intended use. The manufacturer's determination must be based on test data, which shall be kept and made available for inspection to RPP-WTP or its agents thereof.

3.9 Instrumentation and Control Requirements

- 3.9.1 Blowers shall be provided with three wire, dual element, 100 ohm platinum RTD to measure the temperature of each blower bearing. Temperature coefficient shall be 0.00385 ohms/ohm/°C.
- 3.9.2 Blowers shall also come equipped with instruments to measure the vibration of the blower bearings. The instruments shall transmit a 4-20 mA signal proportional to the vibration.
- 3.9.3 Both temperature and vibration sensor wires shall be connected to terminal blocks provided by the Seller. Terminal blocks shall be installed in a separate electrical termination box for external connection to Buyer's cable(s). Seller shall provide terminals to allow continuation of conductor shields.
- 3.9.4 Blower shaft speed sensor shall include shaft sensor, connecting cable, and a digital-to-analog signal conditioner. Signal conditioner shall be mounted on adjustable speed drive cabinet. For blower control & instrumentation requirements, see SPEC 24590-WTP-3PS-JQ07-T0001, "Instrumentation for Package Systems".

3.10 Accessibility and Maintenance

- 3.10.1 Buyer's layout allows for necessary access and space requirements to facilitate maintenance during normal plant operation or scheduled shutdown.
- 3.10.2 Seller's recommended accessibility and maintenance requirements for each piece of equipment shall be included in the Seller's submittal.
- 3.10.3 Frequency of inspection and maintenance intervals shall be in accordance with equipment Seller's recommendations.

4 Materials

4.1 Construction

- 4.1.1 Materials of construction shall conform to ASME AG-1-1997, Section BA, Article BA-3000, Table BA-3100 and the attached Blower Data Sheets as applicable.
- 4.1.2 Material test reports of chemical and physical properties shall be provided for all stress components of the blowers, including the blower impeller and its components, blower shaft, and driver support plate in accordance with ASME AG-1, BA-3400.
- 4.1.3 The ASME and/or ASTM material numbers and grades shall be identified and a Manufacturer's Material Certificate of Compliance shall be provided for scrolls, housing side plates, inlets, support framing integral to the blower, and weld filler metal in accordance with ASME AG-1, BA-3410. All material designations shall be indicated on the fabrication drawings and in the material lists.
- 4.1.4 Blower bearing pedestals and motor bases shall be fabricated from structural steel shapes and plates properly reinforced for maximum rigidity unless shown otherwise on the Blower Data Sheet.
- 4.1.5 Blower housings shall be plates fabricated from materials specified in Blower Data Sheets. All seams shall be seal welded.
- 4.1.6 The access door shall be on the horizontal centerline of the blower opposite the blower discharge. Door gasket and seal pads shall meet requirements of ASME AG-1 Article FE-3130.
- 4.1.7 Blowers shall be provided with bolted drive guards that cover the shaft and bearings meeting OSHA requirements. Provisions shall be made for insertion of tachometer and access to lube fittings without removal of drive guards.

4.2 Prohibited Materials

- 4.2.1 Bronze, copper, lead, zinc, tin, antimony, cadmium, or other low melting point metals, their alloys, or materials containing such metals as their basic constituents or molybdenum, and halogens shall not be used in direct contact with stainless steel. This prohibition applies to use

of tools, fixtures, paints, coatings and sealing compounds, and any other equipment or materials used by the Seller in handling, assembly and storage of stainless steel parts or components.

4.2.2 Asbestos and Teflon shall not be used in any component of the blowers or accessories.

5 Fabrication

5.1 Fabrication of Blowers

Fabrication of blowers shall be as specified in ASME AG-1, Article BA-6000.

5.2 Welding

5.2.1 All fabrication, welding, inspection and repair procedures of blower wheels, blower housing, housing framing and supports shall conform with the following, as applicable:

- AWS D1.1, Structural Welding Code, Steel
- AWS D1.3, Structural Welding Code, Sheet Steel
- AWS D1.6, Structural Welding Code, Stainless Steel
- AWS D9.1, Sheet Metal Welding Code

5.2.2 Repairs required as a result of weld rejection by either Buyer or Seller's final inspection shall be fully documented in accordance with Seller's QA program. Weld repair records shall be included with document package.

5.2.3 Welding procedures and procedure qualification records shall be submitted to Buyer for review and permission to proceed prior to use. Each procedure shall be prepared and qualified in accordance with the requirements of the above listed standards or ASME B & PVC, Section IX

5.2.4 Welds shall be inspected in accordance with ASME AG-1, Article AA-6330.

5.3 Assembly

If shipping size is a limitation, units may be fabricated and delivered in sections or subassemblies after permission to proceed has been obtained from the Buyer.

6 Tests and Inspections

6.1 General

Inspection and testing of blowers shall conform to ASME AG-1-1997, Section BA, Article BA-5000.

Seller shall conduct and shall be responsible for the shop test called for in this specification and in applicable standard and referenced documents. Seller shall furnish all facilities necessary for the performance of such tests. Tests in accordance with AMCA standards shall be done in AMCA approved facilities. Inspection and test procedures shall be submitted to Buyer. Test records and results shall be certified.

6.2 Personnel Qualifications

Personnel performing inspections and tests shall be qualified.

6.3 Non-Destructive Examinations

Personnel performing nondestructive examination or reviewing nondestructive examination results shall be certified to ASNT Standard SNT-TC-1A.

6.4 Shop Tests

Buyer's Inspector will indicate test and inspections that the inspector intends to witness after review of Seller's work plan. Buyer shall perform standard factory test which, as a minimum, includes the following, as well as tests called out in referenced specifications for the motors and ASDs. Inspector may witness the following shop tests:

- 6.4.1 Test for blower performance. Performance testing shall be done on one (1) of similar size blowers.
- 6.4.2 Functional performance test for electrical equipment.
- 6.4.3 Blowers shall be tested and accepted for leakage in accordance with Section BA-5142 of ASME AG-1.
- 6.4.4 Vibration performance shall be checked and reported at 10 % increments of full speed blower/ASD tests.
- 6.4.5 Acceptance of test shall be based on test procedure acceptance criteria permitted to proceed by Buyer. All test results shall be certified, documented, and submitted to Buyer for information.

6.5 Site Tests

Buyer startup personnel will perform test after initial installation. Buyer may request Seller assistance during startup.

7 Preparation for Shipment

7.1 General

Blower assemblies shall be packaged, shipped, handled and stored in accordance with ASME NQA-2, Part 2.2, Article 3.2, Levels of Packaging at the following levels:

Level B:

- Blower assemblies with motors and adjustable speed drives
- Motors and adjustable speed drives in packages separate from the blower

Level C:

- Blower assemblies without motors and adjustable speed drives

7.2 Cleanliness

Prior to surface preparation and coating application, visually examine welds, the fan impeller, air stream surfaces of the fan housing, and the air stream surfaces of all furnished accessories. Remove all dirt, oil, and grease, loose mill scale, weld spatter and other foreign matter on surfaces to be painted in accordance with Seller's cleaning and coating procedures.

7.3 Painting

All shop painting shall be in accordance with Seller's painting procedures. Seller's painting procedures shall be submitted to Buyer for information. List of surfaces to be coated, with manufacturer's names of coating materials to be used for each, and manufacturer's standard color chart shall also be submitted.

7.4 Tagging

A stainless steel nameplate shall be attached to each centrifugal blower showing the manufacturer's name, shop location, date of manufacture, serial number, equipment rating, equipment tag numbers, V&ID or P&ID drawing number, weight of assembly and purchase order number. Instruments shall be identified with Buyer provided tag numbers.

7.5 Packaging

Packaging shall be at the NQA-2, Part 2.2, Section 3 at levels noted above.

7.6 Documentation

Seller shall ensure that appropriate documentation is prepared and, if required, signed by the appropriate person(s). The shipping documentation shall accurately reflect specific traceability to the items being shipped. Drawings (wiring diagrams), showing external terminations for Buyer use to connect to Seller provided instrumentation, shall be marked with the Buyer's instrument tag numbers.

8 Quality Assurance

The quality assurance program requirements of this specification are those specified in ASME-NQA-1 marked as applicable in Supplier Quality Assurance Program Requirements (SQAPR) Data Sheet attached to the material requisition, those specified in Part 2.2 of ASME NQA-2, QA

Requirements for Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants, and those specified in 24590-WTP-3PS-G000-T0001.

8.1 QA requirements specific to item(s) or service

- 8.1.1 The supplier shall have in place a QA program meeting general specification 24590-WTP-3PS-G000-T0001 and all the requirements of ASME NQA-1 and ASME NQA-2 marked as applicable in SQAPR Data Sheet. The supplier shall submit his QA manual with his bid.
- 8.1.2 The successful bidder must pass a pre-award survey by the Buyer. Supplier shall demonstrate that their quality program is in compliance with the procurement quality requirements listed in SQAPR Data Sheet. The Supplier shall allow Bechtel, its agent, and DOE access to their facility and any lower tier subcontractor's facility and records pertaining to this purchase order for the purpose of QA Audits and Surveillance at mutually agreed times.
- 8.1.3 All items shall be manufactured in accordance with the Sellers' Quality Assurance Program that has been previously evaluated and accepted by the WTP Quality Assurance Organization. The very same requirements shall be passed down to any lower tier subsupplier.
- 8.1.4 Supplier shall submit their QA program and work plan to Buyer for review prior to commencement of work. The plan shall include documents and procedures to implement the work and include a matrix of essential Quality Assurance elements cross-referenced with the documents/procedures.

8.2 Supplier Deviation

- 8.2.1 Each supplier shall be required to identify and promptly document all deviations from the requirements of the procuring documents. In addition, the supplier shall be required to describe the recommended disposition based on appropriate analysis. Submittals of request for deviations from lower-tier suppliers shall be through the prime supplier to WTP.
- 8.2.2 Supplier-proposed deviations from procurement documents shall be initiated by use of Supplier Deviation Disposition Request (SDDR) form.

9 Configuration Management

Equipment and or components covered by this specification are identified with Components Identification System numbers shown in Blower Data Sheets. Each item is identified in accordance with Section 7.4, Tagging.

10 Documentation and Submittals

10.1 General

Seller shall submit to Buyer Engineering and Quality Verification documents in the forms and quantities shown in Form G-321-E, *Engineering Document Requirement*, and Form G-321-V, *Quality Verification Document Requirements*, attached to the MR.

10.2 Submittals

The Seller shall submit the following:

10.2.1 Drawings

Drawings shall show the following information:

- 10.2.1.1 The outline dimensions of blower, including outline and detail drawings for each component (ASDs, etc). These drawings shall reflect the “as-shipped” configuration of the equipment and instrumentation.
- 10.2.1.2 Details of construction.
- 10.2.1.3 Mounting dimensions and information required for the design of supports and foundations, including any special assembly instructions.
- 10.2.1.4 Operating weights of blower assembly including motor as well as adjustable speed drive components.
- 10.2.1.5 The space required for the removal of components.
- 10.2.1.6 The locations of access doors.
- 10.2.1.7 The weight of individual components.
- 10.2.1.8 The locations and identification of parts that are included in the parts list.
- 10.2.1.9 Wiring and schematic diagrams. Diagrams shall include wire gauges and fuse sizes applicable to the supplied units only.
- 10.2.1.10 The ASTM or equivalent designation for materials.

10.2.2 Procedures

Procedures shall include:

- 10.2.2.1 Welding procedures
- 10.2.2.2 Procedures for repairs of rejected items or parts.
- 10.2.2.3 Electrical component performance test procedures
- 10.2.2.4 Seller’s shipping preparation procedures.
- 10.2.2.5 Test procedures for blower performance.

10.2.3 Inspection and Test Reports

- 10.2.3.1 Records of repairs of rejected items or parts.
- 10.2.3.2 Electrical component performance test reports
- 10.2.3.3 Blower performance test reports, including blower curves
- 10.2.3.4 Sound power levels
- 10.2.3.5 Blower wheel/shaft vibration test reports

10.2.4 Calculations

Seismic analysis/calculations shall be submitted for Buyer's review and permission to proceed.

10.2.5 Manuals

Manuals and instructions shall include:

- 10.2.5.1 Erection and installation manuals which provide complete, detailed procedures for installing and placing equipment in initial operation. The manuals shall include all erection and installation drawings.
- 10.2.5.2 Operation and maintenance manuals which provide complete, detailed descriptions of components and accessories with data sheets showing design, construction and performance data for equipment. Manuals shall include drawings required for operation, maintenance and repair, maintenance requirements, instructions and operational troubleshooting guides. All manuals/drawings shall include OEM part numbers.
- 10.2.5.3 Instruction manuals shall cover every item purchased, including those obtained from a subcontractor. The Seller shall obtain such manuals and lists, and submit them to the Buyer.
- 10.2.5.4 The Seller shall provide instructions regarding site long and short term storage, and preparation and protection of equipment after installation and prior to operation.
- 10.2.5.5 Where manuals include information applicable to several components, sizes or models, non-applicable information shall be lined-out.

10.2.6 Certificates of Conformance

- 10.2.6.1 Seller shall provide Certificates of Conformance demonstrating compliance with all applicable standards, specifications, and drawings.
- 10.2.6.2 Seller shall certify lifting eyes or lugs and/or spreader bars are suitable for the safe, balanced lifting, and handling of the equipment.

10.2.7 Schedules

Lists and schedules shall include:

- 10.2.7.1 Schedule of engineering, fabrication, and testing.
- 10.2.7.2 Parts list, and cost for parts and items subject to deterioration and replacement. Seller to state shelf life and storage requirements for spare parts.
- 10.2.7.3 List of recommended spare parts.

10.2.8 Materials Certificates

Material Certification for components of the blowers shall be submitted as noted in Paragraphs 4.1.1, 4.1.2 and 4.1.3.

10.2.9 Data

Data shall include:

- 10.2.9.1 Buyer's data sheet, completely filled out by the Seller, showing all information required to determine that the units are of the design and materials specified herein, including motor and ASD data sheets.
- 10.2.9.2 Acoustic data report. Sound test data from similar equipment previously tested can be submitted in lieu of test for the purchased equipment.

Appendix A

Noise Requirements for Fans and Blowers

1.0 SCOPE

This Appendix to the specification covers noise requirements for blowers, including all motors, equipment, and sub-systems furnished by the Supplier.

2.0 PERMISSIBLE NOISE LEVELS

The noise limit applies to operation of the Equipment at rated load or full capacity, and during restart and shut down. When the Equipment or a sub-system is operated cyclically or intermittently, the noise limits apply during all portions of the cycle.

The A-weighted noise level at 3 feet from the surface of the blower casing shall not exceed 85 dBA. The limit applies on each of four sides of the blower at the elevation of the centerline of the blower, but no less than 3 feet above grade or the platform upon which the blower is mounted. All noise limits apply to each blower system taken as a whole, and as installed.

If the Supplier cannot meet the required A-weighted limit, even in a free field, the Supplier shall provide the A-weighted level that they can and will guarantee. Estimated octave-band and A-weighted sound power levels of the blower inlet/discharge shall be provided.