SPECIFICATION NO. HWS-6614

FIRE PUMPS

HIGH LIFT PUMP HOUSE

BUILDING 182-N

TECHNICAL SECTIONS

MASTER

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100-N PROJECT CAI-816
U.S. ATOMIC ENERGY COMMISSION
RICHLAND, WASHINGTON

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Preliminary Issue: June 1, 1960
Bid Issue: July 12, 1960

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6614

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SPECIFICATION NO. HWS-6614

FIRE PUMPS

HIGH LIFT PUMP HOUSE

BUILDING 182-N

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SPECIFICATION NO. HWS-6614

FIRE PUMPS

HIGH LIFT PUMP HOUSE

BUILDING 182-N

TECHNICAL SECTIONS

1. SCOPE

This specification covers the design, fabrication, testing and furnishing of two (2) Fire Pumps complete with drivers and appurtenances. The units have been assigned Equipment Piece Number 182-N-2600-8603.

The Fire Pumps shall consist of the following:

- a. One (1) Motor Driven Unit.
- b. One (1) Diesel Engine Driven Unit.

2. TECHNICAL TERMINOLOGY

Technical terminology employed, where not defined herein, shall be as defined by the organizations listed below in Section 3, wherever applicable.

3. CODES AND STANDARDS

The equipment furnished to this specification shall be in strict conformance with the applicable codes, standards, specifications, regulations and test procedures of the following organizations:

- a. American Society of Mechanical Engineers.
- b. American Society for Testing Materials.
- c. American Standards Association.
- d. American Institute of Electrical Engineers.

- e. National Electrical Manufacturers Association.
- f. Diesel Engine Manufacturers Association.
- g. National Board of Fire Underwriters.
- h. Hydraulic Institute.
- i. Underwriters Laboratory.
- j. National Fire Protection Association.

4. GENERAL DESCRIPTION

The equipment specified herein will be located in a building approximately 500 feet above sea level. During normal operation, the Fire Pumps will be supplied with screened Columbia River water from the discharge of four (4) motor driven large capacity low head vertical pumps. A secondary source of river water will be from diesel driven vertical pumps. The Fire System loop header will be pressurized through a control valve on the discharge of high pressure raw water pumps. The operation of the Fire Pumps will be controlled by a pressure switch on the fire header. If the header pressure should drop below a predetermined value, a control valve in a 1" pipe line from the discharge of the high pressure raw water pumps will be actuated to build up the pressure to a higher set value, after which the switch will close the valve. If for any reason the discharge through the control valve cannot build up or maintain the pressure, due to the operation of a fire hydrant or sprinkler, the pressure will fall to a lower value and the motor driven Fire Pump will be actuated by the pressure switch to supply the demand at the hydrant or sprinkler. If the Motor Driven Fire Pump is out of service for maintenance, the Diesel Driven Fire Pump will be automatically started when the pressure in

the fire header drops below the predetermined low value.

5. FIRE PUMP UNITS

Each of the two (2) Fire Pumps shall consist of but shall not be limited to the following components:

- a. Common baseplate for mounting pump, driver and appurtenances.
- b. Horizontal centrifugal pump.
- c. Driver.
- d. Flexible coupling and coupling guard.
- e. Startup Strainer.
- f. Special tools and maintenance equipment.

6. DESIGN CONDITIONS

6.1 General: The design of the pumps shall be based on the following:

The pumps shall handle raw Columbia River water which has passed through screens of five (5) mesh No. 15 W & M gauge galvanized wire, and has the following analysis:

	Peak Max	Typical Max	Normal	Min
Turbidity (APHA Standard)	1600 ppm	170 ppm	10 ppm	2 ppm
Iron (as Fe)	5	1.1	0.1	0.03
Sulfate (as SO ₄)	30	26	10	10
Chloride (as Cl)	2.6	1.5	1.0	0.2
Hardness (as CaCO ₃)	100	80	70	60
Calcium (as Ca)	30	24	20	18
Magnesium (as Mg)	6	5	4	2
Mo Alk (as CaCO ₃)	70	70	60	54
pH	8.6	8.6	8.2	7.8
Free CO ₂ (as CO ₂)	2.0	1.0	0.5	0.0

	<u>Peak Max</u>	<u>Typical Max</u>	<u>Normal</u>	<u>Min</u>
Phenolphthalein Alk (as CaCO ₃)	2.0 ppm	1.0 ppm	0.0 ppm	0.0 ppm
Silica (as SiO ₂)	11	9	6	3
Sodium (as Na)	3	3	2	1
Total Dissolved Solids (as weighed)	110	110	90	80

6.2 Specific: The pumps shall be designed as described below:

	<u>Motor</u>	<u>Diesel</u>
Quantity	1	1
Capacity, gpm	2000	2000
NPSH available, ft	33	33
Suction Head, (Minimum) ft	2	2
(Maximum) ft	56	56
Total Head, ft	256	256
Ambient Air Temperature		
Minimum, F	55	55
Maximum, F	110	110
Water Temperature		
Minimum, F	32	32
Maximum, F	80	80

a. Each pump shall be complete from suction flange to discharge flange and shall be provided with required accessories.

b. Each pump shall be a single stage horizontally split case type centrifugal pump.

c. Each unit shall meet all requirements of the National Fire Protection Association and shall be listed by Underwriters Laboratories.

d. Each pump shall be capable of delivering not less than 150% of rated capacity at a pressure not less than 65% of rated head.

e. Each pump shall have characteristic curve with the head rising continuously from design flow to shut-off at constant pump speed. Shut-off head shall not exceed 120% of the design point head specified above.

f. Each pump unit shall be capable of starting under load.

g. Each pump unit, including baseplate, will be mounted on a concrete foundation.

h. Each complete pumping unit shall be designed to withstand a horizontal earthquake force of 0.2 gravity.

7. APPURTENANCES

Each Fire Pump shall be provided with the following appurtenances except as qualified.

7.1 Pressure Gauges: A compound pressure and vacuum gauge, connected to the suction of the pump. A pressure gauge connected to the discharge of the pump. Each gauge shall have a dial 4-1/2" in diameter and shall be connected to the pump by means of 1/2" cock with lever handle. Each gauge shall be provided with a snubber. Gauges shall be calibrated in pounds per square inch and shall indicate not less than twice the rated working pressure of the pump. Gauges shall have manufacturer's standard graduations.

7.2 Automatic Air Release Valve: A 1/2" float operated air release valve, to automatically release air from the pump casing.

7.3 Casing Relief Valve: A 3/4" relief valve, set slightly below shut off pressure and arranged to permit circulation of sufficient water to prevent pump from overheating.

7.4 Relief Valve: A 6" relief valve, set slightly above the rated pressure (for the Diesel Engine Driven Fire Pump only). Valve shall be capable of passing all the water discharged from the pump without developing excessive pressure. Valve shall be complete with open waste cone.

7.5 Discharge Tee: A discharge tee for a 10" fire header (for the Diesel Engine Driven Fire Pump only)..

7.6 Hose Head: An outside hose station with 6 hose connections, hose valves, caps and chains (for the Diesel Engine Driven Fire Pump only).

7.7 Nameplate: An Underwriter's capacity nameplate, mounted on the unit. Nameplate data shall include the following information.

"E.P. No. 182-N-2600-8603".

8. CONSTRUCTION FEATURES

Pump materials shall be selected for the service specified in accordance with Bidder's standards.

8.1 Case: The pump case shall be horizontally split at the pump shaft centerline with both suction and discharge nozzles located in the lower half casing, enabling the upper case and rotating element to be removed without disturbing the pump alignment or piping connections. The upper half of the casing shall have water seal piping to the stuffing boxes, vents, and lifting eyes or lugs to facilitate removal. Drain plugs capable of completely draining the pump shall be provided in the lower case. The joint between the upper and lower casing halves shall be machined and provided with a gasket or seal to prevent leakage during all ranges of pump operation.

8.2 Bearings: All pump bearings shall be mounted in totally enclosed housings to protect the bearings from foreign matter and shall be accessible for maintenance and replacement. Bearings shall be grease lubricated ball type and housings shall be provided with fittings and taps for grease injection and drainage.

8.3 Stuffing Box: The pumps shall be provided with stuffing boxes and easily adjustable glands between the pump case and drive shaft.

8.4 Base Plate: The pump baseplate shall be cast iron or of welded steel construction designed for integral mounting of the pump and driver. The baseplate shall be provided with a drip lip and tapped connection arranged for the collection of drainage and leakage.

8.5 Flexible Couplings: Flexible couplings shall be provided with coupling guards and shall be of the non-lubricated all steel flexible type (Thomas, or approved equal) designed to limit the driver shaft end play to the tolerances recommended by the driver manufacturer.

8.6 Impeller, Shaft and Wear Rings: Impellers and all rotating pump parts shall be statically and dynamically balanced. The impeller shall be fastened to the shaft in such manner that the connection will withstand the maximum torque or forces that may occur under all operating conditions.

Renewable corrosion and erosion resistant impeller and casing wear rings shall be provided.

At the stuffing boxes, the pump shaft shall be protected with a sleeve of a material and design which will minimize wear.

8.7 Startup Strainer: Each pump shall be provided with a 12" startup strainer, as shown on drawing HWS-6614-A, for mounting at pump

suction.

Strainers shall have carbon steel body with flanged ends faced and drilled for 150 lb Standard. Screens shall be stainless steel.

9. MOTOR DRIVE UNITS

One (1) Fire Pump shall be provided with an open drip proof squirrel cage induction motor for indoor service. Motors shall be NEMA Design B having normal starting torque and low starting current and shall have the capacity and torque characteristics for starting and continuously operating the driven equipment at rated speed under the conditions specified herein. The motors shall be capable of across the line starting at 85% of normal terminal voltage. Service factor shall be 1.15. The motor safe stalled time shall exceed the accelerating time. Motors shall be sized for nameplate rating equal to or greater than the required pump brake horsepower at the specified design point, without using any part of the service factor.

Motors shall be rated 440 volt, 3 phase, 60 cycle having Class "B" type insulation for 40C ambient with a maximum temperature rise of 40C by thermometer as defined by NEMA. Motor windings shall be impregnated with a compound providing protection against moderate amounts of moisture, weak acid conditions and abrasive or conducting dust. Compound shall be General Electric Co. #1007, Westinghouse Special #1, Allis-Chalmers #A7 or approved equal. Motor bearings shall be of the sleeve type and shall be sealed to prevent leakage of oil and to exclude dust and moisture. A split type oversized terminal box, complete with compression type terminal lugs for

receiving external power supply cable, shall be provided with the motor.

10. DIESEL ENGINE DRIVE UNIT

One (1) Fire Pump shall be provided with a diesel engine drive specially approved for fire pump service. The engine shall have a bare engine brake horsepower rating at least 20% greater than the maximum brake horsepower required to drive the pump at rated speed and load, except that engines listed for fire service by the Underwriters Laboratories shall be accepted at the horsepower rating established by the Underwriters Laboratories.

The engine shall be directly connected to the Fire Pump through a flexible type coupling (Thomas or approved equal) without gears or belting.

10.1 Governor: A governor shall be provided to regulate engine speed within a range of 10% between shut-off and maximum load conditions of the pump. It shall be set to maintain rated speed at rated load.

10.2 Tachometer: A tachometer shall be provided to indicate revolutions per minute. In addition, an hour meter shall also be provided to record total time of engine operation.

10.3 Instruments: An oil pressure gauge, graduated in pounds per square inch, shall be provided to indicate engine lube oil pressure. A thermometer, graduated in degrees Fahrenheit, shall also be provided to indicate engine cooling water temperature.

10.4 Instrument Panel: All of the previously mentioned instruments shall be mounted on a panel board secured to the engine.

10.5 Cooling System: The engine cooling system shall be of the closed

circuit type and shall include a circulating pump driven by the engine, a heat exchanger and an engine jacket temperature regulating device. An opening shall be provided in the circuit for filling, checking coolant level, and adding makeup water when required.

The cooling water supply to the heat exchanger shall be from the Fire Pump discharge and the water will have an analysis as given in Section 6.1. The raw water pipe connection shall include a d-c operated solenoid valve, a strainer and a manual shut-off valve. A bypass line with a manual valve shall be provided around the strainer, solenoid valve and regulating valve. A pressure regulating valve shall be provided at the outlet of the strainer to protect the heat exchanger and other low pressure parts against the Fire Pump high discharge pressure.

A pressure gauge, graduated in pounds per square inch, shall be provided in the cooling water system on the engine side of the last control valve.

The cooling water system outlet line shall be at least one size larger than the inlet line and shall discharge into the visible open waste cone. The line shall be installed without any valves.

A water jacketed exhaust manifold shall be provided to dissipate heat and to avoid hazard to operators. The manifold shall be cooled by discharge water from the engine jacket.

10.6 Fuel System: Fuel oil will be stored in an above ground horizontal tank outside the building.

The fuel will be No. 2 burner oil, conforming to Federal

Specification VV-F-815, with the following additional specifications:

a. Cetane rating will not be less than 40 as determined by ASTM Specification D-613.

b. Sulphur content will not exceed 0.5%.

Engine shall be complete with an oil strainer, a shaft driven pump, filters, injectors and interconnecting piping.

A complete fuel oil system shall be provided as shown in Figure 606 of NBFU Pamphlet No. 20, excluding main storage tank and copper tubing.

10.7 Starting Equipment: Engine shall be provided with a d-c electric starting motor, a battery charging d-c generator complete with a voltage regulator, and wiring between units and to terminal points for remote connections.

10.8 Automatic Control Panel: A combined manual and automatic control panel shall be provided for engine starting and stopping; audible and visual alarms; battery charging rectifier suitable for 120 volts, single phase, 60 cycle, and other control devices to conform to requirements of the National Board of Fire Underwriters' as described in NBFU Pamphlet No. 20.

Control panel shall be complete with terminal strips for remote wiring connections, with all switches, relays, timers, pushbuttons, etc., mounted in a sheet steel drip-proof enclosure. Control panel shall be King-Knight Co., Model No. FP 59 or approved equal.

10.9 Storage Battery: Two storage batteries shall be provided and arranged for manual and automatic starting of the engine and to provide a d-c supply for engine control devices. Each battery shall be sized to provide a minimum of four (4) 15 second duration diesel cranking

starting cycles. Starting current shall be furnished alternately from the two batteries on successive operations of the starter, the change-over being made automatically. Charging connections from the engine driven generator, and the control panel charging rectifier, shall likewise alternate from one battery to the other. All charging equipment shall be specifically approved for fire pump service.

Storage batteries shall be heavy duty type, having separators with double insulation. Shipment of batteries shall be in a dry charge condition, with electrolytic liquid in a separate container. Liquid shall be added to the battery at the time the unit is put in service. Battery to be complete with hydrometer and filling equipment.

10.10 Lube Oil System: Engine shall be complete with a lube oil system consisting of oil sump with dipstick, shaft driven oil pump, oil cooler, bypass and full flow filters and interconnected distribution piping system.

10.11 Air Filter(s): Engine shall be provided with engine mounted oil bath type air filter(s) which shall also serve as air intake silencer(s).

10.12 Muffler: Engine shall be provided with flexible exhaust connector and an exhaust muffler designed for outdoor installation. Outdoor temperatures will vary from -25F to +115F.

11. PAINTING

All finished surfaces shall be thoroughly cleaned and protected against corrosion prior to shipment. A shop coat of paint or other approved corrosion protective material shall be applied to all unmachined steel and cast iron surfaces.

SPECIAL CONDITIONS
FOR
SPECIFICATION NO. HWS-6614
FIRE PUMPS
BUILDING 182-N

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SPECIAL CONDITIONS
FOR
SPECIFICATION NO. HWS-6614
FIRE PUMPS
BUILDING 182-N

The following special sections cover those items that are in addition to the standard Terms and Conditions.

1.0 PERFORMANCE

Specific performance shall be as follows:

a. Each pump shall perform successfully under specified operating conditions at the design point, and shall operate in parallel as specified without difficulties such as instability, vapor binding, cavitation, rumble, noise or other signs of distress.

b. The brake horsepower required for each pump when operating at the design conditions specified shall be as indicated in the Technical Data Sheets.

d. Similar parts of each pump shall be completely interchangeable.

2.0 SHOP TESTS AND INSPECTION

Shop tests and inspections, in addition to standard test procedures normally performed on standard equipment, shall be performed by Seller as follows:

a. After assembling, each unit shall be tested for running clearances, alignment, and vibration.

b. The Motor Driven Fire Pump shall be tested with a dynamometer, or calibrated motor and performance curves, showing head, capacity,

efficiency and brake horsepower, shall be submitted promptly after the test.

c. Each assembled pump shall be subjected to a hydrostatic test pressure of 1-1/2 times the design pressure for a period of at least 30 minutes with no visible leaks and without appreciable loss of pressure.

d. The Diesel Driven Fire Pump shall be tested by running as a unit at rated load until engine outlet cooling water and ambient temperatures reach a constant differential. Performance curves, showing head, capacity and brake horsepower shall be submitted promptly after the test.

3.0 FACILITIES, WORK AND MATERIALS BY OTHERS

The following will be provided by others:

a. Receiving, moving, erecting and installing the pumps including providing foundations and anchor bolts in accordance with Seller's instructions and recommendations.

b. Control equipment for starting and stopping the electric motor driven pump including all remote wiring to control panel and motor.

c. All piping, including companion flanges to and from the pump suction and discharge flanges and or tee and waste cone. Fuel piping to inlet and outlet connections at diesel engine. Exhaust piping from diesel engine flexible exhaust connector.

d. Field painting.

4.0 DRAWINGS AND CURVES

4.1 The following drawings and curves shall be submitted with the quotation.

a. Preliminary dimensional drawings for each pump unit, showing support foundation loadings and anchor bolt data to permit preliminary layout and design of installation.

- b. Cross-sectional drawing of the entire pump unit.
- c. Flow diagrams for the lube oil system, fuel oil system and cooling water system for the diesel engine.
- d. Preliminary performance curves showing head, efficiency, brake horsepower versus capacity from zero flow to maximum flow at rated speed.
- e. Diesel engine performance curves, showing torque, fuel consumption and brake horsepower versus engine speed.
- f. Electrical schematic diagram of control panel.

4.2 The following drawings and curves shall be submitted by Seller for review and approval.

- a. Certified dimensional drawings of each pumping unit locating all connections to external piping, cables and locating anchor bolts.
- b. Loading diagram.
- c. Suggested foundation outline.
- d. Complete wiring diagrams of control panel.
- e. Miscellaneous other drawings necessary for complete approval of purchased equipment.
- f. All performance curves and data.

5.0 CONDITIONS FOR AWARD OF CONTRACT

The following items and conditions, in addition to the bid price, will be used as the basis for determining whether to award the contract to a specific Bidder.

- a. Experience - Bidders shall be regularly engaged in the manufacture of fire pumping equipment approved by the Underwriters Laboratories, and shall have manufactured equipment, comparable in size and type to that specified, which is presently in satisfactory commercial operation.
- b. Conformance with the Specification.

c. Completion of the Technical Data Sheets included with the bid package.

d. A review of the proposed design from the standpoint of determining whether the design of the equipment offered will meet the performance requirements specified.

6. SPARE PARTS

Seller shall submit a separate complete list of recommended spare parts necessary for the maintenance of all equipment furnished to this specification for a period of five (5) years. The list shall include quantity, part number, description and unit price for each item.

FIRE PUMPS
BUILDING 182-N
TECHNICAL DATA SHEETS

DATE _____

NAME OF BIDDER _____

ADDRESS OF BIDDER _____

FIRE PUMPS

1. Size and Weights

a. Distance from bottom
of base plate to centerline
of pump shaft, inches

b. Overall height above base
plate, inches

c. Overall length, inches

d. Overall width, inches

e. Pump Weight, lb

Motor

Diesel Engine

f. Driver Weight, lb

g. Bed Plate Weight, lb

h. Total Unit Weight, lb

i. Weight and identification
of heaviest component to be
handled during maintenance, lb

FIRE PUMPS

2. Performance

- a. Capacity, gpm _____
- b. Total Head, ft _____
- c. Speed, rpm _____
- d. Brake Horsepower (design), bhp _____
- e. Efficiency (rated), % _____
- f. Suction Lift (max), ft _____

3. Construction Features

3.1 Material (ASTM Designation Preferred)

- a. Case _____
- b. Impeller _____
- c. Casing Wear Rings _____
- d. Impeller Wear Rings _____
- e. Shaft _____
- f. Shaft Sleeve at Stuffing Box _____
- g. Stuffing Box Glands _____
- h. Stuffing Box Packing _____
- i. Bed Plate _____

3.2 Case: Description including size of ~~side~~ suction and discharge.

3.3 Bearings: Description including housings. _____

3.4 Stuffing Box and Glands:

a. Description. _____

b. Maximum suction pressure permissible without excessive stuffing box leakage for both running and stopped pump. _____

3.5 Impeller, Shaft and Wear Rings: Complete description, including method of fastening and replacing wear rings. _____

3.6 Base Plate: Complete description. _____

3.7 Flexible Coupling:

a. Manufacturer _____

b. Type and Model No. _____

c. Description including coupling guard. _____

3.8 Startup Strainer:

a. Manufacturer _____

b. Size, inches _____ 12 _____

c. Pressure drop when passing:

2000 gpm, ft _____

3000 gpm, ft _____

4. Lubrication System

Complete description for each pump unit _____

5. Motors

a. Manufacturer and NEMA design type and Code Letter _____

b. Type of enclosure _____

c. Rated horsepower _____

d. Number of Phase & Frequency _____

e. Synchronous speed _____

f. Frame size _____

g. Insulation Class _____

h. Speed at rated horsepower _____

i. Voltage, volts _____

j. Current in amperes: _____

at rated horsepower _____

at locked rotor _____

k. Efficiency and power factor at: _____

4/4 load _____

3/4 load _____

2/4 Load _____

l. Guaranteed maximum temperature
rise at rated load (exclusive of service
factor) and specified ambient temperature _____

m. Type of bearings and lubrication _____

n. Maximum driven equipment WK^2 in
lb - ft^2 exclusive of motor WK^2 _____

- d. Motor WK^2 , lb - ft²
- e. Acceleration time, sec
- f. Safe stalled rotor time, sec
- g. Noise level
- h. Provisions for grounding

6. Diesel Engine

- a. Manufacturer
- b. Model Number
- c. Engine Type
- d. Number of Cylinders
- e. Horsepower Rating, bhp
- f. Starting Motor and Engine

Driven Generator, volts d-c

- g. Compression Ratio

6.1 Lube Oil System

- a. Type of pump
- b. Type of cooler
- c. Type of filters
- d. Capacity of sump, gal
- e. Description

6.2 Fuel Oil System

a. Type of pump _____

b. Maximum lift of pump, ft _____

c. Type of filters and strainers _____

d. Pressure drop through filters
and strainers, ft _____

e. Description _____

6.3 Cooling Water System

a. Capacity, gal _____

b. Cooling water req'd, gpm _____

c. Valves and Specialties

Function	Size	Manufacturer	Model Number
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

d. Description _____

6.4 Governor: Complete description _____

6.5 Instruments: List all instruments furnished with pump and engine.

<u>Serial No.</u>	<u>Type</u>	<u>Size</u>	<u>Range</u>	<u>Manufacturer</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

6.6 Air Filter(s)

a. Manufacturer _____

b. Model No. _____

c. Type _____

d. Description _____

6.7 Automatic Starting Equipment

Description _____

6.8 Storage Batteries

- a. Voltage, volts
- b. Ampere hour capacity,
- c. Dimensions
- d. Manufacture
- e. Type Number

7.0 Relief Valves

7.1 Casing Relief Valve

- a. Manufacturer
- b. Size, inches
- c. Capacity, gpm
- d. Set pressure, psi

7.2 Pump Discharge Relief Valve

- a. Manufacturer
- b. Size, inches
- c. Capacity, gpm
- d. Set pressure, psi

8.0 Hose Head

- a. Size of connections, inches
- b. Valve manufacture
- c. Size, type and
Model number of valves

DIMENSIONS IN INCHES

SIZE	6"	8"	10"	12"	14"	16"
A	2"	2 1/2"	2 1/2"	3"	3"	3"
B	2 1/2"	3"	4"	5"	5"	5"
C	1 1/2"	2"	2"	2"	2"	2"
D	2 3/4"	3"	3 1/4"	3 1/2"	3 1/2"	3 3/4"
E	7 1/16"	9 5/8"	11 3/4"	13 3/4"	15"	16 1/16"
F	14"	18"	22"	26"	30"	34"
G	10 3/4"	13 1/4"	15"	16 1/4"	18 3/4"	20 1/4"
H	6 3/4"	8 1/2"	9 5/8"	11 1/4"	11 3/4"	13"

NOTE 1 - 1. FURNISHED WITH NO. 8 MESH, REINFORCED WITH NO. 2 MESH.

2. VARIATIONS IN FACE TO FACE DIMENSIONS AND END CONNECTIONS ARE AVAILABLE.

HWS-6614 A
JULY 12, 1960

ADDENDUM NO. 1

TO

SPECIFICATION NO. HWS-6614

FIRE PUMPS

HIGH LIFT PUMP HOUSE

BUILDING 182-N

TECHNICAL SECTIONS

100-N PROJECT CAI-816

U. S. ATOMIC ENERGY COMMISSION

RICHLAND, WASHINGTON

Approved by: *G. J. Fielin/For* Date: *10/5/60*
Chief Mechanical Engineer
Burns and Roe, Inc.

Submitted by: *Harmons* Date: *10/5/60*
Project Manager
Burns and Roe, Inc.

Accepted by: *W. H. Huse* Date: *10/12/60*
General Electric Company

October 5, 1960

NOTICE TO BIDDERS:

This Addendum contains changes and additions to and shall form a part of Specification No. HWS-6614. Wherever this Addendum changes a portion of a paragraph of the Specification, the remainder of the paragraph affected shall remain in force.

Burns and Roe, Inc.
Architect-Engineer
160 W. Broadway
New York, N. Y.

1849

Add.#1-6614-

ADDENDUM NO. 1
TO
SPECIFICATION NO.. HWS-6614
FIRE PUMPS
HIGH LIFT PUMP HOUSE
BUILDING 182-N

TECHNICAL SECTION

A. Page 6, Section 7.4, Relief Valve

Change to read:

"A relief valve, set slightly... etc."

B. Page 7, Section 8.6, Impeller, Shaft and Wear Rings

Change second paragraph to read:

"Renewable corrosion and erosion resistant casing wear rings shall be provided. Impeller wear rings may be integrally cast with impeller".

C. Page P-9

Add the following:

9.0 Muffler

a. Manufacturer _____

b. Model No. _____

c. Type _____

10. Flexible Exhaust Connector

a. Size _____

b. Length _____

c. End connections _____

AMENDMENT NO. 1
TO
SPECIFICATION NO. HWS-6614
FIRE PUMPS
HIGH LIFT PUMP HOUSE
BUILDING 182-N

100-N PROJECT CAI-816

U. S. ATOMIC ENERGY COMMISSION

RICHLAND, WASHINGTON

Approved by: *R. J. Felm / FER* Date: *1/10/61*
Chief Mechanical Engineer
Burns and Roe, Inc.
Submitted by: *A. L. Laroque / gtb* Date: *1/11/61*
Project Manager
Burns and Roe, Inc.
Accepted by: *W. H. Munn* Date: *1/16/61*
General Electric Company

January 9, 1961

NOTICE:

This Amendment contains changes to and shall form a part of Specification No. HWS-6614. Wherever this amendment modifies a portion of a paragraph of the specification, the remainder of the paragraph affected shall remain in force.

Burns and Roe, Inc.
Architect-Engineer
160 W. Broadway
New York, N. Y.

AMENDMENT NO. 1
TO
SPECIFICATION NO. HWS-6614
FIRE PUMPS
HIGH LIFT PUMP HOUSE
BUILDING 182-N
TECHNICAL SECTIONS

A. Page 3, Section 5

Add the following to item a:

"Diesel engine driven fire pump unit baseplate shall be complete with vibration eliminators".

B. Page 7, Section 8.4

Add the following:

"The baseplate for the diesel engine driven fire pump shall be provided with vibration eliminators to carry the total weight of the unit under operating conditions."

C. Page SC-2, Section 2

Last sentence of paragraph d should read:

"Performance curves, showing head and capacity and pump input horsepower shall be submitted promptly after the test."

AMENDMENT NO. 2

TO --

SPECIFICATION NO. HWS-6614

FIRE PUMPS

HIGH LIFT PUMP HOUSE

BUILDING 182-N

100-N PROJECT CAI-816

U. S. ATOMIC ENERGY COMMISSION

RICHLAND, WASHINGTON

Approved by: A. J. Felton / FOR Date: 4/18/61
Chief Mechanical Engineer
Burns and Roe, Inc.

Submitted by: Parsons Date: 4/18/61
Project Manager
Burns and Roe, Inc.

Accepted by: W. J. Mundt Date: 4-24-61
General Electric Company

April 18, 1961

NOTICE:

This Amendment contains changes to and shall form a part of Specification No. HWS-6614. Wherever this amendment modifies a portion of a paragraph of the specification, the remainder of the paragraph affected shall remain in force.

Burns and Roe, Inc.
Architect-Engineer
160 W. Broadway
New York, N. Y.

1849

Am. #2-6614

Posted
5/1/61
R/V

AMENDMENT NO. 2
TO
SPECIFICATION NO. HWS-6614
FIRE PUMPS
HIGH LIFT PUMP HOUSE
BUILDING 182-N
TECHNICAL SECTIONS

A. Page 6, Section 7.5

Delete in its entirety and substitute the following:

"7.5 Discharge Elbow: An 8" x 10" discharge elbow with base support (for the Diesel Engine Driven Fire Pump only)."