

Sample Wire Fence Specifications

___ . WIRE FENCE

a. General. - The contractor shall erect *(barbed wire)(woven wire) fence with *(wood) X
(metal) posts and *(tubular)(wire) gates *(and fence crossings) at the locations shown on the X
drawings. The contractor shall furnish all materials for the fence and gates, *(and fence X
crossings,) including posts, wire, staples, nails, cement, sand, coarse aggregate, reinforcement,
and all necessary hardware and accessories for complete installation.

The fence shall be in accordance with the details shown on Drawing No. ___ (____). X

b. Materials. -

*[() Metal posts and braces. - Line posts shall conform to Federal Specification X
RR-F-221f: Provided, That line posts shall not weigh less than 1.33 pounds per linear foot
of post and all line posts shall have the same shape. Corner, gate, and brace posts, and post
braces shall conform to Interim Federal Specifications RR-F-00191F/GEN and
RR-F-00191F/3 and shall be zinc coated, steel pipe posts and braces.

() Wood posts and braces. - Wood posts and braces shall be of the minimum diameters X
shown on the drawings, and shall be round or sawn posts and braces conforming to
Commercial Standard CS 235-61 for Pressure Treated Wood Fence Posts (with oil-type
preservatives): Provided, That western cedar or redwood which conform to the above
requirements, except for preservative treatment, may be furnished. (Note: Copies of
Commercial Standard CS 235-61 may be obtained at a price of 15 cents each from
Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20401.)

() Barbed wire. - Barbed wire shall be galvanized; shall be No. 12 and 1/2 gage with X
two-point, No. 14-gage round barbs spaced 4 inches apart; and shall conform to Federal
Specification RR-F-221f, Type 1, Style 2, with Class 1 zinc coating.

() Woven wire. - Woven wire shall be 26 inches high with seven horizontal wires and with X

* Delete or revise as required.

Sample Wire Fence Specifications - Continued

stay wires spaced 6 inches apart; shall have top and bottom wires of No. 10 gage and intermediate and stay wires of No. 12 and 1/2 gage; and shall conform to Federal Specification RR-F-221f, Type II, Style 4, zinc coated.

() Stays, fasteners, and gates. - Stays, fasteners, and gates shall conform to Federal Specification RR-F-221f. X

() Nails and staples. - Nails shall be bright round nails. Staples shall be No. 9-gage galvanized wire staples with a minimum length of 1 and 1/4 inches for red oak and 1 and 1/2 inches for all other species. Staples may be either U-shaped, or L-shaped with ringed shank.] X

c. Erection. - All trees, brush, ground surface irregularities, and other obstacles which would interfere with the proper erection of the fence shall be removed in advance of starting fencing operations. Material so removed shall be disposed of as provided in Paragraph ____ (Clearing). X
Erection operations shall be conducted in a manner that will prevent the escape of stock. Existing cross fences shall be connected to the new fence by placing a corner post at the junction and properly fastening the wire in both fences to the post. Where directed by the contracting officer, the fence shall be connected to structures to prevent stock from entering the areas. The finished fence shall be in alinement, taut, and solid at all points. The fence shall be thoroughly braced as shown on the drawings.

The contractor shall perform all required excavating, backfilling, and compacting of backfill for posts. All timber posts shall be set plumb in postholes to the depths shown on the drawings and in accurate alinement.

Corner, gate, and brace posts, and post braces shall be set in concrete as shown on the drawings and in accurate alinement. The cement content of the concrete shall not be less than 5 and 1/2 bags per cubic yard of concrete. Postholes shall be backfilled in layers of not more than 8 inches and each layer shall be tamped.

Sample Wire Fence Specifications - Continued

All wire shall be drawn tight and fastened securely to each post. Staples shall be driven diagonally to the grain of the post in a manner to hold the wire securely without causing bends or nicks in the wire. Wire stays shall be placed as shown on the drawings.

At changes in alinement, where the angle of deflection is 30° or more, the deflection points shall be considered as corners and corner posts and bracing shall be installed. At other deflection points bracing shall be installed where shown on the drawings.

Brace posts shall be installed on curves within the right-of-way perpendicular to the fence as shown on Drawing No. ____ (_____).

X

In straight line fence, brace posts shall be installed in line with the fence at about every 500 feet. Brace posts in line with the fence shall be similar to the corner panel shown on the above drawing: Provided, That a brace post shall be welded to both sides of the line post and anchored in concrete as shown on the above drawing.

In lieu of welding brace posts to line posts, the contractor may use approved band and socket-type connectors to connect brace posts to line posts. The socket shall be bolted or pinned to the brace posts.

On tangents the wire shall be placed on the sides of the posts which are away from the canal, and on curves the wire shall be placed on the sides of the posts which are away from the center of the curve. At grade changes, including stream channels, where stresses tending to pull the posts from the ground are created, the fencing shall be anchored at the critical point by a double strand of No. 8-gage wire connecting each horizontal line of fence wire to a deadman, weighing not less than 100 pounds, buried in the ground not less than 2 feet.

d. Gates. -

(1) Tubular gates. - The gates shall be galvanized, tubular steel frame gates with at least one

Sample Wire Fence Specifications - Continued

vertical brace at the center and at least one diagonal brace rod to prevent sagging. The gates shall have a covering or filler of welded mesh or woven wire and shall be furnished with the necessary hinges and latches. Latches shall be of an approved type. The gates shall be set level.

(2) Wire gates. - Where required, gates shall be constructed of strands of *(barbed wire) (woven wire) as used in the adjacent fence. Gate wire shall be stretched between timber latch stays, and tied together by two wire stays. The gates shall be supported by wire loops stapled to the gateposts and looped over the latch stays. The strands of *(barbed wire) (woven wire) shall be securely stapled around the latch stays. The gates shall be supported at the top by gate closers as shown on Drawing No. ____ (____). X
X
X

e. Fence crossings at *(canals and laterals). - Fence crossings shall be erected where shown on the profile drawings and as shown on Drawing No. ____ (____). Each fence crossing shall include the length of the two brace panels of *(barbed wire)(woven wire) which adjoins the crossing at the canal or lateral prism. All *(posts, panel lumber, wire, rope, clips, eyebolts, turnbuckles, metal straps), and other hardware shall be of the types and sizes shown on the drawings. Wire rope and all metal parts shall be galvanized. X
X
X
X

f. Measurement and payment. - Measurement for payment will be made of the actual length along each line of erected fence including wire fence gates, but not including tubular metal gates *(or fence crossings). *(No separate payment will be made for fence crossings at canals or laterals but the lengths will be included in the length of fence measured for payment.) Payment for furnishing and erecting *(barbed wire)(woven wire fence), will be made at the unit price per *(mile)(linear feet) bid therefor in the schedule, which unit price shall include the cost of furnishing all materials, *(including cement)(except cement); erecting *(tubular (wire) fence gates; digging and backfilling postholes; placing concrete for posts and braces; making the fence connections; and all other work required for the complete erection of the fence. X
X
X

Sample Wire Fence Specifications - Continued

*(Payment for furnishing and erecting tubular metal fence gates will be made at the unit price per gate bid therefor in the schedule.) X

*(Payment for constructing fence crossings as shown on Drawing No. ____ (_____) will be made at the unit price per crossing bid therefor in the schedule, which price shall include the cost of constructing the brace panels and the cost of furnishing all materials for the crossings.) X

*(Payment for furnishing and handling cement will be made at the unit price per hundredweight (cwt) bid therefor in the schedule.) X

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Sample Chain Link Fence Specifications

____. CHAIN LINK FENCE

a. General. - *[The contractor shall erect chain link fence (at the locations shown on the drawings.) (around the _____ where shown on the drawings.)] *[The item of the schedule for furnishing and erecting chain link fence includes furnishing all materials for the chain link fence and erecting the chain link fence around the _____ where shown on the drawings.]

X
X
X

The contractor shall furnish all materials for the chain link fence, including fabric; posts, gates, and accessories; cement, sand, and coarse aggregate; and other materials required for complete erection of the fence, except padlocks.

The fence shall be standard chain link fence with gates and a guard of three strands of barbed wire in accordance with the details shown on Drawing(s) No. ____ (40-D-5410) *[and ____ (40-D-5365)], *(except that the height of fabric for the ____ high fence shall be ____ feet in lieu of the 7 feet shown on the drawing and), except as otherwise provided in this paragraph.

X
X
X

b. Materials. - Chain link fencing shall conform to Interim Federal Specification RR-F-00191F/GEN and the following detail Interim Federal Specifications.

(1) Chain link fabric. - The chain link fabric shall be one of the following only:

(a) Zinc-coated steel fabric. - Interim Federal Specification RR-F-00191F/1, Type I, 2-inch mesh, No. 11 gage (0.120-inch nominal wire diameter after coating), and minimum weight of zinc coating of 1.2 ounces per square foot of uncoated wire surface.

(b) Aluminum-coated steel fabric. - Interim Federal Specification RR-F-00191F/1, Type II, 2-inch mesh, No. 11 gage (0.120-inch nominal wire diameter after coating), and minimum weight of aluminum coating of 0.30 ounce per square foot of uncoated wire surface.

* Delete or revise as required.

Sample Chain Link Fence Specifications - Continued

(c) Aluminum fabric. - Interim Federal Specification RR-F-00191F/1, Type IV, 2-inch mesh, No. 9 gage (0.148-inch nominal wire diameter).

(2) Fenceposts, top rails, and braces. - Except as otherwise provided in this paragraph or shown on the drawings, fenceposts, top rails, and braces shall be zinc coated, steel pipe posts, rails, and braces in accordance with Interim Federal Specification RR-F-00191F/3.

(3) Gates and gate accessories. - Except as otherwise provided in this paragraph or shown on the drawings, gates and gate accessories shall be in accordance with Interim Federal Specification RR-F-00191F/2.

Gates shall be swing-type gates with zinc-coated, round tubular frames. The gate fabric shall be the same as furnished under Subparagraph b.(1) above.

Each gate leaf shall be equipped with one pair of heavy hinges of the socket type. Gates shall have heavy latches of an approved type and one set of heavy rings riveted to the gate and suitable for locking with a padlock. *(The gate stops for the double gate shall be of such design that the gate latches cannot be frozen in a closed position during cold stormy weather.) Gate hinges, latches, stops, keepers, and other accessories shall be of zinc-coated steel, ductile iron, or malleable iron, except that wire ties and clip bolts and nuts may be of aluminum alloy. The minimum weight of the zinc coating shall be 1.2 ounces per square foot of surface. The barbed-wire guard at the top of each gate shall be in accordance with the details shown on the drawings. X

(4) Chain link fence accessories. - Except as otherwise provided in this paragraph or shown on the drawings, chain link fence accessories shall be in accordance with Interim Federal Specification RR-F-00191F/4.

Post caps, rail ends, and barbed-wire support arms shall be of zinc-coated steel, malleable iron, or ductile iron, except that post caps and rail ends may be of cast iron. Rail sleeves, wire ties and clips, brace bands, tension bands, reinforcing wire, and tension bars shall be of

Sample Chain Link Fence Specifications - Continued

zinc-coated steel, except that wire ties, clip bolts, and nuts may be of aluminum alloy. Two No. 12 and 1/2-gage twisted barbless zinc-coated strands may be substituted for the No. 7-gage bottom reinforcing wire.

The barbed wire shall be one of the following only:

(a) Zinc-coated barbed wire. - Zinc-coated barb wire shall consist of No. 12 and 1/2-gage wire with No. 14-gage, four-point barbs, zinc coated.

(b) Aluminum barbed wire. - Aluminum barbed wire shall consist of two strands of nominal 0.110-inch-diameter aluminum wire with four-point barbs of nominal 0.080-inch-diameter aluminum wire spaced not more than 5 inches apart.

*[(5) Zinc dust-zinc oxide paint. - Federal Specification TT-P-641b, Type II.]

X

c. Erection. - *[Trees, brush, ground surface irregularities, and other obstacles which would interfere with proper erection of the fence shall be cleared and removed in advance of starting other fencing work. Removed material shall be disposed of as provided in Paragraph _____. (Clearing)] The contractor shall perform all required excavating, backfilling, and compacting of backfill for posts, gate stops, and gatekeepers. Posts shall be plumb and in alinement. Posts and gate stops shall be set in concrete as shown. Gatekeepers shall be set in concrete. *(Where the nature of the material to be excavated is such that the holes for the footings cannot be excavated to the required dimensions and the concrete placed directly against the surfaces of the excavation, forms shall be used for the concrete.)

X

X

X

*(The cement content of the concrete shall be not less than 5 and 1/2 bags per cubic yard of concrete.)

X

Gates shall be erected at the location shown, and shall be adjusted to operate in an approved manner. *(Where required for passage of pipes, fabric shall be cut in an approved manner.)

X

Sample Chain Link Fence Specifications - Continued

Damaged areas of galvanizing shall be *[repaired in accordance with Paragraph _____. X
(Painting)] (cleaned with mineral spirits or xylene, followed by wire brushing. After wire
brushing, these areas shall be recleaned with the solvent to remove residue. After cleaning, the
damaged areas shall be given two coats of zinc dust-zinc oxide paint.) Except for painting
damaged areas of galvanizing, no other painting of the fence is required.

*(Where installation of electrical equipment necessitates making ground connections to the X
fence, such connections and materials for making the connections shall be included in the
work for installing the grounding system for the electrical equipment.)

d. Measurement and payment. - Measurement, for payment, of chain link fence will be made X
along the top rail from centerline to centerline of posts, including gates *(and overhangs). X
Payment for furnishing and erecting chain link fence will be made at the unit price per linear
foot bid therefor in the schedule, which unit price shall include the cost of furnishing all
materials, *(including cement)(except cement); *(cutting fabric for passage of pipes); X
performing all required clearing and earthwork; placing concrete for posts, gate stops, and
gatekeepers; and all other work required for complete erection of the fence. *(Payment for X
furnishing and handling cement will be made at the unit price per hundredweight (cwt) bid
therefor in the schedule.)

* * * * *

Canal Fencing. - A unique fencing device was designed and built by employees of the Farwell Irrigation District, Nebr., and is in use at fence line crossings on canals and laterals.

This device consists of a pipe connected to a fencepost with a cable attached to raise or lower a section of fence above the water surface. Figure 38 shows how the fencepost is supported to the cattle guard; it also shows the pipe attachment that raises and lowers the fence. When the water surface in the channel rises, the operator turns the pipe, which twists the cable around the pipe pulling the fence up to the high-water line.

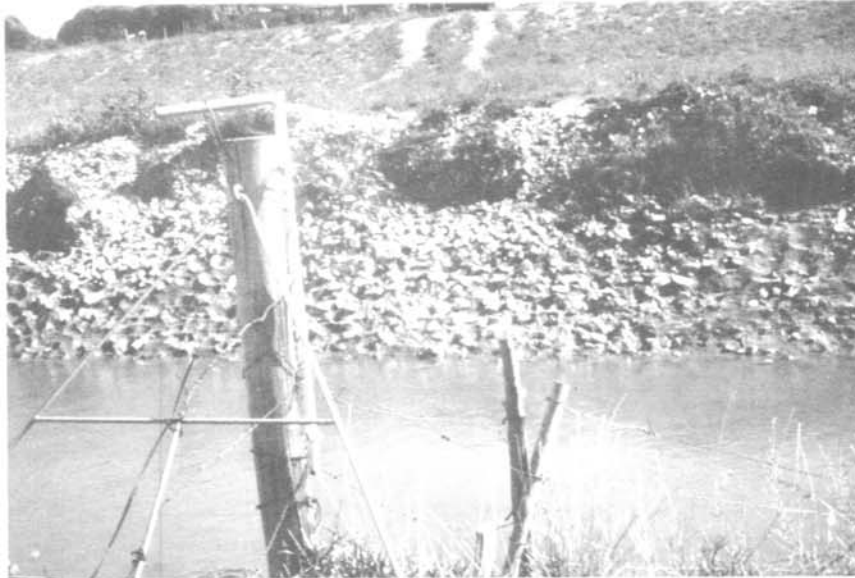


Figure 38

Figure 39 shows the fence panel on the canal side slope between the cattle guard and the high-water line. The fence is designed so that the weeds which float on top of the water surface are not normally caught in the fence. Figure 40 shows a somewhat modified version of the canal fence. It shows the detail of the winch and cable attachment on the fixed and movable posts, and it also shows a full cross section at the fence line with the fence in the high- and low-water position.

Repairing Broken Barbed-wire Fences. - Electricians are familiar with a commercially available device for joining electrical conduit wire consisting of a short length of steel or copper tubing and a crimping tool. Both the crimper and the tubes are available from several manufacturers in a variety of sizes, from very small to very large. This standard crimping equipment was adopted by the San Joaquin Field Division, California Department of Water



Figure 39

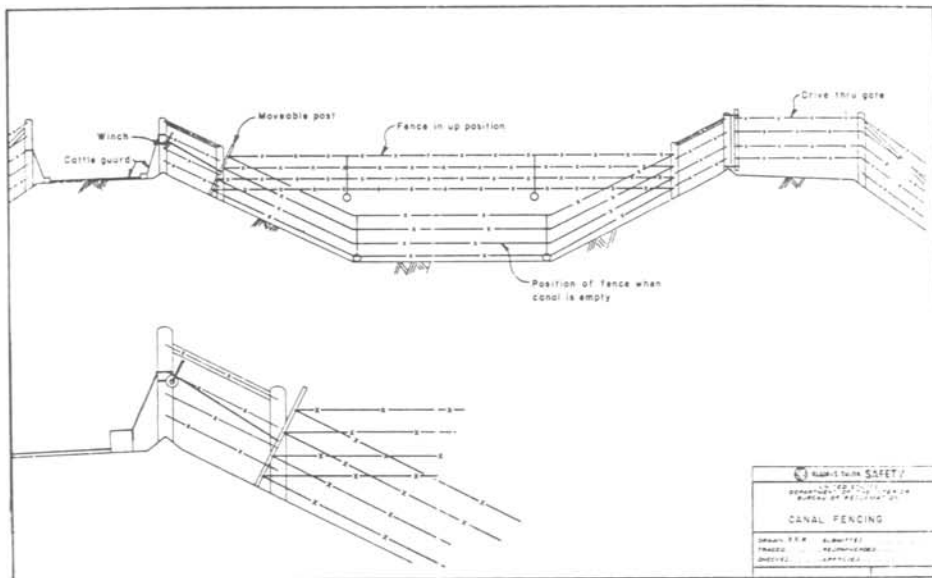


Figure 40

Resources, to solve the problem of restoring broken fences without having to replace barbed-wire strands or struggle to twist short ends together with a pair of pliers. They chose one of the smaller crimping tools (TB-8) and steel tubes as couplers. The broken ends of the wire are inserted into a tube and enough tension is exerted on the fence by one person to lap the wire ends slightly. Then another person simply crimps the wires together. The repaired fence is as strong as before, and the splice was made in shorter time with much less fuss and effort. Figure 41 shows a pair of wires joined in this manner. It is a neat and durable splice - the result of a little creative thinking.

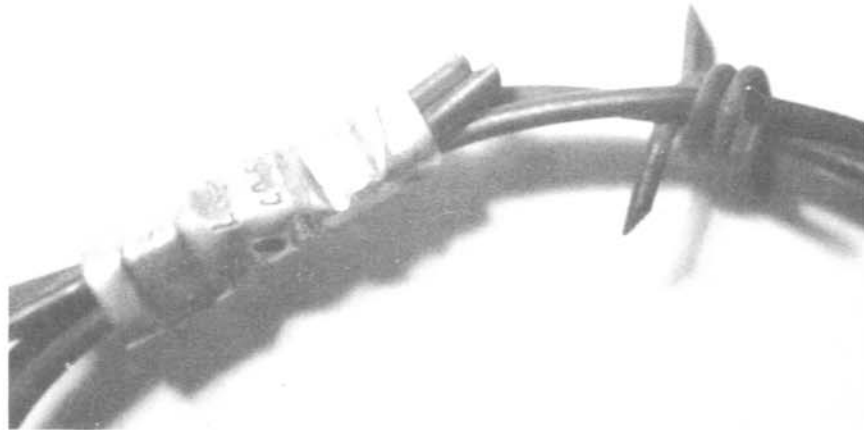


Figure 41

Spraying Equipment for Land Weeds

Spraying equipment for use in the control of land weeds may be of the mounted-motorized type or it may be in easily portable small units, depending upon the job to be done, accessibility of the area where the problem exists, and the conditions and needs encountered on the individual project. Large motorized equipment may be of the single- or multiple-purpose types, with a selection of fixed or control booms, and accessories.

The decision for obtaining single- or multiple-purpose equipment is based on the project's expected requirements. A sprayer will be acquired for a single purpose if there is sufficient need for that one type of performance. Single-purpose units may be designed to get a job done efficiently, using labor, equipment, and materials to the best advantage, provided there is sufficient quantity of one kind of

work to be done during the lifetime of the equipment. Often, other uses will be found for the sprayer should the sprayer be available during a part of the season.

Spray Rigs. - A multiple-purpose unit may fulfill several needs, where the quantity of work of one kind is insufficient to support a single-purpose sprayer. For example, if a project could afford only one weed sprayer, that sprayer probably would be capable of a wide range of pressures and could be changed rapidly to spray with a boom or with a gun to apply sterilants and aquatic herbicides, to fight fires, to transfer liquids from one tank to another, to apply residual insecticides and dust-control chemicals, and to perform other project work where a need exists for the application of liquids under pressure.

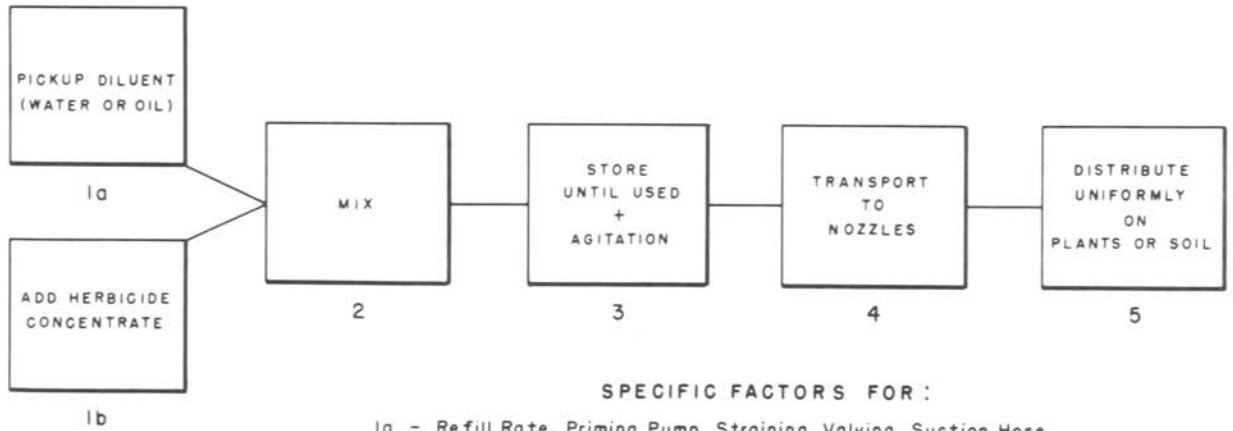
The disadvantages of a multiple-purpose sprayer are: (1) it will do none of the jobs as well, (2) it may be more cumbersome, (3) it may require more changeover time, and (4) the operating charge will be higher than that of single-purpose equipment. Since small, portable power supplies are readily available, a few single-purpose units may be feasible even for a very small irrigation system.

Several of the factors that should be considered in the design and construction of a good quality weed sprayer are shown in figure 42, which illustrates the functions that are required by such a sprayer.

The factors essential to the satisfactory performance of a spray rig are embodied in the waterway weed sprayer shown in figure 43a, which was designed for spraying large and small ditchbanks under irrigation system conditions on the Columbia Basin project. The similar sprayer shown in figures 43b and 43c is in use in the Mid-Pacific Region. The sprayer, designed by Columbia Basin project personnel, was manufactured by the John Bean Manufacturing Company* to specifications issued by the project. They are as follows:

*The John Bean Manufacturing Company has been acquired by:

FMC Corporation
Agricultural Machinery Division
5601 E, Highland Drive
Jonesborough, Arkansas 72401



SPECIFIC FACTORS FOR :

- 1a - Refill Rate, Priming Pump, Straining, Valving, Suction Hose.
- 1b - Concentrate Storage, Metering, Transport to Spray Tank, Valving, Filling, Air Vent.
- 2 - Agitation, Foam Control, Wetting, Emulsification, Invert Problems.
- 3 - Tank (Size, Shape, Location), Gage, Cleaning, Scale, Air Vent.
- 4 - Friction Losses, Hose - Pipe, Valves, Gages, Strainers, Mechanical Activators, Booms - Joints.
- 5 - Spacing, Nozzles, Strainers, Calibration.

GENERAL FACTORS

Corrosion
 Safety Covers
 Fire Prevention
 Weight
 Mounting

DIAGRAM: FUNCTIONS OF A WEED SPRAY RIG

Figure 42



Figure 43a



Figure 43b



Figure 43c

Sample Specifications For Boom-Type Sprayer

1. Service Requirements

The boom sprayer to be purchased under this solicitation will be used by the Bureau of Reclamation in the vicinity of Ephrata, Washington, at an altitude of approximately 1285 feet above sea level. The units will be used for weed spray equipment. Ease of operation, operator comfort, and maneuverability are essential characteristics.

While the right to make changes and improvements remains with the manufacturer, major changes from previous standard production models shall have been thoroughly tested and proven to be satisfactory for use under conditions equal to those specified herein.

Bids on equipment differing in minor details from these specifications but complying with the stated minimum requirements herein will be considered, provided the equipment offered is considered by the contracting officer to be in compliance, in all essential respects, with these specifications. Any differences shall be clearly noted and described by the offeror in his offer.

2. General Requirement

The boom sprayer to be furnished under these specifications shall include truck bed (platform), three-section hydraulically articulated booms mounted to the front left and right corners of the truck platform, operator's control station, an agitated solution tank, chemical and diesel oil supply tanks, and all necessary miscellaneous hardware required to make complete and workable spray unit for attachment to the frame of 21,000 GVW truck having a CA (dimension from back of cab to center of rear axle) of approximately 120 inches. Any necessary dimensions and specifications of the truck will be furnished to the successful bidder in order to assure a unit which will function properly. The sprayer unit shall be completely assembled by the contractor and ready for operation. If, because of transportation problems, it is necessary to ship subassemblies, all component units shall be completely assembled by the contractor at the destination, with all equipment adjusted, completely lubricated and made ready for continuous operation. All labor, equipment, tools, parts, and supplies required for such final assembly shall be furnished by the contractor. The complete boom-sprayer unit will be installed by others, on Government-owned truck.

All parts not specifically mentioned, which are necessary to provide a complete working unit, shall be furnished by the successful bidder

Sample Specifications For Boom-Type Sprayer - Continued

whether herein stipulated or not and shall conform in strength, quality of materials, and workmanship, to what is usually considered good engineering practice. Bids shall be submitted only on NEW EQUIPMENT OF CURRENT STANDARD PRODUCTION.

The overall height of the sprayer unit shall not exceed 62 inches when measured from the top of the truck frame to the top of the tank; controls connected with the operator's station must not extend more than 2 feet above the top of the tank, and overall width for highway transport shall not exceed 8 feet. To insure proper weight distribution the rear end of the solution tank shall not be more than 9-1/2 feet from back of truck cab. Further details of the equipment to be provided are as follows.

3. Truck Platform

The truck bed (platform) shall be fabricated from structural steel members with a deck of four-way safety tread floor plate not less than 1/8-inch thick, which shall be sufficiently strong to adequately support the spray booms by means of attached mounting frames at the front left- and right-hand corners of the platform. The bed (platform) shall be fitted for direct mounting to the truck chassis and shall be sufficiently long to extend at least 12 inches beyond the rearmost extremity of the sprayer power unit but in no case shall it be longer than 15 feet overall, or more than 8 feet wide for highway travel.

4. Suction System and Output Requirement

a. Pump

- (1) Self-priming centrifugal
- (2) Size - no less than 2-inch intake by 1-1/2-inch discharge
- (3) Capacity - at least 75 gallons per minute at 60 lb/in² with refill capacity at 150 gal/min; highest anticipated nozzle demand would be all booms plus two offcenter nozzle on at once, or 52 gallons (40 nozzles at 0.9 gal/min at 10 lb/in² plus two offcenter at 8 gal/min)
- (4) Pressure - simultaneous capability of 60 lb/in² for hand-gun work and offcenter nozzles and 10 lb/in² for boom nozzles
- (5) Open impeller

Sample Specifications For Boom-Type Sprayer - Continued

b. Piping

- (1) Piping to suction side of pump to be 2-inch minimum and shall include a strainer with a minimum of 110 square inches of screen area; screen to be 20 mesh.
- (2) Refill suction connection to be located at rear of truck bed. Suction connection to be of quick-change type to handle 2-inch suction hose. Unit to be complete with two pieces of 2-inch by 15-foot wire reinforced suction hose and quick-change couplings, with storage tubes under truck bed for hose storage.
- (3) Suction lines to backfill hose and tank both to have full-sized, quick action gate or ball valves.
- (4) The refill line from the pump to the tank shall have a full-sized, quick-action ball or gate valve. It shall also have a full-sized check valve to prevent back siphoning the tank contents into the water supply during filling should the engine fail. It should be located so that flow may not occur through the pressure bypass return line either. If the pump is equipped with an integral check valve, such valve required above will not be necessary.

5. Tank

Of rugged construction, welded seams, not less than 10-gage steel.

- a. Capacity - 1,000-gallon total capacity and, in order to obtain proper weight distribution, tank shall be approximately 60 inches wide by 48 inches high by 97 inches long. Tank shall be of three-compartment design; one main 800-gallon spray tank; one 70-gallon storage tank; and one 130-gallon storage tank. The two storage tanks shall be arranged for gravity discharge into a separate 10-gallon measuring tank. Means are to be provided for measuring contents of measuring tank in 1/2-gallon increments. A glass or plastic section inserted in the wall of the measuring tank is preferred over a sight tube.
- b. Means shall be provided to transfer material from the measuring tank through the spray pump to the 800-gallon spray tank.
- c. All tanks to be phosphate-treated and coated with an epoxy inner lining.
- d. All tanks to be designed to insure satisfactory drainage. The main tank shall have a Vee-shaped bottom running lengthwise of the

Sample Specifications For Boom-Type Sprayer - Continued

tank; this Vee to be at least 2 inches deep. The suction line from the tank to the pump shall be located as close as feasible to the low point of this trough. The bottom of the trough will be fitted with a 2-1/2-inch drain opening and plug accessible through a hole in the sprayer platform; this drain to be located at the rear end of the trough.

e. Tank filler openings to be at least 15 inches in diameter and shall be equipped with a durable, nonrusting plastic strainer with 1/8-inch maximum diameter holes.

f. The tank shall be equipped with a sight gage, calibrated to 50-gallon increments to the full vertical height of spray tank to consist of a 1/2-inch clear plastic tube with shutoff valve at bottom.

g. Tank shall have adequate baffling to control shifting of load.

6. Agitator

Mechanical agitator in spray tank to provide thorough mixing of spray materials.

7. Engine

Gasoline, not less than 21.5 hp at 2,400 r/min and equipped with 12-volt electric starter and generator and with battery box and cables, air cleaner, quiet muffler, and spark arrestor.

a. A flexible exhaust pipe should be placed so that the engine is exhausted below the engine deck and shall be shielded to eliminate the possibility of anyone coming in contact with the hot pipe.

b. Belts, chains, couplings, and other moving parts in the pump and engine compartment shall be provided with enclosing guards.

c. The engine shall be so positioned that oil dip stick is easily accessible and adding oil is not difficult.

d. All zerk fittings shall be easily accessible, and tubing shall be added to extend fittings where necessary.

e. The gasoline tank shall be at least 10-gallon capacity, with the filler inlet positioned to prevent spillage or overflow on the engine or exhaust pipe.

Sample Specifications For Boom-Type Sprayer - Continued

f. The engine starter, choke and throttle shall be controllable from the control station.

8. Delivery System

a. The lines to the manifold for the boom valves shall be sized to deliver adequate quantities of solution at 10 lb/in² nozzle pressure, plus line loss from the valves to the booms, within the complete range of boom operation.

b. The system shall include two line strainers of 1-inch minimum size in the lines going to the manifold. These strainers to be sized to minimize friction loss and provide a maximum capacity of 40 gal/min flow at 10 lb/in² nozzle pressure. These strainers shall be of 30 mesh.

c. The valve manifold shall be a pipe of 1-1/4-inch minimum size, served at both ends with at least 1-inch conductors or such size as will insure an adequate supply of solution.

d. The valves shall be full-sized, quick-action ball or gate valves of a size adequate to minimize friction loss. They shall be tapped off the manifold individually and shall not be of the clustered or ganged type.

e. The line to the offcenter nozzle valves will be sized to deliver adequate quantities of solution at 60 lb/in² pressure. It shall include a line strainer sized to provide a maximum capacity of 20 gal/min. This line shall include a 3/4-inch tap with valve and hose threads to provide for attaching a washdown hose or lead to a handgun.

f. The valves for the offcenter nozzles shall be subject to the same requirements listed above for the boom valves.

g. Conducting tubes and hoses from the valves to the booms shall be sized and constructed in such manner that equal pressure and adequate solution will be supplied to each boom section.

9. Control Station

The operator's seat shall be at a control station to the rear of the tank and above the pump power unit. The station shall be so designed that the operator's seat is 4 to 12 inches above the top of the tank and located at least 12, but not more than 14 feet from the front of the truck platform. The seat shall be of the spring-loaded hydraulic shock absorbing type, adjustable for various weights of operators.

Sample Specifications For Boom-Type Sprayer - Continued

The operator shall have in front of him, to his left-hand side, four control valves for controlling the horizontal movement of the boom and the vertical movement of the three boom sections of the left side of the truck, and likewise a similar control located to his right; both of these to be at the quarter position slightly above, so that he can operate both while looking straight ahead or to either side, if necessary. Between these control valves shall be located seven low-pressure shutoffs, six of which shall control the six sections individually of the two spray booms and one of which shall control a spray bar which is to be mounted under the truck, the spray bar of which will be furnished and installed by the Government. This pressure circuit shall be adjustable from 5 to 25 pounds, by means of pump control and proper pressure regulation. Two additional control valves shall be provided on a separate circuit with pressure regulation from 30 to 50 pounds, which can be used simultaneously while the seven main boom sections are being operated at their lower pressure rate. These two valves shall have stainless steel or oil-resistant hose lines leading from them to near the outer end of each three-section boom and shall be so mounted at that point that a 3/4-inch offcenter nozzle may be installed near the boom tip for additional width of coverage and operation at the high-pressure range. These lines will terminate far enough inboard in relation to the last boom nozzle so that there will be no skip in coverage between the boom and offcenter nozzle swathes.

Two pressure gages shall be provided showing the operating pressure for both the high- and low-pressure circuit at a convenient location where they may be observed by the operator. This operator station shall be accessible by means of a ladder or step with adequate hand rails and guard rails with gate, and shall have a floor of safety floor plate covering the entire engine area below. The control station shall be constructed in a manner that will not obscure the operator's view of the inner boom section.

10. Side Booms

There shall be installed 2 three-section hydraulically positioned side booms, one on the left front corner and one on the right front corner of the platform. These booms shall be capable of the following motion:

- a. The entire boom shall be moved in a horizontal plane from a position at right angles to the direction of travel of the vehicle to a position parallel to the direction of travel. Further suitable hydraulic relief mechanism shall be provided to permit the boom to be pushed back should it accidentally strike an object, and this relief shall be adjustable so that the optimum pressure setting

Sample Specifications For Boom-Type Sprayer - Continued

may be reached on this swinging device whereby the boom will stay at right angles to the vehicle when in normal spraying activity and whereby it can be pushed back to the position parallel to the line of travel with the least possible effort.

b. The first section shall have one end connected to the bracket by which the boom is moved horizontally and the opposite end connected to the second section. The movement of this section shall be accomplished by a hydraulic cylinder or other suitable means which shall move it in a vertical plane from at least 60° above to at least 30° below horizontal. This boom shall be not less than 78 inches nor more than 84 inches in length.

c. The second or middle section shall be controlled hydraulically by means of a cylinder and/or other means which shall permit it to move in relation to the first section (assuming the first section is horizontal) of not less than 135° above, to not less than 75° below horizontal. This section shall be not less than 100 inches nor more than 110 inches long.

d. The third or outer section shall be hydraulically controlled by means of hydraulic cylinder or other means so that it may move in relation to the second section (assuming the second section is horizontal) of not less than 180° above horizontal to not less than 75° below horizontal. This section shall be not less than 90 inches nor more than 96 inches long.

All hydraulic movements of the boom shall be controlled through four-way hydraulic control valves and the operation hydraulic devices shall be of such nature that the sections are held in accurate relationship with each other, having approximately equal resistance to the tendency to move up or down as the truck "bounces" over rough roads.

These booms shall be so structurally designed as to have sufficient strength to permit operation at speeds from 4 to 7 mi/h over rough gravel roads.

The solution shall be carried to the boom through stainless steel tubing and flexible hosing of the oil-resistant type.

11. Nozzles

Fittings for the connection of 1/4-inch male thread nozzles shall be provided in the horizontal plane with openings extending to the rear of the boom when the boom is in normal operating position. The nozzles shall be furnished and installed by the Government.

Sample Specifications For Boom-Type Sprayer - Continued

All solution-carrying hoses shall be at least 5/8-inch inside diameter and all solution-carrying tubes shall be at least 1/2-inch inside diameter. NOTE: It is the intention of this spray unit to distribute 50 to 75 gallons per acre with nozzles spaced every 20 inches, traveling at a speed of up to 7-1/2 mi/h with a nozzle pressure of 10 lb/in².

12. Hydraulic System

The left-hand three-section boom and the right-hand three-section boom shall be supplied by two separate hydraulic pumps and have two completely separate hydraulic systems capable of operating either boom independently. The pumps of these systems shall deliver adequate gallonage per minute when operated from 1,000 to 3,000 r/min at a constant rate. The hydraulic system shall be filtered by means of a 10-micron return line filter. The system shall be of the open center type, and the maximum operating pressure shall be 1,200 lb/in². These pumps shall be driven by means of V-belts from the sprayer solution power unit engine. All necessary hydraulic lines, clamps, fittings, and hydraulic hoses shall be supplied to make the hookup between the control station and the booms; all hydraulic hose shall be wire braid and shall have a safety factor at least four times the maximum operating pressure.

13. Painting

All surfaces exposed to the weather, other than corrosion-resistant polished surfaces or trim, shall be suitably primed, and finish painted a minimum of two coats of machinery paint conforming to manufacturer's standard color.

14. Spare Parts, Maintenance, Tools, and Accessories

The offeror shall indicate the nearest source of spare parts. The units shall be equipped with all tools and accessories necessary for the ordinary maintenance, adjustment, and repair of the machine as are normally furnished to commercial purchasers.

15. Manufacturer's Identification

An identification plate stating the name and address of the manufacturer, model number, and serial number shall be mounted in a conspicuous place on the equipment.

16. Data to be Furnished by the Successful Offeror

The contractor shall supply to the Bureau of Reclamation at the destination specified in the solicitation, three (3) copies of each

Sample Specifications For Boom-Type Sprayer - Continued

of spare parts catalog and repairman's service manual; and six (6) copies of the operator's manual with complete instructions, printed or typed, for the operation and lubrication of the equipment. He shall also supply cuts and descriptive information, including prices, of extra attachments and accessories built for the machine which may be desirable for future purchase.

17. Warranty of Equipment

The submission of an offer in response to this solicitation shall constitute the offeror's warranty of the offered equipment for a period of 6 months of single-shift service from and after its acceptance against defects in workmanship and materials. Upon notice by the Government, the contractor shall, at his own expense and with his own or his local dealer's personnel, promptly replace, and install (including shipping and labor costs) such equipment, parts, or materials found to be defective during the warranty period.

Such submission of an offer shall also, in the absence of a specific qualification by the offeror, constitute his certification that the sprayer with its allied and/or accessory equipment, and its component units, and parts will be suitable for the work to be performed; will be constructed to definite standard dimensions, with proper clearances and fits; and further, that the equipment offered will comply in every respect with the terms of these specifications. In the event that the equipment offered does not fully comply with these specifications, the offeror shall state definitely, referring to the proper paragraph of these specifications, wherein the equipment he proposes to furnish does not comply.

18. Data to be Furnished by the Offeror for Consideration of Offers

Offers will be evaluated strictly on the basis of information furnished by the offeror and submitted with his offer. The information called for on the attached questionnaire is essential in determining whether or not the equipment being offered complies with these specifications. Therefore, offerors are cautioned to accurately complete the questionnaire. Failure to submit this information will preclude consideration of the offer for award.

The offeror should also submit, for information purposes, descriptive literature including specifications issued by the manufacturer which may be used to further identify the equipment being offered. Any modifications required and intended by the offeror, which are not a part of such literature, shall be clearly set forth.

The following shall apply to any descriptive literature that accompanies the offer.

Sample Specifications For Boom-Type Sprayer - Continued

a. Standard printed literature: The offeror may submit with his offer standard descriptive literature of a type that is mass produced for general distribution to potential customers. If such literature contains any statement, term, or condition which is at variance with any requirement of this solicitation, it will be construed as being unintended and of no effect unless the offeror specifically states that such statement, term or condition is applicable to his offer.

b. Specifically prepared literature: If the character and arrangement of the descriptive literature submitted with the offer indicates that such literature was specially phrased and prepared for the particular offer concerned, and if such literature contains any statements or data inconsistent with important requirements of the solicitation, those statements and data will be construed as intended, and will be considered in determining whether or not the offer is responsive.

19. Inspection and Tests

The equipment furnished in response to this solicitation will be subject to such inspection and tests as may be determined by the contracting officer to be necessary to ascertain conformance with these specifications. No equipment shall be shipped until all required inspection and tests have been made and the equipment accepted and released by the Government inspector. Acceptance of equipment or the waiving of the inspection and tests thereof shall in no way relieve the contractor of the responsibility for furnishing equipment meeting the requirements of these specifications.

20. Right to Operate and Use Unsatisfactory Equipment

If the operation or use of the equipment, after delivery, proves to be unsatisfactory to the contracting officer, the Government shall have the right to operate and use the equipment for such time as may be necessary until it can be taken out of service without injury to the Government, for an attempt by the contractor or the Government to correct defects, errors, or omissions and/or for replacement in whole or in part if correction is unsuccessful or infeasible.

21. Service to be Performed by the Contractor

Upon being advised of receipt of the equipment at the destination, the contractor shall furnish to the Government at no extra cost the services of a fully qualified, trained mechanic or serviceman to supervise and inspect the initial operation of the equipment. It is required

Sample Specifications For Boom-Type Sprayer - Continued

that under his supervision and responsibility the spray unit be completely adjusted, completely lubricated with the grade of lubricant recommended by the manufacturer, battery fully charged, and made ready for continuous operation. The cooling system shall be filled to the proper operating level with suitable, noncorrosive, nonevaporating solution to permit normal operation without danger of freezing at minus 20°F. (See paragraph 2 hereof.)

In addition, the Government's operator shall be instructed in the proper operation and maintenance of the spray unit.

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