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A MOBILE EMERGENCY RESPONSE UNIT

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A MOBILE EMERGENCY RESPONSE UNIT

ABSTRACT

The "Hotspot" quick-response unit was the solution to a requirement to find, identify, and control areas of radioactive contamination at the scene of a nuclear weapons accident. The unit consists of two trucks and two trailers, and is designed to be transported by one U.S. Air Force C-141.

One truck (generator truck) carries a 40 kW generator-heater-air conditioner combination, spare tires, and accessories. The other (water truck) carries supplies and a 250-gal water tank.

One trailer (counting trailer) contains detecting, counting, and recording equipment. The other (decontaminating trailer) contains a shower, sink, 30-gal hot water tank, and supplies.

TRAILER CONSTRUCTION AND FEATURES

The trailers were built to LLL specifications and design by a commercial trailer manufacturer. They are identical in construction, except for a side door on the decontamination trailer and tandem wheels on the counting trailer. (Figure 1 shows trucks with trailers attached.)

Both trailers and trucks have an overall height of 104 in.--a height dictated by the interior dimensions of the aircraft. The outside trailer dimensions are 8 ft wide by 10 ft long; the width is the maximum allowed by highway regulations.

The counting trailer, #9113, has a gross weight of 8160 lb and the decon trailer, #9114, weighs 5400 lb. Center-of-gravity indicators are stenciled on all equipment to facilitate proper balancing of the transporting aircraft.

The framework and chassis of the trailers are of aluminum and steel; the construction is of commercial quality. Interiors are paneled with 1/8-in. masonite and coated with an intumescent, fire-retardant paint. A 3-in. thickness of fiberglass insulates all sides, ceiling, and floor. Fire protection is provided by a Halon 1301 fusible-link system. Finished interior headroom is 76 in. Because of the low ceilings, corner fluorescent fixtures were installed instead of conventional overhead lighting.

Anticipating the possibility of changes in storage space requirements, adjustable metal framework was installed in the trucks and trailers, and the shelving and doors were attached to form the desired arrangement. If storage requirements should change, the cabinets can be reconfigured without the need for new cabinets.

Counting Trailer

The primary piece of equipment in the counting laboratory is the 512 channel, pulse-height analyzer. The analyzer is used primarily for identifying X- and gamma-ray emitting isotopes.

The analyzer is used in conjunction with a 3 x 3 in. NaI (TI) detector housed in a lead shield. The shield is approximately 3 in. thick and weighs about 500 lb, with a graded interior lining of cadmium and copper to reduce background.

The other major piece of equipment in the trailer is a gas-flow, proportional counter. This equipment is intended primarily for use in

counting air and swipe samples for alpha and beta activity. P-10 counting gas is stored in two small high pressure tanks. Other supporting electronic and chemistry equipment is shown in Fig. 2. The trailer is fully supplied with tools and materials for performing any required maintenance on the electronics equipment (see Fig. 3). Instead of using plain aluminum for the exterior surfaces of the trailer, white enameled aluminum was chosen for its superior resistance to weathering and corrosion. Weathertight, external electrical receptacles are located in convenient places to provide power for lighting and power tools.

Each trailer has eight tie-down locations for securing them in the aircraft: two on each side, and one front and rear. The trucks each have 16 tie-down locations: six on each side, and two front and rear. The 25,000 lb capacity "eyes" are of standard Air Force-approved design. Reinforced locations for lifting the trailers by forklift or cable slings are on the trailer frame.

Conditioned or heated air is supplied to the trailers by 12-in.-diam, flexible canvas ducting connecting the air conditioner to the trailers. When not in use the ducting is collapsed and stored in containers on the generator truck.

Decontaminating Trailer

The equipment in the decon trailer includes a 30 x 30-in. shower stall fitted into one corner, and designed with both an entrance and exit so that the subject does not retrace his steps after showering. The shower head is on a flexible hose so that it may be moved about and given a concentrated stream of water to any part of the body (see Figs. 4 and 5).

For decontamination purposes, the subject enters through the side door where he: disrobes, is counted, showers, is counted again, dresses in clean coveralls, and exits through the rear door.

A 30-gal, electric hot water heater is installed in the trailer. A centrifugal jet pump provides pressure at 35 psi to the trailer's water system. Weathertight insulation and electric heater strips are used to protect all external water lines from freezing. The remainder of the trailer is used for equipment and material storage.

FIG. 1. Hotspot trucks and trailers.

- a. Emergency stop button
- b. Scales and timer
- c. Main power supply
- d. Pulse height analyzer
- e. Pulse height analyzer
- f. Two channel chart recorder
- g. Count rate meter
- h. Single channel analyzer
- i. High and low gain amplifier
- j. x-y plotter for pulse height analysis
- k. Spare NIMs bin
- l. 3 kV high voltage power supply
- m. 25 kV high voltage power supply
- n. Power supply
- o. Power supply
- p. Channel analyzer
- q. Channel analyzer
- r. Channel analyzer
- s. Channel analyzer
- t. Channel analyzer
- u. Channel analyzer
- v. Channel analyzer
- w. Channel analyzer
- x. Channel analyzer
- y. Channel analyzer
- z. Channel analyzer

FIG. 2. Counting trailer equipment.

FIG. 3. Equipment maintenance in counting trailer.

FIG. 4. Decontaminating trailer--shower stall, jet pump, and monitoring panel.

FIG. 5. Decontaminating trailer--shower stall, monitoring panel, and storage cabinets.

TRUCK CONSTRUCTION AND FEATURES

The trucks are 1 1/2-ton models with Allison AT540 automatic transmissions. One truck carries a combined 40 kW diesel, generator-heater-air conditioner unit and a storage compartment for air-conditioning ducting, spare tires, and loading-ramp accessories. The other is mounted with a van body carrying supplies and equipment, and a 230-gal insulated water tank. Electric heaters are installed in the tank to prevent freezing. Each truck has a fuel-tank capacity of 75 gal.

Trailer and Truck Weights

Decontaminating Trailer (#9114)	- 5400 lb (2455 kg)
Counting Trailer (#9113)	- 8160 lb (3709 kg)
Generator Truck	- 15,280 lb (6945 kg)
Supply Truck	- 11,480 lb (5218 kg)

TRUCK AND TRAILER MATERIAL INVENTORY

DECONTAMINATION TRAILER (T-9114)

Bin 1

12 Anti-C coveralls (large)

Bin 2

16 Anti-C coveralls (small)

Bin 3

27 Anti-C hoods

60 pair socks

Bin 4

Poly rope (25 ft)

1000 glassine bags (5-3/4 x 7-3/4 in.)

50 poly poultry bags (4 x 9 in.)

50 poly poultry bags (4 x 12 in.)

50 poly poultry bags (6 x 12 in.)

100 poly zip-lock bags (4 x 4 in.)

100 poly zip-lock bags (8 x 8 in.)

20 poly orange stripe bags (10 x 24 in.)

40 poly orange stripe bags (12 x 30 in.)

50 poly bags (6 x 8 in.)

85 poly bags (12 x 18 in.)

35 poly bags (12 x 29 in.)

Bin 5

25 towels

Bin 6

72 pairs of shorts

80 undershirts

10 pair socks

Bin 7

9 Anti-C coveralls (small)

13 Anti-C coveralls (small-medium)

Bin 8

2 Anti-C coveralls (small)

10 Anti-C coveralls (small-medium)

7 Anti-C coveralls (large)

2 Anti-C coveralls (large-XL)

Bin 9

8 hard hats

Bin 10

36 pair surgeon's gloves (size 9)

36 pair surgeon's gloves (size 9-1/2)

108 pair pylox gloves (large)

Bin 11

15 pair safety goggles

26 pair pylox gloves (large)

Bin 12

11 boxes Kimwipes (small)

5 boxes Kimwipes (large)

23 rolls black tuck tape

5 rolls yellow plastic tape (3 in.)

7 rolls red plastic tape (2 in.)

4 rolls white plastic tape (3/4 in.)

8 rolls masking tape (2 in.)

4 rolls masking tape (4 in.)

Bin 13

2 rangefinders (1500 m)
50 pair clear plastic booties

Bin 14

Paper towels
Laundry soap
Scouring powder
15 Anti-C hoods
2 Anti-C coveralls (small)
4 Anti-C coveralls (small-medium)
Detector probes for fixed monitors

Drawer 1

Office Supplies

Drawer 2

Signs
Clipboards
First aid manual

Drawer 3

Decontamination supplies

Loose Storage

8 full-face respirators
Airplane tie downs
2 Scott Air Paks
First aid kit
1 case clear plastic booties

WATER TRUCK (E-90390)

Bin 1

1 roll diaper paper
Garden hose (150 ft)
2 water pumps
ID tygon tubing (20 ft x 1/2 in.)
ID tygon tubing (50 ft x 3/8 in.)
Heater tape and thermostat
50 tie wraps
Spare water tank heater element
Assorted fittings and valves
Electric drill
2 pipe wrenches (18 in.)
1 screwdriver (18 in.)
Tool box (electrical and mechanical)

Bin 2

Remote weather station
Tripod
Smoke tubes and bulbs
3 boxes of poly gloves
2 cans red spray enamel
4 cans clear acrylic spray
3 cylinder safety straps
2 portable tritium monitors, Model
LE 741112 (223650, 218563)
500 ml HTO standard solution
Sledge hammer (12 lb)
Core cutter
8 core containers

Bin 3

25 core containers
1 MS-2 miniscaler (220942)
with battery pack

3 probes for LUDLUM 12
1 E-120 (220255)
2 PNR-4 (220567, 220566)
2 E-400 (220288, 220257)
2 PAC 4G (164104, 164101)
3 E-500 (122084, 111018, 99399)

Bin 4

30 pair work coveralls
50 pair work gloves
20 pair rubber overshoes
1 Sledge hammer (10 lb)
2 extension cords (4 ft)
3 extension cords (8 ft)
1 extension cord (25 ft)
3 extension cords (50 ft)
3 drop lights

Bin 5

100 fecal sample cups
20 urine sample cups
Balance
Assorted sample bottles
2 air samplers (12 V)
100 poly bags (16 x 26 in.)
Portable toilet

Bin 6

1 poly rope (500 ft)
1 poly rope (1200 ft)
1 spool of coaxial cable (200 ft)
Vacuum cleaner

Bin 7

4 LUDLUM 12 (161411, 161412,
161413, 163743)
4 Radectors (174121, 160739,
174126, 174115)
2 Dosimeter chargers
25 0-1R dosimeters
20 0-200mR dosimeters
1 E-120 (220256)
1 E-112B-1 (111036)
1 LUDLUM 14C (161771)

Workbench (Upper lefthand drawer)

Assorted β , δ and α probes

Loose Storage

4 spark kits (172724, 172728,
172725, ---)
Alpha air monitor
Beta air monitor
Alpha hand and foot counter (LUDLUM 12 -
134322 and 2 probes)
2 Scott air pack bottles

COUNTING TRAILER (T-9113)

6 walkie talkies

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