An Event Rain Sampler for Precipitation Chemistry

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An Event Rain Sampler

Introduction

As monitoring of precipitation for its chemical composition becomes of increasing scientific interest, the need for a simple and inexpensive sampling device is apparent.

To fill the requirement for our own sampling programs in Pacific Region we have developed a sampler that is suitable for this purpose. All materials are easily obtainable "off the shelf" items and the total cost is less than twenty-five dollars per sampler.

A description of the sampler and a series of construction details are provided in this paper.

Sampler Requirements and Characteristics

- Evaporation and contamination must be minimized when gauge is closed.
- Cleaning and maintenance must be minimal when gauges are deployed operationally.
- Samplers must be simple in construction and of low cost.

Sampler Description

The sampler consists of a linear polyethylene funnel enclosed in a Tupperware bowl and fastened to a 4" A.B.S. plastic pipe cap. This assembly then slips over a piece of 4" A.B.S. sewer pipe containing the sample bottle. This general description is detailed in Fig. 1.

Construction

Selection of the bowl and funnel size is dependent on the rainfall amounts expected in the area of deployment. In Pacific Region a Simport F520-3(210mm) funnel and a Tupperware G-25 bowl are used.

a) Sizing of funnel

The lip of the funnel must be cut back to allow the funnel to fit into the bowl. This fitting must be done accurately to prevent water getting by the funnel and collecting in the bottom of the bowl.

A small circular saw can be constructed out of a 3" bolt and a 1" washer as shown in Fig. 2. This tool can be used in a drill press to make an accurate cut in the funnel. The edge of the funnel can then be filed to provide a sealing surface as in Fig. 3.

b) Assembly of bowl, funnel & cap

Since glue and sealants do not adhere to the plastics used, advantage must be taken of mechanical fastening methods. Fig. 4 details how notches are made in the funnel splines to aid in providing a snap fit of the funnel into the bowl.

Three brass bolts are then used to secure the bowl/funnel assembly to the A.B.S. pipe cap. Since the bowl/funnel neck seal is not perfect, any water that gets into the bowl will seep out. To prevent this from getting into the sample, a bead of silicon seal is applied to the funnel neck and pipe cap. The funnel neck must be roughened with sandpaper and the bond obtained is watertight but not strong.

c) Sample bottle container

The pipe cap is designed to be a tight fit over the A.B.S. pipe, too tight in fact to allow the bowl/cap assembly to be removed easily as intended. A series of slits are therefore made in the top of the pipe to allow the cap to be removed and replaced easily, as shown in Fig. 5.

The bottom pipe cap has drainage holes drilled in it and is permanently glued in place. A piece of resilient foam is placed at the bottom of the tube to keep the sample bottle mated snugly to the neck of the funnel.

To keep the sample bottle centered in the tube spacers (either blocks or rings) are glued to the inside of the tube as in Fig. 5.

d) Bird deterrents

A bird deterrent device can be constructed from five large size plastic cable ties and fastened to the collector assembly with a large hose clamp as in Fig. 6.

e) Mounting

A 6 foot stake (pipe or angle iron) driven 2 feet into the ground is an adequate mount. The gauge is then attached to the stake by 2 large hose clamps in such a way as not to restrict the removal of the collector assembly as in Fig. 6.

Further information can be obtained from:

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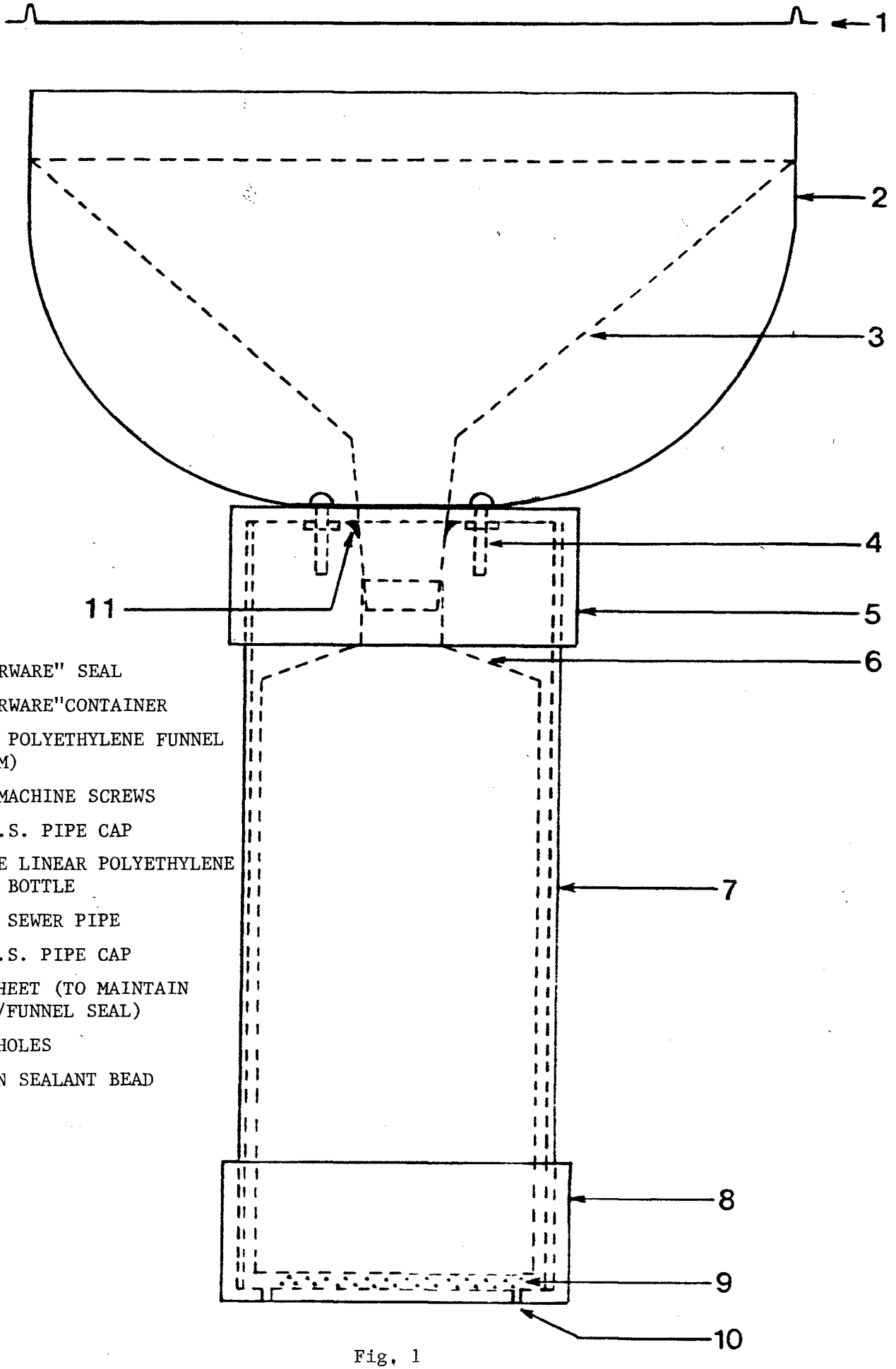
Vancouver, B.C.
V6P 6H9
ATTN: Ron McLaren

RAIN SAMPLER
SCIENTIFIC SERVICES - PACIFIC REGION



1. "TUPPERWARE" SEAL
2. "TUPPERWARE"CONTAINER
3. LINEAR POLYETHYLENE FUNNEL (210 MM)
4. BRASS MACHINE SCREWS
5. 4" A.B.S. PIPE CAP
6. 1 LITRE LINEAR POLYETHYLENE SAMPLE BOTTLE
7. A.B.S. SEWER PIPE
8. 4" A.B.S. PIPE CAP
9. FOAM SHEET (TO MAINTAIN BOTTLE/FUNNEL SEAL)
10. DRAIN HOLES
11. SILICON SEALANT BEAD

Fig. 1

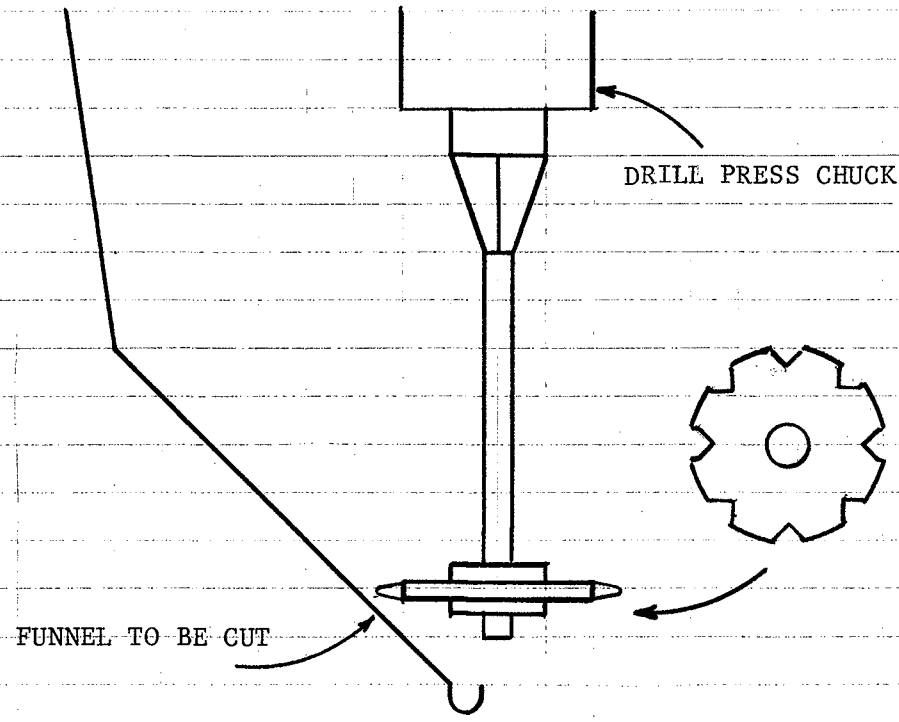


Fig. 2

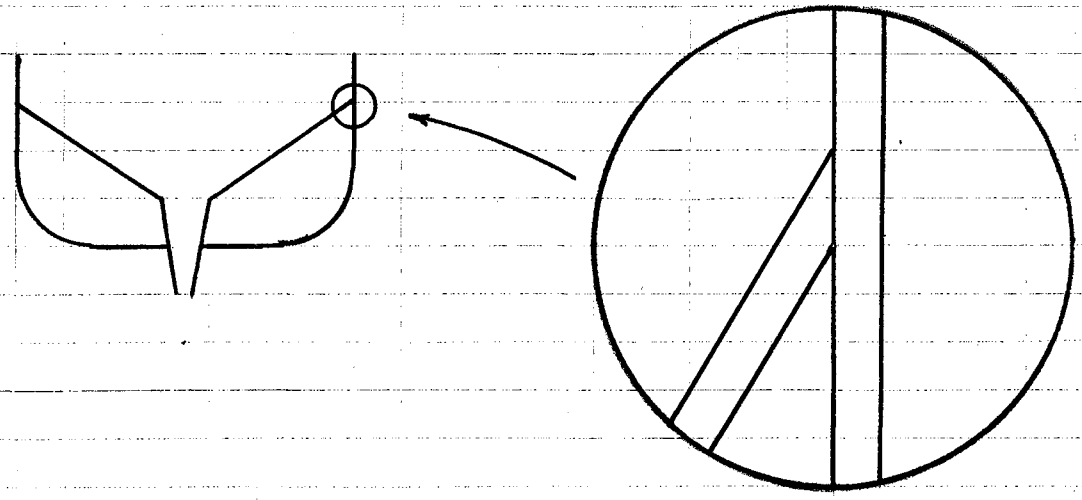


Fig. 3

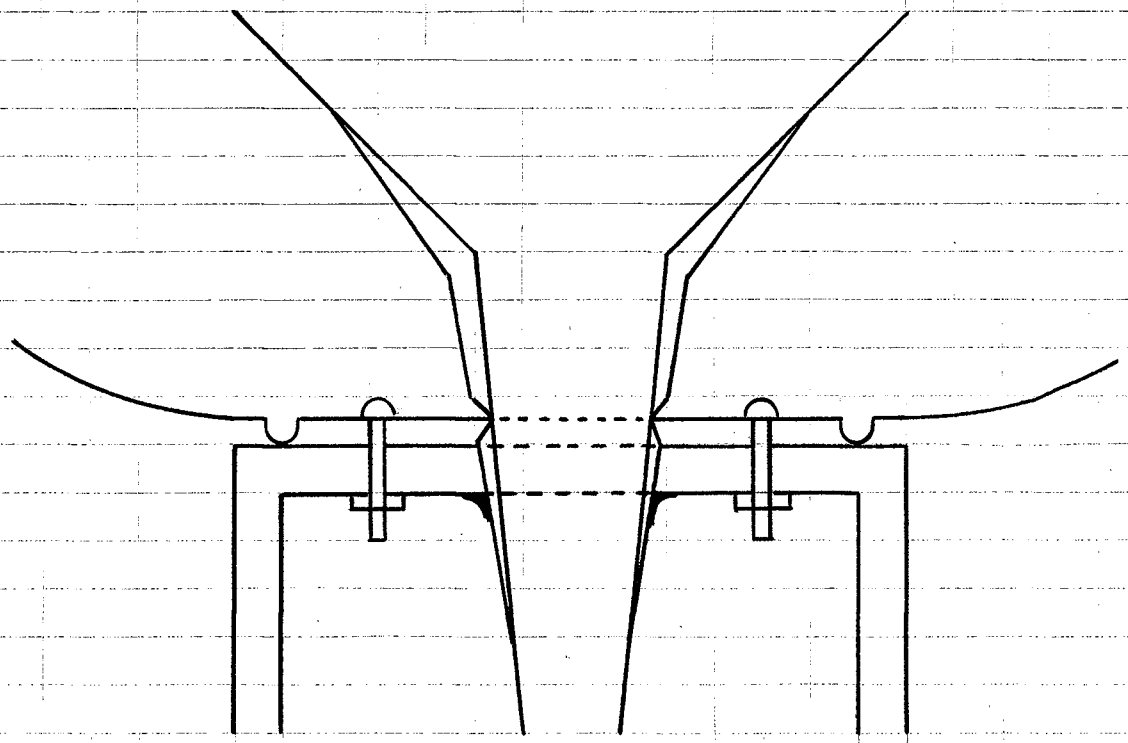


Fig. 4

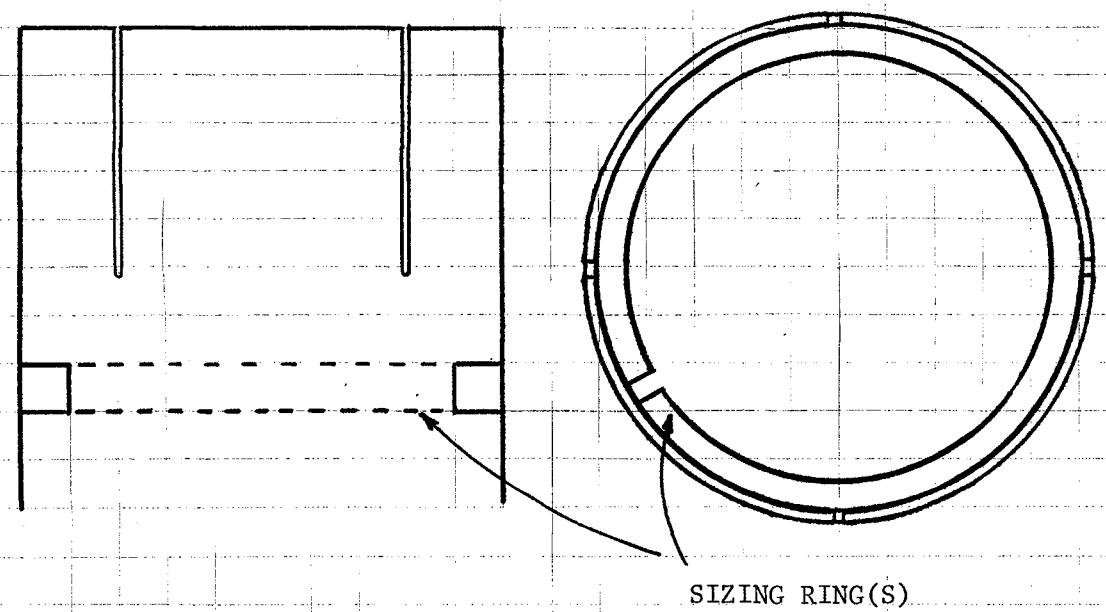


Fig. 5

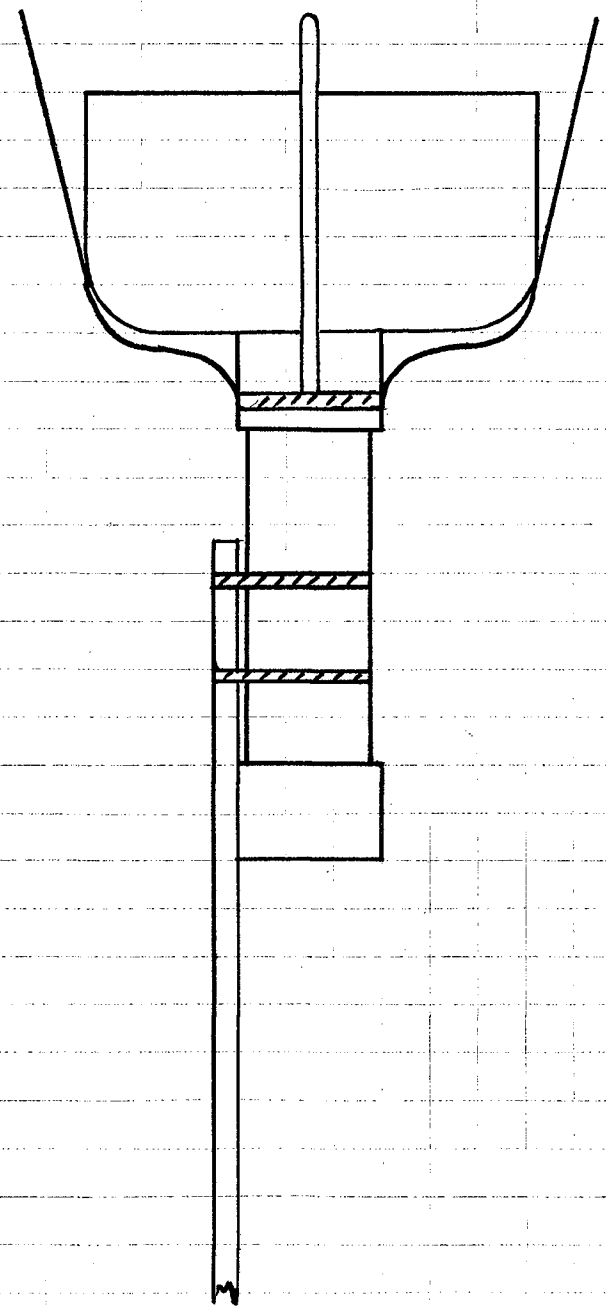
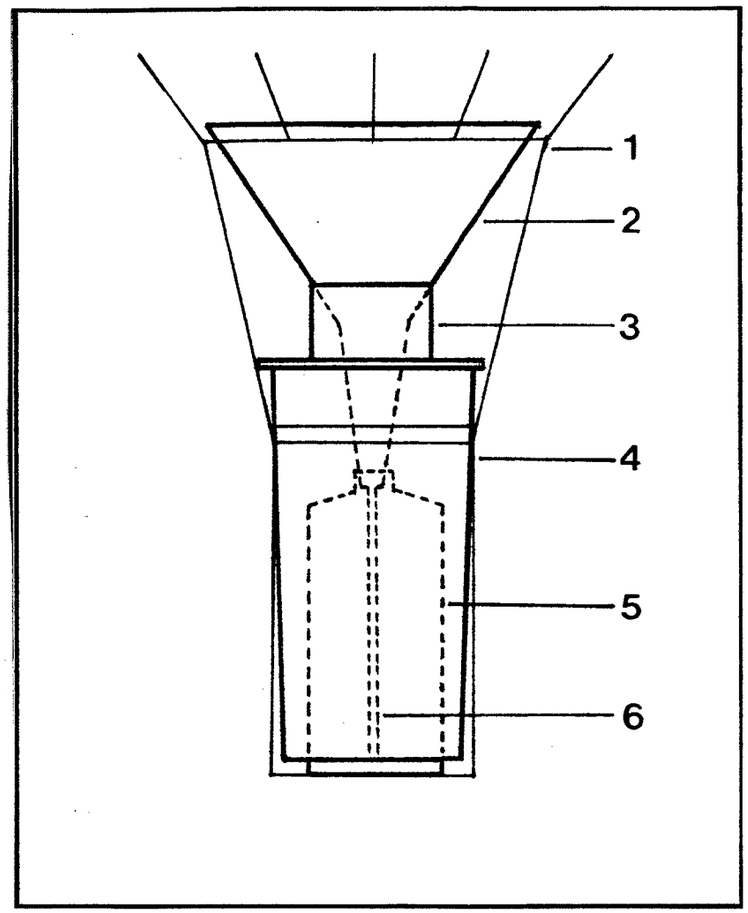


Fig. 6

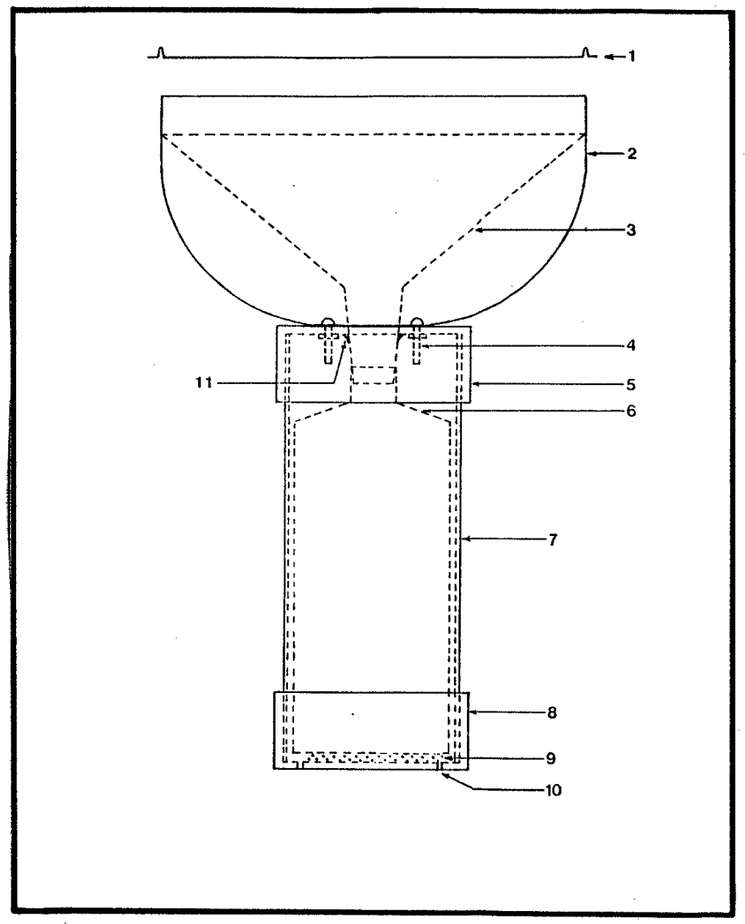
BASIC COMPONENTS

OPERATIONAL GAUGE

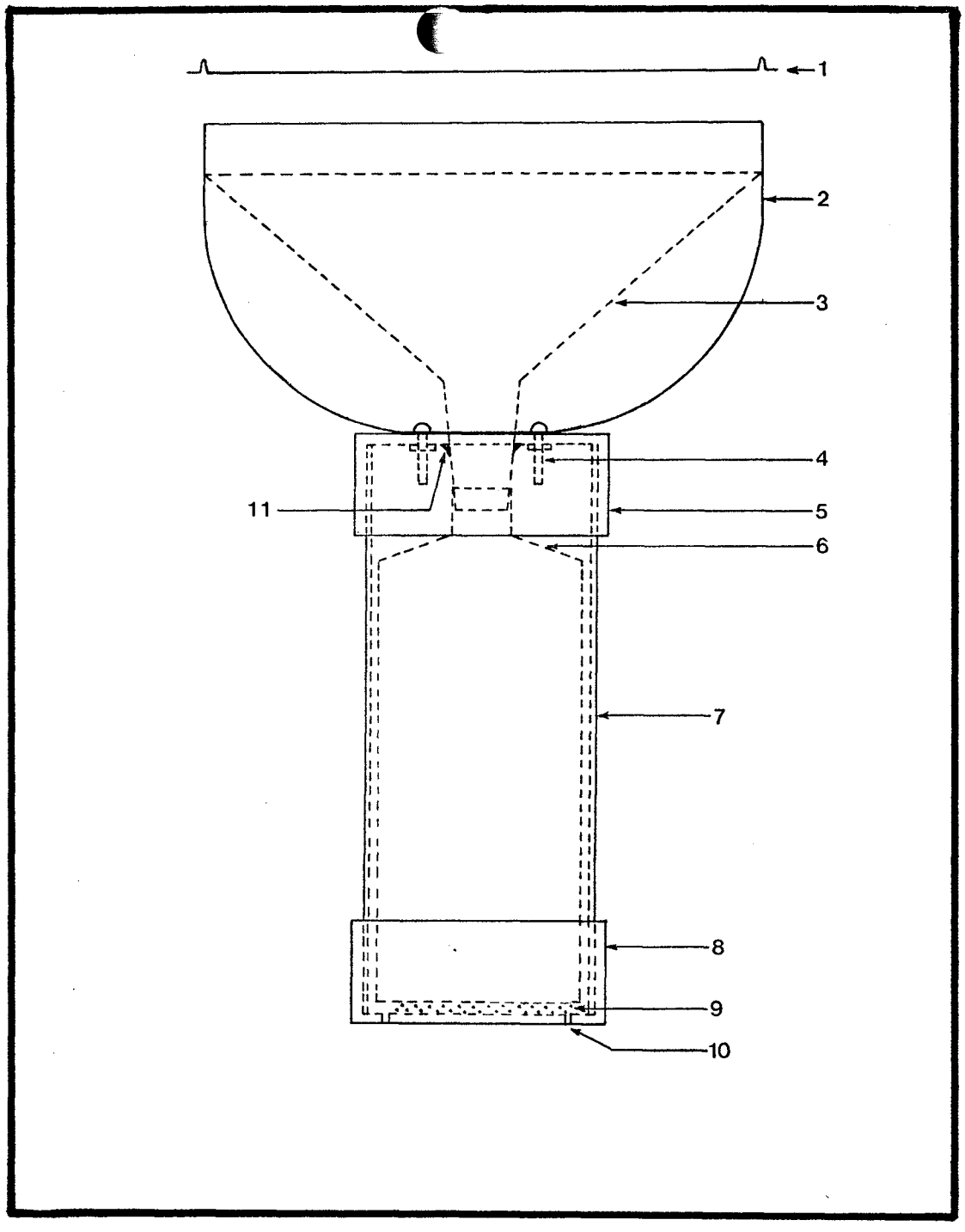
PARTIALLY ASSEMBLED GAUGE



1. STAINLESS STEEL FRAME
2. LINEAR POLYETHYLENE FUNNEL
3. PLASTIC COLLAR
4. CYLINDRICAL HOLDER
5. 1 LITRE LINEAR POLYETHYLENE BOTTLE
6. TYGON TUBING



1. COVER
2. PLASTIC HOUSING
3. LINEAR POLYETHYLENE FUNNEL
4. BRASS MACHINE SCREWS
5. 4" A.B.S. PIPE CAP
6. 1 LITRE LINEAR POLYETHYLENE SAMPLE BOTTLE
7. 4" A.B.S. PIPE
8. 4" A.B.S. PIPE CAP
9. FOAM SHEET (TO MAINTAIN FUNNEL/BOTTLE SEAL)
10. OVERFLOW DRAIN HOLES
11. SILICON SEAL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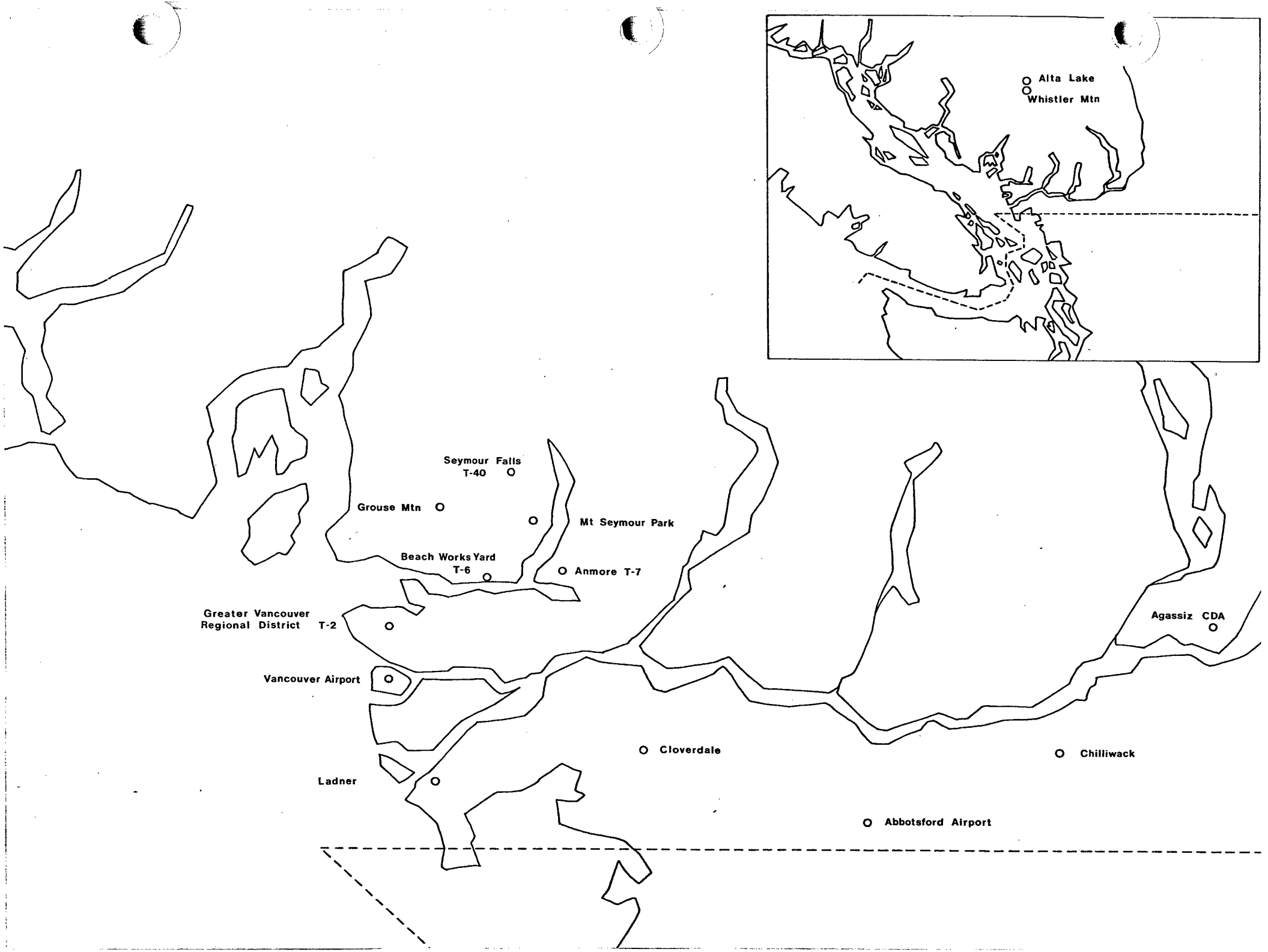
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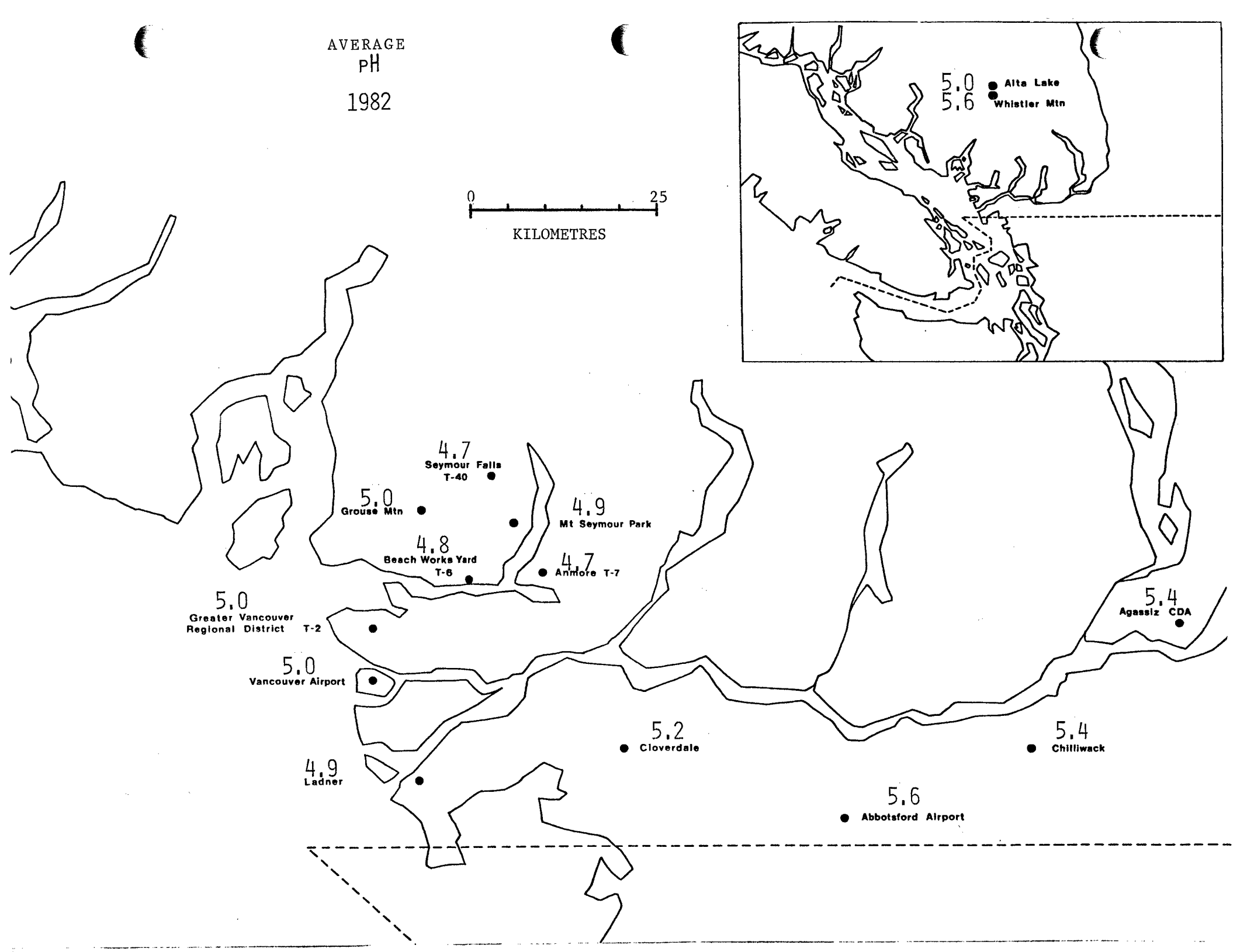
Seymour Falls
T-40
Grouse Mtn
Mt Seymour Park
Beach Works Yard
T-6
Anmore T-7
Greater Vancouver
Regional District T-2
Agassiz CDA
Vancouver Airport
Cloverdale
Chilliwack
Ladner
Abbotsford Airport


AVERAGE
pH
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25
KILOMETRES
5.0
Alta Lake
5.6
Whistler Mtn
4.7
Seymour Falls
T-40
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Grouse Mtn
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Mt Seymour Park
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