Lompoc Plant
May 4, 1955

H. M. Jackson - U.M.Q.

SUBJECT: Design, construction, cost and application of a battery operated Midget Impinger currently used at the Lompoc Plant.

Construction:

Dimensions: 7" high - 13" long - 10" wide. The case is made of mahogany with brass bound corners to reduce wear and tear during field work. Total weight of instrument 21-1/2 lbs. The vacuum pump, motor and vacuum gauge are mounted on the underside of the lid, giving free and easy access for assembly and repairs. A brass fitting, specially constructed from hydraulic couplings and including a bleeder needle valve, is located on the top of the case for convenient regulating of air intake. Mounted on top of the instrument is a collapsible car radio antenna to hold a leather holster containing sample gathering impinger which is detachable to facilitate storage. An indicator light is located on the lid and is connected to the pump electrical circuit to indicate when pump is operating. Air exhausted through pump outlet is released by a vent in the side of the case. The batteries are mounted so as to be easily removed, yet are held firmly in place by a metal band. They are located in the bottom of the case on the opposite side from the pump and motor and give the instrument good balance. A padded leather carrying handle is provided.

Design:

This instrument was modeled, in principal, after a similar one developed by the U. S. Public Health Service. It was demonstrated and employed by Howard Kunsett and Emil Woelrich during the 1954 progress dust survey here at the Lompoc Plant. The adaptability of this type apparatus to our particular problems was quickly recognized, and we arranged to borrow one to pattern a similar one for our own use. I might mention at this point the fine cooperation of the above organization, not only in this matter but also the advice and assistance that has proven valuable to our present work.

The design of this instrument is comparable to the M.S.A. Midget Impinger in principal and results obtained with it are identical. By the application of a rotameter it is a simple matter to calibrate the individual impingers so that, with a predetermined vacuum gauge setting, the amount of sample air aspirated through the impinger is readily determined. I have found that once this vacuum gauge setting is made, by manipulating the bleeder valve, only rarely is it necessary to readjust it. This fact results in a constant rate of sample air intake that tends to eliminate a possible source of error in the computing of actual dust concentrations.

The power supply is furnished by a 3 cell, 6 volt Willard plastic case battery with a rated capacity of 21 ampere hours. With this type power the battery capacity is sufficient 8 - 10 hours in duration before the need of recharging. As most of our samples taken with this instrument average around 10 minutes apiece, it is readily seen considerable sampling may be done before being interrupted for recharging. I recommend a spare set of batteries so there will always be a power source available.

Application:

The various uses of this type instrument and the advantages of its employment are numerous and I shall restrict the number set forth here to the major ones.

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1. The physical effort required to operate the M.S.A. Midget Impinger is eliminated. For example, the taking of 12 air samples in a day of operating would result in saving 120 minutes, or 2 hours, of cranking which I can safely say is a lot of effort.

2. The need of the technician operating the instrument is eliminated, allowing him to more carefully observe and accurately record the detailed data required with every air sample.

3. Permits sampling on or in vehicles where there is not enough space for a technician to operate. The instrument may be set in place, adjusted and be transported about with the subject being tested, faithfully sampling under exact operating conditions.

4. By the use of the collapsible holding rod air may be sampled at any critical level, from the floor to the breathing zone of the operator.

5. Enables sampling certain precarious areas where it would be impossible to sample with instrument requiring use of both technician's hands.

6. Allows taking of longer samples. Due to the tiring effort of cranking a M.S.A. Midget Impinger, long averaging samples are virtually impossible.

7. Releases the technician so he may be able to assist physically some complicated types of sampling.

8. The ability to sample in areas where the prolonged presence of a human may be harmful.

List of Parts and Costs:

1.	Carbon monoxide indicator gear pump M.S.A. cat. #DS-6971	$ 30.00
2.	Midget impinger pump gauge M.S.A. cat. #14[illegible]	12.50
3.	Willard, type 25-2 wet cell battery, Allied Radio, 100 N. Western Ave., Chicago 80, Ill., cat. #J-42[illegible]	21.69
4.	Case mahogany (company Carpenter Shop)	15.00
5.	Buick radio antenna	3.25
6.	Brass fittings (company Machine Shop)	10.00
7.	Motor 6 volt Delco 5[illegible]773	7.63
8.	Switch, indicator light, assembly and wiring (company Electric Shop)	20.00
	Total	$130.07

Above costs include some experimental expenses that I feel could be eliminated in the construction of a duplicate.

Summary:

The acquiring of this piece of equipment was not intended to replace any of the acceptable standard air sampling apparatus, but merely was added to augment them and bring to our Dust Abatement Program a more rounded collection of equipment to facilitate every conceivable sampling demand.

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I have used this instrument now for about two months and have found it measures up to all our expectations. It is handier, easier and more rapid to employ and the results are identical to standard type impinger instruments. We have taken the basic design of the U. S. Public Health Service and in my estimation improved on it considerably. The value of this instrument in any dust sampling program within J-M would, I believe, warrant its construction and employment.

If any further information concerning this instrument is needed, I would be glad to forward it immediately.

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