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SUBJECT: AVCM MONITORING - SOME THOUGHTS ON NUMBER OF SAMPLES, LAG TIME, ETC.

AVCM monitoring equipment for continuous sampling of plant atmospheres is complex and versatile. It can be used in a number of ways to accomplish many objectives. The differences in environment and the different operating conditions at each plant make the prospect of agreement on a common approach to monitoring installations seem less than promising. I believe there are a number of general conditions that are important to a logical selection of a monitoring system. I feel that these criteria provide additional reasons for narrowing the range of options that should be considered:

1. The first and most important criteria is the basic function that these instruments are to perform. The principle (almost overwhelming) objective should be to provide an alarm to indicate when a change in respiratory equipment is required. This is the basic legal requirement, and satisfactory handling of this function is the cornerstone of operating our plants in an efficient manner under the more rigorous standards that will be required after 4/1/76.

This purpose generally argues for some minimum time span between alarms. It is unreasonable to expect people to change their respiratory protection on a minute-by-minute basis.

It further suggests a limited number of probes. From a practical standpoint, it seems unlikely to me that there would be compelling reasons to divide an operating floor into very many zones. Such zones would require some identifiable physical boundary and it seems questionable that we could effectively police the use of different respiratory protection in immediate adjacent sections.

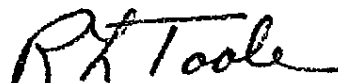
2. This entire approach to selecting revised alarm equipment is based on an estimate of the conditions that will exist sometime after April, 1976. The conditions visualized are that:
  - (a) the AVCM levels in our regulated areas will rarely exceed 100 ppm,
  - (b) the levels will exceed 5 ppm, 0-4 times per shift, and
  - (c) the levels will be below 1 ppm 25-75% of the time.
3. Ventilation in regulated areas will provide 12 air changes per hour. In the light of this, it seems unrealistic to come back for a second look at an area more quickly than within a five minute period; a ten minute period (or two air changes) may be more reasonable.

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4. A meaningful exposure period in terms of the Federal standard is something like ten minutes, based on what might be a typical excursion. This not only meets the legal requirement, but is consistent to a very conservative degree with our understanding of the medical problem. Equipment to provide knowledge of concentrations measured over very much smaller time spans may well represent overkill.
5. The time span between successive samples at a given point should be consistent with the minimum time taken to correct an excursion. If the excursion is caused by some condition which can be corrected, there may not be much point in re-looking at the situation before you could hope to obtain and use such equipment as portable OVA's or H\*nu's to search out and correct the problem. If the upset was a very short time transient event that can be expected to "correct itself", this problem should be overcome by means of compositing the sample via surge tanks.
6. The requirements of record keeping by these instruments are secondary. OSHA, EPA, and our own trouble-shooting needs can be handled by means of the standard recorder charts. Calculation of averages is of very questionable value. Arithmetic averages are often seriously distorted and logarithmic averages seem to upset many people. An alternative approach that might provide even more meaningful information at a much lower price would be to provide the alarm points with simple (Veeder-Root type) counters to provide easily available records of the number of excursion beyond 1 ppm and 5 ppm. The performance of a plant, or an area within the plant, could be characterized by the number of such excursions as well as or better than by the use of averages. The present opportunity to standardize this equipment suggests that we should either add additional mini-computers to those plants not having them, or adopt this alternative approach. It seems to me that the alternative is simple, more dependable, and infinitely less expensive.
7. A common approach to an alarm interface should be a part of this instrument package. I think there is very good evidence that the "microchip computer" developed by Mike Scalera for the Henry installation could be the most effective approach. While this would have to be re-programmed to use a GC rather than a THA analyzer, it would be simple and inexpensive to turn out multiple copies of such an interface device.

I believe that most of the above points suggest that no significant expansion of the number of sampling probes and no overriding concern for high speed samples switching is warranted. In the light of this, it may be possible to simply replace the THA instrument with its GC counterpart--leaving the sampling system, etc., pretty much as is.

I would be interested in hearing your comments on these points.



R. L. Toole