

**OPERATIONAL HEALTH PHYSICS -
IN-HOUSE OR COMMERCIAL SERVICES?**

J. E. Handloser
EG&G, Inc., Santa Barbara Division,
Goleta, California, 93017

To be published in
Proceedings of the 1969 Health Physics Midyear Symposium

LEGAL NOTICE

This report was prepared as an account of Government sponsored work. Neither the United States, nor the Commission, nor any person acting on behalf of the Commission:

A. Makes any warranty or representation, expressed or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately owned rights; or

B. Assumes any liabilities with respect to the use of, or for damages resulting from the use of any information, apparatus, method, or process disclosed in this report.

As used in the above, "person acting on behalf of the Commission" includes any employee or contractor of the Commission, or employee of such contractor, to the extent that such employee or contractor of the Commission, or employee of such contractor prepares, disseminates, or provides access to, any information pursuant to his employment or contract with the Commission, or his employment with such contractor.

NOTICE
This report contains information of a preliminary nature and was prepared primarily for internal use at the originating installation. It is subject to revision or correction and therefore does not represent a final report. It is passed to the recipient in confidence and should not be abstracted or further disclosed without the approval of the originating installation or DTI Extension, Oak Ridge.

~~DISTRIBUTION OF THIS DOCUMENT IS LIMITED~~
To AEC Offices and AEC Contractors

~~DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED~~

SANTA BARBARA DIVISION
EG&G, INC., 130 ROBIN HILL RD., GOLETA, CALIF. 93017

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

OPERATIONAL HEALTH PHYSICS - IN-HOUSE OR COMMERCIAL SERVICES?*

John S. Handloser
EG&G Santa Barbara Division
Goleta, California

Industry's use of radiation requires a large expense for health physics (HP) programs. In some organizations, including the national laboratories, large in-house health physics staffs perform essential HP research and development as well as the operational functions. Industrial users of radiation, however, require only the operational HP groups, a pure service function whose heavy cost is viewed as necessary overhead, to be borne out of profits. Although the results of this expense have been excellent - as verified by the safety record of the nuclear industry - I believe the time has come to critically analyze this cost to determine ways to reduce it. The health physicist is obligated to advise management on how to effect cost savings without sacrificing the quality of the HP program. Management should expect and heed these recommendations.

One method of cost reduction may be the judicious use of commercially available health physics services. From those shown in the table, one can see that many U. S. firms presently offer these services. This consideration will pose a fundamental question for management: Is it more economical to hire an in-house health physics staff or use an outside commercial service or consultant?

The purpose of this paper is not to make specific recommendations to any given user of radiation. The use of outside consultants or HP services can sometimes result in cost savings; however, many managers prefer to establish complete in-house HP capabilities after considering all factors. As we shall see, this decision is merited, particularly in facilities that use large amounts of radioactive materials.

Paper to be published in the Proceedings of the 1969 Health Physics Midyear Symposium.

Commercial Health Physics Services

Services	No. of Suppliers
Film Badges	15
Laundry (contaminated)	5
Leak Testing	30
Urinalysis	17
Radiation Monitoring	31
Air and Water Sampling	25
Waste Disposal	19
Instrument Calibration and Maintenance	29
Decontamination	22
Environmental Surveys	22

The reasons for NOT using commercial health physics services are as follows:

1. If the volume of HP work is very large it may be no more expensive to perform the task in-house than to purchase it from a commercial source. If the service is performed in-house, it can also be more closely controlled.
2. If the required service is too specialized, it may not be available commercially. An example is the specialized readout of film badges for particular situations. Brookhaven's problem of evaluating tracks from GeV particles cannot be solved economically by commercial sources.
3. There is relatively long response time to obtain results from commercial services. Although few facilities have personnel working close to the maximum permissible radiation limits, personnel monitoring and bioassay results for these individuals must be available quickly, in order to determine the work schedule for the next day or week.
4. The lack of quality in commercial services in the past has often deterred their use. (However, the commercial services have been improved as evidenced by the licensing of bioassay laboratories [discussed in this symposium], the various testing experiments and suggested standards for personnel dosimetry services, and the increase in the number of certified health physicists available for consulting.)

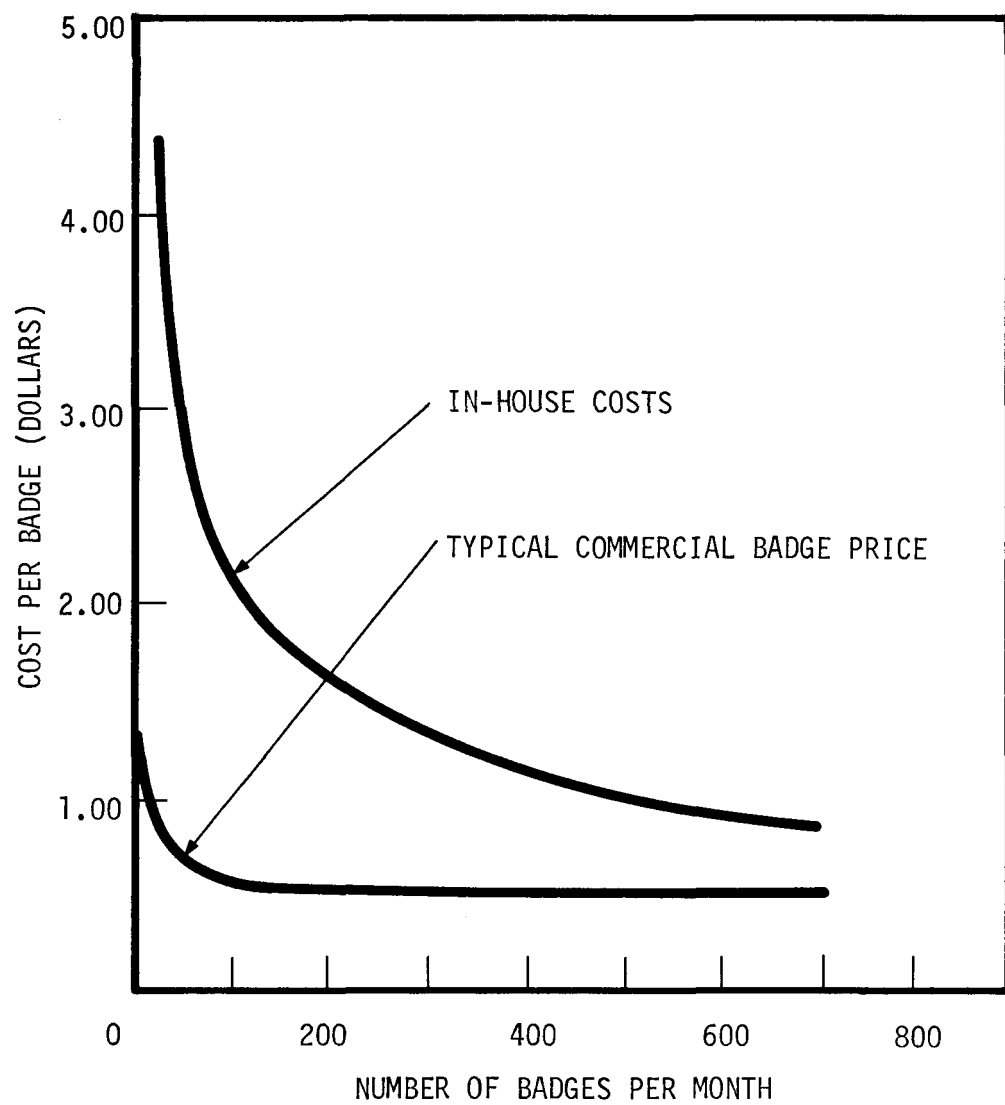
There are also many advantages to using commercial services, particularly for the small user, which may influence management's decision as to the practicality of establishing an in-house capability.

1. Commercial sources do a large volume of the same kind of service and should therefore do it better and cheaper. Personnel dosimetry firms, for example, process so many film badges that they can apply automatic methods of readout and recording and thus reduce the cost per reading over manual in-house systems.
2. A disinterested outside party performs the services. This has particular merit when obtaining data for environmental or personnel monitoring records. Records obtained and kept by reputable commercial services may be more acceptable in court than those from the organization itself, if the in-house operation is small and if nonprofessional personnel perform the HP tasks.

3. Purchased HP services are easily added to or cut back. As business increases or decreases, there is no necessity of hiring or laying off personnel; if new services are required because of a particular task, the services can be easily augmented.

After examining the available commercial services, the advantages of each, and his own situation the important question for the small user of radiation is whether he should hire a resident health physicist or use a professional consultant. If the necessary radiation protection problems require anything less than a full-time professional health physicist, I believe the manager should consider the services of a consultant. If a health physicist is hired, his professional capabilities may not be fully utilized and management may find him doing technician's work at a professional salary. Using a health physicist for other technical tasks sometimes works, but it is difficult to find the type of person who fills two positions well. It is also possible to train a staff industrial safety engineer to perform health physics tasks, but this is usually expensive. The consultant specialist can perform the health physics tasks rapidly and sometimes more economically because of his professional training and experience.

Commercially obtained personnel dosimetry service has been reviewed extensively, and it is one of the services to which costs can be assigned. These costs have been calculated for my own organization and projected to larger volumes of business. The results are given in Fig. 1. In constructing this curve, I have considered beta-gamma film badges only, a 10-year depreciation period for the equipment, and reasonable overhead and labor. It appears that we must process a volume of between 300 and 500 badges per month to justify an in-house capability. If our load is less than 300, the costs are much greater if we perform the services in-house rather than purchase them. Note that I believe the real in-house costs never go below those of commercial services even with the supplier's profit, because this profit is more than offset by in-house overhead costs for administration, record keeping, training of new personnel, etc.



Typical Film Badge Service Costs

The expense involved in establishing an in-house calibration facility to repair, maintain, and calibrate radiation detection instruments usually cannot be justified by the small user of radiation. Although offered by a number of commercial firms, these services are not being used extensively, perhaps because of the service time involved. Generally, extra instruments are required for use during the calibration period; however, the costs of this added instrumentation are usually small compared with setting up an in-house calibration facility. For example, an extensive standardized source setup or range is required to properly calibrate even a beta-gamma ionization chamber survey meter on all ranges.

Waste disposal and bioassays are usually obtained commercially for good reasons. Only the AEC and its laboratories, and some facilities with biological samples, dispose of their own radioactive waste. Most small users agree it is cheaper for a commercial source to perform this task. Bioassay determinations are so specialized, it is usually less expensive to employ a commercial service than to set up an in-house capability. Although certain well staffed and equipped biological research laboratories can perform bioassay services for their HP groups with very little additional expense. The usual user of radioisotopes does not have this advantage.

In facilities with established health physics capabilities and instrumentation, infrequent gross activity environmental surveys can be performed with little additional expense. However, surveys for particular isotopes are more difficult and costly, and in organizations that lack the necessary equipment or available manpower, a commercial source for this service is attractive. Buying environmental surveys does not delay the health physics operation since the data are seldom required immediately.

In summary, the concept of buying health physics services should be re-examined by managers of health physics programs after carefully reviewing their individual needs. In new installations, setting up an in-house capability can be very expensive and unnecessary. In facilities with established health physics capabilities, phasing out these capabilities may be a subject for long range planning.

Personally, I believe the time is near when it will be common practice to contract out large complete health physics programs to commercial HP firms. Only a few such contracts have been let to date. To the health physicist this should be a welcome idea because it would diversify his work. Managers should also welcome the thought because it might reduce their costs and relieve them of the responsibility of the day-to-day operation of the health physics program.

DISTRIBUTION LIST

NV00

R. Loux
J. Koch

DTIE

P. Rosser (2)

EG&G Bedford

R. Cadwallader

EG&G Santa Barbara

H. Borella (2)
C. Hatcher
J. Handloser (10)
Publications