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ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

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July 23, 1976

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Dr. Philip L. Johnson
Executive Director
~~Oak Ridge Associated Universities~~
Post Office Box 117
Oak Ridge, Tennessee

Dear Dr. Johnson:

ANNUAL HEALTH AND ENVIRONMENTAL PROTECTION APPRAISAL OF ORAU, 1976

The annual health and environmental protection appraisal was conducted intermittently between March 29 and June 18, 1976, by members of the ORO Safety and Environmental Control Division. The findings and recommendations were informally discussed with your staff at that time.

Enclosed are six copies of the formal report of the appraisal. You may proceed with implementation of the recommendations unless there are sound reasons why they are not warranted. In any event, your comments with regard to the conduct of the appraisal, the general content of the report, and the detailed plans for implementing or otherwise handling the recommendations are requested by August 24, 1976. Until accomplished, the status of the recommendations, rationale for non-accomplishment in each case, and expected completion date should be reported to me every six months.

The cooperation extended by members of your staff during the appraisal is appreciated.

Sincerely,

Joseph A. Lenhard

Joseph A. Lenhard, Director
Research and Technical Support Division

OSH:RDS

Enclosure:
Appraisal Report (6 cys)

cc w/encl:
C. A. Keller, AMO
D. A. Horsewood, O&P
W. H. Travis, S&EC



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ANNUAL HEALTH AND ENVIRONMENTAL PROTECTION APPRAISAL
OAK RIDGE ASSOCIATED UNIVERSITIES

March 29 - June 18, 1976

by

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SAFETY AND ENVIRONMENTAL CONTROL DIVISION

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I. Purpose and Scope

The annual health and environmental protection appraisal was conducted intermittently between March 29 and June 18, 1976, by Messrs. R. D. Smith, J. T. Dufour, and J. K. Alexander, of the ORO Safety and Environmental Control Division. The appraisal covered ORAU's programs in health physics, industrial hygiene, and environmental protection.

II. Summary

ORAU's health and environmental protection programs continue to function in an acceptable manner. Additional responsibilities of industrial safety and fire protection have been assigned to the Safety Officer, formerly the Radiation and Chemical Safety Officer. With these added responsibilities, a commensurate adjustment in the staffing level has not been made. With the only technician in poor health, all program development, implementation, and record-keeping falls on the Safety Officer. If allowed to continue unchecked this could have a detrimental effect on ORAU's established programs. This and other findings were discussed with Messrs. Paul Elza, ORAU Assistant Director, and James Berger, ORAU Radiation and Chemical Safety Officer, on June 18, 1976. It is anticipated that ORAU management will give the recommendations and findings of this report favorable consideration as it has in the past.

III. Recommendations

A. Implementation of previous recommendations

74-1 Regarding changes in human studies committee procedures to provide documented steps to assure implementation of committee recommendations or limitations placed upon clinical research proposals.

This recommendation was designed to achieve more thorough documentation of committee actions regarding recommendations and their followup on approved projects. The minutes of the Human Studies Committee now incorporate this and this recommendation is considered implemented.

- 74-2 Regarding documentation in Human Studies Committee review statements of an assessment of psychological and sociological harm which may be associated with proposed clinical research.

The Human Studies Committee has added a psychologist and a minister to address these two points. With these additions to the committee, compliance with the recommendation is assured, and this recommendation is considered implemented.

- 75-1 It was recommended that ORAU develop procedures to assure design review of new facilities and modifications to existing facilities by appropriate health and safety staff. Procedures shall include some form of documentation.

As described in ORAU's May 29, 1975, response to the subject appraisal, responsibilities and procedures for safety review of facilities described in Administration Bulletin 73-2 have

been reemphasized. Documentation of reviews and approvals is being accomplished by the addition of safety sign-off spaces on work order forms and engineering drawings. Reorganization of safety and health functions into a single responsible unit has facilitated this approach. As a result, the thorough design reviews performed recently demonstrate that the actions taken have been effective in implementing this recommendation.

B. Recommendations resulting from this appraisal

It is recommended that ORAU:

- 76-1 Review the existing R&CS staff and make the necessary adjustments (both technical and technician) to maintain the existing high quality of programs under this office. (see Section IV-A.)
- 76-2 Establish a policy absolutely forbidding mouth pipeting. (see Section IV-D.2.)
- 76-3 Take the steps necessary to secure all exhibits in the American Museum of Atomic Energy containing radioactive material to preclude theft or tampering. (see Section IV-D.1.)

76-4 Identify work areas and/or noise sources exceeding 90 dBA and post signs requiring mandatory hearing protection for those in the area when equipment is operating. Area supervisors' responsibility for enforcement should be emphasized and employees shall be advised as to the purpose of this program and trained in the work practices required by it. (see Section IV-B.)

IV. Findings

A. Organization

Since the last appraisal, there has been a significant reorganization of ORAU safety and health functions. All safety and health programs including the employee medical program are coordinated by the safety officer. While not resulting in any staff changes, this consolidation should streamline these activities with dividends in the area of interorganizational communications, design review, and planning. This office continues its functions in radiation and chemical safety as well as performing conventional safety inspections, coordinating the respirator and the safety observer program (now essentially a training function) and doing emergency preparedness planning.

The routine activities of the office include periodic work site audits. It is intended that all buildings are to be inspected about every two months and that

construction sites will receive regular attention. We anticipate that this will be effective in keeping safety and health staff apprised of developments in the field and as a gauge on the success of its programs.

The basic health and safety philosophy, in which ORAU firstline supervision has primary responsibility for employee safety and health, remains unchanged. The Safety Office will assist area supervision in identifying and correcting problems, and will audit their performance. Management has been sensitive to safety and health needs and receptive to both internal and ERDA suggestions and recommendations. Institution of a comprehensive eye protection program during the past year evidences the effectiveness of actions taken in consort by ORAU management, the Safety Office and the Safety Committee. The reviewers commend this, and other efforts being made to provide enhanced safety and health for employees at ORAU.

As pointed out earlier the Safety Office staff size has not changed. It consists of one professional, a technician, and a secretary. Unfortunately, the technician has been ill for several weeks and will be away from work for three or four more weeks. As a result, there is more work than the professional can adequately handle. A case in point is the renovation of the medical facility where radioisotopes have been used since the building was constructed. At the time of the appraisal,

the demolition portion of the renovation had not received any contamination surveys.

At this point in time, ORAU needs to give serious attention to the short and long range staffing needs of the Safety Office. The immediate staffing need is a technician capable of performing contamination surveys. To cover long range requirements, ORAU should consider additional professional and technician support.

B. Hearing Conservation

In order to achieve the stringent requirements of ERDAM 0550 regarding hearing conservation, ORO has been recommending that its contractors adopt a program of mandatory hearing protection whenever noise levels exceed 90 dBA. This approach will ensure compliance with OSHA and other non-ERDA standards and will probably result in a time weighted average exposure of less than 85 dBA which is the current ERDA requirement.

Adoption of this program achieves a two-fold purpose; first, it produces lower average exposures to noise by cutting of the peaks and secondly, it facilitates administrative controls. It is in this area where the greatest dividends will result. The previously recognized administrative control program involved a man, or his supervisor, having to determine how many hours per shift he could tolerate a certain noise level or combination of levels without exceeding the 8-hour average

time weighted average. With several woodworking machines at the ORAU carpenter shop exceeding 100 dBA, it is an impossible chore for a supervisor to keep track of the hours (or minutes) per day on each machine to assure that his charges did not exceed the standard. This has been the finding of noise dosimetry results at several ORO facilities. What is proposed instead is a simple formula. When its noisy, wear hearing protection. Supervisors can instantaneously recognize violations by observing the work conditions and whether or not the men are wearing hearing protection.

With the posting of areas and machines pursuant to a comprehensive noise monitoring survey, and an employee and supervisor indoctrination program, we believe this program can achieve the desired standard compliance and also create a general awareness of the fact that noise is harmful to hearing and that simple steps can be taken to protect oneself.

C. Occupational Radiation Exposures

The health physics program is operating with the ALAP concept. All proposals for new or modifications to existing facilities are reviewed by the Safety Office and new programs receive a thorough survey to assure compliance. All incoming radioisotopes are identified to the Safety Office. The radiopharmaceutical program where the largest exposure occurs, receives the Safety Office's personal attention, and all exposures above normal levels are investigated.

Response to emergency situations are an integral part of ORAU's Health Physics and Paramedic Training Courses. As such, the safety officer has participated in the development of ten different emergency drills involving radiation. To make these drills as realistic as possible, small sources are used and areas are actually contaminated with short-lived technetium-99. Course participants are closely watched and evaluated on their performance. During these exercises, radiation exposure to participants is about 5 mRem and all drills incorporate an "all stop" if in the opinion of the observer the drill is getting out of hand. This reviewer observed one such exercise during the appraisal and believes the experience gained far outweighs the trivial radiation exposure received by the participants.

Radiation exposure to ORAU employees remains quite low. During CY 1975, ORAU reported 20 employees with exposures ranging between 100 and 800 mRem and 460 with exposures less than 100 mRem. Most of those reported in the less than 100 mRem category probably received no exposure, as ORAU records the minimum sensitivity of the monitoring device for each exposure period. This does not hold true for the special training course participants monitored for radiation exposure. If their device shows no exposure above the minimum sensitivity of the device, zero is recorded for the exposure.

Over the years, the radiation exposure of course participants has been reported to them via a post card from

"Old Bremsstrahlung University." Due to the Privacy Act of 1974, a person's radiation exposure record can be released to another individual or employer only with the written permission of the person that the exposure pertains to. Unfortunately, the post card method informs every postman between Oak Ridge and the recipient of the person's radiation exposure. Consequently, the intent of the Privacy Act is not met. In addition, all requests for exposure information should be retained as well as the response.

D. Tour of Facilities

As in all our appraisals of ORAU, a tour of all the non-administrative facilities was made. Tours prove to be an effective measure of the adequacy of safety programs as they relate to the work environment. On the whole, the health physics and industrial hygiene programs appear to be functioning well and most areas appeared to be operated in an acceptable manner. The few exceptions to this statement are described below:

1. Museum

The Plexiglas cover over the radium exhibit is secured with screws through the front of the exhibit. Several of these were missing which rendered the exhibit quite accessible to little fingers. Even if the screws were in place, some industrious sould could gain easy access with the aid of a screw driver, pocket knife, hair pin, etc. Similarly, the thickness gauge has a small

radioactive source which is easily accessible to an industrious individual. It is true that each of these exhibits are in areas with closed circuit television monitoring; however, in the opinion of the reviewers, this alone would not prevent the theft of one of these sources. It is therefore recommended that these cabinets be secured in such a manner as to eliminate the exposed securing devices.

2. Marmoset Lab - Mouth Pipeting

Encountered in this laboratory and probably elsewhere within ORAU was the age old but unacceptable practice for health protection reasons of mouth pipeting. This is the subject of regular confrontations between health protection personnel and researchers not only at ORAU but country-wide. Nothing is resolved by debating the virtues of mechanical versus mouth pipeting because personnel preference and habit are involved as well as the fact that personnel exposure through the mouth is rare. As rare as it may be, should someone become infected by this mechanism, mouth pipeting would be universally condemned because adequate mechanical devices are available. Consequently, to resolve this issue and establish good laboratory practices before someone is hurt, ORAU management should enter into the picture, establishing a policy against mouth pipeting and enforcing it.

3. Carpenter Shop

Machines in this area produce a high noise level. Protective measures described in Section IV-A will be required.

4. Additional Observations

- a. Subsequent to an OSHA-type inspection of special training, all required modifications to safety equipment have been completed. New safety eye baths have been installed and will be effective in providing prompt flushing in case of acid splashes.
- b. ORAU has instituted an ERDA approved safety glasses program in which the corporation provides prescription safety glasses to employees with recent eye examinations and plain ones to non-wearers. Strict enforcement of a safety lens requirement in all shop and lab areas completes a program which we believe should preclude serious eye injuries.
- c. All laboratory hoods are checked on a six-month frequency, and the recommended sash height is clearly marked on each.
- d. Labeling and toxic chemical control have been extensively discussed in previous appraisals. Currently, the chemical

labeling program (with the inhouse labels) is falling into disuse while the chemical control program remains strong. Generally, we concur in this development because manufacturer's labels are becoming better and containing more information and sooner or later a federal uniform labeling standard will be promulgated. In the case of totally unlabeled containers, we recommended that the ORAU label be affixed. The Safety Officer reviews all purchase orders and follows up on any extraordinary or new use of any significantly toxic material. We feel this is the most effective approach to control hazardous substances and its success is witnessed by the lack of any incidents involving chemicals at ORAU.

E. Medical

All clinical studies are performed on outpatients. Most patients come from the Oak Ridge, University of Tennessee, and East Tennessee Chest Disease Hospitals. Presently, there are seven active diagnostic research programs having DHEW Investigatory New Drug (IND) applications. Three others are awaiting approval and/or funds.

As described in other appraisal reports each request to perform research on human subjects must receive approval from the Human Use Committee and in cases where radiopharmaceuticals are used also the Medical Radionuclide Committee. In the 1974 appraisal report, it was pointed

out that although the Human Use Committee was reviewing such things as sociological and psychological impact of these studies upon the patients, the review documentation did not reflect it. ORAU has since added an Oak Ridge psychologist and a minister to the committee and are now documenting the decisions in these areas. Similarly, recommendations and their followup was accomplished by the Human Use Committee but there was no documentation. Documentation of these two items are now included in the committee minutes and research is not allowed to start until the necessary recommendations and/or requirements are fulfilled. The two outstanding recommendations from 1974 have now been implemented.

ORAU medical programs have been undergoing dramatic readjustments to occupy what ERDA considers their proper role. This has resulted in drastic cuts in work with inpatients, but diagnostic radiopharmaceutical administration to outpatients have increased several fold. Patients are referred to ORAU by other medical institutions and private physicians.

ORAU's mission is now visualized as application of existing research techniques to the problems of non-nuclear energy technology. For example, work is being conducted to trace the transport mechanisms of some of the compounds associated with coal conversion (to liquid and gas) processes in biological systems to determine possible health effects. Another project involves the use of

Xenon in a study of coal workers pneumoconiosis (Black Lung Disease) sponsored by the United Mine Workers Union.

As a result of the change in emphasis away from inpatient work considerable space in the ORAU hospital is being made available to other groups. The third floor will be renovated into an Experimental Animal Housing Facility (the design of which has been reviewed by the Safety Office, resulting in several beneficial modifications) and the Biochemistry group presently located at CARL will now be brought into the hospital. It is anticipated that this consolidation will result in improved safety and health surveillance.

F. Environmental Management

1. General

The functions and facilities of ORAU have no significant impact on the environment. Air emissions from laboratory hoods and space heating equipment are not significant relative to regulatory concern. All liquid effluents ultimately go to the municipal sewage system. The Biological Chemistry Laboratory will move from its present site at CARL to the facilities on Vance Road in the near future. It is not anticipated that this move, and the startup of the REACTS facility in a new wing of the Oak Ridge Hospital, will create any new emissions or discharges of major environmental impact.

2. Potentially Hazardous Materials and Other Miscellaneous Chemical Disposal

Certain highly reactive materials that are no longer of use and constitute a safety hazard can be disposed of in Kerr Hollow Quarry. The Y-12 Health Physics Department, principally the Environmental Coordinator, now formally administers all chemical disposals in the quarry. While the disposal procedures specifically designate the quarry acceptable for sodium, potassium (or NaK), and lithium disposal, other substances, depending on quantity, chemical nature, and type of containment, can be considered. Various other materials in relatively small quantities (i.e., old or non-rad contaminated lab chemicals) can be handled by Y-12 personnel in a safe manner at a new miscellaneous chemical disposal area west of Y-12. It is suggested that the R&CSO consult Y-12 on all substances that might involve any sort of special treatment for proper disposal.

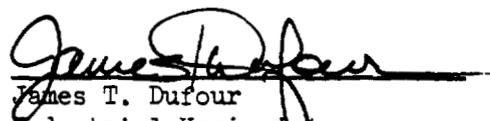
The City of Oak Ridge is currently supplying information to the Environmental Protection Agency relative to a grant for a new sewage treatment plant. Any institutional discharges other than domestic waste may become subject to fairly comprehensive pretreatment requirements or other administrative controls. The Environmental Protection Branch needs to be advised of any special conditions that are specifically outlined for ORAU's use of the City's sanitary system.

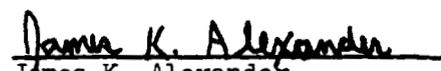
3. Pesticides and Other Chemical Storage

Storage of pesticides and other bulk quantities of chemicals at the Technical Services building is adequate. No special needs relative to a Spill Prevention, Control, and Countermeasure Plan (SPCC) can be identified at this time. Regarding the storage lockers for the pesticides a "caution" sign needs to be posted on each locker and the locker's location noted on the Fire Map.

Reviewers:


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James T. Dufour
Industrial Hygienist


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