University of Washington Correspondence

INTERDEPARTMENTAL

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July 16, 1997

To: Marsha L. Landolt, Dean, The Graduate School
Gilbert S. Omenn, Dean, School of Public Health and Community Medicine

From: John F. Ferguson, Chair

Re: Review of Graduate Programs in the Department of Environmental Health

I am pleased to transmit the report of the Department of Environmental Health Program Review Committee, consisting of Barbara Krieger-Brockett, Sidney J. Nelson, Gareth M. Green, Richard T. Okita and myself. We have all contributed to the report and to its editing into this final form. The report summarizes our findings and recommendations concerning the M.S. and Ph.D. degree programs in this fine department. We all benefitted from the opportunity to participate in the review and appreciate the efforts of many people to make the review a success. We hope that our report will be useful to you and to the department, and the UW committee members look forward to the chance to discuss our findings with your representatives.

cc: Barbara Krieger-Brockett
Sidney J. Nelson
Gareth M. Green
Richard T. Okita

Report of the Program Review Committee

Master of Science and Doctor of Philosophy Degrees

Department of Environmental Health

School of Public Health and Community Medicine

University of Washington

July, 1997

1.0 INTRODUCTION

The Committee, whose membership included Professor John Ferguson (UW), Professor Gareth Green (Harvard University), Professor Barbara Krieger-Brockett (UW), Dean Sidney Nelson (UW) and Professor Richard Okita (Washington State University), met in Seattle on May 15 and 16, 1997. The agenda for the review is enclosed as Attachment A. All meetings on the agenda were conducted. The Committee found wide interest in the review from all members of the Department, and there was full attendance of all invited parties at each meeting. The Committee wishes to express its appreciation for the superior organization of the review, which allowed the Committee to use its time effectively.

The Department of Environmental Health of the School of Public Health and Community Medicine administers Master of Science (MS) degree programs in the areas of Industrial Hygiene, Environmental Technology and Environmental Toxicology and Doctor of Philosophy (PhD) degree programs in Industrial Hygiene and Environmental Toxicology. The reviews of graduate degree programs are conducted regularly by the Graduate School and are part of the peer evaluation process that is carried out at many universities. The Committee was asked to review the quality of the two degree programs, to provide constructive suggestions for strengthening them, and to consider changing the status of the PhD programs from provisional to continuing.

The Graduate School and the School of Public Health and Community Medicine can take considerable pride in the accomplishments of the Department of Environmental Health and in the strengths of its graduate degree programs. The Department is multidisciplinary with active faculty, graduate students and research in each of its program areas; faculty and students come together from a wide range of disciplines in the sciences, health sciences, engineering, medicine and public health. Recommendations for improvement that are offered in this report are intended to make already excellent degree programs even better.

The report is organized into sections dealing with the principal questions posed to the Committee. These questions were: What is the role of the department? What issues relate to the administration of the graduate programs? What is the role of each program? Are resources adequate? What recommendations can be made?

2.0 ROLE OF THE DEPARTMENT

Problems in the outdoor and workplace environments are pervasive in industrial societies and require knowledge and professional expertise to assess and to resolve. Health hazards from environmental disruptions and pollution are definable, present quantifiable risks, are largely preventable, and can be managed with the knowledge developed through research, the guidance provided by trained professionals, and with the resources provided by public resolve.

In the setting of the School of Public Health and Community Medicine, the Department of Environmental Health can draw on the strengths of the School in the quantitative, biological and administrative sciences, and its experience in graduate education at both research and professional

levels. This setting combines the insights, methods, and techniques of molecular sciences with the population perspective of public health and its paradigm of prevention. No other setting in the University of Washington provides these intellectual and material resources.

In this context, the Committee observes that the graduate degree programs serve the following goals and objectives:

- to serve as the chief academic resource in the northwest region for research, teaching, and technical assistance in the environmental health sciences;

- to train investigators at the doctoral level in the basic and applied sciences pertaining to industrial hygiene and toxicology, and in the techniques and skills of laboratory and field research in these disciplines;

- to educate professionals for practice at the masters degree level in industrial hygiene, environmental health technology, and toxicology, meeting the environmental health manpower needs in the Pacific Northwest region;

- to educate university students more broadly in the issues, sciences, and problems of environmental health;

- to assist the region in the analysis and solutions to environmental health problems through public health education and outreach.

The Department of Environmental Health demonstrates strong professional education and technical resources in industrial hygiene, toxicology, and environmental technology. There is impressive capacity for scientific research and research training in toxicology. The interdisciplinary framework of the Department of Environmental Health and the School of Public Health and Community Medicine creates a realistic environment for relating the products of research to the solutions of community environmental health problems. The faculty and technical facilities engaged in the graduate programs serve as an education resource for the Department, the School, the University, and the Northwest Region in environmental health.

As the Department moves ahead, we recommend that they:

- maintain the current academic strength in toxicology and build through recruitment and replacement stronger research activity in industrial hygiene and environmental technology;

- progressively strengthen the teaching environment, the effectiveness of the graduate education programs and student satisfaction with the programs;

- achieve better integration of personnel, program, and space so as to maximize the potential for quality and productivity of the programs;

- and strengthen the program by the development of additional capability in risk analysis, risk assessment, and communication of risk.

3.0 ADMINISTRATION OF GRADUATE EDUCATION

The Environmental Health Department has a comprehensive admissions policy. The graduate students are screened and admitted to the Environmental Health Graduate Program by the admissions committee, headed by Prof. Michael Morgan. The committee consists of directors or representatives of each program within the department, as well as other members. This committee is well organized and has been working to improve the admission's process and student orientation once they are accepted. Dr. Burbacher, the Graduate Program Coordinator, spoke of the need to continue vigorous recruitment, as did faculty in several of the programs.

There are no established guidelines for an active recruitment program for minority students; however, it was stated if a minority student applies, the Admissions Committee will make a strong effort to enroll this student. According to the self-study guide, 45 applications were received from minority students from 1993 to 1995 to the Department of Environmental Health and 16 minority students were offered acceptances. Graduates include three Asian/Pacific Islanders, one African-American and one Hispanic student since1993.

Advising/mentoring to incoming students has been improved by increasing the orientation process from one to two days and developing a system for students to meet with different faculty and research groups. Students are permitted to determine which faculty they wish to perform laboratory rotations with. Dr. Burbacher initiated the formation of a Graduate Student Advisory Committee, and there has been substantial improvement in student satisfaction with the program as a result of its activities.

During the period prior to the student's choosing a research advisor, the admissions committee, and particularly Prof. Burbacher, advise the students. The students appreciate this individualized attention in developing their programs of study. The Department maintains a curriculum that is representative of that of the leading graduate programs in public health. It appears most students' choices for a research advisor are honored by the department. However, the students expressed some confusion about the expectations and method of assigning stipends, research assistantships, and teaching assistantships. There appears to be a concern about the perceived lower workload for students during rotations while on a stipend, and the perceived greater workload for the students on a research assistantship. Likewise the faculty expressed concern that there was little reward or incentive for being able to support a student on a research grant, and little difficulty when the student couldn't be supported.

The department monitors student progress toward the degree. It requires about 2 years to obtain an MS in Environmental Health, which has about 20 students entering each year. The students appear to be quite focused and practical in their expectations about a future job, and therefore are eager to do internships which somewhat prolongs the time to degree. Some students expressed a desire for a greater number of internships so all students could have the

practical experience. In addition, there is a perceived tension between doing an internship (and obtaining workplace knowledge and skills) and thus interrupting the continuity of a research project during the summer, versus doing research that summer quarter (and obtaining a greater knowledge of a particular topic). Most faculty prefer the latter, but some students would prefer the flexibility to pursue internships. Some concern was expressed about the differing expectations concerning the depth and quality of the MS level research; it was said that the range of required effort is extreme. Progress to the PhD is not as easily discerned, since fewer students are involved and the program is relatively new. Procedures for qualifying exams are well established, and questionnaires returned by graduate faculty representatives on PhD committees express satisfaction with the standards of the examinations. The time to degree is quite variable. The review committee thought that perhaps the Department would benefit from a greater flexibility in the PhD degree requirements, and perhaps an individually developed, departmental PhD track would suit some students, notably those in the environmental health technology area.

The graduate students appear to value greatly their research experience and the collegial relations in the Department as judged from the four post-graduation professionals we interviewed. While there does not appear to be a formal, departmentally-tailored exit evaluation of the graduating students, feedback from former students frequently occurs because many graduates maintain contact with their Department faculty. Most graduates are employed in the Seattle area or in Washington, so the Department performs an important service to the State, but the national impact of the high quality program is lessened. The graduate students are extremely practical and focused. They expressed a desire for an increased emphasis on modern equipment, such as they see and use in their internships, and in particular, on data interpretation and professional opportunities to communicate their conclusions. Of great importance was their expressed desire for individual feedback on their presentations and increased accessibility of some of the faculty. In general, the graduate students were extremely aware of the pressures of obtaining funding, and providing the resources and research support they enjoyed.

4.0 ENVIRONMENTAL TOXICOLOGY PROGRAM

Quality of the Toxicology Program

The Toxicology Program of the Department of Environmental Health has a core of established well-funded faculty who have received national and international recognition. Several specialized research units have been created in the Department, which has led to increased scientific recognition for the toxicology program. These units include the Center for Ecogenetics and Environmental Health (CEEH), NIEHS Superfund Basic Research Program Project, The Consortium for Risk Evaluation with Stakeholder Participation (CRESP) and the Institute for Risk Analysis and Risk Communication. With their outstanding productivity in obtaining research funds and publishing their research in peer-reviewed journals, the faculty has had a significant impact on the toxicology field.

The performance of the Toxicology faculty has permitted this unit to develop an effective graduate program at the University of Washington that trains students in state of the art

techniques and subjects. The academic standards are high and entering students are highly qualified. In the Masters program, 6 to 7 students have entered the program per year from 1993 to 1996. The average GPA for students accepted into the Masters program was approximately 3.2 with a GRE total of 1800 (range 1603-1861). The length of time to graduate with a Master's Degree was less than 8 quarters for students who entered in 1993-1994. In the PhD program, 3 to 4 students have entered per year from 1993 to 1996. The average GPA of students accepted into the PhD program was approximately 3.5 with a GRE total of approximately 2000 (range 1848-2060). The length of time to graduate was approximately 6 years for one student who entered the program early after its conception, but the time needed to finish with a PhD is expected to decrease.

It was mentioned during our meeting of the review committee that a number of the Toxicology faculty have had prior associations with the University of Washington as either graduate students or postdoctoral fellows in other departments before becoming faculty members in the Department of Environmental Health. The committee felt that this was not an indication of the program retaining its trainees because the individuals were either trained in other departments of the University and/or had additional training (e.g., postdoctoral) at other universities. The outstanding productivity of the faculty, as a whole, also indicates that retention of these individuals does not detract in any fashion from the overall quality and performance of the Toxicology faculty.

Graduate Education in Toxicology

As mentioned above, the Toxicology Graduate Program has established high entrance and performance standards. There have been positive changes in the overall administration of the graduate programs. Students feel they have greater input into their programs, and overall, the students appeared to be satisfied with the faculty in the Toxicology Program.

One alumnus of the Toxicology Graduate Program met with the committee and she indicated it took her 6 years to graduate with her PhD. She felt that graduation times would decrease in the future because she was one of the first to go through the program. She indicated that there had been improvements since she entered; for example, there has been a reduction in the number of required classes students must take and an increase in elective courses which provides greater preparation for individual students in their selective fields. The self-study guide indicated the Department would like to see students graduate with PhDs in 4 - 4.5 years. Masters students are graduating in two years. Retention of students in the Toxicology Graduate Program appears to be good. The dissertation projects of the Toxicology Graduate Program are well done and are associated with publications in peer-reviewed journals and abstracts to national and regional meetings. It is too early to discuss the placement of PhD graduates of the Toxicology Graduate Program, but it is apparent that many of the graduates would like to remain in the Seattle area. How this strong attachment for the Seattle area affects either the placement of future graduates or the program in general, remains to be determined.

With regard to specific comments or criticisms of the Toxicology Program, there were some concerns expressed by the graduate students in this program as described below.

1. Some first year students were not aware that laboratory rotations were graded classes.

2. Masters level students felt that they were somewhat disadvantaged because courses were not offered every year which affected their course schedules, but they acknowledged that graduation within 2 years was not a major problem.

3. It was stated by some students that they would be interested in receiving more faculty evaluations or input into their performances for their lab work, rotations and presentations. For example, students perform rotations during their first year and receive letter grades for these rotations, but they would like to receive additional input as to their performance in the laboratory. In addition, some Master level students stated that the first extensive progress reports they received were at their Spring research presentations of the second year. Students would like to receive greater input from their faculty advisors as a means of determining whether they are meeting expectations.

4. It was also stated by some Toxicology graduate students that they would like to receive more input on their journal club presentations to improve their oral communication skills. The journal clubs are informal, which they liked, but they felt that greater faculty participation and input into the evaluation of presentations would make them better communicators and researchers. It was acknowledged that it was difficult to get faculty participation in the journal club, because this course is held on the medical campus whereas the majority of the faculty are at the Roosevelt site.

Overall, graduate students in the Toxicology Program spoke very favorably of the Toxicology faculty, the education they were receiving, and the interactions with their faculty. They understand the amount of work which faculty must accomplish imposes time restrictions which limits interactions between faculty and students. This was a recurring theme that was heard from all students in the graduate programs of the Department of Environmental Health. However, the students also recognize that certain faculty are able to meet with students more often and provide more individual mentoring, and they would appreciate if more faculty could meet in this fashion.

Role of the Program

The Toxicology Program has a unique role in the School of Public Health and the Medical School at the University of Washington. It is a highly interdisciplinary program with expertise in reproductive toxicology, neurotoxicology, inhalation toxicology, immunotoxicology, gastrointestinal toxicology and molecular toxicology which permits interactions with several different departments within the University. The development of several centers with focus on toxicology has also helped to establish central themes for the Program and has helped to increase this program's exposure and interactions with other research units in the Department and the University. There appears to be good collegiality among faculty in the Toxicology Program with those in other programs of the Department and in the University. The Toxicology program is also establishing strong ties with the surrounding community with its "Risky Business - Living in a Chemical World" unit to aid school districts and teachers in kindergarten through 12th grades (K-

12) develop curricula on Environmental Health Sciences. The outreach and K-12 educational programs developed by Dr. Dave Eaton are a unique endeavor for a research group and these interactions with the community are to be congratulated. Exposure of Toxicology graduate students and postdoctoral fellows to these programs should permit an unique learning experience for young investigators trained in research.

5.0 INDUSTRIAL HYGIENE PROGRAM

The Industrial Hygiene program is a small, strong and cohesive group, and one that is undergoing significant change in key areas. It has a key role in educating industrial hygienists for Washington and for all the Pacific Northwest. We met with five faculty, including Dr. Kalman who also heads the Environmental Technology group. The faculty are energetic and professionally active in teaching, research and in professional service. The faculty maintain a high level of funded research and are active in publishing their work. The program is losing its specialist in ergonomics and relies on emeritus faculty to teach safety. These areas are central to the education of industrial hygienists; finding replacements in the near term is a priority in the Department and must be completed successfully.

Graduate Education in Industrial Hygiene

The program administers MS and PhD degrees, graduating 9-14 MS and about 1 PhD a year. Between its training grant, state-appropriated Medical Aid and Accident (MA&A) funds and research projects, there are ample funds to support graduate education. There is an opportunity to recruit more well qualified graduate students, and this is seen as a priority by the faculty.

The MS students are professionally motivated and enthusiastic about their program. They value all aspects of their studies, including coursework, internships and their research experience. The internships were especially noted as valuable and needing strong support from the faculty. The students also generally valued breadth in their coursework, noting that all areas, but including safety, ergonomics and environmental technology, are likely to be needed in their professional careers. The students speak appreciatively of the reduction in credits required for the degree and of the flexibility added to the course requirements. They spoke of some tension between the requirements for a research degree and for professional training. The impression of the Committee is that they would value a small shift towards more emphasis on professional training.

The PhD program in Industrial Hygiene is still very small. One student has graduated in the last three years, and there are currently five students. The goal is to admit one or two new students each year, a goal that has been achieved. The course requirements for this degree have also recently been modified to introduce flexibility. The degree program in this area probably has not yet matured enough to be changed from a provisional to a continuing basis.

6.0 ENVIRONMENTAL HEALTH TECHNOLOGY PROGRAM

The Environmental Health Technology group within the Department of Environmental Health is a small, diverse group of energetic faculty and students. The faculty appear to be collegial and interact strongly. This division offers a MS, but as yet no PhD degree.. The highest quality graduate students are attracted in substantial numbers to the research projects within the group. The recent publications are numerous and of high quality. The masters degree candidates we interviewed were dedicated, articulate, enthusiastic spokespersons for their Technology group and their experience within the Department. A number of the students were interested in pursuing a PhD (no PhD is currently offered), and job prospects for individuals with a PhD appear to be good. The obvious student quality and potential demand for graduates of this program suggest a need for a considered, long term development plan for this program. Some of this is already in place, for example, a new faculty search is ongoing. There is an opportunity to develop a PhD option in this area. At least two approaches were mentioned in our meetings: developing an individualized doctoral track, and/or including environmental health technology with the existing industrial hygiene track.

The teaching commitment of the faculty is strong; the faculty spend long hours with the students acting as mentors, and indicative of their commitment, invest their own personal resources in the teaching labs. The student-faculty interaction appears to be strong and healthy, especially as evidenced by the numbers of students working at the graduate as well as undergraduate research level. The graduate students expressed an interest in having more "training" in the research experience. Requests were made for more presentation of papers, a faculty-student (interactive) journal club. Some discussion of the graduate level course offerings occurred, and it appears that the wide diversity of faculty interests, and topics covered lead to a dilemma regarding how much background the diverse graduate students could bring to a graduate course sequence. One thread of the discussion lead to the possibility of offering an undergraduate course (course number 4XX), with an enhancement (number 5XX) for the graduate students. Various possible enhancements were discussed including projects, reports, in-depth work on a subject related to the course content.

Some concerns were expressed by both the faculty and students regarding the uncertain and uneven expectations of what constitutes a masters degree project, and what the duties and activities were for a graduate student on stipend versus a graduate student on a research assistantship. Some of these issues are being addressed among the graduate students and faculty through the very active Graduate Student Advisory Committee.

Strong and interactive Environmental Technology program leadership is given by Prof. David Kalman. He is accessible to the students and faculty, involved and committed to teaching and providing field experiences for his undergraduate students. Prof. Kalman ably accomplishes this in spite of his additional duties as Associate Chair of the Department. They are currently looking for an additional faculty member, but have been frustrated in this effort by the poor quality and small size of the laboratory and office space available to the Environmental Technology Program.

7.0 DEPARTMENTAL RESOURCES

The Department receives major support from the State of Washington through funds appropriated as part of the Medical Aid and Accident funds and a small amount of support from the state-appropriated University budget. About 60% of faculty salaries are paid from these sources. There is a large commitment to staff, who have significant contractual responsibilities to provide services as part of the MA&A funds. There is a very large commitment of funds for rental of off-campus facilities.

There is excellent support for all graduate students in the Department from state funds, individual grants and from training grants. The amount of funds targeted for research and teaching assistantships is substantial and definitely indicates the strong commitment of the Department Chair and faculty to graduate education and support of graduate students.

There is pressure on the faculty to provide research funding, in part to support their salaries, but the combination of MA&A funds allocated to academic programs and University funds appears approximately in balance with the instructional activities of the Department. Some faculty have non-academic duties associated with MA&A support, which must be recognized in measuring academic duties (e.g. teaching assignments under the Instructional Responsibility Policy).

Space problems have eased greatly by addition of the Roosevelt facility. The investigators in the Toxicology Program, who have moved their labs, now operate in significantly better facilities. Although the facility at the Roosevelt site is excellent, it is unfortunate that a majority of the Toxicology faculty are separated from their colleagues who remain on the South Campus, particularly some members of their own program. This situation does impact the graduate programs of the Toxicology program, because students take their courses on the South Campus and this restricts faculty-student interactions for first and second year graduate students who take the majority of their classes on the South Campus. The equipment and facilities at the Roosevelt site are excellent and demonstrate the effectiveness of this program faculty to obtain research funding. However, a new faculty member in Toxicology who is located on the South Campus, because of space limitations at the Roosevelt site, has some difficulties in timely access to equipment at the Roosevelt site and has to seek out assistance from other units on the South Campus.

The facilities in Health Sciences are inadequate in many respects. While the space is intensely utilized, the total amount is not sufficient; it is spread out in three wings of the complex. We note that the teaching laboratories are especially deficient in having control of laboratory space and in having adequate, modern laboratory apparatus. We did not visit other facilities of the Department but were told that there are at least six locations where Department activities are carried out.

The administrative and technical staff appear to be well-trained and motivated. In addition to assisting the faculty, they have a major role in developing and supervising the educational and

outreach programs. The faculty, staff, postdoctoral fellows and graduate students form a highly productive and effective unit.

8.0 GENERAL RECOMMENDATIONS

Maintain current goals and objectives of the graduate education program.

Develop a long term plan for physical unification of the scattered components of the Department.

Work to improve lab facilities and equipment for instruction in environmental technology and industrial hygiene.

Consider the development of a combined Industrial Hygiene and Environmental Technology track in the MS program to prepare graduates who can meet the demand in the private sector marketplace for broad responsibility and competencies in environmental and industrial health and safety services. Consider a similar combined track for the PhD program, or alternatively, an individualized, departmentally administered doctoral track.

Develop collaborative linkages in molecular genetics between environmental toxicology and pathobiology in the School of Public Health, with departments of the medical school, and with other departments on campus.

Explore ways to maintain competitive salaries for top faculty in the environmental health professions.

Attract undergraduate students in the department to the graduate training program in order to open additional career opportunities in environmental and public health to these students.

Increase the internship opportunities for the graduate students and encourage faculty to support this important practical experience by making accommodations in research project schedules.

ATTACHMENT A

AGENDA
Department of Environmental Health Graduate Program Review
May 15-16, 1997

Thursday, May 15

8:30 - 9:00	Gilbert Omenn, Dean, SPHCM
9:00-9:30	Professor Gerald van Belle, Chair (David Kalman, Associate Chair, Sharon Morris, Assistant Chair, Jean Garber, Administrator)
9:30-10:00	Research Associate Professor Thomas Burbacher, Graduate Program Coordinator
10:00-10:30	Break
10:30-11:00	Toxicology Faculty
11:00-11:30	Technology Faculty
11:30-12:00	Industrial Hygiene Faculty
12:00-1:00	Committee Lunch Meeting with Graduate Student Advisory Committee (Marie Foltz, Mark McMillan, Tom Lewandowski, Clint Farr, Cheryl Hart)
1:00-1:30	Graduate Students in Toxicology (Marc Stifelman, Clint Farr, Tom McHugh, Michael Garry, Chetana Acharya, Nancy Beck, Noel Hudson)
1:30-2:00	Graduate Students in Industrial Hygiene (Tommy Meyers, Marie Martin)
2:00-2:45	Health Sciences Facilities Tour (David Kalman)
2:45-3:00	Break
3:00-3:30	Graduate Students in Technology (Frances Buck, Ben Howarth, Ann Wawrukiericz)
3:30-4:00	Executive Session - Review Committee
4:00-5:00	Alumni and Professional Representatives
7:00	Dinner

Friday, May 16

8:30-9:15	Roosevelt Facilities Tour (David Eaton)
9:30-10:15	Assistant Professors in the Department (Zhengui Xia, Lianne Sheppard, Noah Seixas, Michael Yost, Mansour Samadpour)
10:15-10:30	Break
10:30-11:00	Associate Dean Patricia Wahl, SPHCM
11:00-11:30	OPEN
11:30-12:00	Resources Presentation - Professor van Belle and Professor Kalman, Director, Environmental Health Lab
1:00 - 3:00	OPEN for individual appointments 1:00 - 1:20 Crispin Pierce, Senior Fellow
3:00-4:00	Exit Interview with Professor van Belle and Dean Marsha Landolt, The Graduate School
4:00-5:00	Exit Interview with Dean Marsha Landolt