June 21, 2004

Dean Eric W. Kaler
College of Engineering
University of Delaware
102 Dupont Hall
Newark, DE 19716-3101

Re: Department of Civil and Environmental Engineering
    External Advisory Council 2004 Report

Dear Dean Kaler:

The External Advisory Council to the Department of Civil and Environmental Engineering met on the main campus of the University on May 24 and 25, 2004.

Susan Best, Kevin Donnelly, David Charles, Tony Dalrymple, Richard Hangen, Ray Harbeson, James Johnson, Charles O'Melia, Charles Thornton, Carolann Wicks, and John Yadlosky attended the meeting. This letter contains our report to you on the following four areas: (1) Responses to our last report, (2) Strengths, (3) Concerns, and (4) Committee Recommendations.

Responses to the Committee’s Previous Report

In our May 2003 review of the Department of Civil and Environmental Engineering, the External Advisory Council made 12 recommendations to the College and the Department. We are pleased to report that both the College and the Department have responded well to the recommendations. Action was taken on almost all items and three appear to be completely resolved; six partially resolved and only four have had little progress. More specifically, the Department Chair’s responses to the Council’s recommendations are identified in red as follows:

- **Planning**
  
  The Strategic Plan for the Department needs to be completed in 2003, preferably by September 2003. Development of the plan must be a cooperative effort between faculty and leadership and must be consistent with the College Strategic Plan. An Annual Business Plan with specific assigned responsibilities should accompany the Strategic Plan. [Action: Retreat held during winter session 2004 to revise and finalize plan. Mel Hensey of Hensey Associates led the planning session as recommended by the advisory council. Developed an Annual Business Plan in addition to a longer range strategic plan.] RESOLVED

- **Diversity**
  
  At least one engineering faculty position needs to be filled with a well-qualified woman candidate at the earliest possible date. The Department leadership and faculty need to make a concerted effort to seek out and recruit highly qualified women applicants for each faculty position that becomes available. Improving the pool of applicants with more qualified women candidates should lead to the selection of a woman faculty member in the near future. This issue needs to be a priority item in the Department’s Strategic Plan. [Action: Identified and nominated potential women faculty candidates. Interviewed four women for the two open faculty lines. Plans formed to invite potential candidates to campus to give lectures on an ongoing basis. Continued the use of off-campus women instructors.] NOT RESOLVED

- **Programs**

  **Environmental Engineering**
  
  The Department needs to determine its path forward with the separate Civil and Environmental Engineering Degree Programs. If the Department’s goal is to retain a separate Environmental Engineering Degree Program, then strategies to promote the program and recruit more students need to be developed. If the decision is to phase out the program then a transition plan with the existing students needs to be developed. This issue should also be addressed in the Strategic Plan. [Action: Developed a plan for the environmental program. This included the development of a minor (which is now approved). Set goals for where the program needs to be in terms of size. Developed new recruiting strategies. Explored ways to increase interest in environmental engineering among civil students.] RESOLVED
**Transportation Engineering**

The Department needs to make better use of the ITS Lab and develop one or more undergraduate courses that regularly utilize the Lab. Meetings with the Delaware Department of Transportation need to occur quickly to resolve any issues on making data available for the Lab and to seek input on what educational needs exist for current and future staff. [Action: Met with DelDOT to see how the ITS lab can best serve them. Added to the curriculum a transportation laboratory class that will utilize the lab. Discussed with DelDOT short courses to train those in Dover using their ITS lab. Will more actively seek research that leverages the lab.]

PARTIALLY RESOLVED

The Department needs to evaluate its needs and growth potential in the Transportation area and its available resources to meet the needs. With the commitment of Dr. Faghri’s time to Assistant Chair and Director of the Delaware Center for Transportation responsibilities, it appears that the Department has a need to add an additional faculty member in this area in the near future. [Action: The transportation group does lack critical mass. Methods for addressing this are being sought. In 2004/5, a visitor, Dr. Polus, will be in residence] NOT RESOLVED

The Department needs to coordinate its course and seminar offerings in the T² Program more closely with the Outreach Program and the normal curriculum so that newsletters and publications can provide a full listing of educational opportunities. [Action: This is being done by DCT.] RESOLVED

**Structural Engineering**

The Structural Engineering has done an excellent job in setting up the new Center for Innovative Bridge Engineering. The Department and the new Center could now benefit from an increased effort to involve more faculty from other sub areas, such as Geotechnical Engineering and Coastal Engineering, in future research proposals. [Action: CIBE is looking to broaden the research areas including looking at geotechnical engineering problems. The annual program with DelDOT has identified one geotechnical project to help initiate this expansion.] PARTIALLY RESOLVED

**Geotechnical Engineering**

The Department could benefit from more collaboration between the faculty of the Geotechnical Engineering Group and faculty from the other technical sub areas in pursuing research. Opportunities currently exist with the Coastal and Structures groups. [Action: See above.] PARTIALLY RESOLVED

The Geotechnical Engineering Group should work to significantly expand the size of its research program and broaden their research areas of interest to support and potentially team with the new Center for Innovative Bridge Design. The long-term objective of this group should be to obtain comparable national recognition to that achieved by other Engineering Groups within the Department. [Action: A plan for this area is being developed. The potential loss of one faculty member in this area has caused this activity to be put on hold for now.] NOT RESOLVED

**Coastal Engineering**

The Department could benefit from the Coastal Engineering Group broadening their research activities to include other hydraulic infrastructure areas such as scour and stream stability. These research opportunities will require significant collaboration with other Department Engineering Groups, such as Geotechnical and Structures. [Action: The first action item for the coastal group is to fill open faculty lines. These hires are being selected with the idea of allowing the group to branch into new areas that will allow for collaboration with others in the department and on campus. Offers are currently pending.] NOT RESOLVED

- **Collaborations**

  The Department needs to continue to look for opportunities to assemble teams across sub areas to respond to state and corporate research needs. Some opportunities have been identified above for specific areas. Other opportunities still exist in the State’s Biotechnology Initiative and with the Department of Natural Resources.

  Opportunities also appear to be opening up on a regional basis with the initiative led by Congressman Weldon of Pennsylvania. The Department needs to work through the College to take part in this effort to
compete for federal research dollars and develop closer relationships with federal agencies such as EPA. [Action: The department is working with CHEP to forge closer ties with DNREC. An internship program is being initiated. The department is pursuing other multidisciplinary initiatives such as biosensors and fuel cells. The department will look for ways to encourage faculty to seek multi-investigator funding.] PARTIALLY RESOLVED

**Public Relations**

The Department needs to work closely with the College to coordinate its newsletters and publications to best market the programs, accomplishments and major initiatives. Strategic use of those publications allowed under current University Policy should be used to inform the engineering community and alumni of as much College and Department activity as possible.

[Action: The college has initiated an electronic newsletter. The department will actively submit items for this, as well as continue to upgrade the department web site. The department will publish a research report as well (first in Fall 2004). Finally, the department will expand its promotion of faculty and student achievement through awards nominations and will look to get news stories into publications outside the university.] PARTIALLY RESOLVED

**Strengths**

**Leadership & Faculty**

The leadership and the faculty both within the College and the Department continue to be strong and committed to advancement of both the Department’s education and research programs.

**Facilities**

The facilities available to the Department are first class. All immediate needs appear to have been met and future concerns are addressed later in this report.

**Students**

The number of engineering students in the Department continues to increase and the quality of the students remains high.

**Education Program**

The Department continues to have a strong and diverse undergraduate program and continues to maintain its graduate program at approximately 90 students.

**Research Program**

The research program of the Department continues on a steady growth path.

**Concerns**

Despite the excellent leadership at all levels (University, College, and Department) and the great progress on all programs over the past few years, the Council did note a few areas where problems exist or continue to linger and, if not addressed, could undermine the Department’s success in the future.

**Planning**

The Department Chair and the faculty of the Department did an excellent job in putting together a Strategic Plan and an Annual Business Plan. In reviewing the specific items, however, the Council noted that 14 of the items relate to Goal #1, which is research oriented, and only 4 of the items relate to Goal #2, which is education oriented, and one of those items was to expand undergraduate research opportunities. Both research and education are extremely important to industry, however, to the industry representatives of the council, excellence in the classroom often seems to take a back seat to the accomplishments in research. In general, to the Council, it appears that in future Annual Plans the overall individual actions should begin to balance in order to maintain the quality the University currently enjoys in both research and education.

**Diversity**

The lack of progress on hiring a woman faculty member is still troubling to the Council. The Department made an excellent effort to hire a woman faculty member in the Structures area and the Dean made an excellent offer to the Mechanical Engineering Department to provide a position to hire her husband. In the end, however, the College was unable to find a good fit for the husband and
acceptance of the offer fell through. The Department reported that it is contacting women faculty and encouraging them to respond to positions and there have been more women in the final pool of candidates for each position advertised. Still the Department has not been successful and these efforts and more need to be pursued until an experienced woman faculty member is hired. Once an experienced woman faculty member is on board, the Council believes that it will be much easier to attract junior women faculty members.

The Department is commended for continuing to put excellent women role models in the classroom through the hiring of women engineers as adjunct faculty.

- **Programs**

While the Council did not meet with the individual sub areas of Civil Engineering at this meeting, program areas were discussed in the follow up to last year and through questions of the individual members. Most areas made progress on the areas discussed last year but some areas have been hindered in resolving issues because of the loss of faculty. Filling these positions is the key objective for Structures and Coastal Engineering in the upcoming year.

The Environmental Engineering Degree Program was addressed as recommended by last year’s Council and we are pleased to see that the number of students enrolled has increased and the establishment of a Minor in Environmental Engineering will add students to the courses offered in this area. Since the past experience of the Department of Civil Engineering was that a third of their students selected Environmental Engineering when it was not a separate major, the Council is suggesting that the Department consider enrolling all students as Civil Engineering students for the first year and allowing students to select the Environmental Engineering major after the first year. To accomplish this, however, a decision needs to be made on the level of Chemistry required for the Civil Engineers and the Environmental Engineers, since they now take different levels during their first year.

- **Collaborations**

Development of the Strategic Plan was done in an excellent manner in that it involved the faculty and spread out the assignment of responsibility among faculty members. With this effort behind them the faculty should be better positioned to work together to look for opportunities to collaborate across sub area lines to pursue future research projects and on call relationships.

To the Council it appears that additional efforts can be made in the partnering of the various areas on research proposals, partnering with the Delaware Department of Natural Resources and Environmental Control, partnering with EPA and partnering through Congressman Curt Weldon’s “SMART” Caucus (“Strengthening the Mid-Atlantic Region for Tomorrow”).

A general concern raised among the Council members was the issue of mixed messages on collaborations. While the Dean and Chair are out front in encouraging collaboration on research work, the promotional system seems to only focus on the individual work of the researcher. While it would take a change in the historical approach to reviewing candidates for tenure, the Council feels that the addition of a review and evaluation of an individual’s willingness and ability to collaborate with colleagues both inside and outside of his Department during the promotional process would strongly send this message to the staff. The Council believes that collaboration will not only strengthen the research products of the Department but will teach both faculty and students the kind of teamwork that industry needs.

**Recommendations**

1. **Planning**
   a) The Department needs to develop performance measures for its Strategic Plan and set an interim date for reviewing and updating the Plan. Review and update of the plan should not be more than 3 to 5 years from the establishment of the plan.
   b) In the annual element of the plan (which should be reviewed and updated each year), more balance needs to occur between research action items and education action items.

2. **Diversity**
   a) With its available faculty lines the Department should hire one experienced woman faculty member within the next year.
   b) A woman Civil Engineering faculty member from another institution should be appointed to the CE Department Advisory Council before the next meeting.
c) The Dean should continue to make an additional faculty line available; if it will help the Department hire an experienced woman faculty member. He should also consider offering the additional faculty line to the first area within the Department to recruit a first class, experienced, woman faculty member, as incentive to all areas and not just the ones that have existing vacant lines.

3. Programs -
   a) Environmental - Consider admitting all students as Civil Engineering students and admit students to the Environmental Engineering degree program after the first year (to accomplish this the level of Chemistry required will need to be consistent).
   b) Transportation - Continue to develop courses and research proposals that use the ITS Lab.
   c) Structural - Fill vacancy in accordance with the Strategic Plan and try to keep the special “niche” in Railroad Engineering.
   d) Geotechnical - Continue efforts to collaborate with other areas of Civil Engineering on research proposals.
   e) Coastal -
      • Fill existing vacancies using a joint line with Marine Studies, if advantageous.
      • Develop collaborative research proposals with the Structures, Geotechnical, and Environmental areas.

4. Collaborations -
   a) Explore collaborative approach to new fuel cell research grant, opportunities in the Homeland Security area, and opportunities from the SMART Caucus.
   b) Look at ways to encourage collaboration in the promotional process.
   c) Continue to develop closer ties with DNREC and EPA.

5. Public Relations - Continue current efforts to get the word out to Alumni and the Engineering Community on Department research, educational opportunities and other awards and activities.

6. Facilities -
   a) Develop a plan for future improvement of the High Bay Structures Lab.
   b) Develop a plan for future improvement or replacement of the Coastal Engineering Lab.

The Council continues to be impressed with quality, the content, the facilities and the personnel of the Department of Civil Engineering. Overall the Department is very sound and continues to advance its reputation with the engineering community. Our format was somewhat different this year, focusing on the overall plans of the Department with the Chair and a couple of faculty members. Our recommendations this year are centered on those items that we believe will ensure the Department continued success well into the future. Next year the Council would like to meet with the individual faculty members in breakout sessions, as we have occasionally done in the past, and hear from them on the Strategic Plan and their new initiatives and actions to support the plan.

We are grateful to Chairman Chajes, Linda Flamer and members of the Department faculty and staff for their time and hospitality during our visit to the campus. We also appreciate not only the time you provide from your schedule to discuss our reviews but the attention and follow up you obviously provide to the Department. We trust you find these comments helpful and if there are any questions, the Council remains ready to have further discussions with you or the Department.

Sincerely,

Raymond M. Harbeson, Jr.
Chairman

Cc: Dr. Michael Chajes, Chair
    Dr. Ardeshir Faghri, Assistant Chair
    Council Members