CHAIR RESPONSE
Review Committee Report
Program Performance Review
Department of Geological Sciences

Initial Remarks:
The review committee for the Department of Geological Sciences 2014 Program Performance Review consisted of four members with a diverse array of experiences. The committee members were:

- Kevin Furlong, Professor of Geosciences, Penn State University, has expertise in research and teaching at a large, research university.
- Vicki Pedone, Professor of Geological Sciences, CSU Northridge, has 20+ years of experience as a teacher, researcher and chair of a similar-size geology program at a sister CSU campus.
- Kay Pitts, Senior Manager, Aera Energy, Inc., is a CSUF Geology Alum with 20+ years in the energy industry.
- Binod Tiwari, Associate Professor of Civil and Environmental Engineering, CSU Fullerton, has expertise in geotechnical engineering and has the perspective of another CSUF college.

We appreciate the efforts of the committee and the opportunities and challenges they identify in their review. As I read the review document, the main concerns and recommendations revolve around the following categories:

- Faculty
  - Hiring
  - Mentoring
  - Others (Professor of Practice, Female faculty, external grant salary)
- Undergraduate program
  - Evaluation of thesis
  - Evaluation of BA program
  - Assessment
- Graduate Program
  - Focused graduate curriculum
  - Career paths
  - Reduce tuition costs
- Other
  - Department funding opportunities
  - Develop alumni relations
  - Room scheduling
  - Handling travel arrangements

I address the issues and recommendations of the committee in detail below.

I have reproduced the specific issues and recommendations from committee below in **bold**. I then address these items in detail.

The Faculty

Faculty Expertise and Future Hiring

1. … a geophysics position should be a very high priority in future hiring …
2. … expertise in clastic-sedimentology and basin studies …

The committee recommends hiring priorities as (1) geophysicist and (2) clastic sedimentologist (hydrocarbon resource geologist in our self study); both are in line with our own self study, but with a different time frame. The committee highlighted the geophysics hire due to the new administrative roles of David Bowman, interim Dean of NSM, and Phil Armstrong, Chair of Geological Sciences, who were the two faculty members able to teach geophysics. The clastic sedimentologist was suggested to provide faculty expertise to train students for the energy industry.

We held a faculty meeting to discuss our next faculty search in Fall 2014 and decided that hiring a geophysics position may be premature because Armstrong and Bowman may not be chair and dean, respectively, two years from now when geophysics is scheduled. Hiring a new geophysicist could conceivably lead to three geophysicists in our department. The faculty, instead, voted unanimously to search for a GEOSCIENCE EDUCATION expert, which was on our hiring plan for 2015. Our reasons include:

1. We have significant assessment issues that will need to be developed and maintained over the next several years.
2. The need for coordination, revamping, and teaching of our Geoscience education courses (GEOL 102, 410, 420). This is especially true for GEOL420, which is a capstone course for the teacher track of our BA in Earth science.
3. Integration of geoscience education and STEM in general with our BA program in a more effective manner.
4. We would like to remain in line with college efforts in science education. All the other Natural Sciences and Mathematics (NSM) departments are searching for science education faculty in 2014-15.
5. We see the potential for pre-service teachers integrating with college centers (CATALYST, Cooper).

Our hiring plan beyond 2014-15 will be a main topic at our department retreat on August 21, 2014.

1. Provide explicit mentoring of new hires (and new lecturers) to help them effectively develop and offer courses….

Apparently there were complaints by some students regarding the quality of teaching received from part-time (PT) lecturers. AY 2013-14 was particularly difficult for our department in terms of staffing courses because of retirements, faculty taking positions elsewhere, and sabbaticals. In my 15 years at CSUF, AY 2013-14 was the first time that PT lecturers taught upper division core courses in Earth Materials (GEOL 303A), Igneous and Metamorphic Petrology (GEOL 303B), Geophysics (GEOL 456) as well as the upper division elective in Hydrogeology (GEOL 436). As I said, this is unprecedented in my experience here.

I want to stress that the majority of the PT lecturers are excellent teachers who mostly teach lower division and GE courses. The average summary Student Opinion of Instruction (SOQ) for all PT faculty was 3.45 (out of 4.0) in Spring 2014. This includes the

SOQ scores for Geophysics (GEOL456), which were extremely low. Again, AY2013-14 was an anomaly in terms of PT lecturers teaching our major's courses. Regardless, the department sees the need to provide better mentoring to our PT lectures and new Tenure Track (TT) faculty.

Prior to 2013-14, our department had a formal mentor for all TT faculty outlined in our department personnel document. In 2013, we removed the mentoring requirement from our DPD and left the choice of mentoring (or not) up to the new faculty member. We will re-address the formal mentoring process at a faculty meeting this Fall.

Others (Professor of Practice, Female faculty, external grant salary)

The committee suggested we consider hiring "Professors of Practice", either as full-time TT faculty or utilize local industry expertise as PT lecturers for industry-specific courses.

We plan to hire a "Hydrocarbon Resource Geologist" in the next few years and that position will require establishing oil industry connections and training. One of our full-time faculty, who has industry experience in engineering geology, is now revamping and teaching our engineering geology course (GEOL376) to include industry experts as a routine aspect of the course. We plan to evaluate changing this course to a 400-level to advance its rigor and more fully involve industry expertise. We also plan to make more of an effort to invite applied industry experts, especially alumni, to our bi-weekly seminar series, which is a required class for graduate students. In Fall, 2014, we scheduled at least one energy-industry scientist for the seminar series.

With regards to the number of female, full-time (FT) faculty, we will have a female faculty starting in Fall 2014 (Dr. Vali Memeti), which will bring the male:female ratio for FT faculty to 4:1. We are searching for a Geoscience Education faculty member to start Fall 2015 and will work with HRDI to ensure that we reach out to as many qualified female applicants as possible. We hope to continue closing the gender gap with future hires.

Concerns regarding external grant salary. The Chair will work with interim Dean Bowman and NSM's grant writing liaison (Dr. Chandra Srinivasan) to potentially convene a college workshop/meeting to clarify policies and opportunities for salary from external grants and to potentially raise limits on salary from grants.

Undergraduate Program

Recommendations on Curriculum

1. Examine how the undergraduate thesis requirement can be better managed with growing enrollment….

The committee suggests considering the thesis as an Honors Program.

Every few years the faculty have a "conversation" about the future of our required undergraduate thesis for the BS major. As our program has grown in numbers of BS majors, this issue has become more acute. In our PPR self-study we describe the undergraduate thesis as one of the hallmarks of our BS program. We encourage our students to start the initial phases of thesis work in their junior years. With 120 BS majors, and roughly 1/2 to 3/4 in their last two years and looking to start a thesis project, each faculty would need to actively advise/mentor about 8 students each. Some faculty

accept more students than others, leading to inequity in numbers of students mentored. Finding the time to mentor this many students in a lab- and/or field-based discipline such as geology is difficult.

Altering the undergraduate thesis from a requirement to an elective may have substantial consequences. This may cause many students to miss out on this very effective High-Impact Practice, which is part of CSUF's Strategic Goal #2. In addition, with impending performance-based funding that includes capstone experiences and HIPs in its equation, we face a threat of losing funding if we decrease HIPs such as our undergraduate thesis.

The future of the undergraduate thesis will be the primary focus of the August 2014 faculty retreat. Our goal will be to evaluate the sustainability of the thesis and come up with potential solutions to best suit the growing numbers of majors, work load on faculty, while at the same time providing the HIP experiences that have been a department strength.

The committee raised the issue of faculty receiving teaching credit for supervising theses and that this is costly for the program in terms of having to pay PT lecturers to teach classes full-time faculty are relieved from. As long as we have a required (or optional) thesis, it is important that faculty continue to be compensated (with WTU's) for the valuable time they spend with students, which often includes long lab hours and/or many days of fieldwork.

2. Require the proposed GEOL280 (Research Methods in Earth Science course (currently proposed only for BS students) for both BA and BS…

The committee suggested the proposed GEOL280 (Research Methods in geosciences) as a required course for BS program rather than adding supervisory course (GEOL299). GEOL299 (actually GEOL293 – Directed lab and field studies) is in the approval stage at this point, but BS students cannot get credit for it in the major; only BA students can apply it to major. Adding a new course requirement (GEOL280) to the BS major would increase units unless we decrease geology elective units. The curriculum committee will discuss this issue in AY2014-15.

3. Consider adding an Honors Program for high-performing students with strong promise in research abilities….

See above 1. Examine how the undergraduate thesis… Will be evaluated at retreat in August 2014.

BA Program

We just finished the third year of our BA program. In our proposal for the degree, we expected to have 35 majors after three years – we have 43 majors so we have exceeded expectations. We expected there would be a need to re-visit our curriculum after three years to evaluate potential changes.

1. Consider adding concentrations (or recommend course sequences) to better define career pathways…

I will propose that the AY 2014-15 curriculum committee work on developing curriculum pathways through the BA for different career paths. We are searching for a Geoscience Education specialist in Fall 2014 who will help facilitate the integration of one

of the major pathways, STEM teacher preparation, into the BA program. I will charge the AY 2014-15 curriculum committee to develop concentrations and/or course pathways related to career paths.

2. As new GEOL electives are developed in coming years, ensure that B.A. students have the prerequisites…

We will make efforts to ensure new electives courses for B.A. students are not limited by prerequisites beyond those expected by the rigors of the BA program.

3. Consider making the proposed GEOL280 a department-wide requirement.

See above.

4. Make the capstone experience for the BA students rigorous and challenging…

Last year we hired a new faculty member, Dr. Sean Loyd, to help us advance one of the BA capstone courses (GEOL470). The 2014-15 curriculum committee will work on enhancing this capstone experience. Alternatively, I will charge the curriculum committee with developing a new capstone course that includes an extensive research project and meets the university's upper division writing requirement. This will be part of a program change for the BA, which was expected after year 3.

Recommendations on Assessment

1. Develop a plan that measures performance in each SLO…

In Spring 2014, the faculty met with Dr. Su Swarat (Director of Assessment and Educational Effectiveness) to evaluate our SLOs and the most effective way to plan and implement program assessment for all programs. As outlined in our self study, our main focus to date has been on assessing the BS program by rubric-based undergraduate thesis evaluation. We also completed an indirect assessment of our alumni. After our meeting with Dr. Swarat, it is clear that we need to better refine our SLOs and build an assessment plan around those SLOs in a manner suggested by the committee. We have refined the SLOs for the BS program, but these need further evaluation before moving forward. Frankly, our department is hesitant to pursue assessment planning until we can understand how to do MEANINGFUL assessment in line with university expectations; it is not yet clear to us what the University's expectations are for program assessment. Nonetheless, starting in Fall 2014 I will convene a new assessment committee to refine SLOs and develop a multi-prong assessment strategy that include thesis assessment, embedded assessment in courses, and surveys/polls. These efforts will start our assessment plan, which will hopefully be modified and continued after hiring a Geoscience Education faculty member expected to start in Fall 2015.

2. Conduct simple norming exercises for faculty…

This will be part of the assessment plan, especially for the thesis evaluation. We will seek the help of the Office of Assessment and Educational Effectiveness for best practices on norming.

3. Continue to analyze the data…

This will be part of the assessment plan. We will seek the advice of the Office of Assessment and Educational Effectiveness.

Recommendations on Recruitment

1. Assess the direct impact of increased enrollments…

Increasing numbers of majors is a double-edged sword – more majors increases our visibility in the college and provides graduates for the job market, but more majors limits our ability to provide the high-impact practices and faculty-student research experiences that our department is known for. Historically, our numbers have been less than about 80, but with our relatively new BA major and increased recruitment efforts, our number have increased to >160 (BA + BS). Our major's courses are at capacity and over the last year we have had to offer additional sections of some core geology courses (e.g., 303A) or offer sections in both Fall and Spring (e.g., 380, 335). In AY2014-15, we will split the lab portions of GEOL303A/303B into two sections each due to lab classroom size (24 student capacity) and equipment constraints (enough microscopes) but have one discussion/activity section with all students. Though this works with scheduling, it is less pedagogically sound than having smaller integrated discussion/activity/labs. We are as yet unsure if the growth trend will continue; the next year will provide important insight. If the growth does continue, all core courses (which all have labs and field trips) will need multiple sections and/or labs separated from discussion/activity sections. Just as important as the lab capacity is our limited ability to get students to the field for important HIP field experiences. We are at the limit of our vehicle capacity (we can transport 34 students + instructor + TA).

Next year, after we have a better sense of our growth trend, we will assess and evaluate scheduling of major's courses and ability to continue running extensive field trips. We can split labs, but this will require additional resource for TA's or PT lecturers to teach the new labs. For field trips, a potential option is to scale down field time so that one section goes one weekend (or day) and other section goes the next weekend (or day). This would effectively cut the field time to half and would diminish one of our program strengths. Another option is to limit the students in the BS core courses to only BS students. Currently, BA students can take the core BS courses (e.g., GEOL303A, 303B, 321, 360) as geology electives. This is not a high-priority option because some or all of these courses could be important for students' career objectives.

2. Develop targeted recruitment efforts for underrepresented minorities…

Our underrepresented minorities (URM) numbers (26%) are higher than the average for US geoscience programs (7%), but below the CSUF URMs (37%). The committee suggests partnering with regional geo-based employers to target additional resources to recruit URMs. I am unclear on what is meant by partnering with employers. However, we currently are pursuing an NSF S-STEM grant entitled "Project GEODES: Geoscience Experiences and Opportunities to help Diversify and Educate Students". This grant aims to introduce underrepresented minorities to the geosciences through focused curriculum, peer-cohorts, and unique internships including opportunities at the John D. Cooper Archaeological and Paleontological Center.

Graduate Program

1. Develop a focused graduate curriculum with key core courses, relevant to most of the graduate students program…

Graduate programs at CSUF require 30 units. In our program, three core courses are required: GEOL500-Advanced Concepts and Research Methods in Geology (4 units); GEOL590-Geology seminar (1 unit, taken twice); GEOL598-Thesis (3 units). All other units are electives, with potential for up to six units outside of geology (e.g., Civil and Environmental Engineering). We've tried to provide flexibility that can be tailored to students' goals. We are hesitant to have more required courses because students need the flexibility to apply to the most important aspect of their academic background, their thesis work.

2. Identify the desired career paths for the graduate students and make sure there is sufficient training in those areas…

We try to maintain a schedule of diverse graduate courses so that there is at least some choice of elective courses each semester. For example, we offer an Advanced Topics in Hydrogeology each spring semester. Thus a student focusing on hydrogeology can take at least two 500-level advanced hydro courses during his/her MS career at CSUF. We also try to offer advanced topics in engineering geology (GEOL575T) or Geochemistry (GEOL506T) every other year. And students have the opportunity to take six units outside the department. We acknowledge that we cannot offer all the classes we'd like to offer because our student numbers are too low and more course offerings would have too few students enrolled (<3). Also, the diversity of student interest is wide – we have students interested in tectonics, hydrogeology, volcanology, landslides, petrology, to name a few. It is impossible to have enough focused electives to directly address all the disciplines. We strive to give a broad background that stresses understanding of fundamental geologic principles and is rooted in field- and lab-based experiences.

We can, and sometimes do, encourage our students to take courses at other CSU campuses that might be relevant to the career objective. There may be the potential to collaborate with other nearby CSU geology programs (Long Beach, Northridge, Cal Poly Pomona) that offer graduate courses for student cross-enrollment. There are programs such as the International barrel Award program that we may investigate (see below).

3. Explore ways to remove or reduce the additional costs (tuition and other fees) graduate students have, even when supported on university funds.

We support our graduate students (on a competitive basis) as much as possible through Teaching Associate (TA) and Graduate Assistant (GA) offers. However, the committee hits on an extremely important aspect with regard to attracting students – TA/GA graduate students still must pay tuition and fees. We have been able to get the non-resident fee waived for most out-of-state students (though the numbers are limited), but the in-state tuition and fees for full-time graduate student are $7,580 (per year currently), thereby negating much of the support we can offer. Faculty often budget tuition costs for graduate student in larger external grants, but these grants are so difficult to get that cutting tuition from the budget is often required to be competitive. I would like to start a dialog with the college and university to find ways to support full tuition waivers for state-supported graduate students. As research requirements continue to grow for faculty, the need to attract quality graduate students becomes even more important – having to pay tuition and fees (even in-state) is a major roadblock to attracting these students.

Other graduate program issues

Continued assessment of who is taking the courses (evening) and allow for more effective scheduling…

Our graduate program began in 2000 as a nighttime program that catered mostly to part-time graduate students who worked during the day and took classes at night. In the last 7 years, we have seen a transition to more traditional graduate students as we bolstered our TA/GA support to attract higher quality students and as the pool of working graduate students dwindled. We will discuss our evening graduate courses at a future faculty meeting to address whether our more recent graduate populations would be better served with daytime courses.

…graduate program is only accessible for students with an undergraduate degree in geology.

This is not true. Our catalog description says "Students with a degree in a related field and/or substantial subject deficiencies are encouraged to apply". We accept students from other fields (e.g., biology); subject deficiencies are identified by the graduate and thesis advisers and a set of courses to make up the deficiencies are mapped out. Accepted students must make up these deficiencies before they can qualify for classified standing.

…the graduate students involved in teaching need additional mentoring and training in teaching.

This comes as a surprise because our new TAs receive substantial mentoring by our GE coordinator. TAs for GEOL101L must sign up for a GEOL593 (Directed studies) course whereby they have regular meetings to discuss teaching methods, problems, and other issues (e.g., effective testing/grading, motivation of students, pedagogical issues). Students also receive in-class reviews by the GE coordinator in about week 5 to catch any teaching problems. In Fall 2014, we will experiment with having a more experienced TA be a "head TA" who will mentor other TAs.

Other

Department Funding

…engaging external groups in funding…

The committee suggests we convene an Advisory Council to help maintain relevancy in industry and to develop funding strategies. Several years ago, the department had an Advisory Committee that consisted mostly of industry representatives. The goals of that committee were to advise on industry/employment trends, fund raising efforts, and curricular issues. That Adcvisory Council was largely ineffective due to the lack of leadership in the committee and lack of focused direction from the department. The faculty will start discussions about a new Advisory Committee that, for example, includes more alumni who are familiar with our programs and one that is directed to focus on specific tasks such as fundraising. This will be the topic of a Fall 2014 faculty meeting.

… develop stronger connections with department alumni…

Last year we started a campaign to engage our alumni in more meaningful ways. We held our first annual Alumni reception in Fall 2013 and chose our first "Alum of the Year". We will continue those efforts and are in planning stages for both in AY2014-15. Last year we had more alumni involvement than in previous years at our Spring student Research Day. Some of the suggestions by the committee are being planned – for example, we are starting to work on a Fall newsletter that will focus on fundraising efforts, list past donor giving, and highlight alumni ("where are they now"). We have several geology funds that donors can easily contribute to through our website, but we think more targeted giving has a better chance of fundraising success. For example, we might target funds for a new field vehicle, or funds to support specific research experiences for students. It is also important to work with the new NSM Director of Development to streamline fundraising efforts for the department.

…students we spoke to didn't feel that the faculty is encouraging them to go into an industry career.

This comes as a surprise, especially given that the majority of our students do go into industry careers, though not historically energy jobs. Some of the committee comments may reflect the perspective of one member who comes from energy industry and the relative lack of our students pursuing oil company jobs. Note that our students historically have been very successful at obtaining geological engineering, hydrology, or environmental geology positions and have been less interested in energy jobs. Note that energy jobs generally require MS degrees. There seems to be a perception that students are not encouraged to attend meetings or venues where students can meet with industry recruiters. Our faculty members are very active in meetings (e.g., GSA, AGU, SCEC, NGWA, AAPG); they encourage and provide support for students to attend these meetings. Many of our students regularly attend the monthly meetings of the South Coast Geological Society attended by many industry professionals offering chances for networking. We recognize that we need to promote energy careers more to our students, especially given the recent increase in those jobs. Given that there still seems to be a perception that interactions with industry are not as encouraged as they might be, the Chair will bring this up at a faculty meeting. The chair will also encourage the faculty to be more involved with the Geology Club to make sure that students understand and know about these opportunities.

We think there are some other activities that might strengthen the ties with industry…

The committee recommends having students be involved in the International Barrel Award (IBA) competition sponsored by the American Association of Petroleum Geologists (AAPG) and take part in the CSUN AAPG expo. Our AAPG faculty representative is looking into the IBA competition and tentatively plans to incorporate the competition into his graduate course (GEOL510T – Basin analysis) in Spring 2016. Note that the IBA is for graduate students only. Products from that competition could also be used in our GEOL321 course, which all BS students must take. Some of our students have attended the CSUN expo the last few years, but this connection (CSUF-CSUN geology) needs to be strengthened. The Chair will contact representatives of the CSUN AAPG/SEG expo to strengthen our ties so that the expo is more attractive to our students. We are also being more proactive with industry by having a representative

from Anadarko Energy (an alum) come to give talk and meet with students about careers in the hydrocarbon industry.

Department Logistics

Room scheduling, ….

This is a university scheduling issue over which we have no control.

The required university review of any IT expenditure over $100 is ludicrous.

We agree and hopefully this restriction/requirement can be lifted to decrease bottlenecks and waste of time.

Having a technician handle travel … a waste of talent…

We disagree. Our Instructional Support Technician is well positioned and qualified to keep up with ever-changing university regulations and requirements on travel. Having the IST handle all travel has led to a streamlining of our travel planning and reimbursement, especially for students and faculty involved in foreign travel or for rentals (buses, facilities). Our IST handles most of the purchasing with POs, and travel plans (buses or renting dorm room) often require a PO. So keeping the same person involved makes sense to us. In addition, our IST is in charge of all driver training for faculty/staff/students (recall that we have many field trips and maintain six department vehicles), which is integrated with travel procedures and planning. Another issue is who else would do it? We have three other staff members and each are already booked with other job responsibilities. We would need to hire another staff member to take over the travel responsibilities. Given our current staffing, it makes sense for our IST to remain involved in all travel operations and it is the best use of valuable staff resources.