OKLAHOMA STATE REGENTS FOR HIGHER EDUCATION
STATE CAPITAL COMPEX, OKLHOMA CITY

ACADEMIC UNIT/ DEGREE PROGRAM REVIEW

FOR

SCHOOL OF CIVIL & ENVIRONMENTAL ENGINEERING
207 ENGINEERING SOUTH

BACCALAUREATE, MASTERS & DOCTORAL DEGREES

MARCH 1, 2005

Table of Contents

OKLAHOMA STATE UNIVERSITY
ACADEMIC PROGRAM REVIEW
EXECUTIVE SUMMARY

DEPARTMENT OR DEGREE PROGRAM: School of Civil and Environmental Enginering

Address items specified in OSRHE policy on program review (VI-Content of Program Review Reports): description of review process, program objectives, student outcomes assessment, and program recommendations. Please limit the summary to 1 or 2 pages.

The School of Civil and Environmental Engineering offers four programs: Bachelor of Science in Civil Engineering; Master of Science in Civil Engineering; Master of Science in Environmental Engineering; and Doctor of Philosophy in Civil Engineering. This program review addresses all four programs.

The first three programs are very similar. The objectives of these programs are to produce graduates who have the understanding and technical skills necessary to develop engineering solutions that are technically feasible, economically acceptable, and environmentally sustainable. In addition, the graduates should have the personal attributes to contribute to society's infrastructure. The student outcomes are that the School produces students who have the ability to apply knowledge of mathematics, science, and engineering; to design and conduct experiments; and to design and construct engineering systems and components necessary to address infrastructure needs and problems. For the doctoral program the objectives and outcomes are the same as those of the bachelor and masters programs with the additional requirement of producing graduates who can conduct research on important civil and environmental engineering problems.

This program review relies heavily on our on-going assessment processes in the School. These assessment processes include employer surveys, alumni surveys, exit surveys of graduates, Board of Visitors surveys and suggestions, and student comments and course ratings.

Dean Karl N. Reid Date 3/4/05
(Signature)

OKLAHOMA STATE REGENTS FOR HIGHER EDUCATION

2004 - 2005
ACADEMIC PROGRAM REVIEW

BACCALAUREATE, MASTERS & DOCTORAL DEGREES

OKLAHOMA STATE UNIVERSITY

CIVE Bachelor of Science
Title of unit or degree program reviewed (Level III)

With options (Level IV) in: Civil Engineering
Environmental Engineering

Bachelor of Science
Degree designation as on diploma (Level II)

BS
Formal degree abbreviation (Level I)

Degree-granting academic unit School of Civil and Environmental Engineering
(Name) (Cost Center)

CIP code 140801

HEGIS code 0908

Instructional Program code 047

Name of department head Dr. Gorman Gilbert
(person who oversees degree program listed above)

Program holds specialized accreditation from ABET

Name and title of contact person Dr. Gorman Gilbert
(Name)
Head and Professor
(Title)

Date of Institutional Governing Board Review: _____

President _____ Date: _____
(Signature)

OKLAHOMA STATE REGENTS FOR HIGHER EDUCATION

2004 - 2005
ACADEMIC PROGRAM REVIEW

BACCALAUREATE, MASTERS & DOCTORAL DEGREES

OKLAHOMA STATE UNIVERSITY

CIVE Master of Science
Title of unit or degree program reviewed (Level III)

With options (Level IV) in: _____

_____

Master of Science
Degree designation as on diploma (Level II)

MS
Formal degree abbreviation (Level I)

Degree-granting academic unit School of Civil and Environmental Engineering
(Name) (Cost Center)

CIP code 140801

HEGIS code 0908

Instructional Program code 048

Name of department head Dr. Gorman Gilbert
(person who oversees degree program listed above)

Program holds specialized accreditation from ABET

Name and title of contact person Dr. Gorman Gilbert
(Name)
Head and Professor
(Title)

Date of Institutional Governing Board Review: _____

President _____ Date: _____
(Signature)

OKLAHOMA STATE REGENTS FOR HIGHER EDUCATION

2004 - 2005
ACADEMIC PROGRAM REVIEW

BACCALAUREATE, MASTERS & DOCTORAL DEGREES

OKLAHOMA STATE UNIVERSITY

CIVE Doctor of Philosophy
Title of unit or degree program reviewed (Level III)

With options (Level IV) in: _____

_____

Doctor of Philosophy
Degree designation as on diploma (Level II)

PhD
Formal degree abbreviation (Level I)

Degree-granting academic unit School of Civil and Environmental Engineering
(Name) (Cost Center)

CIP code 140801

HEGIS code 0908

Instructional Program code PhD 049

Name of department head Dr. Gorman Gilbert
(person who oversees degree program listed above)

Program holds specialized accreditation from ABET

Name and title of contact person Dr. Gorman Gilbert
(Name)
Head and Professor
(Title)

Date of Institutional Governing Board Review: _____

President _____ Date: _____
(Signature)

OVERVIEW

A. Description of the Departmental/Program Review Process.

In assessing our programs we relied heavily on the assessments performed in preparation for our recent ABET visit and successful review. These assessment methods include:

1. Employer surveys
2. Alumni surveys
3. Exit surveys
4. Board of Visitors comments
5. Students comments
6. Informal comments from alumni.

These methods are described more fully in this report.

B. Recommendation from Previous Program Reviews.

The most recent OSRHE Program review in 1999 resulted in no recommendations.

CRITERION I
Program Centrality

A. Goals and objectives of degree programs.

Degree Program:	Bachelor of Science
Program Clientele:	Primarily full-time students at Stillwater campus
Program Objectives:	To produce graduates who have the following attributes: • The understanding and technical skills necessary to develop engineering solutions that are technically feasible, economically acceptable, and environmentally sustainable; • The technical and personal attributes needed to meet the needs of our external constituencies, and to contribute to society's infrastructure and the environment. To recruit and retain a faculty that is qualified by education, experience and interpersonal skills to effectively provide the desired educational experiences and guidance to students. To provide instructional facilities, equipment and other resources to students and faculty to enable them to achieve the program's objectives.
Expected Student Outcomes:	Graduates of the program will have: • An ability to apply knowledge of mathematics, science and engineering;

- An ability to design and conduct experiments, as well as to analyze and interpret data;
- An ability to design systems, components, or processes to meet desired needs;
- An ability to function on multi-disciplinary teams;
- An ability to identify, formulate, and solve engineering problems;
- An understanding of professional and ethical responsibility;
- An ability to communicate effectively;
- The broad education necessary to understand the impact of engineering solutions in a global and societal context;
- A recognition of the need for, and an ability to engage in life-long learning;
- A knowledge of contemporary issues;
- An ability to use techniques, skills, and modern engineering tools necessary for engineering practice.

Degree Program: Master of Science in Civil Engineering

Program Clientele: Primarily full-time students at Stillwater campus

Program Objectives: To produce graduates who have the following attributes:

- The understanding and technical skills necessary to develop engineering solutions that are technically feasible, economically acceptable, and environmentally sustainable;
- The technical and personal attributes needed to meet the needs of our external constituencies, and to contribute to society's infrastructure and the environment.

To recruit and retain a faculty that is qualified by education, experience and interpersonal skills to effectively provide the desired educational experiences and guidance to students.

To provide instructional facilities, equipment and other resources to students and faculty to enable them to achieve the program's objectives.

Expected Student Outcomes: Graduates of the program will have:

- An ability to apply knowledge of mathematics, science and engineering;
- An ability to design and conduct experiments, as well as to analyze and interpret data;
- An ability to design systems, components, or processes to meet desired needs;
- An ability to function on multi-disciplinary teams;

- An ability to identify, formulate, and solve engineering problems;
- An understanding of professional and ethical responsibility;
- An ability to communicate effectively;
- The broad education necessary to understand the impact of engineering solutions in a global and societal context;
- A recognition of the need for, and an ability to engage in life-long learning;
- A knowledge of contemporary issues;
- An ability to use techniques, skills, and modern engineering tools necessary for engineering practice.

Degree Program: Master of Science in Environmental Engineering

Program Clientele: Primarily full-time students at Stillwater campus

Program Objectives: To produce graduates who have the following attributes:

- The understanding and technical skills necessary to develop engineering solutions that are technically feasible, economically acceptable, and environmentally sustainable;
- The technical and personal attributes needed to meet the needs of our external constituencies, and to contribute to society's infrastructure and the environment.

To recruit and retain a faculty that is qualified by education, experience and interpersonal skills to effectively provide the desired educational experiences and guidance to students.

To provide instructional facilities, equipment and other resources to students and faculty to enable them to achieve the program's objectives.

Expected Student Outcomes: Graduates of the program will have:

- An ability to apply knowledge of mathematics, science and engineering;
- An ability to design and conduct experiments, as well as to analyze and interpret data;
- An ability to design systems, components, or processes to meet desired needs;
- An ability to function on multi-disciplinary teams;
- An ability to identify, formulate, and solve engineering problems;
- An understanding of professional and ethical responsibility;
- An ability to communicate effectively;

- The broad education necessary to understand the impact of engineering solutions in a global and societal context;
- A recognition of the need for, and an ability to engage in life-long learning;
- A knowledge of contemporary issues;
- An ability to use techniques, skills, and modern engineering tools necessary for engineering practice.

Degree Program: Doctor of Philosophy in Civil Engineering

Program Clientele: Mixture of part-time and full-time students

Program Objectives: To produce graduates who have the following attributes:

- The understanding and technical skills necessary to conduct research on important civil engineering problems.
- The technical and personal attributes needed to meet the needs of our external constituencies, and to contribute to society's infrastructure and the environment.

To recruit and retain a faculty that is qualified by education, experience and interpersonal skills to effectively provide the desired educational experiences and guidance to students.

To provide instructional facilities, equipment and other resources to students and faculty to enable them to achieve the program's objectives.

Expected Student Outcomes: Graduates of the program will have:

- An ability to apply knowledge of mathematics, science and engineering;
- An ability to design and conduct experiments, as well as to analyze and interpret data;
- An ability to design systems, components, or processes to meet desired needs;
- An ability to identify, formulate, and solve engineering problems;
- An understanding of professional and ethical responsibility;
- An ability to communicate effectively;
- An ability to use techniques, skills, and modern engineering tools necessary for engineering practice.

B. Linkage of the program to institution's mission.

The relevance of the CIVE mission to that of the University as a whole is apparent. The University mission is:

"Proud of its land grant heritage, Oklahoma State University advances knowledge, enriches lives, and stimulates economic development through instruction, research, outreach, and creative activities."

The CIVEN mission for our BS and MS programs is:

"To prepare students for the practice of civil engineering, to enable them to contribute to society's infrastructure and the environment, and to develop engineering solutions that are technically feasible, economically acceptable, and environmentally sustainable."

For its doctoral degree program the CIVE mission is:

"To enhance the development of civil engineering researchers."

We believe that the OSU and CIVE missions are compatible. Both stress the positive role of a land grant institution in economic development while attending to environmental preservation and technology feasibility.

CRITERION II
Program Curriculum Structure

A. Program structure.

Copies of the current degree requirements sheet are attached.

B. Distance education.

Summer 2002: CIVE 5113, Project Planning, Scheduling & Control
Fall 2001: CIVE 5953, Bio Waste Treatment

C. Articulation agreement.

None

D. Multidisciplinary programs.

The environmental engineering faculty of the School of Civil and Environmental Engineering participate in the campus-wide multi-disciplinary Environmental Science graduate program. This program involves a wide variety of programs across campus, and offers both MS and PhD degrees. Environmental engineering faculty are involved in the steering committee of the program, serve as advisors for Environmental Science graduate students, and also serve on examining committees for these students. By this participation, the program serves those students who seek a broader program for their graduate degree, but who are still qualified by their background to have an environmental engineering aspect or focus to their research.

CRITERION III
Program Resources

A. New facilities and major equipment.

A detailed analysis of the program's available facilities, including office, classroom and laboratory space, as well as the equipment available to support the educational program has been performed. What follows is a summary of each of its key components.

Space

Current Civil and Environmental Engineering office, classroom, and laboratory facilities are located in Engineering South (designated Bldg 0027 by the OSU Physical Plant), Civil Engineering Laboratory, aka Engineering Annex (Bldg 0026), Advanced Technology Research Center (Bldg 0046) and WWT Pilot Plant (Bldg 105). Faculty, staff, and graduate student office space is located in Engineering South. Primary classroom space for Civil and Environmental Engineering classes is located in Engineering South, although some of the classes are taught in locations determined by the University classroom coordinator. Teaching and research laboratories are located in Engineering South, Engineering Annex, WWT Pilot Plant, and Advanced Technology Research Center (ATRC). (NOTE: The ATRC space, 1800 ft^2, has just recently become available for use by Civil and Environmental Engineering and is in the process of being set up for research and some limited instruction use.)

The space available includes:

Basement — 1592 ft^2 (Student Lounge, GTA offices, storage)

First Floor — 4949 ft^2 (Faculty/Staff Offices, ODOT Design Lab, Environmental Lab, Construction Management Lab)

Second Floor — 2194 ft^2 (Faculty/Staff Offices)

Third Floor — 3314 ft^2 (Faculty/Staff Offices, GRA/GTA Offices)

12049 ft^2

The ATRC (Rooms 218 and 220) and the WWT Pilot Plant. The space available includes:

Engineering Annex	— 16977 ft^2
ATRC (Rooms 218 and 220)	— 1799 ft^2
WWT Pilot Plant	— 753 ft^2
	19529 ft^2

Essentially all of the space in these three locations is assigned to laboratory-class, laboratory-research, laboratory-service, or graduate student offices.

To address the issue of needed space, the School of Civil and Environmental Engineering with the support of a strong alumni base developed a strategy for upgrading laboratory space as part of the major fund-raiding campaign "*Project Excellence.*" The lab upgrade plan consists of three components. First, we plan to build a new structures lab building. The new structures lab will be built by W&W Steel Corporation on the northeast corner of campus on McElroy and Willis. The new building will be a state-of-the-art facility with 14000 ft^2 of fabrication and testing space, and 4000 ft^2 of faculty and graduate student offices. The main bay of the building will include a reaction floor 90 feet by 44 feet by nearly 4 feet. This large reaction floor will be serviced by a 20-ton overhead crane. The large capacity of the reaction floor and overhead crane will enable researchers to test very large structural members and mark the laboratory as one of the finest in the nation.

The second component of the lab space upgrade is to occupy two rooms in the ATRC building for the environmental lab. Several major pieces of environmental testing equipment are currently housed in small rooms in the Engineering Annex. The move to ATRC will provide approximately 1800 ft^2 of research lab space.

The final component is to add and upgrade equipment in the remaining lab areas (i.e., soils, asphalt, concrete) which will all have additional space as a result of the space vacated in the structures and environmental areas. The move to ATRC is underway; construction on the new structures lab is set to start in June and some of the "clean-up and fix-up" activities are underway for the remaining lab space.

Equipment

Major equipment purchases for Civil and Environmental Engineering instruction, research and support purposes are summarized in Table 6.2, and highlighted in the following:

Fiscal Year	Computer Equipment (% of total)	Laboratory Equipment	Total
97/98	$29995 (25.8%)	$ 86315	$116310
98/99	$16278 (8.7%)	$170456	$186734
99/00	$24124 (21.5%)	$ 87894	$112018
00/01	$24972 (15.7%)	$134413	$159385
01/02	$28759 (48.6%)	$ 30470	$ 59229
02/03	$21389 (37.1%)	$ 36236	$ 57625
03/04	$21960 (23.2%)	$ 72785	$ 94745
	$167477 (21.3%)	$618569	$786046

Equipment purchases are made from state fund allocations, private donations, and research grants. The trends in equipment expenditures tend to follow the general economy as noted in the dramatic decreases in purchases during the current and previous fiscal years. This is of particular concern with regard to the laboratory

equipment expenditures as compared to the computer equipment purchases. With the outlook for improvements in state fund allocations bleak and competition for research grants on the increase, the best approach to address the declining funds issue is through private donations. The School of Civil and Environmental Engineering initiated in Fall 2001 its first-ever fund-raising campaign entitled *Project Excellence* - Civil and Environmental Engineering Equipment Fund. The fund-raising campaign is solely focused on equipping the School's laboratory facilities. Project Excellence has a target of $885,000. These funds will be spent in all of the School's laboratories. Approximately $100,000 will pay for moving the environmental lab into the new space in the ATRC. The asphalt and concrete materials labs will receive about $190,000. The soils lab will receive $160,000 and the construction management lab about $30,000. The remaining $35,000 will be spent on equipment for the hydraulics lab. As of March 2005, donations to Project Excellence have reached $467,618 in cash plus stock and land.

B. Academic and administrative efficiencies.

In the past five years we have taken a number of steps to make CIVE work more efficiently and more effectively. We have instituted a competitive procedure each spring for soliciting applications from students for scholarships. The result is a clearer, more understandable process that is also fairer. We have also temporarily eliminated one secretarial position. We expect to refill this position at a lower salary at some point in the future. We have also discussed with the architectural faculty the possibility of jointly offering several courses that are offered by them and by us. We expect that this step will enable us to offer more courses at the graduate level in structural engineering.

C. External funding.

There are two types of external funding that are of relevance to our School. One is external research funding, and the other is private gifts. Unfortunately, the data included in the Five-year Report Card are incorrect in the case of the external research funding. With respect to the private gifts, the School's Five-year Report Card includes no data on the School's private gifts. Therefore, we provide herein the data that should have been in the School's Report Card.

The external research funding data are:

Year	External Research Funding
1999-00	$ 587,287
2000-01	529,166
2001-02	1,189,126
2002-03	1,328,101
2003-04	724,983

The private funds received by the School include contributions to *Project Excellence*, gifts to the School's new laboratory building, and other CIVEN activities. Also, some gifts are the form of cash while other gifts are in the form of

stock and/or land. Thus, we can only estimate the value of private gifts to the School in the past five years:

Project Excellence	$467,618
Building funds	$1.2 million (in hand)
Building funds	$2.0 million (promised)

There has been a significant increase in the generation of external research funding by the School's faculty. The increase in external research funding is a result of three changes that have occurred in CIVEN. One is a change in the faculty to place more emphasis on research. This change has been clearly stated, and faculty reviews, promotions, and raises have all reflected this increased emphasis on research. Second, the development of OTC has made more research funding available for faculty. Third, the School has begun an upgrading of its laboratories, thereby making faculty more competitive for research grants and contracts.

It should be noted that the external funding for 2003-04 is artificially low because the OTC research funds for that year have yet to be awarded. They will be awarded soon and will be included in the 2004-05 figures.

We note that all three of theses changes are fundamental ones and also that they will continue to increase our research productivity over time.

The private gifts received by the School are also a positive change. We expect to continue our fund raising.

CRITERION IV
Productivity

A. **Number of majors (headcount), student credit hours, and average time to graduation.**

The enclosed Five-year Report Card for CIVE provides useful information regarding the School. It shows that the head count has generally increased during the past five years by 11.8%. It also shows that there has been a decrease in graduate students and an increase in undergraduates. The School enrollment has very closely matched that of the College, holding steady at just over 7% of the College enrollment.

The Report Card also shows that the number of student credit hours has not changed very much during the past five years, averaging about 1921 per year and ranging from 1605 to 2188.

The average time to graduate is also reported in the Report Card. The measure is the number of semester hours till graduation. This measure has held steady at about 10 semesters. No comparable data are available for the College or for the University.

A. **Faculty ratio and class size.**

The Report Card reports on the trends in class size and the faculty/student ration. Class size is measured in two ways: the percent of classes with more than 50 students and the percent with fewer than 20. On both of these measures, CIVE has fewer students per class than does the College as a whole. The CIVE measures are about 3% and 70%, respectfully, with a percentage of classes with fewer than 20 students increasing.

The faculty-to-student ratio is steady at about 15 for CIVE and about 25% for the College

B. **Five-year average number of degrees conferred and majors.**

Degree	**Number of Degrees Conferred**		**Majors (Headcount) – Fall Semester**	
	OSRHE standard	5-yr average	OSRHE standard	5 yr average
Certificate	NA	NA	NA	NA
Baccalaureate	5	30	12.50	183.6
Masters	3	8 Environmental 18 Civil	6.0	24 Environmental 41 Civil
Doctoral	2	1	4.5	4.2

CRITERION V
Quality

A. Program faculty qualifications.

Our School curriculum covers all six areas of civil and environmental engineering: construction; environmental; geotechnical; hydraulics/hydrology, structures; and transportation. In this section we address the competence and breadth of the faculty with respect to these six areas of study.

Faculty Breadth

Our School faculty includes fifteen persons. The background and training of these faculty members are shown in Table I-3 and Table I-4. It is evident that the School faculty covers all six areas of civil engineering. However, our faculty is not evenly distributed across these six areas. Our faculty includes five persons in the environmental area and four in the structures area. Conversely, there is one person in each of three areas: geotechnical; water resources; and construction. There is one person in transportation (in addition to the School Head, who also teaches in the transportation area), and one person who teaches civil and transportation materials and contributes to several of the six areas.

One faculty member is assigned to our OSU-Tulsa location. This person still participates in graduate student committees and teaching at the Stillwater location. Other faculty also teach classes at the OSU-Tulsa site, sometimes via video. As the OSU-Tulsa student demand increases, we shall add faculty to our School there.

We recognize that the faculty is seemingly unbalanced toward structures and environmental engineering. To some extent this skewed balance is an historical accident: we added faculty in environmental engineering when we faced a large demand for retraining engineers in environmental engineering. More recently we added an additional structures faculty member to carry out our strategic decision to emphasize structures as a prime research area for the School.

To compensate for this imbalance in faculty specialization, we promote joint teaching and cross-over teaching. For example, one of our construction courses has been taught by one of our structures faculty. Other examples are the joint teaching of a materials course and our capstone courses. In general, we try to break down the "silo effect" by encouraging cooperation among faculty through joint teaching.

We realize that we must work toward balancing the faculty across the various areas or civil engineering. We anticipate that our next faculty hires will be in the construction, materials, and geotechnical areas. We expect that the next faculty hire will be at OSU-Tulsa, probably this coming academic year. We also expect two retirements in the next three years.

Faculty Qualifications

The background information for the faculty is shown in Table I-4. Every member of the faculty has a doctoral degree, and all but three are registered professional engineers. Only one of the doctoral degrees came from OSU, and only one other degree came from OU. Thus, thirteen of fifteen doctorates were earned from out-of-state universities. These include schools of national prominence such as UC-Berkeley, Northwestern, Cornell, Virginia Tech, and Texas.

Name	Faculty Status (Regular or Adjunct)	Faculty FTE in program	Highest Degree Earned (Type)	Related Work Experience (Years)
Gilbert, C. Gorman	Head, Professor	FT	PhD	31
Ahmed, M. Samir	Professor	FT	PhD	31
Bowen, Charles M.	Assistant Professor	FT	PhD	6
Clarkson, William	Professor	FT	PhD	25
Cross, Stephen A.	Associate Professor	FT	PhD	25
Emerson, Robert N.	Assistant Professor	FT	PhD	6
Gipson, G. Steven	Professor	FT	PhD	29
McTernan, William	Professor	FT	PhD	28
Oberlender, Garold	Professor	FT	PhD	40
Russell, Bruce	Associate Professor	FT	PhD	21
Sanders, Dee Ann	Associate Professor	FT	PhD	28
Snethen, Donald	Professor	FT	PhD	32
Tyagi, Avdhesh K.	Associate Professor	FT	PhD	35
Veenstra, John N.	Professor	FT	PhD	25
Wilber, Gregory G.	Associate Professor	FT	PhD	15

B. Evidence of regional/national reputation and ranking

Civil engineering programs are ranked through the top 50 programs by *U.S. News and World Report.* We are not in the top 50 programs according to this source. However, our graduates compete with the graduates of the most prestigious civil engineering programs both for jobs and for admission to graduate schools.

C. Scholarly activity.

The scholarly output of the faculty is shown in Appendix B.

D1. Assessment of student achievement of expected learning outcomes

Degree Program - BS Civil Engineering

The Program Outcomes that have been established for the program are listed below. The list of outcomes matches identically the outcomes put forth by the Engineering Accreditation Commission of the Accrediting Board for Engineering and Technology (ABET). These Program Outcomes have been periodically evaluated. They were first presented to the faculty for comment and input. Once endorsed by the faculty, the Board of Visitors and the Student Advisory Board were consulted

and also provided endorsement. These two groups have been consulted regularly for the past five years to ensure continuous approval of this approach.

Program Learning Outcomes for the BSCE degree

Graduates of the program will have:

a. an ability to apply knowledge of mathematics, science, and engineering,
b. an ability to design and conduct experiments, as well as to analyze and interpret data,
c. an ability to design systems, components, or processes to meet desired needs,
d. an ability to function on multi-disciplinary teams,
e. an ability to identify, formulate, and solve engineering problems,
f. an understanding of professional and ethical responsibility,
g. an ability to communicate effectively,
h. the broad education necessary to understand the impact of engineering solutions in a global and societal context,
i. a recognition of the need for, and an ability to engage in life-long learning,
j. a knowledge of contemporary issues, and
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Assessment of Program Outcomes achievement is a multi-year process that involves all of the program's constituencies in multiple ways. The primary goal of the assessment program has been to monitor and demonstrate achievement of each outcome by at least two different measures. Where possible, one or more of these measures is to have a quantitative aspect, though in many cases a more qualitative approach is more appropriate. The table below maps the numerous assessment tools in place to some of the specific outcomes they address. Most of the assessment tools are either administered or collected by the School's ABET Accreditation Committee. Results of the various assessment tools are distributed to the appropriate parties, generally the School Head and the School's Curriculum Committee. In other cases, the results may be more appropriately presented to the full faculty or to a college level oversight committee (in the case of an assessment that indicates a change in the pre-professional curriculum).

Degree Program: BS Civil Engineering - Assessment Summary for Selected Outcomes

Key Expected Outcome	Assessment Method	Years this assessment conducted	# of grads/number assessed
a. an ability to apply knowledge of mathematics, science, and engineering	Employer Survey FE Exam Professional School GPA Pre-engineering GPA	2002, 2005 (plan) 2000 – 2005 2000 – 2005 2000 – 2005	35* 176/115 176/176 176/176
b. an ability to design and conduct experiments, as well as to analyze and interpret data	Employer Survey Laboratory Course GPA STAT 4910 grade	2002, 2005 (plan) 2000 – 2005 2000 – 2005	35* 176/176 176/176
c. an ability to design systems, components, or processes to meet desired needs	Employer Survey OUA Survey Board of Visitors Capstone Evaluation Exit Interviews	2002, 2005 (plan) 2002, 2005 2000 – 2005 2000 – 2005 2000 – 2005	35* 22/70**, 94/44** 75[§] /176 176/176 176/176
g. an ability to communicate effectively	Employer Survey OUA Survey Board of Visitors Capstone Evaluation Exit Interviews	2002, 2005 (plan) 2002, 2004 2000 – 2005 2000 – 2005 2000 – 2005	35* 70/22** , 94/44** 75[§] /176 176/176 176/176
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	Employer Survey FE Exam Capstone Evaluation Exit Interviews	2002, 2005 (plan) 2000 – 2005 2000 – 2005 2000 – 2005	35* 176/115 176/176 176/176

* estimated, involved graduates from 1998 – 2002

** estimated, involved graduates from various years

[§] estimated, BoV visits each year and talks to an uncontrolled number of students

What follows is a brief discussion of five of these outcomes, including how the outcome is interpreted by the program (where necessary), the assessment process in place to determine how well the Program Outcomes are being achieved, and, where appropriate, the metric goals for each.

a. an ability to apply knowledge of mathematics, science, and engineering,
This program outcome is primarily assessed with the results of the FE exam, the Employer Survey, and the success of the students in the professional school curriculum. Obviously this outcome is integral to nearly every course in the required

curriculum. Students take 35 hours of math and basic science and 72 hours of engineering topics. Student success in these courses in itself is a strong indicator of achievement of this program outcome. A passing score in the Fundamental of Engineering can be considered an equally strong indicator, and one that is external and readily quantified. The goal is to have every graduate pass the FE exam upon graduation. Lastly, the Employer Survey provides evidence of the graduates' abilities once in the workplace. Here, the goal is to have 100% of employers surveyed satisfied with the abilities of our graduates.

b. an ability to design and conduct experiments, as well as to analyze and interpret data,

Laboratory skills are assessed primarily by the students' performance in the laboratory courses (both general science and within the school) and the statistics course. The statistics course, STAT 4910, is geared toward design of experiments and interpretation of data. Furthermore, employers have been surveyed for their evaluation of our graduates' ability in this area. The School's Board of Visitors has endorsed the assertion that these assessments provide adequate indication of achievement of this outcome. The Board also recommended that analysis and interpretation of data receive more attention than design of experiments.

c. an ability to design systems, components, or processes to meet desired needs,

This Program Outcome is integrated throughout the curriculum. Twenty four semester hours in the professional school have significant design content. Primary assessment tools include the Employer Survey and the student performance in the capstone design courses. Secondary indications of achievement come from the alumni survey, faculty input and the students' performance in the professional school. The metric goal is to have 100% of employers satisfied with our graduates' ability in this area, and for 100% of alumni reporting that they are adequately prepared for design work as they begin their careers. The Board of Visitors also monitors the design content of the curriculum and makes recommendations.

g. an ability to communicate effectively,

This Program Outcome is interpreted to include written and oral communication, as well as the visual communication of technical concepts. The ability to communicate effectively is assessed in a number of ways. For example, the students' performance in courses that focus exclusively on communication (ENGL 3323 - Technical Writing and SPCH 2713 - Introduction to Speech, in particular) provide initial evidence of achievement of this program outcome. Furthermore, the Employer Survey and the survey of program alumni, as well as the evaluation of student performance in the communication aspects of the capstone courses provide evidence of achieving this outcome. Quantitatively, it is desired that every employer surveyed report being satisfied with the communication skills of our graduates. Four different questions in the Employer Survey address various aspects of our graduates' communication skills.

k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

This program outcome is assessed by both internal and external assessments. Internally, the Employer Survey addresses the abilities of program graduates to use modern tools in civil engineering. Externally, the Fundamentals of Engineering section that addresses computers and numerical methods is a useful indication of the students' achievement in this area. The metric goal here is for our students to perform at or above the national average on this section of the exam. Furthermore, because such tools are frequently used in the capstone courses, the students' performance in these courses also is used as an indication of achievement of this program outcome.

Degree Programs - MS Civil Engineering and MS Environmental Engineering, PhD Civil Engineering

The table below lists the primary outcomes for the graduate programs in the School of Civil and Environmental Engineering and the assessment methods used for them. The graduate programs are highly individualized, and the curriculum and independent study are directed by the individual's examining committee. As such, the bulk of the assessment lies with each committee.

Degree Program: MSCE, MS EnvE, PhD Civil Engineering - Assessment Summary

Key Expected Outcome	Assessment Method	Years this assessment conducted	# of grads/number assessed
Demonstration of appropriate depth of knowledge in area of specialization	Committee evaluation of independent study Qualifier exam (PhD only)	2000 – 2005	91 (MSCE)/91 31 (MSEnvE)/31 6 (PhD)/6
Ability to communicate results of independent study	Committee evaluation of independent study Qualifier exam (PhD only)	2000 - 2005	91 (MSCE)/91 31 (MSEnvE)/31 6 (PhD)/6
Demonstration of appropriate background knowledge and research skills for PhD-level work	Qualifier exam (PhD only)	2000 – 2005	6/6

D2. Results of Program Outcomes Assessment
Degree Program - BS Civil Engineering

The following is a presentation and discussion of some of the qualitative and quantitative data gathered to assess the quality of achievement of the five selected outcomes.

a. an ability to apply knowledge of mathematics, science, and engineering,
An initial indication of student achievement of this Program Outcome is the performance of students in these courses. The average grade point for graduating classes over the past three years in the professional school courses is above a 3.0. At a minimum, of course, every graduating student has achieved a passing grade in all of these courses and has an overall GPA of 2.5 or better on all math, science and engineering courses.

Further indication of student achievement of this Program Outcome is provided by the Fundamental of Engineering exam. As noted above, our graduates have performed above the national average on this exam, and they perform well above the national average on a number of specific sections. A strong performance on these sections, all of which require an ability to apply math, science and engineering, is strong evidence that our graduates are achieving this Program Outcome. The performance of CIVE (and OSU engineering students in general) on the math section has been below the national average. A number of steps are being taken at the college level to address this situation. In particular, the math sequence taken in the first two years of the pre-professional program is being revised. It is felt that this revised format will improve student learning of key calculus and differential equation concepts, which in turn should improve student performance on the math section of the FE exam.

Regarding the Fundamentals of Engineering exam, it should be noted that in the alumni survey, 100% of the graduates from 1996 and 200 who were surveyed reported having passed the FE exam. Lastly, the Employer Survey also found that 100% of employers of our graduates reported satisfaction with the technical capabilities of our graduates.

b. an ability to design and conduct experiments, as well as to analyze and interpret data,
Several assessments contribute to our understanding of our achievement of this outcome. In terms of coursework, one assessment tool used as an initial indicator of our students' ability in conducting experiments is the grades in three lab courses (CHEM 1314, PHYS 2014, and CIVE 4711). All of our students successfully complete these courses. The substantive lab content of the Chemistry and Physics courses is monitored by a college level oversight committee. In addition, the students' grades in the required statistics course (STAT 4910 and its predecessor, STAT 4033) indicate achievement in the area of designing experiments and interpreting data. All graduates passed this course, and the average grade point for these courses ranged from 2.68 to 3.29.

The Employer Survey asked employers of our graduates' ability to use laboratory test data for design and analysis. Of those who felt that skill applied to the graduate(s)' position, 88% said their expectations were met or were exceeded. The Board of visitors has expressed the opinion that analysis and interpretation of data is a more important part of this Program Outcome than the actual design of experiments. They felt that the current program (and its assessment) addresses the design of experiments adequately.

c. an ability to design systems, components, or processes to meet desired needs,
Design, as noted, is integrated in numerous spots in the professional school curriculum. In addition, most of the CIVE elective courses include some design content as well. Most significant, perhaps, is the design content of the capstone courses. Evaluations by faculty and outside reviewers of the performance by students in these courses indicate that students have achieved this Program Outcome.

In the exit interviews, graduating seniors reported feeling that their educations had prepared them for design work, and on the alumni survey, more than 90% of both 1996 and 2000 graduates reported being at least "adequately prepared" (and in most cases "well prepared" or better) for the design work required by their jobs. In the 2002 Employer Survey, 94% of employers of our graduates reported that our graduates met or exceeded their expectations in "using critical thinking to identify, define, and develop alternate solutions to problems." Similar levels of satisfaction were reported on other questions relating to design abilities.

g. an ability to communicate effectively,
As noted, numerous assessment tools indicate student achievement of this Program Outcome. The composite grade in the courses that focus exclusively on communication (ENGL 1113, ENGL 3323 and SPCH 2713) provides an initial indication of student achievement of this outcome. The composite grade point average of our graduates in these courses shows a B average or better, which has remained reasonably steady from 2000 to 2002. Student performance in the communication requirements of the capstone design courses also indicates our students development of these abilities.

The Employer Survey also addresses communication skills. Ninety four percent of surveyed employers reported satisfaction with our graduates' oral communications skills, and 83% of that group expressed satisfaction with the written communication skills of the OSU graduates they have employed in the past five years. The three respondents (17%) who stated that their OSU graduate did not meet their expectations for written communication skills are clearly of concern. The Curriculum Committee has been made aware of this, and has recommended that the CIVE faculty review the written communication content of the CIVE curriculum. Among the responses to be considered are increasing the number of written assignments across the curriculum and establishing a uniform criteria that all faculty will use in evaluating the written documents produced by students in their courses.

With respect to visual communication, employers were asked to "rate the ability of our BSCE graduate(s) to graphically illustrate technical concepts..." and 89% said their expectations were met or exceeded. When asked to "rate the ability of our BSCE graduate(s) to produce computer generated graphics", 100% said their expectations were met.

k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

One external assessment for this outcome is student performance on the 'Computers/Numerical Methods' portion of the Fundamental of Engineering exam. This is one area in particular that our students lag somewhat behind the national average on the FE exam. These results were recently presented to the School's Board of Visitors, who expressed some concern but did not feel an immediate response was warranted. In particular, most Board members felt that some of the numerical methods addressed in the exam were specialized enough that not all BSCE students need them. They did, however, encourage more integration of spreadsheet applications into the curriculum. The School's Curriculum Committee has also met and issued a report addressing this assessment result. Among the recommendations was greater integration of spreadsheet applications within the curriculum, beginning with greater emphasis in the ENGR 1111 Introduction to Engineering course. Some faculty have already begun to put additional spreadsheet calculations and plotting into some course assignments. Evidence of this will be found in the course files made available to the evaluators.

Other indicators provide positive evidence of our students' achievement of this Program Outcome. As an initial indication, the students' lab course and professional school GPAs certainly support a contention that they have significant abilities in using modern engineering techniques and tools. The capstone experiences make particular use of these skills and tools, and faculty have not identified any significant deficiency in students' performance in their capstone course activities.

The Employer Survey also asked about our graduates' abilities in this area. For example, when asked to rate our graduates' ability to use computers in problem solving and communications, 100% of respondents reported that their expectations were met or exceeded. The alumni survey asked 1996 and 2000 alumni to respond to the following statement: "My OSU education prepared me to understand the new, job-specific technology that I encounter." Over 90% of the 2000 graduates and 80% of the 1996 graduates reported feeling "adequately prepared" or better.

Interpretation and Use of Assessment Results

A process is in place by which results of the various assessments are used to develop and improve the program. The process is based in the school's Curriculum Committee, which is charged with the monitoring and development of the school's curriculum. Furthermore, some program improvements happen outside the Curriculum Committee. These changes result from direct input from constituent groups, input that channels either directly to faculty responsible for a particular

feature of the program or to the School Head, who discusses the proposed change with the appropriate group. Examples of both types of program development are listed below. Additional detail is available upon request.

Changes in the past five years as a result of program assessment

Addition of CIVE 3833 Applied Hydraulics
Realignment of the Engineering Science Sequence
Revision of the Engineering Statistics from STAT 4033 to STAT 4910
Content of Existing CIVE Courses
Content of CIVE 4273 Construction Engineering and Management
Content of Transportation Courses
Content of CIVE 4042 Senior Seminar
Addition of CIVE 3623 - Engineering Materials Lab

Degree Programs - MS Civil Engineering and MS Environmental Engineering, PhD Civil Engineering

All graduates from any of the graduate degree programs are assessed primarily by their examining committee. And in all cases, the assessment must indicate adequate achievement of the expected outcomes before the student is approved for the graduate degree. Performance in coursework, maintenance of adequate overall GPA in courses used on the Plan of Study, communication (both written and oral) of results of the independent study or research, and demonstration of mastery of the specific subject area, are all assessed by the examining committee. Investigation of additional methods to assess the level of achievement by graduate program graduates is currently underway. It should be noted that the Employer Survey cited above does address, to some extent, the quality of graduate degree program graduates, as a significant number of our undergraduate students stay to earn graduate degrees. No attempt was made to require employers responding to our survey to separate those employees with only the BSCE degree from OSU and those with both BSCE and MS.

E. Feedback from program alumni/documented achievements of program graduates.

Degree Program - BS Civil Engineering

Undergraduate Program Alumni Survey

The OSU Office of University Assessment performs a wide variety of assessments aimed at meeting the requirements for the university-level accreditation of the Higher Learning Commission, as well as those set by the regents of the university system. Among the assessment tools used is the Undergraduate Program Alumni Survey, which is performed on a three-year cycle. It focuses on alumni of undergraduate programs who graduated approximately two and five years before the time of the survey. In the most recent surveys, performed in January 2002 and February 2004, graduates of the BSCE degree program in 1996 and 2000, and 1998 and 2002, respectively, were contacted. Questions asked of all alumni center on the graduates' satisfaction with their experiences at OSU, as well as each individual's current employment status. However, individual programs have the opportunity to ask additional questions of their graduates specifically. These questions have been

tailored to assist in determining our program's achievement of its Educational Objectives and Program Outcomes. In general, graduates report a high level of satisfaction with their educations. For example, over 90% report feeling 'adequately' or 'very well' prepared for their positions. More than half have completed or are actively working on a graduate degree. Nearly 100% either have taken or plan in the near future to take the Professional Engineers exam. Lastly, in the questions tied specifically to program outcomes, a large majority report being 'adequately', 'well', or 'very well' prepared to perform in each of the outcome areas.

Employer Survey

The 2002 Employer Survey was sent to 22 employers, and 18 responses were received. These employers were selected to represent a cross section of those who employ our graduates, including public institutions at all levels (federal (US Army Corps of Engineers), state (Oklahoma department of Transportation) and local (City of Tulsa Public Works)), large consulting firms (Atkins America), and a few small specialty firms. It is felt that these employers hire a representative group of our graduates in terms of ability, specialization, and demographics. In the case of employers that hire a large number of our graduates (such as the Corps of Engineers or the OK Department of Transportation), the survey was distributed to more than one supervisor with direct contact with employees from our program. The survey included a variety of questions aimed at determining the employers' assessment of the quality of our graduates, with particular attention paid to achievement of most of our Program Educational Objectives and Program Outcomes. The actual survey and the hard data will be available to the evaluators. In general, a high level of satisfaction was expressed by the employers of our recent graduates. Two areas did receive some negative comments, with three of the 18 respondents stating their OSU-degreed employee did not meet their expectations in those areas. Specifically, these deficiencies were in planning and scheduling of projects and in written communication. These findings have been passed on to the School's Curriculum Committee, which is investigating possible curricular responses. Another Employer Survey is being prepared for Spring 2005.

Degree Programs - MS Civil Engineering and MS Environmental Engineering, PhD Civil Engineering

Graduate Program Alumni Survey

The OSU Office of University Assessment performs a wide variety of assessments aimed at meeting the requirements for the university-level accreditation of the Higher Learning Commission, as well as those set by the regents of the university system. As with the undergraduate programs, a Survey of Alumni of Graduate Programs is conducted every two years. It focuses on alumni of graduate programs who graduated approximately two and five years before the time of the survey. The most recent surveys were performed in January 2003; graduates of the MS and PhD degree programs in 1997 and 2001 were contacted. Questions asked of all alumni center on the graduates' satisfaction with their experiences at OSU, as well as each individual's current employment status. However, individual programs have the opportunity to ask additional questions of their graduates specifically. Another

survey is being conducted in the Spring of 2005. In general, students report a high level of satisfaction with their graduate experience in our programs. For example, 92% report being 'somewhat satisfied, 'satisfied', or 'very satisfied'. All were fully employed, mostly in fields highly related to their areas of study, and most report feeling 'satisfied' or 'very satisfied' with how well prepared they were for their current position.

F. Other Program Evaluations

Degree Program - BS Civil Engineering

ABET Accreditation

The primary external program evaluation performed was the accreditation review performed in 2003 by ABET (The Accrediting Board for Engineering and Technology). In this review, a very thorough self-study is performed by the faculty and submitted for review by a trained evaluator. This evaluator reviews the self-study, compares it to the accreditation criteria, and then visits the school. During this time, the evaluator meets with administrators, faculty, and students. Upon completion of this thorough review, the evaluator issues a report. Program personnel are allowed to respond to issues raised by the evaluator, and these responses are considered. A final report is then issued. In the final report, the BSCE program received again a full six-year accreditation, the highest level attainable. Two issues were raised as concerns of the evaluating team. These both related to the make-up of our faculty and the evaluator's concern that more faculty are needed to ensure that all six areas of specialization within civil engineering can be adequately covered, one of the program's educational objectives. The current and future makeup of the faculty is addressed elsewhere in this report.

Fundamentals of Engineering Exam Results

The School of Civil and Environmental Engineering (CIVE) has chosen to use student performance on the Fundamentals of Engineering exam as one component of its overall assessment program. All CIVE students are encouraged to take the exam, and approximately 80% of all CIVE graduates have done so before graduation. The vast majority of those students who do not take it are international students who plan to return to their home countries.

Data detailing the performance of CIVE students on the exam are made available to the Associate Dean of Engineering each semester. These data do not give results for individual students but rather composite scores for groups of students, categorized according to the discipline listed on their application. All examinees take the same morning 'general' exam. Students than have a choice of taking either another 'general' exam in the afternoon, or a discipline specific afternoon exam. The vast majority of CIVE students elect to take the 'civil engineering' afternoon section. A very small number take either the 'general' or 'environmental' afternoon exam. Results are sent to the Dean's office categorized by the specific exam taken by a given group of examinees. A detailed statistical analysis of these results is prepared twice each year by an assessment specialist in the College of Engineering,

Architecture, and Technology. These data and analyses will be available to the evaluator in the School's assessment files.

Listed below are the trends in the overall passing rates for examinees that identified themselves as CIVE students from Spring 2000 through Fall 2004. These include both students taking the civil exam and those few taking the 'general' or 'environmental' afternoon exams. With respect to overall passing rates, OSU civil engineering students performed at or above the national average every year. In previous periods, the passing rate among our students was somewhat higher, resulting in a review by CIVE faculty. Among the issues under review are the timing of the exam (i.e. students taking the exam too early in their programs), the prevailing attitude about the exam (i.e. students viewing the exam as something to take more than once, the first time just to "see what it's like"), and improving the availability and publicizing of the review sessions that are currently offered.

Data for Fundamental of Engineering Exam

EXAM DATE	No. CIVE students taking FE	Percent passing	National % Passing
Spring 2000	9	100	76
Fall 2000	8	88	81
Spring 2001	5	80	77
Fall 2001	20	80	80
Spring 2002	12	83	79
Fall 2002	11	72	80
Spring 2003	11	82	78
Fall 2003	14	85	77
Spring 2004	13	92	76
Fall 2004	12	83	75

As an example of the way these FE exam results are used, the following conclusions were recently drawn:

1) During this period, CIVE students performed significantly above the national average on the following topic areas:
   chemistry, dynamics, electrical circuits, materials science, mechanics of materials, statics, and thermodynamics.
2) CIVE students performed significantly below the national average on the following topic areas: computers (general exam) and computer and numerical methods (civil exam).
3) For the past two years' results, CIVE students performed above the national average on at least one occasion on the following topic areas: thermodynamics and dynamics.
4) Also in the past two years, CIVE students performed below the national average, on at least one occasion, on the following topic areas: mathematics, computers (general exam), computer and numerical methods (civil exam), hydraulics and structural design.

A 'significant difference' here is defined as 'more than one standard deviation' from the mean value of the national test scores. Two sections in which CIVE students have consistently performed below the national averages over the past five years are computers (from the general exam) and computers and numerical methods (from the afternoon civil exam). The School's curriculum committee is currently investigating ways in which to address this situation. For example, it was found that a significant part of the computer methods section of the exam focuses on spreadsheet applications. An informal poll of CIVE students in junior-level courses found that many students had relatively little experience applying spreadsheet techniques in their engineering courses. Opportunities to incorporate more such applications into the upper-level courses are being explored. The Board of visitors has also been apprised of these results and plan to monitor the effect of actions taken by the Curriculum Committee.

CRITERION VI
Program Demand/Need

E. Occupation manpower demand.

Two of our primary indicators of demand for our graduates are our alumni and our knowledge of how easy or difficult it is for or students to find jobs upon graduation. The alumni information is from both informal sources as well as formal ones. Informal indicators are comments made by firms wishing to hire our graduates. Formal data are from employer surveys and recommendations from our Board of Visitors. The Board consists of 13 persons who have laudable careers in civil and environmental engineering. Both sources provide us with ample information about how difficult or easy it is for our students to find jobs. Given that our program is not a large one, it is relatively easy to keep track of the job market for our graduates.

F. Societal needs for program.

The information about the demand for our graduates points to several conclusions. One is that the national production of civil and environmental engineering degrees fluctuates considerably over time. Data for the years 1974—2001 indicate these changes. There have been several ups and downs in the number or degrees granted. The most degrees granted were 11,119 in 1997. The least number of degrees was 7,587 in 1990. For environmental engineering BS degrees the high point was 882 in 1997 and 129 in 1974. The data also show that the numbers of both degrees was very high in the early 1980's and declined in the late 1980's. In general, the numbers of civil engineers and environmental engineers are about the same now as they were in the early 1980's.

The other factor that is present in the degree data is that civil and environmental engineering demand clearly fluctuates with time, apparently with the economy, although this relationship is not easily understood. There is, for example, some indication that the fluctuations my lag changes in the economy.

G. Graduate student applicants and enrollment changes.

The number of MS degrees conferred and the number of MS students enrolled the last five years are two to four times more than the OSRHE standards. The number of PhD degrees conferred during the last five years is below the OSRHE standards, whereas the number of PhD students enrolled over the last five years is about the same as OSRHE standards.

If these numbers are compressed over a shorter period, say, three years from 2002 to 2004, there are fluctuations in graduate student applications, acceptances, and enrollments, and changes over this time period. The acceptance rate is about 60 percent of applications for MS students. The acceptance rate has averaged about 23 percent for PhD students. The average acceptance rate of all graduate students in CIVE is higher than the average CEAT rate of 40 percent.

The graduation rate compared to enrollment for MS students in CIVE averages 42 percent over the 2002 to 2004 period. The MS students generally graduate in two years. The graduation rate for PhD students in CIVE averages 33 percent. The graduation rate for CEAT overall is 24 percent. Thus, the graduation rate of CIVE MS and PhD students is more than that of CEAT.

New positive changes have occurred in research that will attract more graduate students in CIVE. The School has hired four faculty engaged in research. The School started the Oklahoma Transportation Center (OTC). Last year the OTC received $4.1 million and this fiscal year $5.7 million in research funding. This infusion of research funding will further enhance the ability of this school to attract more MS and PhD students. In addition CIVE has developed a recruitment plan to increase MS and PhD students in the different areas of Civil and Environmental Engineering. Overall, the acceptance rate and graduation rate of CIVE is more than the CEAT rate. Furthermore, the School has developed a recruitment and retention plan for MS and PhD students, fostered with significant research funding from OTC and Project Excellence to upgrade our CEAT research laboratories.

CRITERION VII
Program Duplication

E. Identify other degree programs at OSU with similar titles or functions.
The other engineering programs at OSU have obvious overlaps in that for the first two years their curricula are nearly the same. However, these programs are quite different after the first two years. Also, the College of Engineering, Architecture, and Technology takes advantage of the overlaps by offering the engineering sciences courses for all the engineering programs.

The only other program with which there is any overlap is the architectural engineering program, which overlaps somewhat with our structural engineering courses. Along with the architectural engineering faculty, we are discussing how we should alter our curricula to eliminate the overlaps between our two curricula.

F. For similar programs, describe how each degree program fulfils unique student needs.
The architectural engineering curriculum and our structural engineering courses are largely the same except for the scheduling of the courses. The architectural engineering courses are scheduled to fit the schedules of the architectural students, all of whom must take some architectural design studio courses. Our students do not take studio design courses, and hence we have more flexibility in scheduling our structural engineering courses.

CRITERION VIII
Summary and Conclusions

A. Strengths.

1. A comprehensive undergraduate curriculum that covers all six areas of civil engineering.
2. A competent faculty.
3. A new laboratory building in the next twelve months
4. A strong and positive relationship between our students and faculty.
5.

B. Areas for improvement.

1. Upgrade our labs. Project Excellence is our effort to raise funds to upgrade our labs.
2. We need to hire at least three new faculty in the next two years to cover two expected retirements and to provide depth in construction and concrete materials.

C. Recommendations for action

1. Continue fund raising via Project Excellence
2. Upgrade our labs and build new structures testing lab.
3. Hire three additional faculty.

D. Five-year goals for the program

Goal One. ACADEMIC EXCELLENCE IN INSTRUCTION - Provide world-class programs that prepare graduates to serve and lead in a global community.

Critical Success Factors:

- Program accredited by ABET.
- Pass rates on the national Fundamentals of Engineering Exam, and performance of undergraduates on all major components (e.g., mathematics), exceed national averages.
- Graduate engineers who are competitive with the best as evidenced by the following:
    - Average starting salaries at or above those for graduates from peer institutions.
    - Satisfaction of graduates with their education determined from nationally-administered surveys; high percentage of graduates at "satisfied" or high rating.
    - High acceptance rate for our graduates into their postgraduate school of choice: 90% of qualified applicants accepted into first or second graduate school of choice.
- Graduate program at OSU-Tulsa that attracts qualified graduate students from institutions of recognized quality.
- Enhanced quality of graduate programs as indicated by the following:

- The US News and World Report study of graduate programs.
- Increase the number of PhD students per faculty member.

Objectives:

Objective 1.1: Continuous quality improvement of curriculum and instruction

Strategies:

1. Conduct curriculum review in CY04.
2. Review curriculum as necessary.

Objective 1.2: Develop and implement faculty incentive program to reward excellence in teaching and research.

Strategies:

1. Convene CIVE faculty committee to develop incentive programs for teaching and research.

Objective 1.3: Expand OSU-Tulsa civil engineering course offerings.

Strategies:

1. Enhance undergraduate program at OSU-Tulsa by offering at least 2 CIVE undergraduate courses each semester.

Objective 1.4: Maintain full ABET accreditation in all six areas of School's undergraduate program.

Strategies:

1. Using ABET framework maintain continuous assessment, improvement, and documentation.
2. Ensure that CIVE meets all ABET criteria.

Objective 1.5: Recruit and hire sufficient faculty to accomplish CIVE goals.

Strategies:

1. Hire one construction management faculty at OSU-Stillwater.
2. Hire one construction management faculty for Stillwater campus two semesters before Professor Oberlender retires.
3. Hire one geotechnical faculty for Stillwater campus two semesters before Professor Snethen retires.
4. Hire second geotechnical faculty.
5. Hire one materials faculty.

Objective 1.6: Establish one chaired professorship.

Strategies:

1. Continue *Project Excellence* and use a portion of the funds for a chaired position.

Objective 1.7: Increase external research funding by 50% over 5 years.

Strategies:

1. Expand funding for OTC
2. Develop marketing plan for OIC

Goal Two. ACADEMIC EXCELLENCE IN RESEARCH & SCHOLARLY ACTIVITY – Conduct world-class research and other scholarly activities that advance and apply knowledge to the benefit of society.

Critical Success Factors:

- Research productivity at levels that exceed the average at peer institutions as measured by dollars per FTE, F&A generation, PhD graduates, and peer-reviewed publications.
- Major federal funding in areas of national and state importance for six years for the Oklahoma Transportation Center (OTC).

Objectives:

Objective 2.1: Expand number of research professors from one to three over 5 years.

Strategies:

1. Encourage faculty members to pool research funds to hire research professors.

Objective 2.2: Increase the scope of opportunities for faculty development.

Strategies:

1. Increase the financial resources available for faculty development.
2. Develop and implement a faculty incentive program for teaching and research.

Objective 2.3: Expand and renovate laboratories.

Strategies:

1. Continue *Project Excellence*
2. Build new structures laboratory
3. Renovate Engineering Annex for soils and materials research.
4. Secure benches and equipment for ATRC environmental lab

Goal Three. ACADEMIC EXCELLENCE IN OUTREACH – Provide multi-faceted programs and services that contribute to quality of life and economic development.

Critical Success Factors:

- Number of people served in academic credit courses and continuing education programs increased by 10%.
- Number of small businesses and entrepreneurs served each year increases by 10%.
- External grant support increased by 15%.

Objectives:

Objective 3.1: Conduct research recognized as relative to economic development in Oklahoma.

Strategies:

1. Develop continuous financial support for growth of OTC and OIC.

Objective 3.2: Increase public awareness of CIVE activities

Strategies:

1. Increase number of press releases and newsletters by hiring part-time writer/publicist.
2. Get involved with ASCE and ASEE K-12 initiatives.

Goal Four. STUDENT RECRUITMENT & DEVELOPMENT – Create a collegial environment that attracts outstanding students and encourages academic excellence, career planning, personal growth, discovery of knowledge, and leadership achievement.

Critical Success Factors:

- The best and brightest are attracted to CIVE as evidenced by:
  - Percentage of new freshmen who were in the top 10% of their high school class compared with peer institution norms.
  - Fifty percent of incoming students will have an ACT score of 29 or higher.
- Success rate of undergraduate students as evidenced by the following:
  - Graduation rates equal or exceed peer institution norms.
  - Freshman retention equal or exceed peer institution norms.
- At least 10% of BS students will have had a significant international experience.
- A majority of eligible undergraduate students will receive and accept at least one internship assignment in industry, government, or other appropriate organization.
- An increasing number of undergraduate students participate on teams that are nationally competitive (e.g., concrete canoe, steel bridge).
- Annual levels of PhD production increased by 60%.
- Significant increase in number of international applicants and enrollees from prominent universities in the respective home countries (e.g., IIT's in India, national universities in Korea and Taiwan).

- Three endowed graduate fellowships.
- One hundred percent of graduate students participation in scholarly activity.

Objectives:

Objective 4.1: Increase the number of undergraduate admission applications by 2% per year

Strategies:

1. Participation in CEAT recruitment programs for high schools.
2. Increase the amount of undergraduate scholarships by 50% over 5 years.

Objective 4.2: Increase the number of graduate students by 50% over 5 years

Strategies:

1. Increase the number of graduate scholarships by 50% over 5 years.
2. Increase funds for research assistants by 50%.

Objective 4.3: Increase the retention rates of freshman-to-graduation by 10% over 5 years.

Strategies:

1. Develop freshman and sophomore student retention plan.
2. Establish mentoring programs for freshman and sophomores involving faculty and upper class persons.
3. Continue to aggressively recruit incoming freshmen with scholarships

Objective 4.4: Maintain a friendly and respectful learning atmosphere.

Strategies:

1. Conduct team-building program with faculty.

Objective 4.5: Continue to promote enrichment of student education experience.

Strategies:

1. Continue to participate in concrete canoe, steel bridge, and timber bridge contests.
2. Encourage student participation in ASCE student chapter.
3. Encourage faculty participation in student's activities.

Goal Five. ECONOMIC DEVELOPMENT – Contribute to the economic vitality and growth of Oklahoma through collaborative relationships with its public and private enterprises.

Critical Success Factors:

- Significant increase in the number of CIVE graduates who take employment in the State of Oklahoma.

Objectives:

Object 5.1: Conduct research on topics that affect economic development.

Strategies:

1. Support OTC and OIC research.

Goal Six. DIVERSITY – Achieve diversity and create an environment of respect for individuals.

Critical Success Factors:

- The ethnic diversity of the Oklahoma residents in the undergraduate and graduate student bodies reflects the demographics of the State.
- The gender diversity of the undergraduate student body reflects the norms in peer institutions.
- Retention and graduation rates of members of underrepresented groups increase by 20%.
- Effective mentorship programs/resources available to underrepresented groups.
- Existence of self-organized teams of diverse individuals who come together to respond to professional opportunities.

Goal Seven. HUMAN RESOURCES –Attract, retain and develop faculty who are nationally recognized, or have the potential to be, and ensure the professional growth of faculty and staff by facilitating opportunity and performance.

Critical Success Factors:

- Number of faculty who meet or exceed CIVE promotion and tenure criteria.
- Number of faculty who attract external funding to support scholarship, curriculum development, graduate education, and infrastructure development.
- Number of faculty who engage in scholarship that is validated nationally.
- 100% of faculty receiving major national awards and honors.
- Number of faculty holding national offices in technical and professional societies.
- Number of faculty engaged in advisory committees and review teams.
- Number of staff participating in meaningful professional development programs.
- Number of staff receiving university-level performance awards.

Objectives:

Objective 7-1: Establish professional development fund for faculty.

Strategies:

1. Use Project Excellence funds.

Objective 7-2: Develop and establish a faculty assessment/incentive program.

Goal Eight. FISCAL RESOURCES AND INFRASTRUCTURE – Leverage and focus financial and physical resources to achieve national prominence in strategically targeted areas.

Critical Stress Factors

- The Structures Research facility will be constructed, furnished, and occupied.
- Add five technology equipped classrooms.

Objectives:

Objective 8-1: Build Structures Lab and renovate other labs.

Objective 8-2: Recruit nationally to attract, hire, and retain the best faculty members.

Goal Nine. PARTNERSHIPS & COLLABORATIONS – Strengthen relationships with constituents and professional partners to improve mutually beneficial public and private support.

Critical Success Factors:

- Total annual private gifts from alumni and friends in Project Excellence increased by 25%.
- Total number of donors increased by 25%
- One new endowed chairs/professorships.
- Number of alliances/partnerships with industry, government, and academia increased by 25%.
- Active and effective Board of Visitors.

Objectives:

Objective 9.1: Leverage funds with other universities, government agencies, and private firms.

Strategies:

1. Maintain and expand partnerships with other universities, such as OTC.
2. Maintain and expand partnerships with ODOT, OTA, and other public entities.
3. Develop marketing plan for OIC

Objective 9-2: Continue partnerships with OU and Langston University with OTC.

Objective 9-3: Expand the Board of Visitors.

Goal Ten. IMAGE DEVELOPMENT – Communicate an image that reflects achievement and pride.

Critical Success Factors

- Print and video-based publicity for program innovation, and student and faculty achievements, increased significantly.
- The number of "hits" on the CIVE webpage each year increased 10 times.

Objectives:

Objective 10.1: Develop outreach programs for state citizens.

Strategies:

1. Coordinate CIVE-related outreach programs through CLGT
2. Hire part-time writer to publicize activities and programs at CIVE

Objective 10.2: CIVE broadly recognized as a friendly, competent, highly focused organization.

Strategies:

1. Increase number of CIVE newsletters and e-mail progress reports.
2. Hire part-time writer/publicist to increase number of press releases

Objective 10.3: CIVE maintains a life-long relationship of pride with its students and alumni.

Strategies:

1. Maintain accurate mailing list of CIVE graduates.
2. Hire part-time journalist to write articles about CIVE projects and activities.

OKLAHOMA STATE UNIVERSITY

GENERAL REQUIREMENTS COLLEGE OF ENGINEERING, ARCHITECTURE AND TECHNOLOGY

For students matriculating:

Academic Year . . . . . 2004-05 BACHELOR OF SCIENCE IN CIVIL ENGINEERING

DEGREE

Total hours 136

CIVIL ENGINEERING

MAJOR

Minimum overall grade-point average 2.00

Other GPA requirements, see below.

General Education Requirements 38 Hours

Area	Hrs	To Be Selected From
Underlined courses below are Pre-Engineering requirements simultaneously to meet general educatioin requirements.		
English Composition and Oral Communication	6	ENGL 1113 or 1313, 1213 or 1413, 3323. Total hours for degree is based on substitution of 3323 for 1213 as per Academic Regulation 3.5.
American History and Government	6	HIST 1103 POLS 1113
Analytical and Quantitative Thought (A)	13	MATH 2144, 2153, 2163, 2233
Humanities (H)	3	Any course designated (H) at Oklahoma State University.
Natural Sciences (N)	4	CHEM 1414
Social and Behavioral Sciences (S)	6	SPCH 2713 plus any course designated (S) at Oklahoma State University.
International Dimension (I)	-	Any course designated (I). Students are encouraged to meet the requirement in their selection of (H) or (S) course work.
Scientific Investigation (L)	-	Any course designated (L). Normally met by Natural Science and/or Basic Science requirements.

College/Departmental Requirements Pre-Engineering 28 Hours

Basic Science	8	PHYS 2014, 2114
Engineering	5	ENGR 1111, 1322, 1412
Engineering Science	15	ENSC 2113, 2123, 2143 2213, 2613

Major Requirements 70 Hours

Common Professional School 12 Hours

Mathematics	3	STAT 4073
Engineering Science	3	ENSC 3233
Basic Science	3	BIOL 1114 CHEM 2113, 3053; GEOG 2343; GEOL 1114, 4453 PHYS 3013, 3313, 3513 SOIL 2124, 3893
Humanities (To complete Gen. Education requirements)	3	Courses designated (H) at Oklahoma State University. Consult the college and departmental requirements.

Specific Professional School Requirements 49 Hours

Admitted to the Professional School of Civil Engineering.
(See Professional School Admission Requirements in catalog.)

CIVE 3413	3833
3513	3843
3523	4042
3614	4043
3623	4273
3633	4711
3713	4833
3813	
IEM 3503	

3 hours from Basic Science above or MATH 3013, 4013, 4233, or GEOG 4333, 4343

Controlled Electives 9 Hours

9 semester hours of 4000- or 5000-level courses in Civil Engineering not required in the curriculum.

Other Requirements: A "C" or better is required in each course that is a prerequisite for a major course.
The major engineering design experience, capstone course, requirement is satisfied by CIVE 4043 or 4143 or 5373 or 5383 or 5503.

Students will be held responsible for degree requirements in effect at the time of matriculation (date of first enrollment) and any changes that are made so long as these changes do not result in semester credit hours being added or do not delay graduation.

Karl N. Reid
DEAN

Glenn Gilbert
HEAD

EN-10

OKLAHOMA STATE UNIVERSITY

GENERAL REQUIREMENTS — COLLEGE OF ENGINEERING, ARCHITECTURE AND TECHNOLOGY

For students matriculating:

Academic Year ..... 2004-05 — BACHELOR OF SCIENCE IN CIVIL ENGINEERING

DEGREE

Total hours ..... 136 — CIVIL ENGINEERING

MAJOR

Minimum overall grade-point average ..... 2.00 — (ENVIRONMENTAL)

OPTION

Other GPA requirements, see below.

General Education Requirements 38 Hours

Area	Hrs	To Be Selected From
Underlined courses below are Pre-Engineering requirements used simultaneously to meet general education requirements		
English Composition and Oral Communication	6	ENGL 1113 or 1313, 1213 or 1413, 3323. Total hours for degree is based on substitution of 3323 for 1213 as per Academic Regulation 3.5.
American History and Government	6	HIST 1103 POLS 1113
Analytical and Quantitative Thought (A)	13	MATH 2144, 2153, 2163, 2233
Humanities (H)	3	Any course designated (H) at Oklahoma State University.
Natural Sciences (N)	4	CHEM 1414
Social and Behavioral Sciences (S)	6	SPCH 2713 plus any course designated (S) at Oklahoma State University.
International Dimension (I)	-	Any course designated (I). Students are encouraged to meet the requirement in their selection of (H) or (S) course work.
Scientific Investigation (L)	-	Any course designated (L). Normally met by Natural Science and/or Basic Science requirements.

College/Departmental Requirements Pre-Engineering 28 Hours

Basic Science	8	BIOC 2344, CHEM 3015 or PHYS 2014
Engineering	5	ENGR 1111, 1322, 1412
Engineering Science	15	ENSC 2113, 2123, 2143, 2213, 2613

Major Requirements 70 Hours

Common Professional School 15 Hours

Mathematics	3	STAT 4073
Engineering Science	3	ENSC 3233
Basic Science	6	BIOL 1114, 3014; CHE 2033; CHEM 2113, 3053; GEOG 2343, 4333, 4343; GEOL 1114; MICR 2124
Humanities (To complete Gen. Education requirements)	3	Courses designated (H) at Oklahoma State University. Consult the college and departmental requirements.

Specific Professional School Requirements 46 Hours

Admitted to the Professional School of Civil Engineering.
(See Professional School Admission Requirements in catalog.)

CIVE 3413, 3523, 3614, 3623, 3633, 3713, 3813, 3833, 3843, 3853, 4042, 4143, 4273, 4711, 4833

IEM 3503

Controlled Electives 9 Hours

Select from: CIVE 5010, 5833, 5863, 5873, 5883, 5933, 5943, 5953, 5983, 5993

Other Requirements: A "C" or better is required in each course that is a prerequisite for a major course.
The major engineering design experience, capstone course, requirement is satisfied by CIVE 4143.

Students will be held responsible for degree requirements in effect at the time of matriculation (date of first enrollment) and any changes that are made so long as these changes do not result in semester credit hours being added or do not delay graduation.

Karl N. Reid
DEAN

Gorman Gilbert
HEAD

EN-11

Colleges Report Card.

Oklahoma State University
FIVE-YEAR ACADEMIC REPORT CARD
College of Engineering, Architecture & Technology

Fall Semester	1999	2000	2001	2002	2003	Change Amount	Change Percent
Student Information							
Headcount							
Undergraduate	2,688	2,580	2,661	2,788	2,804	116	4.3%
Graduate	610	631	722	868	847	237	38.9%
Professional	0	0	0	0	0	0	-
Total	3,298	3,211	3,383	3,656	3,651	353	10.7%
White	2,274	2,258	2,288	2,426	2,486	212	9.3%
African American	75	71	82	90	77	2	2.7%
Native American	194	186	209	225	212	18	9.3%
Hispanic	66	64	76	71	52	-14	-21.2%
Asian	90	92	93	90	86	-4	-4.4%
International	599	540	635	754	738	139	23.2%
Entry Scores ACT	26.38	26.38	26.33	25.94	26.32	-0.06	-0.2%
Retention/Graduation Rates							
Freshman Retention Rates	79.5%	86.5%	85.5%	84.7%	83.5%	0.04	5.0%
6-Year Graduation Rate	54.9%	52.4%	57.6%	59.3%	61.9%	0.07	12.75%
Semester Credit Hours - State Funded							
Undergraduate	18,820	17,521	17,900	18,293	19,206	386	2.1%
Graduate	3,872	4,332	5,145	5,509	5,131	1,259	32.5%
Professional	0	0	0	0	0	0	-
Total	22,692	21,853	23,045	23,802	24,337	1,645	7.2%

Number of Lecture Classes Taught /Avg Class Size	Number	Avg.	Number	Avg.	Number	Avg.	Number	Avg.	Number	Avg.		
Lower Division	44	48.0	35	52.0	29	58.0	42	53.0	39	57.0	-5	-11.4%
Upper Division	131	29.0	135	29.0	132	29.0	133	29.0	138	30.0	7	5.3%
All Undergraduate	175	33.8	170	33.7	161	34.2	175	34.8	177	35.9	2	1.1%
Graduate/Professional	93	11.0	82	13.0	84	13.0	88	14.0	94	12.0	1	1.1%
All Student	268	25.9	252	27.0	245	26.9	263	27.8	271	27.6	3	1.1%

Faculty Information							
Instructional-FTE							
Professor-Lecturer	93.27	95.98	98.82	98.19	97.83	4.56	4.9%
Graduate Assistant	36.41	37.36	42.60	30.28	39.19	2.78	7.6%
Total	129.68	133.34	141.42	128.47	137.02	7.34	5.7%
Headcount							
Professor-Lecturer							
Total	136	134	138	141	136	0	0.0%
Minority	18	18	26	33	32	14	77.8%
Tenured/Tenure Track	112	112	117	120	119	7	6.3%
Tenured	98	91	90	92	95	-3	-3.1%
Student Faculty Ratio	17:1	16:1	16:1	17:1	17:1		

Faculty Salaries vs. Peer Inst. (Full-time Faculty - 9 mos.)	OSU	Big 12	OSU	Big 12	OSU	Big 12	OSU	Big 12	OSU	Big 12		
Professor	$79,778	$87,933	$84,094	$91,836	$86,589	$94,888	$87,640	$97,284	$86,619	$99,626	$6,841	8.6%
Associate	$60,940	$64,920	$63,375	$67,653	$65,595	$71,141	$67,016	$72,018	$67,826	$73,479	$6,886	11.3%
Assistant	$53,057	$55,439	$55,293	$58,535	$55,828	$61,258	$56,601	$63,798	$58,057	$65,267	$5,000	9.4%

Classes Taught by Tenured/Tenure Track							
% Lower Div. Classes	89%	94%	97%	98%	97%	8.00%	
% Undergrad. Classes	88%	89%	90%	90%	92%	4.00%	

Fiscal Year	1999	2000	2001	2002	2003		
Financial Information							
Faculty Salaries	$7,854,893	$7,955,840	$8,320,320	$9,189,626	$8,537,286	$682,393	8.7%
Other Salaries	$3,069,239	$3,401,622	$3,361,591	$3,584,975	$3,958,162	$888,923	29.0%
Other Expenses	$3,576,093	$4,277,911	$4,532,542	$5,203,686	$4,985,134	$1,409,041	39.4%
Total	$14,500,225	$15,635,373	$16,214,453	$17,978,287	$17,480,582	$2,980,357	20.6%
Cost per SCH	$306.34	$355.48	$352.40	$374.85	$353.84	$47.51	15.5%
Cost Per SCH in Constant $	$306.34	$343.53	$330.19	$344.97	$316.97	$10.63	3.5%
External Funding							
Sponsored Expenditures	$9,336,382	$10,617,180	$10,636,958	$11,799,196	$14,705,085	$5,368,703	57.5%
Fundraising	$3,322,343	$2,748,082	$2,136,390	$1,861,602	$2,351,019	($971,324)	-29.2%

Oklahoma State University
FIVE-YEAR ACADEMIC REPORT CARD
University Summary

Fall Semester	1999	2000	2001	2002	2003	Change Amount	Change Percent
Student Information							
Headcount							
Undergraduate	16,203	16,659	17,211	18,043	18,683	2,480	15.3%
Graduate	4,590	4,301	4,372	4,657	4,591	1	0.0%
Professional	294	292	289	292	297	3	1.0%
Total	21,087	21,252	21,872	22,992	23,571	2,484	11.8%
White	16,390	16,507	16,753	17,475	17,905	1,515	9.2%
African American	694	709	720	766	778	84	12.1%
Native American	1,453	1,555	1,656	1,784	1,838	385	26.5%
Hispanic	384	347	400	415	444	60	15.6%
Asian	366	366	379	375	371	5	1.4%
International	1,800	1,768	1,964	2,177	2,235	435	24.2%
Entry Scores							
ACT	24.16	23.9	23.83	23.78	24.08	-0.08	-0.3%
Retention/Graduation Rates							
Freshman Retention Rates	82.6%	84.6%	81.7%	80.1%	80.4%	-0.02	-2.9%
6-Year Graduation Rate	51.8%	50.0%	53.7%	55.5%	58.8%	0.07	13.51%
Semester Credit Hours - State Funded							
Undergraduate	218,920	222,231	229,224	241,097	255,899	36,979	16.9%
Graduate	22,708	24,181	25,133	27,042	26,342	3,634	16.0%
Professional	4,910	5,517	5,756	5,696	5,816	906	18.5%
Total	246,538	251,929	260,113	273,835	288,057	41,519	16.8%
Number of Lecture Classes Taught ,Avg Class Size	Number / Avg.	Number / Avg.	Number / Avg.	Number / Avg.	Number / Avg.		
Lower Division	896 / 45.0	893 / 46.0	867 / 48.0	884 / 49.0	939 / 50.0	43	4.8%
Upper Division	862 / 33.0	875 / 33.0	899 / 34.0	946 / 35.0	998 / 35.0	136	15.8%
All Undergraduate	1758 / 39.1	1768 / 39.6	1766 / 40.9	1830 / 41.8	1937 / 42.3	179	10.2%
Graduate/Professional	509 / 13.0	398 / 18.0	409 / 17.0	436 / 17.0	429 / 16.0	-80	-15.7%
All Student	2267 / 33.3	2166 / 35.6	2175 / 36.4	2266 / 37.0	2366 / 37.5	99	4.4%
Faculty Information							
Instructional-FTE							
Professor-Lecturer	776.56	785.70	829.95	839.11	839.96	63.40	8.2%
Graduate Assistant	363.01	371.68	379.32	335.85	366.65	3.64	1.0%
Total	1139.57	1157.38	1209.27	1174.96	1206.61	67.04	5.9%
Headcount							
Professor-Lecturer							
Total	1,294	1,324	1,370	1,394	1,374	80	6.2%
Minority	184	191	204	239	237	53	28.8%
Tenured/Tenure Track	961	955	995	996	985	24	2.5%
Tenured	739	730	736	730	729	-10	-1.4%
Student Faculty Ratio	22:1	22:1	22:1	22:1	24:1		
Faculty Salaries vs. Peer Inst. (Full-time Faculty - 9 mos.)	OSU / Big 12	OSU / Big 12	OSU / Big 12	OSU / Big 12	OSU / Big 12		
Professor	$70,888 / $78,468	$74,104 / $82,336	$76,149 / $85,993	$75,808 / $88,581	$76,751 / $90,445	$5,863	8.3%
Associate	$53,348 / $57,675	$56,270 / $60,482	$58,180 / $63,096	$59,225 / $64,979	$59,315 / $66,106	$5,967	11.2%
Assistant	$47,210 / $47,842	$48,548 / $50,558	$50,647 / $53,007	$50,976 / $56,801	$51,520 / $57,878	$4,310	9.1%
Classes Taught by Tenured/Tenure Track							
% Lower Div. Classes	39%	39%	38%	36%	38%	-1.00%	
% Undergrad. Classes	58%	58%	57%	55%	55%	-3.00%	
Fiscal Year	1999	2000	2001	2002	2003		
Financial Information							
Faculty Salaries	$51,928,577	$54,905,703	$55,809,142	$59,827,332	$58,196,590	$6,268,014	12.1%
Other Salaries	$17,744,937	$18,806,736	$19,726,939	$20,608,484	$21,197,574	$3,452,637	19.5%
Other Expenses	$25,473,752	$27,533,734	$30,701,535	$33,640,071	$31,253,321	$5,779,569	22.7%
Total	$95,147,266	$101,246,173	$106,237,616	$114,075,887	$110,647,486	$15,500,220	16.3%
Cost per SCH	$189.95	$197.36	$205.47	$212.14	$197.27	$7.33	3.9%
Cost Per SCH in Constant $	$189.95	$190.72	$192.52	$195.23	$176.72	($13.23)	-7.0%
External Funding							
Sponsored Expenditures	$60,000,510	$59,174,176	$58,571,342	$65,619,993	$74,442,313	$14,441,803	24.1%
Fundraising	$8,289,124	$8,738,317	$9,600,411	$8,336,809	$8,766,640	$477,516	5.8%

Condensed Printable Form
CIVIL Report

Oklahoma State University
FIVE-YEAR ACADEMIC REPORT CARD
CIVIL & ENVIR ENGR

Fiscal Year	1999	2000	2001	2002	2003	Change Amount	Change Percent
Financial Information							
Faculty Salaries	$1,039,380	$1,056,279	$1,138,214	$1,249,900	$1,028,748	($10,632)	-1.0%
Other Salaries	$158,916	$156,948	$146,005	$161,633	$298,933	$140,017	88.1%
Fringe Benefits	$262,909	$258,330	$317,040	$378,174	$350,418	$87,509	33.3%
Travel	$9,522	$16,165	$17,655	$17,890	$9,277	($245)	-2.6%
Utilities	$0	$0	$0	$9	$0	$0	-
Supplies & Other Oper. Exp.	$63,925	$66,535	$80,713	$88,478	$68,748	$4,823	7.5%
Property, Furniture & Equip.	$22,724	$20,108	$13,115	$17,086	$8,988	($13,737)	-60.4%
Library Books & Periodicals	$2,128	$2,361	$3,216	$1,735	$667	($1,461)	-68.7%
Transfers & Other Disbur.	$0	$0	$0	$0	$0	$0	-
Total	$1,559,504	$1,576,726	$1,715,958	$1,914,905	$1,765,778	$206,274	13.2%
Cost per SCH	$338.80	$308.86	$440.55	$525.78	$481.14	$142.34	42.0%
Cost per SCH in Constant $	$338.80	$298.48	$412.79	$483.87	$431.00	$92.20	27.2%
Other Revenue							
Other Student Fees	$870	$1,425	$2,860	$2,630	$2,100	$1,230	141.4%
Gifts and Grants	$422	$10,686	$0	$299,952	$46,663	$46,241	10955.5%
Fees Related to Educ. Depts.	$0	$1,339	$4,800	$2,603	$4,000	$4,000	-
Other Income	$50,872	$318,967	$255,781	$193,867	$460,356	$409,484	804.9%
Total	$52,164	$332,416	$263,441	$499,052	$513,119	$460,955	883.7%
External Funding							
Sponsored Expendiutres**							
Fundraising							

**Excludes federal appropriations for College of Agriculture Sciences and Natural Resources.

Appendix A
Civil & Environmental Engineering
External Grants and Contracts Awarded to Program Faculty

External Funds			Dollar Amounts				
Name of Grant, Contract, or Gift	Principal Investigator(s)	Source of Funds	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Oklahoma State University Geothermal Smart Bridge Task 4.2.2 Investigate Integration of Smart Bridge with ITS Systems	Ahmed, M.S.	United States Department of Transporation - Federal Highway Administration	68,913.00	13,496.00		36,927.00	
Oklahoma State University Geothermal Smart Bridge Task 4.4.2 Overall Life-cycle Economic Analysis	Ahmed, M.S.	United States Department of Transporation - Federal Highway Administration	83,671.00	29,503.00		37,330.00	
Oklahoma State University Geothermal Smart Bridge Task 4.5 Technology Transfer	Ahmed, M.S.	United States Department of Transporation - Federal Highway Administration	51,843.00	24,980.00		48,958.00	
Evaluation of Permanent Formed Metal Decking as Lateral-Torsional Bracing in Bridges	Bowen, C.M.	Oklahoma Transportation Center for Oklahoma State University			18,684.00		
Documenting Public Agency Responses to I-40 Bridge Collapse	Bowen, C.M. Gilbert, G.	Oklahoma Department of Transportation				50,000.00	
Treating Swine Waste Using Laboratory Scale Anaerobic Sequencing Batch Reactors	Clarkson, W.W.	Environmental Institute's Water Research Center			24,746.00	(10,848.00)	
Bioslurry Remediation of Soils Contaminated with Nitroaromatics: Microorganisms Involved and Surfactants Enhancement	Clarkson, W.W. Wilber, G.G.	Environmental Institute's Water Research Center	25,000.00				
Determination of Dynamic Modulus Master Curves for Oklahoma HMA Mixtures	Cross, S.A.	Oklahoma Department of Transportation					97,001.00
Determination of Dynamic Modulus Master Curves for Oklahoma HMA Mixtures	Cross, S.A.	OSU Foundation					63,318.00
Evaluation of Cold, In-Place Recycling for Rehabilitation of Transverse Cracking on US 412	Cross, S.A.	Oklahoma Department of Transportation					42,757.00
Evaluation of Test Methods for Determination of Aggregate Specific Gravity	Cross, S.A.	Oklahoma Department of Transportation					39,887.00
Guidelines for Using Prime and Tack Coats	Cross, S.A.	United States Department of Transportation - Federal Highway Administration Central Federal Lands Highway Division				25,000.00	8,379.00

External Funds			Dollar Amounts				
Name of Grant, Contract, or Gift	Principal Investigator(s)	Source of Funds	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Durability of Cost Effective Timber Pile Repair Techniques to Moisture Cycling	Emerson, R.N.	Oklahoma Transportation Center for Oklahoma Department of Transportation				25,638.00	
Durability of Cost Effective Timber Pile Repair Techniques to Moisture Cycling	Emerson, R.N.	Oklahoma Transportation Center for Oklahoma State University				23,117.00	
Durability of Cost Effective Timber Pile Repair Techniques to Moisture Cycling: Phase 2	Emerson, R.N.	University of Oklahoma for the Oklahoma Transportation Center for the Oklahoma Department of Transportation					30,000.00
Evaluation and Development of Cost Effective Timber Pile Repair Techniques	Emerson, R.N.	Oklahoma Transportation Center for Oklahoma Department of Transportation			15,230.00		
Evaluation and Development of Cost-Effective Timber Pile Repair Techniques	Emerson, R.N.	Oklahoma Transportation Center for Oklahoma State University			22,271.00		
Flexural Strength of Concrete Reinforced with Carbon Fibers	Emerson, R.N.	Conoco, Inc.			85,524.00		
Partnership for Advancing Technologies in Housing: Engineered Wood Frame Wall Panel System Integrating Prefabricated Truss Technology	Emerson, R.N.	National Science Foundation			89,822.00		
Civil Engineering Student Design Squad	Gilbert, G.	Oklahoma Department of Transportation				142,705.00	142,705.00
Oklahoma Transportation Center	Gilbert, G.	Oklahoma Department of Transportation			245,994.00	139,105.00	
OTC - Funding Practices for State Highway Projects: A Multi-State Analysis	Gilbert, G.	Oklahoma Department of Transportation			11,998.00		
Undergraduates Working with ODOT	Gilbert, G.	Oklahoma Department of Transportation				135,000.00	
Oklahoma Transportation Center Improvement	Gilbert, G.	University of Oklahoma for the Oklahoma Transportation Center for the Oklahoma Department of Transportation					10,000.00
Analytical Quantification of the Basic Problems of Pavement Behavior Under the Action of Sutained Loading	Gipson, G.S.	Oklahoma Transportation Center for Oklahoma State University			21,623.00		
Static and Fatigue Behavior of Threaded Drillstring Connectors	Lamport, W.B.	Unocal Corporation		155,937.00			
Fatigue Performance of Tubular Connections - Ursa Project	Lloyd, J.P.	Shell Offshore, Inc.	86,130.00	93,300.00			
Flexural Strength of Portland Cement Mortar and Concrete Reinforced with Carbon Fibers	Lloyd, J.P.	Conoco, Inc.	20,000.00				
Saga Flexural Fatigue of Tubular Connectors	Lloyd, J.P.	Saga Petroleum	4,145.46				
Static and Fatigue Behavior of Threaded Drillstring Connectors	Lloyd, J.P.	Unocal Corporation			25,182.00		
Thor Connector Fatigue Testing	Lloyd, J.P.	Wyman-Gordon Limited	5,870.00				

External Funds			Dollar Amounts				
Name of Grant, Contract, or Gift	Principal Investigator(s)	Source of Funds	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Evaluation of Existing MODFLOW Model of CG037 with Accompanying Suggestions for Modification	McTernan, W.F.	Automated Science Group, Inc.			42,732.00		
Investigation into the Application of Artificial Neural Network, Bayesian Networks and Inverse Stochastic Time of Travel Modeling to Identify Contaminant Source Locations	McTernan, W.F.	Automated Science Group, Inc.			47,701.56		
Use of Sensor Technology for Accurate Determinations of Groundwater Flow Parameters	McTernan, W.F.	Automated Sciences Group, Inc.					53,753.04
Using Artificial Neural Network Models to Determine Contaminant Sources	McTernan, W.F.	Automated Sciences Group, Inc.				2,669.81	
Strategic Solutions Concrete Materials Testing	Oberlender, G.D.	Strategic Solutions for OCAST					5,145.00
Investigating Admixture IPANEX for Use in Bridge Decks	Russell, B.W.	Oklahoma Transportation Center for Oklahoma Department of Transportation				49,507.00	
Investigating the Admixture IPANEX for use in Bridge Decks	Russell, B.W.	University of Oklahoma for the Oklahoma Transportation Center for the Oklahoma Department of Transportation					66,500.00
Investigation of Stainless Steel Clad Reinforcement for Bridge Decks	Russell, B.W.	Oklahoma Transportation Center for Oklahoma Department of Transportation				89,922.00	
Transfer, Development, and Splice Length for Strand/Reinforcement in High-Strength Concrete	Russell, B.W.	Purdue University for the National Academy of Sciences (NAS) / National Cooperative Highway Research Program (NCHRP)				300,000.00	
Evaluating the State of the State's Bridges: A Systematic Review of the Bridge Inspection System	Russell, B.W., Bowen, C.M.	Oklahoma Transportation Center for Oklahoma Department of Transportation				32,210.00	
Evaluating the State of the State's Bridges: A Systematic Review of the Bridge Inspection System	Russell, B.W., Bowen, C.M.	Oklahoma Transportation Center for Oklahoma State University				17,788.00	
Evaluating the State of the State's Bridges: A Systematic Review of the Bridge Inspection System	Russell, B.W., Bowen, C.M.	University of Oklahoma for the Oklahoma Transportation Center for the Oklahoma Department of Transportation					10,000.00
Development of a 511 Traveler Information Program Deployment Plan for Oklahoma	Sanders, D.A.	Oklahoma Department of Transportation				100,000.00	
Environmental Impact Assessment on Fuel Jettisoning	Sanders, D.A.	Automated Science Group, Inc.			46,067.23		
Technology Transfer for the Domestic Petroleum Industry	Sanders, D.A.	University of Tulsa - Integrated Petroleum Environmental Consortium	39,313.00	43,650.00	(2,703.00)		

External Funds			Dollar Amounts				
Name of Grant, Contract, or Gift	Principal Investigator(s)	Source of Funds	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Evaluation of Geocomposite Drainage Layer in Roadway Pavement Design	Snethen, D.R.	Tenax Corporation					15,365.00
Geotechnical Design and Dam Safety	Snethen, D.R.	US Army Corps of Engineers - Tulsa District		31,863.00			
Influence of Permeability and Test Method on Volumetric Properties of Compacted Hot Mix Asphalt	Snethen, D.R.	Oklahoma Department of Transportation	55,077.00	20,437.00			
Levee Improvement Project	Snethen, D.R.	US Army Corps of Engineers - Tulsa District			11,656.00		
Quality Control Testing for Granular Materials	Snethen, D.R.	University of Oklahoma for the Oklahoma Transportation Center for the Oklahoma Department of Transportation					25,000.00
Linear Scheduling Program Development	Spencer, G.R.	Willbros USA, Inc.		20,000.00			
A Prioritizing Methodology for Scour-Critical Culverts in Oklahoma	Tyagi, A.K.	Oklahoma Transportation Center for Oklahoma State University			35,000.00		
FATE/TRANSPORT Evaluation of Non-Aqueous Phase Liquids in Aquifers	Tyagi, A.K.	Automated Science Group, Inc.			40,224.00		
Modeling of Population and It's Relationship with Water Resources	Tyagi, A.K.	City of Enid	15,800.00				
Research of Water Sources	Tyagi, A.K.	City of Enid	19,683.00				
Validation and Modeling of Water Distribution Network	Tyagi, A.K.	City of Minco			27,839.00		
Gas Phase Corona Technology for Treatment of VOC Paint Booth Emissions	Veenstra, J.N.	Altech Services, Inc.				46,390.74	
Air Emission Evaluation at the Industrial Wastewater Treatment Plant at Tinker AFB	Veenstra, J.N.	Automated Science Group, Inc.			42,812.00		
A Demonstration of a Subsurface Drainage System for the Remediation of Brine-Impacted Soil	Veenstra, J.N.	University of Tulsa - Integrated Petroleum Environmental Consortium	41,286.00				
Gas Phase Corona Technology for Treatment of VOC Paint Booth Emissions (Phase II)	Veenstra, J.N.	Tec-Masters, Inc.					60,286.18
Industrial Water Treatment Plant Metals Treatment Process Optimization	Veenstra, J.N.	Automated Sciences Group, Inc.					54,837.70
State of the Art Review of Lamella Separators to Treat Water Associated with Dredging Operations	Veenstra, J.N.	United States Army Corps of Engineers				21,582.00	
Tinker IWTP Performance Evaluation	Veenstra, J.N.	Automated Science Group, Inc.			51,107.82		
Evaluation of Road Base Material Derived From Tank Bottom Sludges	Veenstra, J.N. Snethen, D.R. Sanders, D.A.	University of Tulsa - Integrated Petroleum Environmental Consortium	70,556.00				

External Funds			Dollar Amounts				
Name of Grant, Contract, or Gift	**Principal Investigator(s)**	**Source of Funds**	**1999-2000**	**2000-2001**	**2001-2002**	**2002-2003**	**2003-2004**
Industrial Wastewater Treatment Plant (IWTP) Toxic Release Inventory Emissions	Veenstra, J.N. Wilber, G.G. McTernan, W.F. Sanders, D.A.	CH2M Hill, Inc.			70,136.00	15,100.00	
Mechanisms and Control of Carbon Monoxide Generation in an Industrial Wastewater Treatment Plant	Veenstra, J.N. Clarkson, W.W.	The Stover Group		20,000.00			
Metals Treatment Optimization at the Industrial Wastewater Treatment Plant at Tinker Air Force Base	Veenstra, J.N. Wilber, G.G. Sanders, D.A.	CH2M Hill, Inc.		76,000.00			
Analysis of Temperature Effects on Sludge Treatment at the Tinker AFB IWTP	Wilber, G.G.	Automated Science Group, Inc.			69,917.11		
Improved Operations at the Industrial Wastewater Treatment Plant at Tinker AFB - Metals Treatment, Odor Control, and Air Emission Evaluation	Wilber, G.G.	Automated Science Group, Inc.			35,563.00		
Improved Sludge Dewatering at the Tinker Air Force Base Industrial Wastewater Treatment Plant	Wilber, G.G. Veenstra, J.N.	CH2M Hill, Inc.			110,000.00		
		TOTAL	**587,287.46**	**529,166.00**	**1,189,126.72**	**1,328,101.55**	**724,933.92**

Appendix B

Record of Significant Scholarly, Artistic and/or Creative Work

Name and Type of Scholarly, Artistic and/or Creative Work	Program Faculty	Year Completed (1999-2005)
Name: Life-Cycle Cost Analysis of Bridge Winter Maintenance Technologies *Type*: Computer software and User's Manual *Prepared for*: USDOT/FHWA	Samir Ahmed	2004
Name: Life-Cycle Cost Analysis of Bridge Winter Maintenance Technologies *Type*: Final Report *Prepared for*: USDOT/FHWA	Samir Ahmed	2004
Name: Integration of Smart Bridge with Intelligent Transportation Systems *Type*: Final Report *Prepared for*: USDOT/FHWA	Samir Ahmed	2004
Name: Smart Bridge Web Site *Type*: Computer software and Technology Transfer *Prepared for*: USDOT/FHWA	Samir Ahmed	2004
Name: Managing Travel for OSU Football Games *Type*: Final Report *Prepared for*: Board of Regents for Oklahoma A & M Colleges	Samir Ahmed	2004
Name: Snow and Ice Control Technologies *Type*: Final Report *Prepared for*: USDOT/FHWA	Samir Ahmed	2000
"Evaluating the State of Oklahoma's Bridges", with Bruce Russell and Shawn Painter, *Journal of Infrastructures Systems,* American Society of Civil Engineers	Charles Bowen	2005
"Evaluation of Short Span Non-Composite Steel Truss Bridge Decks", with M.D. Engelhardt, *Journal of Bridge Engineering,* American Society of Civil Engineers	Charles Bowen	2005
"Evaluating the State of the State's Bridges: A Systematic Review of the State's Bridge Inspection Program", with Dr. Bruce Russell and Shawn Painter, report to the Oklahoma Transportation Center	Charles Bowen	2004
"Field Load Testing of a Non-Composite Concrete Slab on Steel Girder Truss	Charles Bowen	2004

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Record of Significant Scholarly, Artistic and/or Creative Work

Name and Type of Scholarly, Artistic and/or Creative Work	Program Faculty	Year Completed (1999-2005)
Bridge", with M.D. Engelhardt, *proceedings, 2nd International Conference on Structural Engineering, Mechanics and Computations*		
Comparison of Finite Element Analysis and Field Load Testing of Concrete Slab-on-Girder Steel Truss Bridges", *Proceedings, International Symposium on Steel Bridges,* Millau, France	Charles Bowen	2004
"Evaluation of Permanent Metal Decking Forms as Lateral-Torsional Bracing in Bridges", report to the Oklahoma Department of Transportation	Charles Bowen	2003
"The I-40 Bridge Emergency Response and Reconstruction Report", report to the Oklahoma Transportation Center	Charles Bowen	2003
"Improved Capacity Determination of Historic Steel Truss Bridges", with M.D. Engelhardt, *Proceedings, ISCE conference*	Charles Bowen	2001
A Basic Asphalt Recycling Manual. Asphalt Recycling and Reclaiming Association, Annapolis, Maryland.	Stephen A. Cross	2001
"Determination of Superpave Gyratory Compactor Design Compactive Effort for Cold In-Place Recycled Mixtures." *8th International Conference on Low Volume Roads*, *Transportation Research Record No. 1819, volume 2,* Transportation Research Board, National Research Council, Reno, Nevada.	Stephen A. Cross	2002
Mixing Procedures for Lime Modified Soil." *9th IAEG Conference*, International Association of Engineering Geologists, Durban, South Africa.	Stephen A. Cross	2002
"Determination of N_{design} for CIR Mixtures." *Beneficial Use of Recycled Materials in Transportation Applications,* Taylor Eighmy, Ed. Air & Waste Management Association, Pittsburgh, PA	Stephen A. Cross	2002
"Effects of Fine Aggregate Angularity on VMA and Rutting of Kansas HMA Mixtures." *Aggregate Contribution to Hot Mix Asphalt (HMA) Performance, ASTM STP 1412*, T. D. White, S. R. Johnson, and J. J. Yzenas, Eds., American Society for Testing and Materials, West Conshohocken, PA.	Stephen A. Cross	2001

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Name and Type of Scholarly, Artistic and/or Creative Work	Program Faculty	Year Completed (1999-2005)
"Thermogravimetric Analysis of Aggregates in Portland Cement Concrete." *Journal of Materials in Civil Engineering*, Vol. 11, No. 2, American Society of Civil Engineers, Racine Virginia.	Stephen A. Cross	1999
"Experimental Cold In-Place Recycling with Hydrated Lime." *Transportation Research Record No. 1684,* Transportation Research Board, National Research Council, Washington, D.C.	Stephen A. Cross	1999
Recycling Using Fly Ash and Slaked Lime Slurry." *MatCong5-5th Materials Engineering Congress*, ASCE Materials Engineering Division, American Society of Civil Engineers, Racine Virginia.	Stephen A. Cross	1999
Evaluation of Expenditures on Rural Interstate Pavements in Kansas." *Preprints*, 81st Annual Meeting of the Transportation Research Board, National Research Council, Washington, D.C. (CD-ROM)	Stephen A. Cross	2002
Effects of Sample Preconditioning on Asphalt Pavement Analyzer (APA) Wet Rut Depths." *Catalog of 2001 Practical Papers, Group 2, Design and Construction of Transportation Facilities*. Transportation Research Board, National Research Council, Washington, D.C. (Abstract Only).	Stephen A. Cross	2001
Effects of Sample Preconditioning on Asphalt Pavement Analyzer (APA) Wet Rut Depths." *Preprints*, 80th Annual Meeting of the Transportation Research Board, National Research Council, Washington, D.C. (CD-ROM)	Stephen A. Cross	2001
. "Evaluation of Field Mixing and Construction Procedures for Lime Modified Subgrades." *Preprints*, 80th Annual Meeting of the Transportation Research Board, National Research Council, Washington, D.C. (CD-ROM)	Stephen A. Cross	2001
. "Effects of Sample Preconditioning on Asphalt Pavement Analyzer Wet Rut Depths." *Proceedings, Iowa Mid-Continent Transportation Symposium*, Iowa State University, Ames, Iowa.	Stephen A. Cross	2000
. "Effect of Gradation on Performance of Asphalt Mixtures." *Preprints*, 78th Annual Meeting of the Transportation Research Board, National Research Council, Washington, D.C. (CR-ROM).	Stephen A. Cross	1999

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Record of Significant Scholarly, Artistic and/or Creative Work

Name and Type of Scholarly, Artistic and/or Creative Work	Program Faculty	Year Completed (1999-2005)
"Determination of Superpave Gyratory Compactor Design Compactive Effort for Cold In-Place Recycled Mixtures." *Eighth International Conference on Low-Volume Roads*, Transportation Research Board, Reno, Nevada.	Stephen A. Cross	2003
Evaluation of Expenditures on Rural Interstate Pavements in Kansas." *47th Annual National Asphalt Pavement Association Convention*, San Francisco, California.	Stephen A. Cross	2002
Cold In-Place Recycling on High Volume Roads; Viability & Experiences." *4th Annual Pavement Recycling Seminar*, Ontario Asphalt Recycling and Reclaiming Association, Toronto, Ontario, Canada.	Stephen A. Cross	2002
Determination of N_{design} for CIR Mixtures." *International Conference on Beneficial Use of Recycled Materials in Transportation Applications*, The Recycled Materials Resource Center, University of New Hampshire, Arlington, Virginia.	Stephen A. Cross	2001
Preliminary Findings Using the Superpave Gyratory Compactor for CIR Mixtures." *Annual Meeting*, The Asphalt Recycling and Reclaiming Association, San Diego, CA.	Stephen A. Cross	2001
Effects of Sample Preconditioning on Asphalt Pavement Analyzer (APA) Wet Rut Depths." *80th Annual Meeting of the Transportation Research Board*, National Research Council, Washington, D.C.	Stephen A. Cross	2001
Jann, H., Blaik, M., Emerson, R., Tomioka, M., Stein, L., and Moll, D., "Healing Characteristics of Deep Digital Flexor Tenorrhaphy Within the Digital Sheath of Horses," *Veterinary Surgery*, The American College of Veterinary Surgeons, 2003, Vol. 32, pp. 421-430.	Robert N. Emerson	2003
Emerson, R., Pollock, D., McLean, D., Fridley, K., Ross, R., and Pellerin, R., "Ultrasonic Inspection of Large Bridge Timbers," *Forest Products Journal*, Forest Products Society, September 2002, Vol. 52, No. 9, pp. 88-95.	Robert N. Emerson	2002
Emerson, R., Pollock, D., McLean, D., Fridley, K., Ross, R., and Pellerin, R., "Ultrasonic	Robert N. Emerson	2001

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Record of Significant Scholarly, Artistic and/or Creative Work

Name and Type of Scholarly, Artistic and/or Creative Work	Program Faculty	Year Completed (1999-2005)
Inspection of Glued-Laminated Timber Fabricated with Defects," *Transportation Research Record*, No. 1770, Design of Structures, 2001, pp. 155-165.		
Peterson, S.T., McLean, D.I., Symans, M.D., Pollock, D.G., Cofer, W.F., Emerson, R.N., and Fridley, K.J. "Application of Dynamic System Identification to Timber Beams - Part 1: Derivation of Technique and Analytical Verification." *ASCE Journal of Structural Engineering*, April, 2001, Vol. 127, Issue 4, pp. 418-425.	Robert N. Emerson	2001
Peterson, S.T., McLean, D.I., Symans, M.D., Pollock, D.G., Cofer, W.F., Emerson, R.N., and Fridley, K.J. "Application of Dynamic System Identification to Timber Beams - Part 2: Laboratory Evaluation." *ASCE Journal of Structural Engineering*, April, 2001, Vol. 127, Issue 4, pp. 426-432.	Robert N. Emerson	2001
Allocating Financial Responsibility under CERCLA: An Empirical Model. *Journal Environmental Systems* 27 (3) 163-189 (co-author)	William F. McTernan	2000
Application of Neutral Networks to Update and Modify a DOS based Environmenta System. *Journal of Environmental Systems* 28:157-174 (co-author)	William F. McTernan	2001
The Development and Application of a Multilevel Decision Analysis for Remediati Contaminated Groundwater Under Uncertainty. *Journal of Environmental Management* 64:221-235 (co-author)	William F. McTernan	2002
A Quantitative Risk Assessment with Attendant Uncertainty Estimations for Irrigated Farmland in Oklahoma. *Journal of Environmental Systems.* 29:2:125-150 (co-author)	William F. McTernan	2002
Lessons for Environmental Managers in Choosing and Applying Models for Groundwater Transport and Remediation: A Case Study. *Journal of Environmental Systems.*30:1:65-90 (co-author)	William F. McTernan	2004
Evaluation of Existing MODFLOW Model of CG037 with Accompanying Suggestions for Modifications. CDRL A013 for Assignment TIET 01-001. OC-ALC/TIET Technology and Engineering Project. EA 3.2.7. (co-author) Poster Sessions: Tinker, AFB, Oklahoma City, Oklahoma and Rose State College,	William F. McTernan	2001

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Record of Significant Scholarly, Artistic and/or Creative Work

Name and Type of Scholarly, Artistic and/or Creative Work	Program Faculty	Year Completed (1999-2005)
Midwest City, Oklahoma (co-author)		
Groundwater Modeling Results – A case study. Proceedings: Air and Waste Management Association. Baltimore, MD. (co-author)	William F. McTernan	2002
Using Artificial Neural Network Models to Determine Contaminant Sources. A Poster Session: Tinker, AFB, Oklahoma City, Oklahoma. (co-author)	William F. McTernan	2002
Delegate to The Universities Council on Water Resources	William F. McTernan	1999
Diplomat for American Academy of Environmental Engineers	William F. McTernan	1999-present
Use of Groundwater Models to Infer Fate and Transport of DNAPL Contaminants And to Support Plume Stability. Briefing Session. Tinker AFB, Midwest City, Oklahoma (co-author)	William F. McTernan	2004
Use of Sensor Technology for Accurate Determination of Groundwater Flow Parameters. Poster Session. Rose State College, Midwest City, Oklahoma (co-author)	William F. McTernan	2003
Name: *New Installations and Pipeline Rehabilitation* Type: Trenchless Technology Symposium	Garold D. Oberlender	2000
Name: *Project Management for Engineers* Type: Paper presented at Williams in Tulsa	Garold D. Oberlender	2002
Name: *Lab Manual for Construction Engineering* Type: Student's Manual for Undergraduate Course	Garold D. Oberlender	2003
Name: *Project Management for Well Control Events* Type: Paper presented at Total Corp in Houston	Garold D. Oberlender	2003
Name: *Laboratory Manual for Cost Estimating* Type: Lab Manual for Graduate Course	Garold D. Oberlender	2004
Name: *Project Team Communications* Type: Paper presented at PMI Symposium	Garold D. Oberlender	2004

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Record of Significant Scholarly, Artistic and/or Creative Work

Name and Type of Scholarly, Artistic and/or Creative Work	Program Faculty	Year Completed (1999-2005)
Name: *Project Management for Engineering and Construction, 2nd edition* Type: Textbook published by McGraw-Hill, Inc.	Garold D. Oberlender	2000
Name: *Predicting Accuracy of Early Cost Estimates Based on Quality* Type: Refereed technical paper published by ASCE Journal of Construction Engineering & Management	Garold D. Oberlender	2001
Name: *Estimating Construction Costs, 5th edition* Type: Textbook published by McGraw-Hill, Inc.	Garold D. Oberlender	2002
Name: *Predicting Accuracy of Early Estimates using Factor Analysis and Multivariate Regression* Type: Refereed technical paper published by ASCE Journal of Construction Engineering & Management	Garold D. Oberlender	2003
"Comparing Different Cements in High Performances Concrete", *ACI Materials Journal,* V.101, No.6, Nov-Dec, 2004, PP. 435-441 (co-author)	Bruce Russell	2004
"Heat Curing of High Performance Concrete Containing Type III Cement", *ACI Materials Journal,* V.100, No.6, Nov-Dec, 2003, pp 449-454 (co-author)	Bruce Russell	2003
"Introduction of HPC and the Production of HPC Bridge Girders at the Local Level", *3rd International Symposium on High Performance Concrete and PCI National Bridge Conference,* Orlando, FL (co-author)	Bruce Russell	2003
"Designing HPC for Today's Precast/Prestressed Bridge Beams", *3rd International Symposium on High Performance Concrete and PCI National Bridge Conference,* Orlando, FL (co-author)	Bruce Russell	2003
"An Assessment of the Rapid Chloride Ion Penetrability Test", *Concrete of Extreme Conditions, Proceeding of the International Conference,* Dundee, Scotland, (co-author)	Bruce Russell	2002
"Flexural Fatigue Behavior of Threaded Connections for Large Diameter Pipes", *Experimental Mechanics,* V.42, No.4, June, 2002, pp.1-7, (co-author)	Bruce Russell	2002

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Record of Significant Scholarly, Artistic and/or Creative Work

Name and Type of Scholarly, Artistic and/or Creative Work	Program Faculty	Year Completed (1999-2005)
"The Need for Air Entrainment in High Performance Concrete", *PCI/FHWA International Symposium on High Performance Concrete,* Orland, FL, (co-author)	Bruce Russell	2000
"Issues in Transferring High Performance Concrete Technology from the Laboratory to the Precast Concrete Plant", *PCI/FHWA International Symposium on High Performance Concrete,* Orlando FL, (co-author)	Bruce Russell	2000
"Effects of Horizontal Web Reinforcement on Shear Capacity, Shear Ductility and Strans Anchorage, *1999 Transportation Research Board,* CD-Rom Paper No 991065, (co-author)	Bruce Russell	1999
"Investigation of Very Early Portland Cement Concrete Suitable for Patching Regid Pavements", *1999 Transporation Research Board,* CD-Rom Paper No. 990934, (co-author)	Bruce Russell	1999
"interaction of Blast Furnace Slag and Class C Fly Ash with Type I Cements", *1999 Transportation Research Board,* CD-Rom Paper No 1990941, (co-author)	Bruce Russell	1999
"Biofiltration of Airstreams Contaminated with MTBE," with Harvinder Singh, John Veenstra. *Remediation*, 12 (4) 81-96 (2002).	Dee Ann Sanders	2002
"Treatment of Contaminated Groundwater Using Permeable Reactive Barriers," with Jami Striegel, John Veenstra. *Environmental Geosciences*, 8 (4) 258-265 (2001).	Dee Ann Sanders	2001
"Environmental Law." *Water Environment Research Annual Literature Review 2004*. Water Environment Federation.	Dee Ann Sanders	2004
Draft Deployment Plan for the 511 Traveler Information Program. With James Sluss, Joe Havlicek, and Shridar Radakrisnan.	Dee Ann Sanders	2005
"Environmental Law." *Water Environment Research Annual Literature Review 2003*. Water Environment Federation.	Dee Ann Sanders	2003
"Technology Transfer to the Domestic Petroleum Industry, Phase I," with George Collington. Presented at the *6th International Petroleum Environmental*	Dee Ann Sanders	1999

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Record of Significant Scholarly, Artistic and/or Creative Work

Name and Type of Scholarly, Artistic and/or Creative Work	Program Faculty	Year Completed (1999-2005)
Conference, November 16-18, 1999, Renaissance Hotel, Houston, Texas.		
"Pollution Prevention and Reuse of Alternatives for Crude Oil Tank Bottom Sludges," with John Veenstra. Presented at the *8th International Petroleum Environmental Conference*, November 6-9, 2001, Renaissance Hotel, Houston, Texas.	Dee Ann Sanders	2003
"Environmental Law." *Water Environment Research Annual Literature Review 1999*. Water Environment Federation.	Dee Ann Sanders	1999
"Technology Transfer to the Domestic Petroleum Industry, Phase II," with George Collington. Presented at the *7th International Petroleum Environmental Conference*. November 7-10, 2000, Albuquerque Hilton Hotel, Albuquerque, New Mexico.	Dee Ann Sanders	2000
"Environmental Law." *Water Environment Research Annual Literature Review 2000*. Water Environment Federation.	Dee Ann Sanders	2000
Environmental Assessment of Fuel Jettisoning. Final Report, OC-ALC/TIET Technology and Engineering Projects.	Dee Ann Sanders	2002
"Evaluation of Road Base Material Derived from Tank Bottom Sludges," with John Veenstra and Donald R. Snethen. Presented at the *7th International Petroleum Environmental Conference*. November 7-10, 2000, Albuquerque Hilton Hotel, Albuquerque, New Mexico.	Dee Ann Sanders	2000
"Environmental Law." *Water Environment Research Literature Review 2001*. Water Environment Federation.	Dee Ann Sanders	2001
"Evaluation of a Full-Scale Biological Denitrification System for the Treatment of Drinking Water," Published in the *Proceedings of the First Oklahoma Water Symposium*. 2003.	Dee Ann Sanders	2003
Modeling Natural Attenuation of Petroleum Hydrocarbon Contamination Using Alternate Electron Acceptors: Case Study Comparing BIOPLUME III and BIOSCREEN," with Candy R. Akins, Jami A. Striegel and John Veenstra.	Dee Ann Sanders	2000

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Record of Significant Scholarly, Artistic and/or Creative Work

Name and Type of Scholarly, Artistic and/or Creative Work	Program Faculty	Year Completed (1999-2005)
Remediation. 10, 4, Autumn 2000.		
"Environmental Law." *Water Environment Research Literature Review 2002*. Water Environment Federation.	Dee Ann Sanders	2002
"Removal of Air-Phase 1,2-dichloroethane in a Biofilter: A Comparison of Cometabolism Using Pre-Loaded Phenol and Concurrent Phenol Addition," with John Veenstra and Johan Johan. *Journal of Environmental Science and Health*. A34, 8, 1569-1589, 1999.	Dee Ann Sanders	1999
"Pollution Prevention Self-Assessment: A Sensible Approach for Small Businesses," with Doritha Ramey and John Veenstra. *Pollution Prevention Review*. 9, 3, 81-92, 1999.	Dee Ann Sanders	1999
"Impact of Chromium and Copper on Fixed-Film Biological Systems," with John Veenstra and Seyoung Ahn. *Journal of Environmental Engineering*, 125, 6, 522-531, 1999.	Dee Ann Sanders	1999
"Use of Tank Bottom Sludges as a Road Base Material: Investigation of the Concept," with John Veenstra. Presented at the *6th International Petroleum Environmental Conference*. November 16-18, 1999, Renaissance Hotel, Houston, Texas.	Dee Ann Sanders	1999
"Evaluation of Road Base Material Derived from Tank Bottom Sludges," with John Veenstra and Donald R. Snethen. Presented at the *7th International Petroleum Environmental Conference*. November 7-10, 2000, Albuquerque Hilton Hotel, Albuquerque, New Mexico.	Dee Ann Sanders	2000
"Frontiers of Groundwater Management," Am. Soc. Civil Engineers	Avdhesh K. Tyagi	2005
"OSU Research Determines Bridge Safety in Epic Disasters," Daily O' Collegian, Vol. 7, No. 130	Avdhesh K. Tyagi	1999
"Transport Modeling of Fractured Media Using Fuzzy Numbers," International Water Resources Engineering (with J. LaRue), ASCE	Avdhesh K. Tyagi	1999

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Name and Type of Scholarly, Artistic and/or Creative Work	Program Faculty	Year Completed (1999-2005)
"Fate/Transport Modeling of DNAPLs in an Aquifer System," International Water Resources Engineering (with S. Wakelam-Sayler), ASCE	Avdhesh K. Tyagi	1999
"Two-Dimensional Flow Modeling of I-35 on Cimarron River," International Water Resources Engineering (with M. Buechter), ASCE	Avdhesh K. Tyagi	1999
"Scour Modeling of Black Bear Creek Bridge on Cimarron Turnpike, Oklahoma," World Water and Environmental Resources Congress, ASCE	Avdhesh K. Tyagi	2001
"Two-Dimensional Hydraulic Modeling of Existing and Original Bridges at I-35 and Cimarron River," World Water and Environmental Congress (with G. Bruehl), ASCE	Avdhesh K. Tyagi	2001
"Fate/Transport Modeling of BTEX in Subsurface Environment," International Petroleum Environmental Consortium, Houston, Texas, (with S. Wakelam-Sayler) (CD)	Avdhesh K. Tyagi	2001
"Modeling of Water Quality in a Rural Water Distribution System," Environmental and Water Resources Systems Analysis Symposium, Am. Soc. Civil Engrs., (with T. Rowe) (CD).	Avdhesh K. Tyagi	2002
"Two-Dimensional Hydraulic and Scour Modeling of Existing and Original Bridges at I-35 and Cimarron River," International Water Resources Congress (with G. Bruehl), ASCE, (CD)	Avdhesh K. Tyagi	2003
"Oklahoma's Infrastructure Assessment Methodology," International Water Resources Congress (with R.W. Warden), ASCE, (CD)	Avdhesh K. Tyagi	2003
"A Methodology for Source Tracking of DNAPLs at Tinker AFB," Tinker AFB	Avdhesh K. Tyagi	2001
"Field Research on Culvert Scour," Indian Institute of Technology, Roorkee, India	Avdhesh K. Tyagi	2005
"Groundwater Management Issues of a Fractured Aquifer in Okalahoma," Am Institute Hydrology, (with P. Kumar)	Avdhesh K. Tyagi	2004
"Field research on Bridge Scour," Indian Institute of Technology, Roorkee, India	Avdhesh K. Tyagi	2004

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Record of Significant Scholarly, Artistic and/or Creative Work

Name and Type of Scholarly, Artistic and/or Creative Work	Program Faculty	Year Completed (1999-2005)
"WaterCad Modeling of Water Distribution System, City of Minco, Oklahoma," Oklahoma Infrastructure Consortium, School of Civil and Environmental Engineering, Oklahoma State University, Stillwater, Oklahoma, 70 pp, (with B. Schwarz).	Avdhesh K. Tyagi	2004
"Modeling of Population and Water Demand for Enid, Oklahoma," Oklahoma Infrastructure Consortium, School of Civil and Environmental Engineering, Oklahoma State University, Stillwater, Oklahoma, 73 pp., (with A. Finchum).	Avdhesh K. Tyagi	2003
"A Prioritizing Methodology for Scour-critical Culverts in Oklahoma," Oklahoma Transportation Center, 13 pp	Avdhesh K. Tyagi	2002
Oklahoma Society of Professional Engrs., President, Board of Directors, Board of Trustees	Avdhesh K. Tyagi	2005
Oklahoma Society of Professional Engrs., President Elect, Solicitations Committee, Education Committee, Annual Conference Committee, Board of Directors, Board of Trustees	Avdhesh K. Tyagi	2004
Oklahoma Society of Professional Engrs., Board of Directors, Board of Trustees, Vice President of Public Relations, Chair of Publications Committee	Avdhesh K. Tyagi	2003
Oklahoma Society of Professional Engrs., Board of Directors	Avdhesh K. Tyagi	2002
Oklahoma Society of Professional Engrs., Vice President of Programs & Operations, Chair of Publicity & Advertising Committee	Avdhesh K. Tyagi	2001
Oklahoma Society of Professional Engrs., Chair of Honors Awards Committee, Chair of Personnel Committee	Avdhesh K. Tyagi	2000
National Society of Professional Engrs., Honors Award Committee	Avdhesh K. Tyagi	2003
"A Comparison of WATER9 and TOXCHEM+ V 3.0 for Estimating an Industrial Pretreatment Plant's Emissions," with Freddie Hall. Presented at the *97th Annual Conference and Exhibition of the Air and Waste Management Association*, June 22-25, 2004, Indianapolis, Indiana.	John Veenstra	2004

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Record of Significant Scholarly, Artistic and/or Creative Work

Name and Type of Scholarly, Artistic and/or Creative Work	Program Faculty	Year Completed (1999-2005)
"Reduction of VOC Emissions from Paint-Booth Operations Using Dielectric Barrier Discharge," with Gregory D. Holland, Arland H. Johannes, Gary L. Foutch, and Freddie Hall. *Proceeding of the 30th Environmental and Energy Symposium & Exhibition*, April 5-7, 2004, San Diego, CA.	John Veenstra	2004
"Impact of Net Pen Aquaculture on Lake Water Quality," with S. Nolen, J. Carroll, and C. Ruiz. *Water Science and Technology*, 47 (12): 293-300 (2003).	John Veenstra	2003
"Field Inactivation of Oocysts Exposed to Agricultural Land," with P.J. Udeh and G. John. *Water, Air, and Soil Pollution*, 142: 211-228 (2003).	John Veenstra	2003
"Biofiltration of Airstreams Contaminated with MTBE," with Harvinder Singh, DeeAnn Sanders. *Remediation*, 12 (4) 81-96 (2002).	John Veenstra	2002
"Treatment of Contaminated Groundwater Using Permeable Reactive Barriers," with Jami Striegel, DeeAnn Sanders. *Envir. Geosciences*, 8 (4) 258-265 (2001).	John Veenstra	2001
"Remediation of Brine-Impacted Soil with a Leachate Collection System with Evaluation of Several Performance Enhancements," with Robert W. Warden. Presented at the *8th International Petroleum Environmental Conference*, November 6-9, 2001, Renaissance Hotel, Houston, Texas	John Veenstra	2001
"Pollution Prevention and Reuse of Alternatives for Crude Oil Tank Bottom Sludges," with DeeAnn Sanders. Presented at the *8th International Petroleum Environmental Conference*, November 6-9, 2001, Renaissance Hotel, Houston, Texas.	John Veenstra	2001
"An Overview of US and International Regulations Regarding Hydrocarbons in Water Effluents," with Kirby S. Mohr. Presented at the *7th International Petroleum Environmental Conference.* November 7-10, 2000, Albuquerque Hilton Hotel, Albuquerque, New Mexico.	John Veenstra	2000
"Remediation of Oilfield Brine Scars with Subsurface Drainage and a Solar Evaporation Pond," with Thomas M. Harris and Dorathy Perumallapalli, University of Tulsa, Joseph L. Jones, Nader Y. Sherif and Sarah J. Painter. Presented at the *7th International Petroleum Environmental Conference.*	John Veenstra	2000

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Record of Significant Scholarly, Artistic and/or Creative Work

Name and Type of Scholarly, Artistic and/or Creative Work	Program Faculty	Year Completed (1999-2005)
November 7-10, 2000, Albuquerque Hilton Hotel, Albuquerque, New Mexico.		
"Evaluation of Road Base Material Derived from Tank Bottom Sludges," with DeeAnn Sanders and Donald R. Snethen. Presented at the *7th International Petroleum Environmental Conference.* November 7-10, 2000, Albuquerque Hilton Hotel, Albuquerque, New Mexico.	John Veenstra	2000
"Modeling Natural Attenuation of Petroleum Hydrocarbon Contamination Using Alternate Electron Acceptors: Case Study Comparing BIOPLUME III and BIOSCREEN," with Candy R. Akins, Jami A. Striegel and DeeAnn Sanders. *Remediation.* Volume 10, No. 4, Autumn 2000.	John Veenstra	2000
"Quantitative Polymerase Chain Reaction (QPCR) using MIMIC Approach to Estimate *Cryptosporidium parvum* oocytes in Municipal Water Treatment Sludge Samples," with Patrick Udeh and Gilbert John. *Molecular and Cellular Probes.*Volume 14, p 121-126, 2000.	John Veenstra	2000
"Development of a Biological Permeable Barrier to Remove 2,4,6-Trichlorophenol from Groundwater using Immobilized Cells," with Fatemeh Razavi-Shirazi. *Water Environment Research.* Volume 72, No.4,p 460, July/Aug 2000.	John Veenstra	2000
"Use of Tank Bottom Sludges as a Road Base Material: Investigation of the Concept," with DeeAnn Sanders. Presented at the *6th International Petroleum Environmental Conference.* November 16-18, 1999, Renaissance Hotel, Houston, Texas.	John Veenstra	1999
"Use of Silent Glow Discharge to Control Off Gas Pollutants," with Arland H. Johannes and Gregory D. Holland. Presented at the *6th International Petroleum Environmental Conference.* November 16-18, 1999, Renaissance Hotel, Houston, Texas.	John Veenstra	1999
"Upgrading a Refinery 'Once-Through' Cooling Water System for Pollution Prevention," with Kirby Mohr and Michael Foley. Presented at the *6th International Petroleum Environmental Conference.* November 16-18, 1999,	John Veenstra	1999

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Record of Significant Scholarly, Artistic and/or Creative Work

Name and Type of Scholarly, Artistic and/or Creative Work	Program Faculty	Year Completed (1999-2005)
Renaissance Hotel, Houston, Texas.		
"Evaluation of GAC-Immobilized Cells as a Biological Permeable Barrier Media to Treat Contaminated Groundwater" with Fatemeh Razavi-Shirazi. Presented a WEFTEC'99. October 9-13, 1999. New Orleans, Louisiana.	John Veenstra	1999
"Development of a Biological Permeable Barrier to Treat Contaminated Ground Water Using PVA-Immobilized Cells" with Fatemeh Razavi-Shirazi. Presented at 31st Mid-Atlantic Industrial and Hazardous Waste Conference, June 20-23, 1999, University of Connecticut, Storrs, Connecticut.	John Veenstra	1999
"Removal of Air-Phase 1,2-dichloroethane in a Biofilter: A Comparison of Cometabolism Using Pre-Loaded Phenol and Concurrent Phenol Addition," with DeeAnn Sanders and Johan Johan. *Journal of Environmental Science and Health.* Volume A34, No.8, p1569-1589, 1999.	John Veenstra	1999
"Pollution Prevention Self-Asseessment: A Sensible Approach for Small Businesses," with Doritha Ramey and DeeAnn Saunders. *Pollution Prevention Review*. Volume 9, No. 3, p81-92, 1999.	John Veenstra	1999
"Impact of Chromium and Copper on Fixed-Film Biological Systems," with DeeAnn Sanders and Seyoung Ahn. *Journal of Environmental Engineering*, Volume 125, No. 6, p522-531, 1999.	John Veenstra	1999
"Assessing General Education with Institutional Portfolios: Successes and Challenges", P. Lumpkin and G. G. Wilber, proceedings publication and presentation, Annual Meeting of the Higher Learning Commission, April 10, 2005	Gregory G. Wilber	2005
"Assessing and Improving Students' Critical Thinking Skills", OSU campus workshop, presented by G.G. Wilber, and J. Hattey, February 10, 2005	Gregory G. Wilber	2005
Meyers, S.K., S. Deng, N.T. Basta, W.W. Clarkson, and G.G. Wilber, "Acetonitrile Extractable and Water Leachable 2,4,6-Trinitrotoluene (TNT), Hexahydro-1,3,5-Trinitro-1,3,5-Triazine (RDX), and Octahydrol-1,3,5,7-Tetranitro-1,3,5,7-Tetrazocine (HMX) in Soil and Their Impact on Microbial Community", accepted for publication, *Water, Air and Soil Pollution*, 2004 (peer-reviewed publication).	Gregory G. Wilber	2004

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Name and Type of Scholarly, Artistic and/or Creative Work	Program Faculty	Year Completed (1999-2005)
"Developing and Assessing Critical Thinking", OSU campus workshop presented byJ. Hattey and G. Wilber, September 30, 2004	Gregory G. Wilber	2004
"Improved Sludge Dewatering at the Tinker Air Force Base Industrial Wastewater Treatment Plant", G. G. Wilber, J. N. Veenstra, A. Pise, K. Parveen, J. Panchal, final project report to CH2M-Hill	Gregory G. Wilber	2003
"Industrial Wastewater Treatment Plant Hydraulic Loading: Part 2 - Temperature Effects on the Coagulation Process", G. G. Wilber, J. Panchal, S. Mani, S. Selvanathan, final project report to CH2M-Hill	Gregory G. Wilber	2002
"Metals Treatment Optimization at the Industrial Wastewater Treatment Plant at Tinker AFB" , J. N. Veenstra, G. G. Wilber, D.A. Sanders, M. Krondak, M. Nagaiah, S. Subramanian, final project report to CH2M-Hill	Gregory G. Wilber	2001
Wilber, G. G., J. Li and W. W. Clarkson, "Factors Affecting the Biotransformation of TNT", *Proceedings, ASCE-CSCE Conference on Environmental Engineering*, Norfolk, VA, July 2000.	Gregory G. Wilber	2000
Clarkson, W. W., G. G. Wilber, W. C. Light, R. D. Hort, "Biodegradation of Explosives from Contaminated Soil", *Proceedings, National Conference on Remediation Science and Technology*, Greensboro, NC, September 1999.	Gregory G. Wilber	1999