Five Year Plan

September 1, 2007 – August 31, 2012

July 2008

Texas A&M University
Harold Vance Department of
Petroleum Engineering

Summary of the Five-Year Plan

This Five-Year Plan documents the current state of the Harold Vance Department of Petroleum Engineering and our operational plans for the next five years. We have identified our current successes, projects, and action plans for continuing our reputation as one of the world's leading petroleum engineering academic programs.

Successes

We are pleased to count the following among our successes:

- We have continued to foster our outstanding reputation in the global oil and gas community for turning out quality graduates and technical information;
- We had a positive review from ABET in 2004 for our undergraduate degree – program reviewed every six years;
- We had a positive review of the PhD program in 2006 by an outside committee;
- We have strong enrollment at both the undergraduate and graduate levels with continued emphasis and improvements on the quality of our students;
- We are operating our Texas A&M University Qatar campus, with seven faculty and 68 students for the Spring 2008 semester;
- We have developed and are operating a model distance learning degree program for graduate degrees;
- We have focused research activity in the Crisman Institute for Petroleum Research with the support of 14 oil and gas member companies;
- We have added 10 new faculty members in College Station and 7 in Qatar with plans to add 5 more in Qatar in the next two years; and
- We have increased our endowments to over $32 million with a plan to reach $50 million in total endowments in two years.

Activities

We are working on the following projects to improve our ability to provide the best academic programs in petroleum engineering:

- We are improving our recruiting and admissions of graduate students to increase the quality of our graduate program. We are increasing the percentages of PhD students in our program to improve the quality of our research;
- We continue interviewing faculty candidates for new positions in Qatar and replacement positions in College Station;
- We continue improving our computer capabilities by installing modern servers, participating in the cost of super computing, replacing classroom computers and hiring additional support staff;
- We continue recruiting new member companies to the Crisman Institute, then working with these companies to generate industry-directed research projects; and
- We continue working with companies to assure there will be ample job offers for our graduates.

Five-Year Forecasts

The following three tables present the forecasts for the next five years concerning the number of students, the number of faculty, and the expense budget, respectively.

	College Station Campus								Qatar	Qatar	Total
FY	Fish	Soph	Junior	Senior	Total UG	Master	PhD	Total Grad	Under grads	Grads	CS Qatar
2006	144	75	69	50	338	141	50	191	29	0	558
2007	209	100	70	76	455	157	55	212	52	0	719
2008	226	122	108	65	521	179	69	248	84	5	858
2009	210	150	125	90	575	180	70	250	105	10	930
2010	210	150	125	115	600	180	70	250	120	10	980
2011	210	150	125	115	600	180	70	250	125	15	990
2012	210	150	125	115	600	180	70	250	125	15	990

FY	Tenured or Tenure Track	Visiting Professor	Adjunct	Lecturer	Research and Post-Doc	Qatar	Total
2005	19	4	1	3	5	0	32
2006	19	4	1	3	5	1	33
2007	20	2	1	4	5	6	38
2008	21	2	3	4	6	8	44
2009	23	2	1	5	6	12	49
2010	23	2	1	5	6	12	49
2011	23	2	1	5	6	12	49
2012	23	2	1	5	6	12	49

Financial Support

Acknowledging that our success depends on our ability to plan for future growth, we have identified the following areas that need financial support:

- We need adequate research project funding, largely under the umbrella of the Crisman Institute, to support our growth of graduate students and research activities;
- Increased endowment funding to support administrative, operational, and academic programs, including greater funding for our Nelson Scholars program and additional graduate fellowships;
- Additional support for the Whiting Technology Fund; and
- Increased endowment funding to provide every tenured and tenured track faculty with a named endowed position.

Table of Contents

List of Figures

List of Tables

Introduction

The Harold Vance Department of Petroleum Engineering is one of the largest departments of Petroleum Engineering in the United States. For many years, we have also been known as one of the best—if not the best—department of Petroleum Engineering in the world, both at the undergraduate and the graduate level. Since 2003, we have extended our reach to the Texas A&M University branch campus in Qatar, TAMUQ.

Our quality was confirmed in 2004 when our program was accredited by the Accreditation Board for Engineering and Technology (ABET). We also received an extremely positive review of our PhD program in 2006. The PhD program was reviewed by a panel comprised of Professors from peer institutions.

We have a reputation within industry for producing practical engineers with excellent problem-solving ability, grounded well in science, engineering, business and communications fundamentals, and able to "hit the ground running." Compared with peer institutions, our graduates are viewed as practical, but still able to use fundamentals and critical thinking to solve the numerous, difficult problems facing the upstream oil and gas global industry.

Vision

Our graduates are our most important product. Our vision is

> **...that the statement "I am an Aggie Petroleum Engineer" is considered to be the most respected, prestigious self-definition within the global petroleum engineering profession.**

Mission

We see our mission, then, as being able:

> **...to create, preserve, integrate, transfer and apply petroleum engineering knowledge; and**
>
> **...to enhance the human capability of its practitioners through quality education and outreach programs.**

This 5-Year Plan documents the operations during our recent past, the current status, and the projections for the next five years for the Harold Vance Department of Petroleum Engineering at Texas A&M University. We intend to update this report periodically to plan for and manage activities by the students, faculty, staff, and friends of the department to ensure the long-term success of the department.

1 Students

Our enrollment at both the undergraduate and graduate student levels places us as one of the largest petroleum engineering program in the United States in 2007 – 2008 (FY2008). We expect to see continued growth over the next 5 years, as shown in **Table 1.**

Table 1–Projection of student populations in College Station and Qatar

	College Station Campus								Qatar	Qatar	Total
FY	Fish	Soph	Junior	Senior	Total UG	Master	PhD	Total Grad	Under grads	Grads	CS Qatar
2006	144	75	69	50	338	141	50	191	29	0	558
2007	209	100	70	76	455	157	55	212	52	0	719
2008	226	122	108	65	521	179	69	248	84	5	858
2009	210	150	125	90	575	180	70	250	105	10	930
2010	210	150	125	115	600	180	70	250	120	10	980
2011	210	150	125	115	600	180	70	250	125	15	990
2012	210	150	125	115	600	180	70	250	125	15	990

We will increase the number of PhD students and post-doctoral personnel to improve the quality of the research program. We want to keep our Masters of Science (MS) program at about 100 at the College Station campus. The increase in the number of students in the Masters program will be a result of the growth in our distance learning program. We also expect to begin a graduate program in Qatar in FY 2009.

1.1 Undergraduate Students

During the Fall 2006 (FY2007) semester, we had a total of 455 undergraduate students on the College Station campus. The number was up from the 338 undergraduates in the Fall 2005 (FY2006) semester. In the Fall 2007 (FY2008) semester, we had 521 undergraduates in College Station and 68 in Qatar, for a total of 589 undergraduate students. **Table 2** gives the most recent undergraduate enrollment figures.

Table 2–Recent Undergraduate Enrollment

Classification	Fall 2006 College Station	Fall 2007 College Station	Fall 2006 Qatar	Fall 2007 Qatar
Seniors	76	65	0	13
Juniors	70	108	15	28
Sophomores	100	122	25	15
Freshmen	209	226	12	28
Totals	455	521	52	84

A list of the number of students and degrees we have conferred since 1930 is included in the Appendix. As you can see, we have conferred 4050 BS degrees in Petroleum Engineering since our first class of 1931.

Figs. 1-4 illustrate the numbers of students and the number of degrees we have issued in the department.

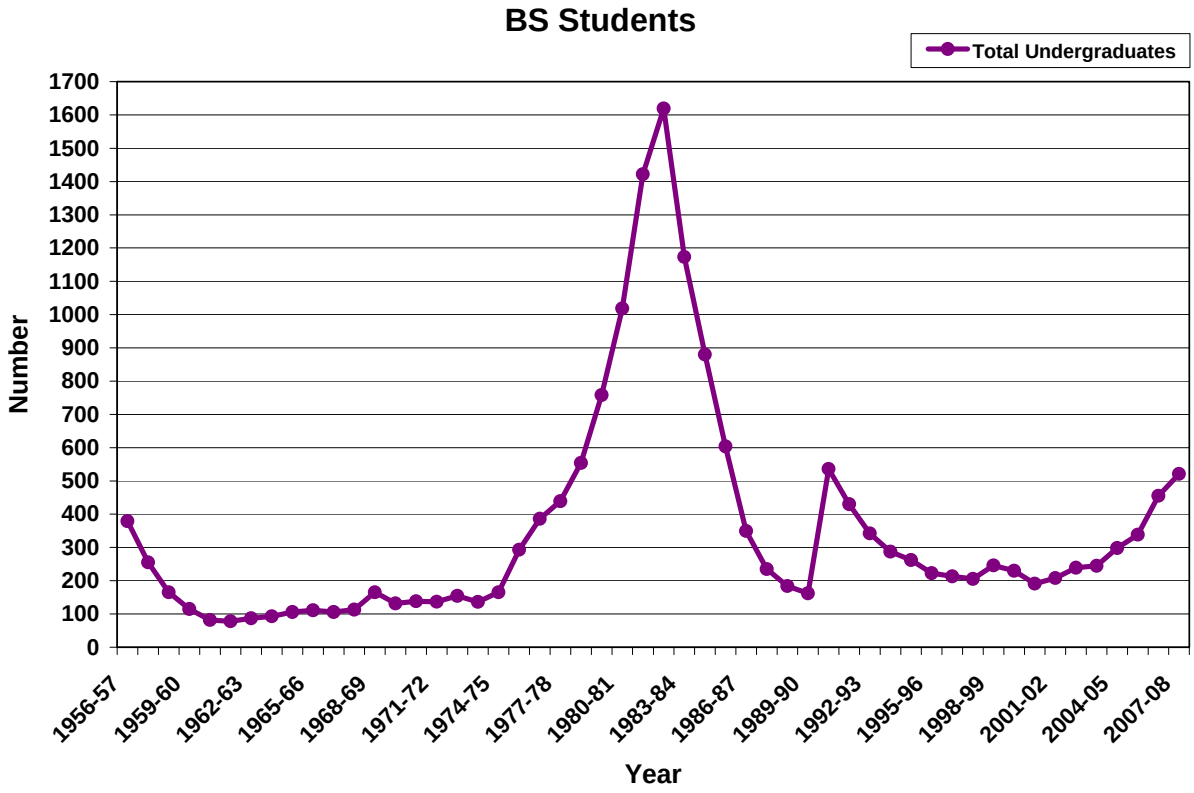

Fig. 1–BS Students Enrolled 1956-2008

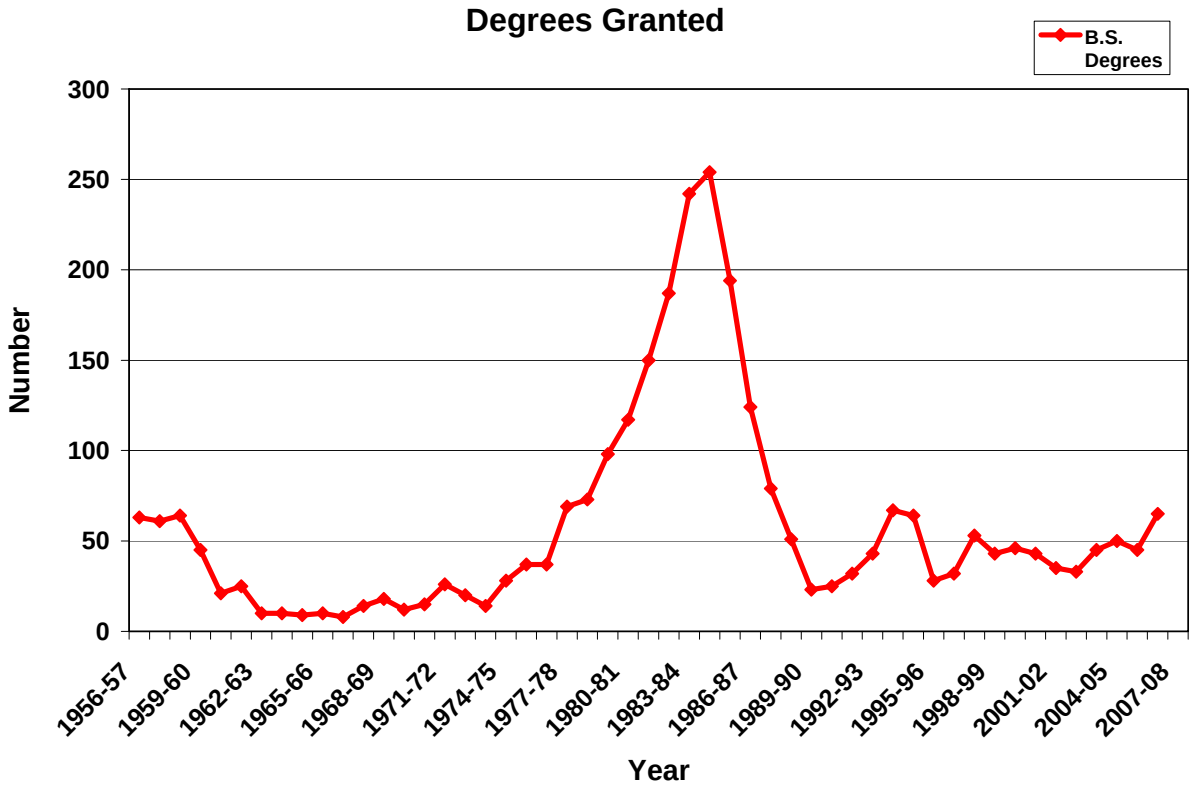

Fig. 2–BS Degrees Graduated 1956-2008

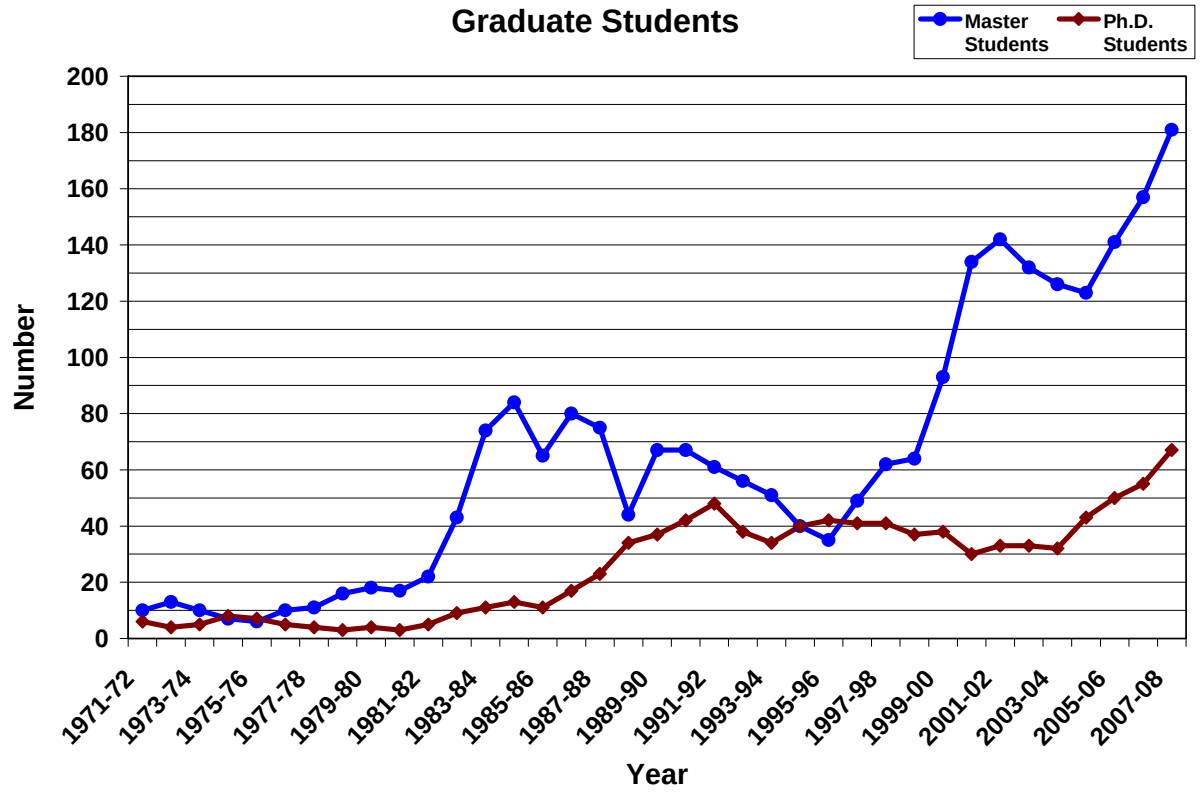

Fig. 3–Graduate Students Enrolled 1971-2007

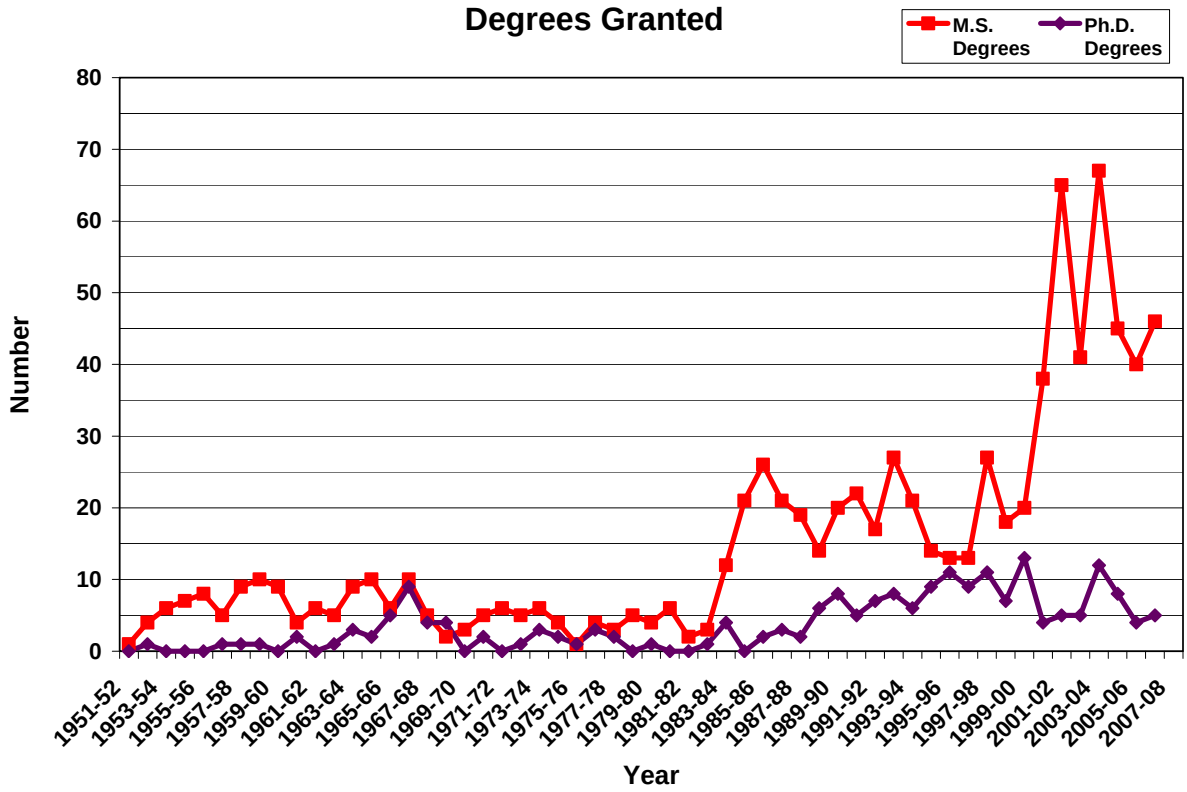

Fig. 4–Graduate Student Degrees

The most recent trends in our undergraduate enrollment are shown in **Table 3.** Enrollment since 1997-1998 (FY1998) has varied from the 521 undergraduates in College Station in Fall 2007 to a low of 191 in FY2001. The numbers in Table 3 from FY 1998 to FY 2005 are yearly averages while the numbers in Table 2 are for specific semesters. The number of BS degrees awarded has varied from a low of 33 in FY2003 to a high of 53 in 1997-1998 (FY1998). We will have about 75 BS graduates in FY2008.

Table 3–Recent Trends in Undergraduate Enrollment and BS Degrees from the College Station Campus

Year	Enrollment	BS Degrees
FY1998	205	53
FY1999	246	43
FY2000	230	46
FY2001	191	43
FY2002	208	35
FY2003	239	33
FY2004	245	45
FY2005	311	50
FY2006	338	45
FY2007	455	64
FY2008	521	--
	Total	**393**

We expect undergraduate enrollment to increase in the next five years as shown in Table 1 and in **Figs. 5 and 6.** We have 84 undergraduate students in Qatar now, and this number will grow until we have around 125 undergraduate students by FY 2012.

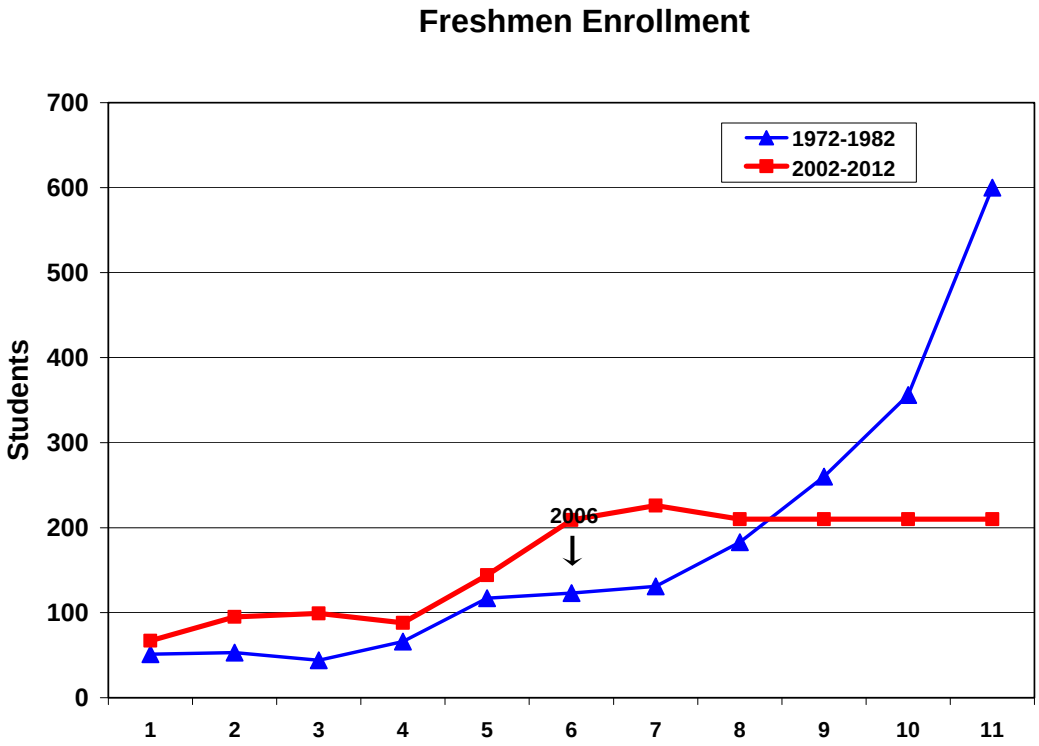

Figure 5 – Expected Freshmen Enrollment in College Station Now Compared to the Late 1970's

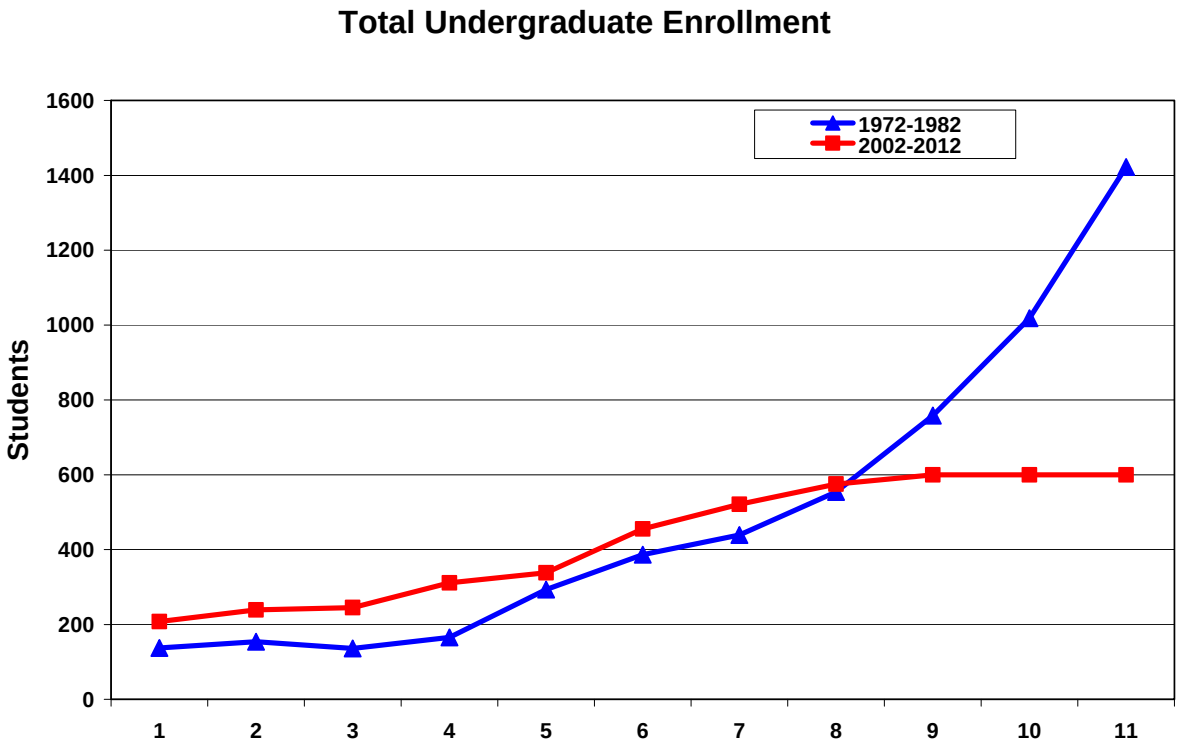

Figure 6 – Expected Undergraduate Enrollment in College Station Now Compared to the Late 1970's

In **Figs. 5 and 6**, we have superimposed the growth rate in freshmen enrollment and total undergraduate enrollment in College Station, respectively in this 5 year plan compared to the growth pattern in 1972 to 1982. We grew rapidly in the 1970's, which led to real problems with our graduates finding employment. We do not want to repeat the behavior that led to the problems of the 1980's. As such, we plan to allow an increase in the number of students in our department to help supply the graduate engineers the industry demands, but we will manage our growth and output better than what was done in the 1970's and 1980's.

If the undergraduate program grows faster than anticipated in Table 1 and in Fig. 5, then the department will have to decide how to handle the growth. In the late 1970's and early 1980's, we taught multiple, small sections of our undergraduate courses. During the peak, we had over 200 seniors and we taught 6 sections of each course with about 30-40 students in each section. We had as many as three professors teaching each course. Even though we used the same class notes, none of the professors really taught the course in the same manner. In fact, the quality of the instruction varied immensely depending on the professor delivering the lecture. One thought is to have larger sections with the best professor in the subject giving his or her best lecture to all the students at once. We can then break into smaller groups for problem solving sessions.

Also, during the growth periods of 1972 – 1982,

- we had few graduate students so the faculty had very few graduate courses to teach and very few graduate students to supervise,
- we did not have any large classrooms, so we had to use small sections, and
- the university did not put as much emphasis on research and publications as a necessary condition for promotion and tenure as they do now.

Today, our faculty cannot teach multiple, small sections of undergraduate courses. We currently have over 248 graduate students. This large number of graduate students requires substantial faculty time to properly fund and supervise. Teaching graduate courses for over 248 graduate students, in addition to conducting and supervising research correctly, requires a substantial time commitment from our tenured faculty. In Vision 2020, Texas A&M University has taken steps to become a top-10 public university by the year 2020. To do our part, our professors must increase research funding, do more research, and publish more papers. They cannot teach more than 2 or 3 courses per year, especially if they are also required to conduct research, supervise graduate students, and publish. These priorities limit the number of courses per year that each professor can teach and still maintain the productivity required in the research arena.

Between now and FY 2012, we expect the number of undergraduates to increase as shown in **Table 4.**

Table 4–Expected Undergraduate Enrollment at the College Station and Qatar Campuses

	College Station					Qatar	
FY	Freshmen	Sophomore	Junior	Senior	Total in C.S.	Under grads	Both Locations
2007	209	100	70	76	455	52	507
2008	226	122	108	65	521	84	605
2009	210	150	125	90	575	105	680
2010	210	150	125	115	600	120	720
2011	210	150	125	115	600	125	725
2012	210	150	125	115	600	125	725

	Qatar					C.S.	
FY	Freshmen	Sophomore	Junior	Senior	Total Qatar	Under grads	Both Locations
2007	12	25	15	0	52	455	507
2008	28	15	28	13	84	521	605
2009	30	25	25	25	105	575	680
2010	40	30	25	25	120	600	720
2011	40	30	30	25	125	600	725
2012	40	30	30	25	125	600	725

1.2 Graduate Students

From the 1930s through the 1970s, virtually all students in the department were undergraduates who received BS degrees. As can be seen in the Appendix, the graduate enrollment increased substantially in the 1980s, especially after the oil price decline led to a job market collapse in the mid-1980s. Since the late 1990s, we have once again experienced a large increase in the number of graduate students. This increase in the number of graduate students has necessitated an increase in research funding by our faculty to provide even minimal support for the graduate students. **Table 5 and Fig. 3** illustrate the most recent trends in our graduate student population, and **Table 6 and Fig. 4** show trends in graduate degrees awarded.

Table 5–Recent Trends in Graduate Enrollment

Year	Master	PhD	Total
FY1998	62	41	103
FY1999	64	37	101
FY2000	93	38	131
FY2001	134	30	164
FY2002	142	33	175
FY2003	132	33	165
FY2004	126	32	158
FY2005	143	43	186
FY2006	141	50	191
FY2007	157	55	212
FY2008	179	69	248

Table 6–Recent Trends in Graduate Degrees

Year	Master	PhD	Total
1997-1998	27	11	38
1998-1999	18	7	25
1999-2000	20	13	33
2000-2001	38	4	42
2001-2002	65	5	70
2002-2003	41	5	46
2003-2004	67	12	79
2004-2005	45	8	53
2005-2006	40	4	44
2006-2007	62	17	79
2007-2008	39	9	48
Total	**462**	**95**	**557**
Total Undergraduate			**511**

As shown in Table 6, we have graduated more students with a graduate degree (557) than an undergraduate degree (511) for the 10-year time period FY1998 – FY2007.

We expect our graduate program will continue to grow, mainly through increased demand for distance learning and increased funding for research in our department. The number of graduate students we can properly supervise is controlled by the size of the faculty and the number of post-doctoral students we can afford to hire, which in turn is controlled by the size of our research budget. Currently, about 25 of our faculty members are doing research. Each

professor can supervise the research of only about 6 students on the average. Thus, we can supervise around 150 students at any time. However, we always have 20 to 30 new students who are taking classes and not prepared to start their research, so they do not require much time from the professors outside of the classroom teaching hours. Virtually all of the increase we expect in our graduate program will be in the distance learning program. These DL students require very little supervision until they near the end of their coursework and approach graduation.

As our research funding grows, we can increase the number of graduate students in our department by using post-doctoral students to help supervise some of the research. Thus, it may be possible to increase the number of graduate students in the future if our research faculty and research funding continue to grow, and we can find qualified post-doctoral candidates.

During the next 5 years, we will continue to upgrade the quality of our graduate students. We will do this by marketing our department; recruiting high-quality undergraduate students, especially in the United States; and implementing a new, more structured graduate admissions system. We now, once again, require a doctoral qualifying exam that is administered in a manner to truly allow the faculty to determine if a student is qualified and prepared to do the independent research required for a PhD.

We have a growing and successful Master of Engineering (ME) program delivered by Distance Learning (DL). We currently offer around 12-15 courses per year over the Internet. The ME degree by DL requires a minimum of 36 hours—or about 12 courses—plus an engineering report which students must submit in writing and present orally.

Most DL students take around 3 courses per year because they simultaneously hold full-time engineering positions. The entire course content is delivered over the Internet, so anyone can be a DL student as long as they have access to the Internet. All DL students must be accepted for admission to graduate school at Texas A&M University as would any of our on-campus students. **Table 7** shows the number of DL students we have had since the program began in 1999.

Table 7–Enrollment History in the Master of Engineering Distance Learning Program

Year	Number of Students
FY2000	10
FY2001	22
FY2002	17
FY2003	17
FY2004	32
FY2005	30
FY2006	37
FY2007	63
FY2008	70

Table 8 shows our projected enrollment in the graduate program through 2012. We expect our graduate enrollment to increase mainly through an increase in DL students and by increasing our research funding that will allow us to hire more post-doctoral personnel.

Table 8–Expected Enrollment in the Graduate Program

	Master on campus	PhD on campus	Total on campus	DL	Total
2005	113	43	156	30	186
2006	104	50	154	37	191
2007	118	67	185	63	248
2008	115	65	180	72	252
2009	115	65	180	76	256
2010	115	70	185	80	265
2011	115	70	185	84	269
2012	115	70	185	84	269

2 Faculty

Our current number of faculty is adequate to handle our needs of the current (FY2008) academic year. However, increasing enrollments in College Station and Qatar and increasing research programs will all contribute to our need to grow the faculty size.

3.1 Current Faculty

We currently have 44 faculty members who are teaching or doing research or both. **Table 9** illustrates the distribution of our faculty in terms of their classification.

Table 9–FY 2007 Faculty Distribution by Classification in Petroleum Engineering

Tenured or Tenured Track Professors	22
Visiting Professors	2
Qatar	7
Adjunct Professor	3
Lecturers	5
Research Only	6
Total	**44**

At the beginning of FY2008, we had 22 tenured or tenured track professors on our faculty in College Station. Five of our faculty are currently at 50% and we have three adjunct faculty who lecture several times per semester. As our research portfolio increases, we will be hiring more post doctoral personnel.

Below is a table listing all current faculty persons.

Campus	Name	Title	Category
College Station	Barrufet, Maria	Professor	Reservoir Engineering
College Station	Blasingame, Tom	Professor	Reservoir Engineering
College Station	Datta-Gupta, Akhil	Professor	Reservoir Engineering
College Station	Ehlig-Economides, Christine	Professor	Economics and Evaluation
College Station	Hill, Dan	Professor	Production
College Station	Holditch, Steve	Professor	Production
College Station	Juvkam-Wold, Hans	Professor (50 %)	Drilling
College Station	Lee, John	Professor	Economics and Evaluation
College Station	Lane, Robert	Professor	Production
College Station	Mamora, Daulat	Professor	Reservoir Engineering
College Station	Nasr-El-Din, Hisham	Professor	Reservoir Engineering
College Station	Valkó, Peter	Professor	Production
College Station	Wattenbarger, Bob	Professor (50%)	Reservoir Engineering
College Station	Ahr, Wayne	Professor (Geology)	Geology
College Station	Ghassemi, Ahmad	Associate Professor	Rock Mechanics
College Station	McVay, Duane	Associate Professor	Reservoir Engineering
College Station	Schechter, David	Associate Professor	Production
College Station	Falcone, Gioia	Assistant Professor	Production
College Station	Jafarpour, Behnam	Assistant Professor	Reservoir Engineering
College Station	Schubert, Jerome	Assistant Professor	Drilling
College Station	Teodoriu, Catalin	Assistant Professor	Drilling
College Station	Zhu, Ding	Assistant Professor	Production
College Station	Ayers, Walt	Visiting Professor	Economics and Evaluation
College Station	McCain, Bill	Visiting Professor (50%)	Reservoir Engineering
College Station	Maggard, Bryan	Senior Lecturer	Reservoir Engineering
College Station	Piper, Larry	Senior Lecturer (50%)	General Courses
College Station	Voneiff, George	Senior Lecturer (50%)	Economics and Evaluation
College Station	Yan, Lilai	Lecturer	General Courses
College Station	Weatherford, Darla-Jean	Lecturer	Technical Writing
College Station	Cobb, Bill	Adjunct Professor	Economics and Evaluation
College Station	Burnett, David	Research Associate	Production - GPRI
College Station	Zhang, Zhennan	Postdoctoral Research	Rock Mechanics
College Station	Zhou, Xiaoxian	Postdoctoral Research	Rock Mechanics
Qatar	Hoskins, Earl	Professor	Geology
Qatar	Amani, Mahmood	Visiting Associate Professor	Drilling
Qatar	Gupta, Anuj	Visiting Associate Professor	Production
Qatar	Hosein, Raffie	Visiting Associate Professor	Reservoir Engineering
Qatar	Shedid, Shedid	Visiting Associate Professor	Production
Qatar	Fahes, Mashhad	Visiting Assistant Professor	Reservoir Engineering
Qatar	Nasrabadi, Hadi	Visiting Assistant Professor	Reservoir Engineering
Qatar	Platt, Frank	Lecturer	Production

In general, we teach courses in four core areas: Drilling, Production, Reservoir, and Economics & Evaluation. We also teach introductory courses in Petroleum Engineering, basic engineering science courses, and technical writing. In the table above, the faculty members are listed under their primary specialization, although some do teach courses under more than one category.

The former President of Texas A&M University, Dr. Robert M. Gates, initiated a tuition reinvestment program to hire more that 400 new faculty at Texas A&M University. The College of Engineering received over 100 new positions and the Department of Petroleum Engineering received 7 new positions. We have hired seven professors as part of the reinvestment program.

We have one replacement faculty position open in College Station for FY 2008 and we still need to hire four more new faculty for Qatar. An estimate of the faculty needs for both campuses is shown in **Table 10.**

Table 10–Projections of faculty needs in College Station and Qatar

FY	Tenured or Tenure Track	Visiting Professor	Adjunct	Lecturer	Research and Post-Doc	Qatar	Total
2006	19	4	1	3	5	1	33
2007	20	2	1	4	5	6	38
2008	22	2	3	5	3	9	44
2009	23	2	1	4	6	12	48
2010	23	2	1	4	6	12	48
2011	23	2	1	4	6	12	48
2012	23	2	1	4	6	12	48

In 2004, we hired 4 new faculty members: Stephen Holditch, Dan Hill, Christine Ehlig-Economides and Ding Zhu. Two of the four were hired under the tuition reinvestment plan. Two were hired as replacements for Jim Russell and Ron Robinson.

In 2006, we hired 6 new faculty members: Gioia Falcone, Catalin Teodoriu, Raffie Hosein, Earl Hoskins, Hadi Nasrabadi, and Mashhad Fahes. Four of the six were hired to teach in Qatar. We also promoted Frank Platt to Lecturer and he is now in Qatar for two years teaching and working to set up the laboratories.

In FY2007 and FY2008, we hired six new faculty members: Ahmad Ghassemi, Behnam Jafarpour, Robert Lane, Hisham Nasr-El-Din, Shedid Shedid, and Anuj Gupta. Two of these six were hired to teach in Qatar.

The Integrated Ocean Drilling Program (IODP) is a research endeavor funded in part by the National Science Foundation and managed by Texas A&M University. To win the project, Texas A&M University committed to funding several faculty positions to tie the IODP more closely with the academic activities in the university. One commitment was to fund a faculty position in the Department of Petroleum Engineering. Catalin Teodoriu was hired to fill this position, and he will conduct some of his research to complement the mission of IODP.

To get the IODP faculty position, the College of Engineering was required to fund a matching faculty position. The Dean committed funds for this matching position. Gioia Falcone was hired to fill this position. A portion of Dr. Falcone's research will also be compatible with the mission of IODP.

3.2 Qatar Campus

We currently have 84 students in Qatar. They have been taking their freshmen and sophomore courses in math, physics, chemistry, English, history, and political science, and junior courses in petroleum engineering. Three faculty members transferred from the College Station campus to teach in Qatar - Dr. Mahmood Amani, Dr. Earl Hoskins, and Frank Platt. Five faculty members were hired to teach in Qatar - Dr. Raffie Hosein, Dr. Hadi Nasrabadi, Dr. Mashhad Fahes, Dr. Shedid Shedid, and Dr. Anuj Gupta.

We plan to have a cross-section of faculty who can teach our drilling, production, reservoir, and economics & evaluation courses. We will also develop a faculty that can supervise graduate students and conduct research sponsored by the Qatar Foundation and the oil and gas industry in the Middle East.

We plan to teach our undergraduate courses in Qatar just as we do in College Station. However, we plan to use the Internet and Video Conferencing equipment to allow the students in Qatar to discuss class materials with some of our senior faculty in College Station. We also plan to send senior faculty to Qatar to kick off the semester with students taking the course that the professor is the course leader.

We will likely adopt a different system to teach graduate courses in Qatar in FY2008. In addition to the Qatar faculty teaching graduate courses, we will encourage our senior faculty to travel to Qatar for 3-4 weeks at a time to teach a graduate course. Having our senior professors working for extended periods in Qatar will provide a quality experience for both graduate and undergraduate students, and the faculty. We currently offer all of our graduate courses on line in our Distance Learning program.

Fig. 7–Engineering building now under construction on the campus of TAMU—Q.

3.3 Faculty Retention

During the past few years, we have successfully recruited a number of high quality faculty and our prospects of hiring another 6-11 high quality faculty are excellent. The next issue we need to address is faculty retention. Most college professors are at universities because they like teaching, research, working with young persons and the lifestyle on a college campus. The salaries we offer are competitive with other universities but are less than what our faculty could earn in the upstream oil and gas industry. However, our faculty are encouraged to teach short courses, consult and keep active in their professional societies.

Even with these outside sources of extra income, we need to do more to keep our bright, young faculty members engaged at Texas A&M University. One very positive step is to have a named, endowed faculty position for all tenured and tenured track faculty. We are fortunate in the Department of Petroleum Engineering to have 7 Chairs and 7 Professorships that can be used to support the faculty. The benefits of having 'named faculty positions' are that it adds prestige to one's position and provides funding for activities such as travel, equipment purchases or summer salaries. This discretionary money can be very important to a faculty person.

One of our goals was to increase the funding level of our Chairs and Professorships while creating a third level of named faculty positions, called 'Faculty Fellows'. The hurdle to achieve a Chaired position is high and all Chairs are approved by the Dean. The hurdle for obtaining a Professorship is also high and must be approved by the Dean. We need to increase the funding in almost all our Chairs and Professorships to reward our top performers and give them one more reason to stay at Texas A&M.

The 'Faculty Fellows' program was started to help our tenured track Assistant and Associate Professors and some younger tenured faculty who do not yet qualify for a Professorship. We feel the hurdle required to be hired as a tenured track Assistant or Associate Professor is high and those who qualify should have a named Faculty Fellowship.

To implement the Faculty Fellowship program, we were ale to fund 6 Faculty Fellowships with a targeted amount of $300,000 each for a total of $1.8 million. Even though some of our Chairs and Professorships are well funded, we need another $5 million or so to increase the value of these named positions to provide much needed discretionary funding for our faculty. The purpose, of course, is to provide just one more incentive to come and remain on the faculty in the Department of Petroleum Engineering at Texas A&M University.

3.4 Faculty Committees

Five faculty committees spread the workload of running the department and ensure we have proper faculty input into the decisions required to run the department in the most efficient and fair manner.

The **Tenure & Promotion (T&P) Committee** meets initially every year in January or February. At that time, the committee reviews its procedures, successes, and objectives for the coming year. The committee reviews the status of the faculty and makes recommendations to the department head on who should be put forward for promotion. They also determine who is up for tenure or tenure review. Once the candidates for tenure or promotion are identified, the tenure committee helps them document their records of teaching, research, publications, and service so the best package of documentation possible can be sent to the Dean, Provost, and President.

The **Undergraduate Curriculum Committee (UCC)** monitors the content of our undergraduate curriculum and suggests changes in the curriculum using the ABET guidelines and input from our industry contacts. The committee also monitors the data collection for ABET reviews and makes sure the department is in compliance. Because the ABET review in the Fall 2004 found our department was in full compliance, we are accredited until the next review.

In addition to the ABET review, the UCC continually monitors our undergraduate curriculum to keep it relevant so it meets the needs of the students and the industry. The UCC periodically reviews the courses and hours required for a BS degree and recommends any changes. The UCC also reviews the courses our students are taking outside of petroleum engineering to be certain the course materials cover what our students need to know to succeed in the upper-lever engineering courses. The UCC reviews all course content and the timing and sequencing of the course materials to be sure the department is teaching the correct course content during the correct semesters. All evaluations of the courses and recommended changes are initiated, evaluated, and documented using the ABET processes.

The **Graduate Committee** oversees the graduate admissions process and the departmental guidelines for all matters pertaining to the graduate program. The graduate committee has

been working on ways to streamline the selection process for graduate school admission decisions. The committee has developed a data base to evaluate and sort the qualifications of those applying to the department to make our selection process fair and accurate. Our philosophy is to recruit new graduate students as we travel for various SPE events and to screen the applicants to increase the quality of our graduate program, especially for the PhD degree. The graduate committee also has also developed a way to implement a PhD qualifying exam to evaluate a PhD candidate's ability to do independent research.

The **Faculty Search Committee** evaluates our faculty needs in both College Station and Qatar. The committee has begun the process for recruiting faculty to either go to Qatar or replace current faculty who decide to go to Qatar. In addition, the search committee has developed a plan for hiring the additional faculty we will need in College Station. We expect to hire from 9 to 11 faculty members in FY 2008 and 2009. We will be hiring 3 to 4 new faculty members for College Station, and 6 to 7 new faculty members for Qatar.

The specific objectives of the committee are to:

- Develop and regularly update long-term plans for faculty hiring;
- Write advertisements to publicize faculty openings and place them in appropriate journals and websites;
- Solicit faculty candidates through personal contacts with industry and academia, and encourage all the faculty to do so;
- Evaluate all applications received for faculty positions;
- Recommend to the faculty, the department head, and the administration which applicants should be invited for interviews;
- Recommend to the faculty, the department head, and the administration which applicants should be made job offers; and
- Remain aware of market conditions and make recommendations about the job offers to be made.

The purpose of the **Scholarship Committee** is to administer the Undergraduate Scholarship Program, including the Nelson Scholars Program. Highly qualified incoming freshmen and current students are nominated and must complete an application. The committee meets at least twice per year to select scholarship recipients from among the applicants. The chair is responsible for detailed administration of the program.

The Nelson Scholars Program has the following features:

- The Nelson Scholars Program provides scholarships equivalent to the university's President's Endowed Scholarships but available solely to petroleum engineering students;
- Nelson Scholarships, each worth approximately $12,000, are awarded to several applicants each year depending upon the total number of scholarships funded and the number available at the time;
- The scholarships are merit-based and are awarded without regard to financial need.

- Highly qualified incoming freshmen and/or current students are nominated and must complete an application to be considered;
- An incoming freshman must major in petroleum engineering, have scores of 1300 SAT or 30 ACT, and be in the top 10% of his or her high school class.
- A current student must have a 3.5 GPR; and
- Recipients of a Nelson Scholarship must maintain a 3.0 GPR during their period of study at Texas A&M University.

4 Courses

Our undergraduate curriculum consists of 18 courses taught on a regular schedule, as shown below. (The two geology courses are typically taught by faculty who hold joint appointments with our department.) The graduate curriculum has a great deal more flexibility, although all students are expected to develop competence in each of the major areas of the industry.

The schedule of all our courses, both graduate and undergraduate, as well as the distance learning courses, can be found on the departmental Website at http://www.pe.tamu.edu/academics/ClassSchedule/index.shtml.

4.1 Undergraduate

Because of the size of our department, we only offer each course once per year and we do not teach any undergraduate courses in the summer. A reduction in the state budget has caused the administration to limit university pay for most of the professors to only 9 months. Only the Department Head, the Graduate Advisor and the Undergraduate Advisor are on the payroll for 12 months using state money. All other professors must essentially "pay themselves" during the summer using money from Professorship or Chair revenue, or Research Funds they have brought into the department themselves.

Table 11 presents the schedule of when we teach each course.

Table 11–Schedule for Teaching Undergraduate Courses in College Station

Fall	Spring
Sophomore	**Sophomore**
GEOL 104 – Physical Geology	PETE 311 – Reservoir Petrophysics
PETE 225 – Petroleum Drilling Systems	
Junior	**Junior**
GEOL 404 – Geology of Petroleum	PETE 321 – Formation Evaluation
PETE 301 – Petroleum Engineering Numerical Methods	PETE 323 – Reservoir Models
PETE 310 – Reservoir Fluids	PETE 324 – Well Performance
PETE 314 – Transportation Processes in Petroleum Production	PETE 325 – Petroleum Productions Systems
PETE 335 – Technical Presentations I	PETE 403 – Petroleum Project Evaluation
Senior	**Senior**

PETE 401 – Reservoir Development	PETE 322 – Geostatics
PETE 405 – Drilling Engineering	PETE 400 – Reservoir Description
PETE 410 – Well Completions and Stimulation	PETE 406 – Advanced Drilling Engineering
PETE 435 – Technical Presentations II	PETE 416 – Advanced Production Engineering

4.2 Graduate

Most of our faculty members are involved with teaching graduate courses. Our introductory courses have been taught for many years by many different professors. **Table 12** lists all of the courses we now offer; the list changes on the basis of who is on our faculty and the type of research projects our faculty is working on at the time, and not all courses are taught every year.

Table 12–Graduate Courses

Number	Title
602	Well Stimulation
603	Advanced Reservoir Engineering I
604	Advanced Reservoir Engineering II
605	Phase Behavior of Petroleum Reservoir Fluids
606	EOR Methods-Thermal
608	Well Logging Methods
609	Enhanced Oil Recovery Processes
610	Numerical Stimulation of Heat and Fluid Flow in Porous Media
611	Application of Petroleum Reservoir Simulation
612	Unconventional Oil and Gas Reservoirs
613	Natural Gas Engineering
616	Engineering Near-Critical Reservoirs
617	Petroleum Reservoir Management
618	Modern Petroleum Production
619	Naturally Fractured Reservoirs
620	Fluid Flow in Petroleum Reservoirs
621	Petroleum Development Strategy
622	Exploration and Production Evaluation
623	Waterflooding
624	Rock Mechanic Aspects of Petroleum Reservoir Response
625	Well Control
626	Offshore Drilling
628	Horizontal Drilling
629	Advanced Hydraulic Fracturing
630	Geostatistics
631	Petroleum Reservoir Description
632	Physical and Engineering Properties of Rock
633	Data Integration for Petroleum Reservoirs
634	Petroleum Reservoir Modeling and Data Analysis
648	Pressure Transient Testing
661	Drilling Engineering
662	Production Engineering
663	Formation Evaluation and the Analysis of Reservoir Performance
664	Petroleum Project Evaluation and Management
665	Petroleum Reservoir Engineering
666	Conservation Theory and Applications in Petroleum Engineering
689	Special Topics in Flow with Mathematica
689	Special Topics in Geoscience Applications for Petroleum Engineering
689	Special Topics in Horizontal, Multilateral and Intelligent Wells
689	Special Topics in Integrated Reservoir Description and Development
689	Special Topics in Well Drilling Fundamentals
689	Special Topics in Reserves and Evaluation
689	Special Topics in Streamline Simulation
689	Special Topics in Transport Phenomena
689	Special Topics in Under-Balanced Drilling
689	Special Topics in Well Stimulation-Matrix Acidizing

4.3 Qatar

The schedule for teaching courses in Qatar appears as **Table 13**.

Table 13–Undergraduate Courses in Qatar

Fall 2005	**Spring 2006**
GEOL 104 – Physical Geology	PETE 311 – Reservoir Petrophysics
PETE 211 – Petroleum Engineering Systems	
Fall 2006	**Spring 2007**
Sophomore	**Sophomore**
PETE 225 – Petroleum Drilling Systems	PETE 311 – Reservoir Petrophysics
	GEOL 104 – Physical Geology
Junior	**Junior**
GEOL 404 – Geology of Petroleum	PETE 321 – Formation Evaluation
PETE 310 – Reservoir Fluids	PETE 323 – Reservoir Models
PETE 335 – Technical Presentations I	PETE 324 – Well Performance
	PETE 320 – Drilling & Production Systems
	PETE 403 – Petroleum Project Evaluation
Fall 2007	**Spring 2008**
Sophomore	**Sophomore**
PETE 225 – Petroleum Drilling Systems	PETE 311 – Reservoir Petrophysics
	GEOL 104 – Physical Geology
Junior	**Junior**
GEOL 404 – Geology of Petroleum	PETE 321 – Formation Evaluation
	PETE 323 – Reservoir Models
PETE 310 – Reservoir Fluids	PETE 324 – Well Performance
PETE 335 – Technical Presentations I	PETE 325 – Petr. Production Systems
	PETE 403 – Petroleum Project Evaluation
Senior	**Senior**
PETE 401 – Reservoir Development	PETE 322 – Geostatistics
PETE 405 – Drilling Engineering	PETE 400 – Reservoir Description
PETE 410 – Production Engineering	PETE 406 – Advance Drilling Engineering
PETE 435 – Technical Presentations II	

4.4 Distance Learning

A practicing engineer anywhere in the world with Internet access can apply for admission, take courses over the Internet, and obtain an Master of Engineering (ME) degree in Petroleum Engineering from Texas A&M University in 2 to 4 years. The degree requires 36 hours of course work, or 12 courses. The student can take one course per semester (3 per year) and finish in 4 years, or two courses per semester (6 per year) and finish in 2 years. Most practicing engineers take only 1 course per semester.

A student can also take courses required for the Master of Science (MS) and Doctor of Philosophy (PhD) degrees by DL. However, MS and PhD candidates must satisfy university residency requirements and must maintain close contact with their supervisory committees while they conduct their research projects.

Professionals who are interested in expanding their knowledge about the industry but not in earning degrees can register for the courses to earn certificates, professional development hours, or continuing education units.

4.4.1 DL Program Goals

Our Masters of Engineering (ME) degree program focuses on the academic needs of its industry audience. Our program provides a core body of knowledge of advanced topics in petroleum engineering with the objective to prepare our graduates for leadership positions in drilling, reservoir, and production engineering, as well as economics and evaluation.

Upon completion of the degree, students are able to perform advanced-level tasks in drilling, production, and reservoir engineering. Examples include horizontal and multilateral drilling techniques, advanced analysis of production and well-test data, prediction of long-term reservoir performance, and advanced tasks in formation evaluation (analysis/correlation of well log/petrophysical data)—including geostatistics, nonparametric optimization, and so forth.

4.4.2 DL Program Description

The ME program requires coursework in drilling, production, and reservoir engineering as means of providing depth and breadth in these skills. The ME is a working degree that complements the petroleum engineer's work requirements. However, it also provides challenges that yield a significant growth in technical skills.

All students are required to complete 36 hours of study and an engineering report. The PETE 692 Professional Study (Project) course provides supervision and advising to students as they prepare this report.

4.4.3 DL Target Audience

The ideal candidate for the Distance Learning ME program was either educated (BS degree) as a petroleum engineer or has an engineering education (BS degree) and has worked as a petroleum engineer.

Students with degrees in other fields that include advanced mathematics, geosciences, or energy-industry-related study are also good candidates for the program. A strong basis in mathematics is critical to success in the degree.

Three or more courses are scheduled for delivery in the program during each academic term, including summers. The current schedule can be found on the departmental Web site. http://www.pe.tamu.edu/DL_Program/Courses.html

5 Support Staff

Day-to-day operations of the department depend on the activities of our qualified support staff. We currently have seventeen (17) full-time staff working for the department, and one (1) working for the Global Petroleum Research Institute (GPRI), in addition to a number of student workers who serve as part of the staff. These student workers are not included in the twenty (20) listed above.

Administrative Staff

The department's administrative staff is organized as follows:

Administrative

- Kathy Beladi – Senior Administrative Coordinator
- Jason Demshar – Senior Microcomputer/LAN Administrator
- John Maldonado – Facilities Coordinator
- Brandon Bartlett – Microcomputer Specialist
- David Courchesne – Microcomputer Specialist
- VACANT- Communications Specialist/Web Designer
- Connie Conway – Business Coordinator I
- Susan Atkins – Project Coordinator (PT)
- Betty Robbins – Program Assistant
- Laura Hall – Program Coordinator
- Noel Neely – Office Associate
- Several student workers for computer support, receptionist, meeting support, and mail distribution

Financial

- Rudy Schultz – Business Administrator II
- Tim Meekma – Business Coordinator I
- John Winkler – Business Coordinator I
- Several student workers to load financial data into the system

Graduate Administration

- Eleanor Schuler – Senior Administrative Coordinator
- Barbi Miller – Senior Office Assistant

Undergraduate Administration

- Gail Krueger – Administrative Assistant

Distance Learning

- Ted Seidel – Information Specialist
- Mary Lu Epps – Information Specialist

The size of the staff is currently sufficient for the size of the faculty and the department. We have to deal with an incredible bureaucracy at Texas A&M University that includes the University administration, the Texas Engineering Experiment Station (TEES), and the Texas

A&M Development foundation. All three groups have their own procedures, their own accounting systems, their own rules for charging expenses, and their own way of entering and retrieving data. It is an understatement to say the workload on the staff is exaggerated by having to deal with three separate bureaucracies.

In addition, since the immigration laws have tightened, the bureaucracy involved with International Student Services (ISS) has expanded the workload on staff.

Computing

We have installed a computer system in the department that is one of the best on campus for any department. The computer system has been expensive and has shown that we will need more and better trained staff to support the system. We currently have three full-time staff and 2 student workers offering computer support to our entire faculty, staff and student body, which is over 800 individuals. We may need to add another staff position and more student workers for computer technical support in the near future.

6 Research

Since FY1993, the research expenditures in the Department of Petroleum Engineering have increased from around $1.3 million per year to about $3.9 million per year in FY 2006. The totals by fiscal year since FY1993 are shown in **Fig. 7**.

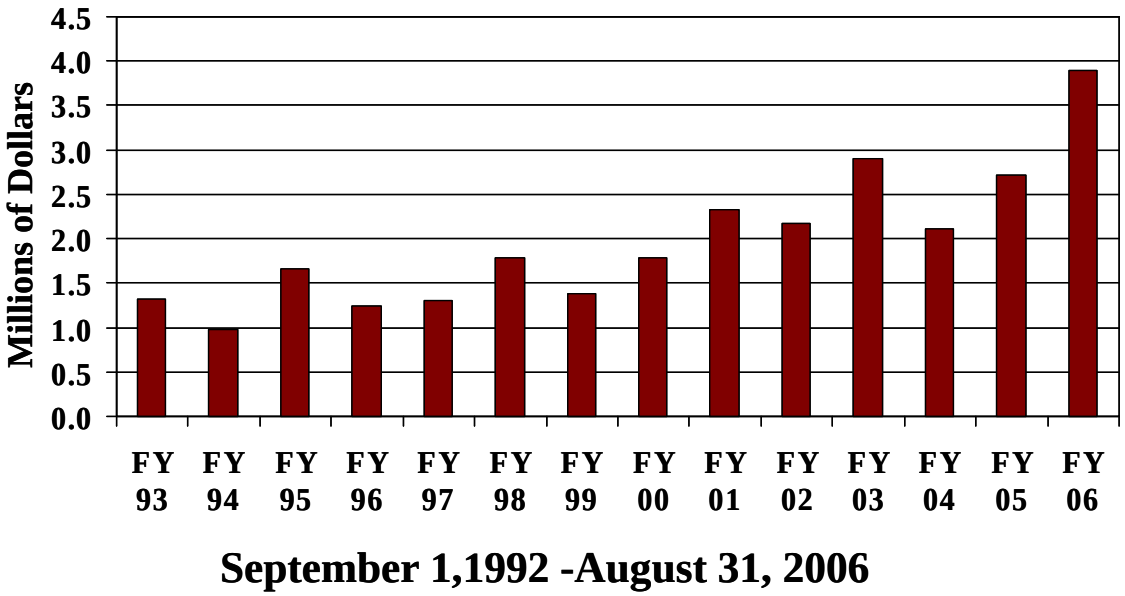

Fig. 7–TEES Research expenditures since FY 1993

As evident in Fig. 7, our department has been conducting between $2 -3 million of research through the Texas Engineering Experiment Station since FY 2001. That value has increased to about $3.9 million in FY 2006.

6.1 Crisman Institute

The oil and gas industry in the United States and the faculty at Texas A&M University have been developing technology for the improved extraction of oil and gas for decades. Through the Crisman Institute for Petroleum Research, we plan to leverage our experience at a time when the energy from oil and gas resources becomes of utmost importance to Texas, to the United States, and to the world.

The Crisman Institute combines the talents of the faculty into four research Centers that can continue the technology development required by industry. The focus of each center is to develop technology and processes to reduce the finding and development costs in petroleum reservoirs or to develop better uses for oil and gas. Costs can be reduced by developing technologies that either reduce the costs involved in the application of existing technologies or that increase the reserves per completion as a result of better technology.

During calendar years 2005 and 2006, we have conducted much of our research through the Crisman Institute for Petroleum Research. The Crisman Institute has been reorganized to identify and solve significant research problems of major interest to industry and government. The Crisman Institute manages its work using four research Centers: the Halliburton Center for Unconventional Resources, the Chevron Center for Well Construction and Production, the Schlumberger Center for Reservoir Description and Dynamics and the Center for Energy, Environment, and Transportation Innovation.

Schlumberger, Halliburton, and Chevron have endowed 3 of the research centers for $1 million for each center. The original Crisman endowment of $1 million has grown to $2.3 million in FY 2007. Once the generous donations from Schlumberger, Halliburton and Chevron are fully funded in January 2008, the endowment for research under the Crisman Institute umbrella will be around $5.3 million. The revenue from this endowment will be used to seed research ideas in the department and fund ongoing projects that require additional funding.

Vision

The vision of the Crisman Institute for Petroleum Research is to provide a vehicle to enhance development of petroleum engineering technology through cutting-edge, industry-directed research conducted in three dedicated research Centers in the Harold Vance Department of Petroleum Engineering at Texas A&M University

Mission

The mission of the Crisman Institute for Petroleum Research is to produce significant advances in upstream petroleum engineering technology through the combined efforts of faculty, post-doctoral researchers, and highly qualified graduate students, in close cooperation with industry.

The mission of the **Halliburton Center for Unconventional Resources** is to increase our ability to characterize reserves of unconventional resources and to develop new, more efficient ways to reduce costs and improve recovery of these resources.

The mission of the **Chevron Center for Well Construction and Production** is to develop new tools, both theoretical and physical, to construct and complete wells in today's increasingly challenging environments in a way that will reduce the finding and development costs.

The mission of the **Schlumberger Center for Reservoir Description and Dynamics** is to develop better approaches to describe and model petroleum reservoirs and to manage the resources identified there to reduce costs and improve recovery.

The mission of the **Center for Energy, Environment, and Transportation Innovation** is to develop new tools, solutions, standards, and collaboration methodologies to enable the realization of a 21st century transportation system while respecting a balance between mobility, economic development, congestion, safety, environment, and energy security interests. A second but vital mandate for the center will be to develop energy awareness education for the general public.

Objectives

The Crisman Institute and its four Centers have seven primary objectives:

- Work with industry and government representatives to identify the most important problems now facing the upstream petroleum industry and those that arise in the future.
- Focus our efforts tightly on solutions to as many of the identified problems as possible within the framework of available resources.
- Develop solutions that will be immediately useful in the industry.
- Maintain a clearinghouse of research efforts, tracking not only research in progress but also results of completed projects and perspectives on research possibilities for the future.
- Continuously upgrade the problem-solving capabilities of the Institute through ongoing faculty development strategies and pursuit of outstanding post-doctoral and graduate students.
- Ensure financial stability to continue to provide long-term solutions to technology-development problems.
- Publicize the activities of the Institute and the contributions of the membership who make those activities possible.

Crisman Membership

Participation in the Crisman Institute for Petroleum Research is by membership. One is referred to the Petroleum Engineering Website to find out more about the activities of the Crisman Institute and how to become a member.
http://www.pe.tamu.edu/crisman/index.html

6.2 Global Petroleum Research Institute

The Global Petroleum Research Institute (GPRI) provides a means of coordinating research and technology development among its members in the upstream sector of the oil and gas industry. Its goal is to offer the best means of funding and managing collaborative tactical and strategic programs for the least cost. Its objectives are to identify technology gaps in the specific areas of (1) Drilling and Completion, (2) Facilities, (3) Flow Assurance, and (4) Environmental and then propose solutions that enable members to find and produce oil and gas in an environmentally responsible manner with less cost and greater efficiency.

GPRI is a purveyor of new technology, providing clients with the "best research for the best price". We offer the loyalty of a business partner and the economics of an outside vendor. We ensure that our clients have what they need to run their businesses as well as possible, with maximum efficiency and reliability. Many of our joint ventures are mission critical, so we give our clients the assurance that we will be there when they need us. New technology is a multi-disciplinary effort across a number of different science and engineering disciplines. We have seen our industry reshape itself as it uses advanced technology to provide petroleum resources to the world's economy at affordable cost. Another characteristic of technology development is its international scope, with technology advances in the future coming from non-U.S. countries and territories. A long-term trend is the increasing role of national oil companies. These entities, because of their resource bases will have more of a voice in the future of the industry.

Finally, the role of environmental issues related to energy production by petroleum is becoming more and more important. The term sustainable development is a topic being addressed by more and more far seeing managers in more and more companies.

GPRI is governed by a Management Committee (Board of Directors) supported by an Executive Committee (Operations). Technical Forum Committees address specific technical areas, such as deep water research, flow assurance and environmental programs. GPRI's annual budget average for the past five years has totaled over $1,500,000 yearly.

GPRI is differentiated from the Crisman Institute in that its research is conducted by members of its project committees. That research may or may not include PE faculty, depending upon the focus of the individual project. GPRI also conducts more interdisciplinary research cutting across A&M University Departmental lines to collaborate on projects in several areas. Current collaborations include Offshore Technology Research Center (OTRC) with Civil Engineering, The Shape Memory Alloy Research Team with Aerospace, Beneficial Uses of Produced Water with Rangeland & Ecology Management and Texas Water Resource Industries (TWRI), Homeland Security and Bioterrorism Transporation and Infrastructure with Texas Transportation Institute (TTI), and the Intergrated Offshore Drilling Program (IODP).

Currently GPRI has the following on-going projects: 1) Advanced membrane desalination (completed, commercialized), 2) Environmentally Friendly Drilling, 3) MiniEnergy Efficiency, and 4) Stakeholder Involvement with Low Impact Drilling - Public Surveys.

6.3 Research at the Qatar Campus

The Qatar Foundation pays all costs associated with the Texas A&M University Qatar campus. In late 2003, the Qatar Foundation announced that in addition to funding Education City, they also wanted to develop a research capability in Qatar. They are building a Science and Technology Center within Education City and are expecting many of the companies doing business in Qatar to contribute to the research effort. As a result, we are now expected to have students in Qatar during FY 2008 who will be working on graduate degrees and conducting research.

To build a research program, the faculty in Qatar will need to be involved with research and could possibly have some of our College Station graduate students move to Qatar to do their research. We also plan to begin enrolling young professionals in the Middle East Region in our Masters program in FY 2008. The students can take graduate courses from the Qatar faculty, they can take our Distance Learning courses, and we will likely have some of our senior faculty go to Qatar for a month or a semester to teach graduate courses. We expect to have research projects that are co-located in Qatar and College Station.

6.4 Other

We will continue to conduct research outside of the Crisman Institute and outside of Qatar by agreement with individuals or organizations who prefer to conduct private research projects or whose grant stipulations do not allow joint research.

7 Finance

7.1 Expenditures

The revenue to run the Department of Petroleum Engineering comes from four sources. One source is state money used to fund the academic salaries of the faculty and provide some operating funds, but not enough to run the department well. A second source of funds is income from endowments. We are increasing our endowments so the department funding will be improved. A third source of funds is gifts given by individuals and companies. Most of these gifts are for scholarships. The fourth source of funds comes from research contracts. It is difficult to track the income to the department. However, we can track expenditures. The expenditure budget history for the department is shown in **Table 14 and Figure 9**.

Table 14–Expenditure Budget History

	FY97	FY98	FY99	FY00	FY01	FY02	FY03	FY04
Category	**$MM**	**$MM**	**$MM**	**$MM**	**$MM**	**$MM**	**$MM**	**$MM**
Academic	1.642	1.620	1.660	1.761	1.756	2.109	2.043	1.989
Chairs	0.175	0.212	0.306	0.253	0.374	0.455	0.507	0.454
Professorships	0.096	0.103	0.124	0.160	0.081	0.094	0.099	0.088
Academic Labs	0.046	0.041	0.037	0.085	0.077	0.083	0.085	0.085
Fellowships	0.090	0.094	0.066	0.058	0.076	0.073	0.172	0.067
Scholarships	0.170	0.151	0.193	0.966	0.452	0.510	0.303	0.393
Departmental	0.159	0.310	0.470	0.500	0.788	0.737	0.483	0.610
Research	1.217	1.793	1.180	2.300	2.119	3.741	3.453	2.470
Total	**3.598**	**4.323**	**4.036**	**6.084**	**5.722**	**7.082**	**7.143**	**6.156**

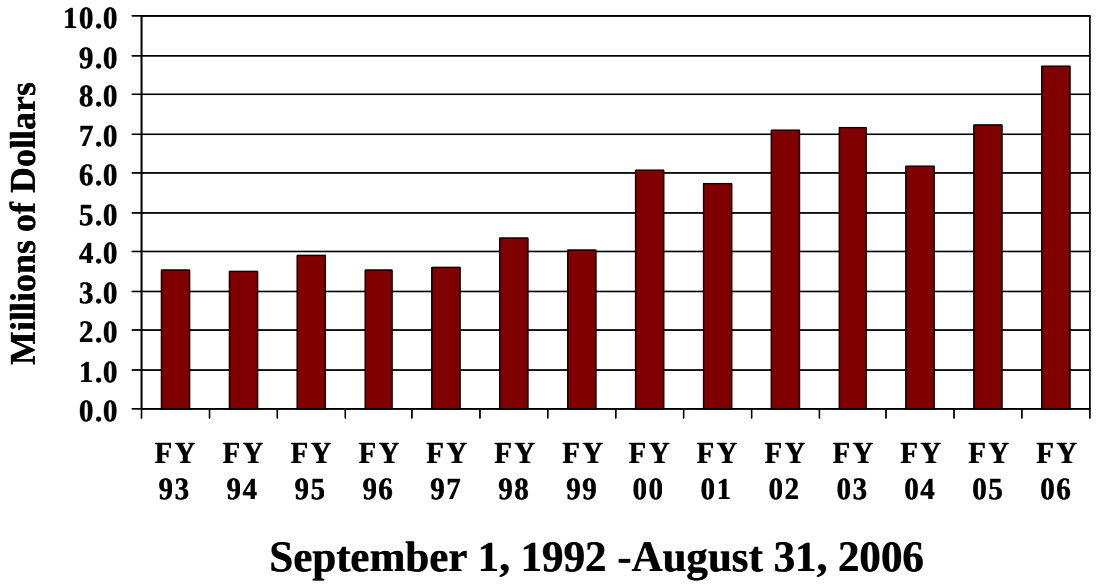

Fig. 9–Annual Expenditures from FY93-FY06

Clearly, the annual expenditures of the department will continue to increase through FY 2011 because, as we have documented, the number of students in College Station will increase to 844 by FY 2011. We will be teaching courses in Qatar, and we will have 48 faculty members who will be actively teaching or doing research in College Station and Qatar.

Fig. 10 shows that the percentage of the funding in our department that we receive from the State of Texas has been steadily decreasing since FY 1993, from almost 50% to less than 40%. The amount of money from the State of Texas has not changed perceptibly, but our budget has grown and the percentage has declined.

The costs to teach our courses in Qatar will be paid for by the Qatar Foundation. Thus, there will be no requirement for State of Texas for the 12 faculty and 140 students that will be in Qatar by 2011.

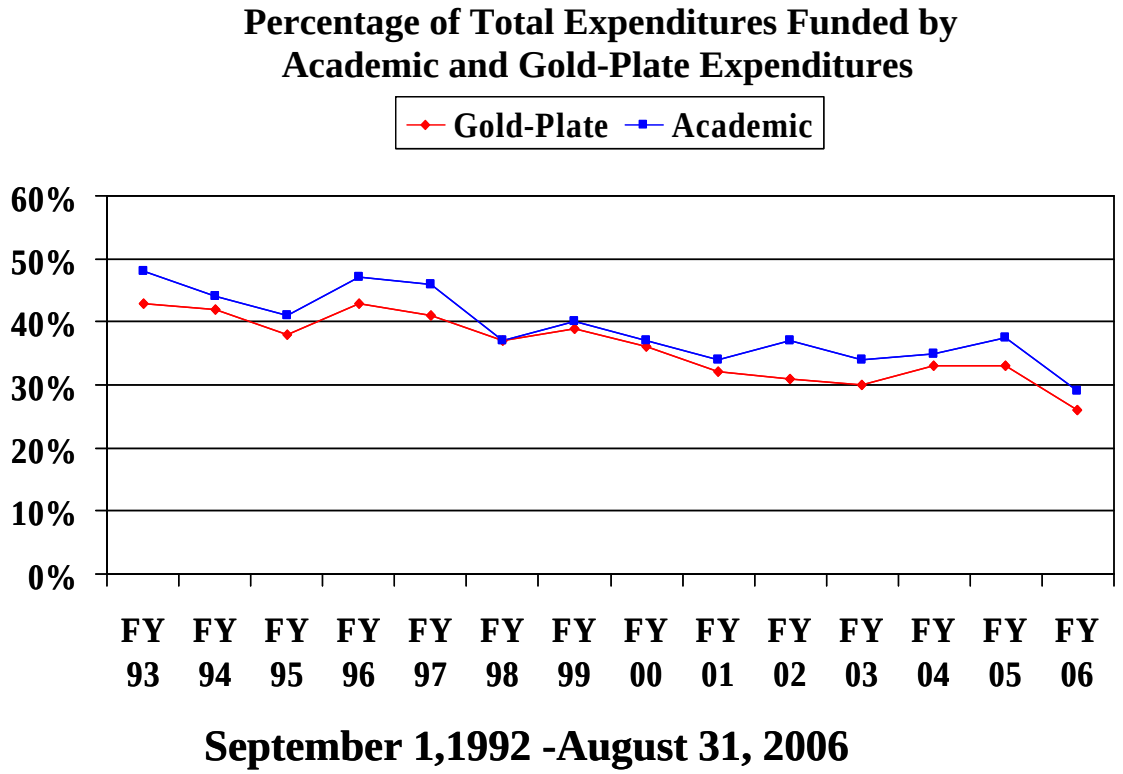

Fig. 10–Percentage of Expenditures

7.2 Forecast

The expenditure forecast for FY 2005 through FY 2011 is shown in **Table 15**.

Table 15–Budget Forecast for FY05-FY-11

Category	FY05 Actual	FY06 Actual	FY07 Est	FY08 Est	FY09 Est	FY10 Est	FY11 Est
	$M	$M	$M	$M	$M	$M	$M
State – Education and General	2372	2255	2350	2450	2550	2650	2750
State – Designated	337	416	437	459	482	506	531
State – Distance Learning	118	201	241	265	292	321	353
Research Contracts	2604	3832	3900	4000	4500	5000	5000
Chairs and Professorships	869	815	897	986	1085	1193	1313
Scholarships	305	386	400	500	525	550	575
Fellowships	104	205	215	237	260	286	315
Research Endowments	133	107	150	200	250	275	300
Departmental Endowments	375	478	526	578	636	700	770
Total	7,217	8,695	9,116	9,676	10,580	11,482	11,907

7.3 Endowments

The Department of Petroleum Engineering endowment program is vital to our success. Without the endowments, our ability to support students and student programs would be severely impaired. Friends of the Department have generously given endowments to the department, much of which were designated to scholarships. Very little organized effort was applied to increasing the endowments even though many companies and individuals would generously provide the department with gifts every year.

In the late1990s, the Texas A&M Foundation set out to substantially increase the endowments at Texas A&M with a campaign called *The Leader Today, the Leader Tomorrow*. In the Department of Petroleum Engineering, our financial goal in the capital campaign was $20 million. We closed out that campaign at the end of 2003, after raising $19.1 million. Of the $19.1 million, we collected $3.7 million in cash gifts that were essentially spent as they were collected for items such as scholarships, research, equipment, or salaries, and the remainder of the $19.1 million was added to the endowments.

In the *The Leader Today, the Leader Tomorrow* capital campaign, a single donor, Mr. and Mrs. Jim Nelson of Houston, gave the department $10 million. Of that value, $3 million has been used to fund the Nelson Scholarship program, the Whiting Chair, and the Stephens Chair in the department, while the other $7 million is in trust at the Texas A&M Foundation. In recognition of Mr. and Mrs. Nelson's generosity, we named our premiere scholarship program for them, and at the request of Mr. Nelson, we named the department the **Harold Vance Department of Petroleum Engineering**. Harold Vance was the first department head and became a famous oil and gas banking executive after leaving Texas A&M University.

The history of our endowment growth appears in **Fig. 11.**

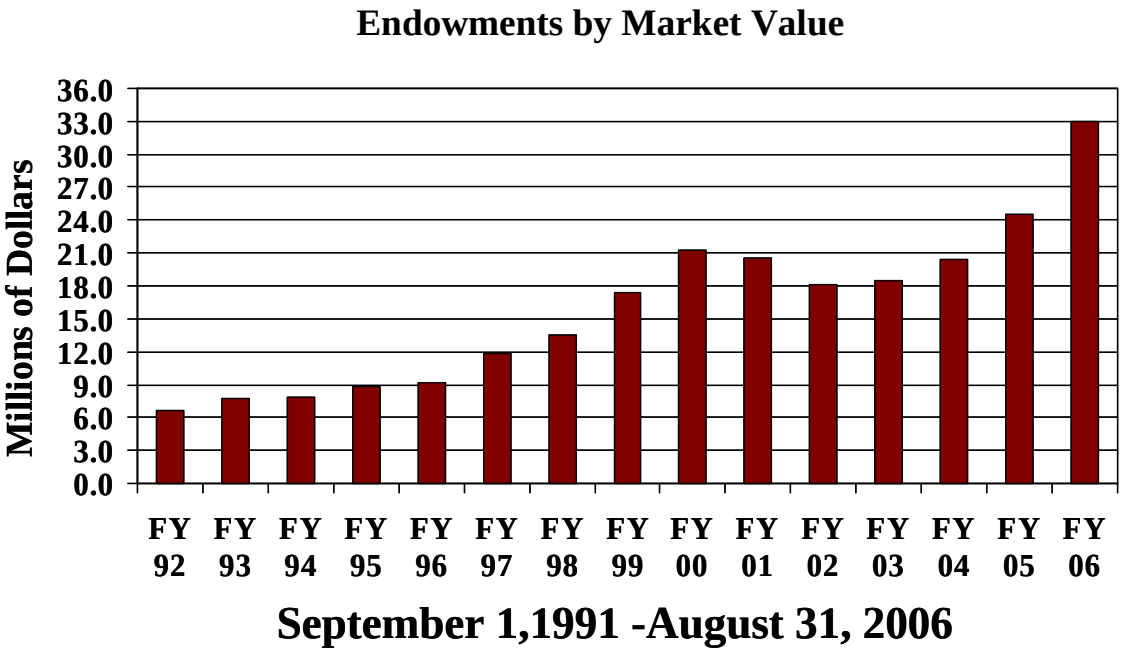

Fig. 11–Endowments – Market Value FY 92-FY06

The current value of our endowments is over $33 million, and the money is distributed as follows:

Faculty Chairs (7)	$11.5 million
Faculty Professorships (7)	$ 3.8 million
Scholarships	$ 6.3 million
Fellowships	$ 1.7 million
Crisman Institute for Petroleum Research	$ 4.7 million
Whiting Technology Fund	$ 1.2 million
Other	$ 3.8 million
Total	**$33 million**

7.4 Current Endowment Campaign

In April of 2004, the Harold Vance Department of Petroleum Engineering Industry Board's Development Committee made the decision to begin a new campaign as part of the *One Spirit One Vision* campaign run by the TAMU Foundation**.** It was also decided to set the target of the campaign for the Department of Petroleum Engineering at $20 million.

The following table lists the items we have identified for funding during the new campaign.

Table 16–Categories and Targets for Current Capital Campaign

Type of Gift	Area of Support	Amount	Remarks
Cash	Computers for the class rooms	$ 150,000	Funded
	Recruitment of new faculty	$ 50,000	Pledged
Endowments	Graduate Fellowships	$ 4,000,000	$756,950 pledged/given
	Undergraduate Scholarships	$ 4,000,000	$1,636,000 pledged/given
	3 Endowed Research Centers	$ 3,000,000	Funded
	3 Professorships	$ 1,500,000	$2,000,000 funded
	6 Faculty Fellowships	$ 1,800,000	
	Whiting Technology Fund	$ 2,000,000	$1,200,000 given
	Petroleum Engineering Fund	$ 3,500,000	$782,950 pledged/given

We currently have around $9.6 million that have been given or pledged to fulfill the *One Spirit One Vision* campaign goal of $20 million. Our Industry Board or their companies have been responsible for $5.82 million of the $9.6 million. We have active gift agreements under negotiation with donors for an estimated $4.2 million. As such, we need approximately $6.2 million in new gift agreements, over and above those we have currently identified to reach our goal of $20 million for the current campaign.

The Whiting Technology Fund – We created the **Robert L. Whiting Technology Fund** to assure the department has access to the best technology in our teaching and research. To maintain our ranking as a top Petroleum Engineering Department, we need to be sure our students and faculty have access to the best technology for solving engineering problems. In most cases, this means we need the best hardware and software for solving engineering problems. The Whiting Technology Fund will primarily used for, but not necessarily limited to, computer hardware and software.

The Nelson Scholars Program – We will diversify the Nelson Scholars program to include endowments of $60,000 (Nelson Scholarships) and $120,000 (Von Gonten Scholarships) which will allow us to give scholarships of $3,000 and $6,000 per year, respectively. This range of endowment values will give us flexibility when trying to recruit the best students.

Appendix – Enrollment and Degrees

Enrollment and Degrees in Petroleum Engineering at Texas A&M University

Academic Year	Fr	So	Jr	Sr	Total Ugrads	Master Students	Ph.D. Students	Total Grads	B.S. Degrees	M.S. Degrees	Ph.D. Degrees
1930-31									2		
1931-32									20		
1932-33									29		
1933-34									16		
1934-35									17		
1935-36									18		
1936-37									27		
1937-38									35		
1938-39									47		
1939-40									75		
1940-41									67		
1941-42									48		
1942-43									28		
1943-44									1		
1944-45									3		
1945-46									22		
1946-47									71		
1947-48									66		
1948-49									95		
1949-50									108		
1950-51									83	1	0
1951-52									53	1	0
1952-53									56	4	1
1953-54									60	6	0
1954-55									62	7	0
1955-56									49	8	0
1956-57					379				63	5	1
1957-58					255				61	9	1
1958-59					165				64	10	1
1959-60					115				45	9	0
1960-61					82				21	4	2
1961-62					78				25	6	0
1962-63					87				10	5	1
1963-64					93				10	9	3
1964-65					106				9	10	2
1965-66					111				10	6	5
1966-67					106				8	10	9
1967-68					113				14	5	4
1968-69					165				18	2	4
1969-70					132				12	3	0
1970-71					138				15	5	2

Academic Year	Fr	So	Jr	Sr	Total Ugrads	Master Students	Ph.D. Students	Total Grads	B.S. Degrees	M.S. Degrees	Ph.D. Degrees
1971-72	51	30	26	30	137	10	6	16	26	6	0
1972-73	53	42	32	27	154	13	4	17	20	5	1
1973-74	44	31	29	32	136	10	5	15	14	6	3
1974-75	66	33	36	30	165	7	8	15	28	4	2
1975-76	117	87	50	39	293	6	7	13	37	1	1
1976-77	123	119	92	52	386	10	5	15	37	4	3
1977-78	131	120	110	78	439	11	4	15	69	3	2
1978-79	183	164	127	80	554	16	3	19	73	5	0
1979-80	260	191	190	117	758	18	4	22	98	4	1
1980-81	356	269	254	139	1018	17	3	20	117	6	0
1981-82	600	442	205	175	1422	22	5	27	150	2	0
1982-83	527	478	394	220	1619	43	9	52	187	3	1
1983-84	240	300	338	295	1173	74	11	85	242	12	4
1984-85	150	190	245	295	880	84	13	97	254	21	0
1985-86	105	120	149	230	604	65	11	76	194	26	2
1986-87	47	52	100	150	349	80	17	97	124	21	3
1987-88	44	41	51	99	235	75	23	98	79	19	2
1988-89	46	42	36	60	184	44	34	78	51	14	6
1989-90	36	44	46	36	162	67	37	104	23	20	8
1990-91	343	79	74	40	536	67	42	109	25	22	5
1991-92	125	151	81	73	430	61	48	109	32	17	7
1992-93	77	61	104	100	342	56	38	94	43	27	8
1993-94	58	53	50	126	287	51	34	85	67	21	6
1994-95	76	40	50	96	262	40	40	80	64	14	9
1995-96	50	59	61	53	223	35	42	77	28	13	11
1996-97	38	42	59	74	213	49	41	90	32	13	9
1997-98	31	30	57	87	205	62	41	103	53	27	11
1998-99	96	51	42	57	246	64	37	101	43	18	7
1999-00	81	61	42	46	230	93	38	131	46	20	13
2000-01	64	47	37	43	191	134	30	164	43	38	4
2001-02	67	65	41	35	208	142	33	175	35	65	5
2002-03	95	48	59	37	239	132	33	165	33	41	5
2003-04	99	52	44	50	245	126	32	158	45	67	12
2004-05	75	88	69	66	298	123	43	166	50	45	8
2005-06	144	75	69	50	338	141	50	191	45	40	4
2006-07	209	100	70	76	455	157	55	212	64	62	17
2007-08	226	122	108	65	521	181	67	248	54	39	9

Cumulative Bachelor Degrees Awarded: 4168

Cumulative Master's Degrees Awarded: 896

Cumulative Doctorate Degrees Awarded: 225