

TABLE OF CONTENTS

Chapter 1:	Institutional Context.....	1
Chapter 2:	Significant Developments Since the 1996 Team Report.....	9
Chapter 3:	Response to the Concerns and Suggestions of the 1996 Team Report.....	33
Chapter 4:	Design of the Self-Study and Request for Continued Accreditation	39
Chapter 5:	Criterion One, Mission and Integrity.....	47
Chapter 6:	Criterion Two: Preparing for the Future	67
Chapter 7:	Criterion Three: Student Learning and Effective Teaching.....	113
Chapter 8:	Criterion Four: Acquisition, Discovery, and Application of Knowledge	149
Chapter 9:	Criterion Five: Engagement and Service.....	183
Appendix A:	Organizational Charts	
Appendix B:	Reference list of Academic Department, Administrative Offices, and Contacts	
Appendix C:	Map of Campus	
Appendix D:	List of Acronyms and Abbreviations	
Appendix E:	List of Figures	
Appendix F:	List of Items in Electronic Resource Room	

Chapter 1: Institutional Context

This chapter provides a broad orientation to the South Dakota School of Mines and Technology (referred to hereafter as SDSM&T); details on the topics introduced here are given later in this text and in the Resource Room.

Items in the Resource Room are referenced with an “RR,” followed by a number. All “RR” items are available electronically via the in-text hyperlinks that can be activated by holding down the “control” key while clicking the underlined RR number. Online, these same items are found in alphabetic order at <http://www.hpcnet.org/ResourceRoom>. Appendix F lists all items alphabetically and numerically. During the team visit, all RR items will be available in hard copy format in the Resource Room.

The State Context

South Dakota is a rural state with a relatively low per capita income (\$17,562) and a total population of 754,844, which is 46th in the nation. Half of all state residents live in rural areas, and the overall population distribution is 9.9 people per square mile. We have the nation's poorest county, Buffalo County, and with 9.3% of South Dakota's total population living in poverty, we have the 2nd highest state poverty level.

Given the low per capita income, many South Dakota residents need assistance with the cost of college. This is especially true for our Native American population, which is 8.3% of the population. High school degrees are earned by 84.6% of state residents and 21.5% hold a bachelor's or other advanced degree. In academic year 2004-05, 522 or 25.96 % of SDSM&T's total domestic undergraduate population was eligible for Pell Grants.

SDSM&T is one of six regents' universities in the state and is located in the 2nd largest population center, Rapid City, which is nestled on the eastern side of the Black Hills. The University is governed externally by the South Dakota Board of Regents and internally by the President, Dr. Charles Ruch.

The Institutional Context

SDSM&T is a regional university specializing in undergraduate and graduate education in science and engineering. It was established in 1885 to provide instruction in mining engineering. The University diversified as a science and engineering school following World War I, and in 1943 the state legislature changed the name of the institution to the South Dakota School of Mines and Technology, in recognition of the school's expanded role. Since then, the University has expanded its curriculum to include 16 Bachelor of Science programs in science and engineering, 10 Masters of Science programs, and four Doctor of Philosophy degree programs in science and engineering ([RR219](#)). *NOTE: Hold “control” key down while you click on the RR link in order to bring up linked Resource Room file.*

In December 2003, the Board of Regents reconfirmed SDSM&T's mission as a technological university and the only institution in the western half of the state to grant engineering degrees. The mission of the South Dakota School of Mines and Technology is as follows:

The South Dakota School of Mines and Technology serves the People of South Dakota as their technological university. Its mission is to provide a well-rounded education that prepares students for leadership roles in engineering and science; to advance the state of knowledge and application of this knowledge through research and scholarship; and to benefit the state, region, and nation through collaborative efforts in education and economic development.

South Dakota Tech (School of Mines) is dedicated to being a leader in twenty-first century education that reflects a belief in the role of engineers and scientists as crucial to the advancement of society. Our vision is to be recognized as a premiere technological university in the United States.

Most immediately, our goal is to be recognized as the University of Choice for engineering and science within South Dakota and among our peer group of specialized engineering and science universities.

Our Statement of Purpose (created in 2003) reflects our commitment to positive change through our mission:

SDSM&T is dedicated to being a leader in twenty-first century education that reflects a belief in the role of engineers and scientists as crucial to the advancement of society. Responding to the unprecedented challenges facing today's world, SDSM&T will seek opportunities to benefit the educational, civic, and economic activities of the community, state, and region. SDSM&T will maintain and expand its role in research, scholarship, and creative endeavors that advance knowledge, solve problems, develop individual potential, and explore the human condition. Through its rigorous academic programs and co-curricular activities, SDSM&T is committed to developing informed and responsible scientists and engineers who behave ethically, value a global perspective, and accept the duties and responsibilities of citizenship.

In 1983 SDSM&T reached a peak enrollment of 2,908 students. Current total enrollment as of the census date in fall 2005 is 2313, of which 256 are graduate students. Females comprise 30.7% of the student population; 83.8% is Caucasian; 69% of all students fall between the age of 18 and 23; and 75% of all students attend the institution full time.

The cost of an education at SDSM&T is not high. Based on a weighted average cost and rank of public higher education institutions in the eight-state region, SDSM&T (and the other regents' schools) are the least expensive for undergraduates, graduates, residents, and non-residents ([RR106](#)).

The Student Context

- The average ACT composite score of new incoming freshman in fall 2005 is 24.3. In spring 2005, the regents approved a proposal to raise admission standards.
- The typical SDSM&T freshman is a white male between 18 and 24 years of age who resides on campus. Looking at undergraduates overall, the profile is similar except that 70% of undergraduates overall live off campus.

- Examination of National Survey of Student Engagement (NSSE) and Student Satisfaction Inventory (SSI) results tell us that our students, overall, are highly goal and task-oriented, technologically skilled, yet relatively homogeneous in their Western cultural views. They place high importance on values and ethics but have relatively few interactions with people from diverse and differing cultural and religious orientations.
- South Dakota is one of two states nationwide that uses ACT and Collegiate Assessment of Academic Proficiency (CAAP) scores as bookend assessments of the General Education program and requires a passing score for degree progression beyond the sophomore year. All regents' institutions have conducted proficiency testing since 1998. Compared to national norms, South Dakota students test higher than the national norms in all four testing areas (writing, mathematics, reading and science reasoning), and SDSM&T students consistently score highest in the state.
- Students are encouraged to engage in the development of life skills through the division of student affairs. Alcohol education and prevention, career planning and placement, counseling and ADA services, external scholarship coaching, campus ministries, child care, health services, Ivanhoe International Center, multicultural development, residence life, student activities and leadership, student center, and student conduct services are provided.
- Most students participate in at least one of the 80 co-/extra-curricular activities that encompass academic, recreational, community service, Greek life, honor society, leadership development, multicultural, religious, special interest group, government and media opportunities and experiences.
- 540 students live on-campus in one of three residence halls. Typically half of these students are in their first year; more than 80% are traditional age males. Student staffing provides most of day-to-day supervision at a 1 to 23 ratio. For the past four years, applications for student positions have been double or triple the number of positions available. Residence Life is charged with ensuring resident students are proficient in five major outcome areas: academic skills; personal skills; leadership skills; community and civic responsibility; and understanding and appreciating human differences.
- Ten percent of the undergraduate degree-seeking students participate in Intercollegiate Athletics. Teams are competitive in the NAIA Dakota Athletic Conference (DAC). Athletes often are recognized as DAC "player of the week." The Lady Hardrocker basketball team has a strong record of success, with 10 NAIA national tournament appearances since 1994. SDSM&T is the recipient of the Dakota Athletic Conference Scholars Award presented to the school with the highest percentage of athletes honored as DAC Scholars. The Hardrockers placed 38% of their athletes on the academic honors list. Student-athletes must earn a grade point average of 3.25 or better to earn the conference academic recognition.
- Students are proud of "traditions" which include each "frosh" receiving a "beanie" at orientation. Seniors have miner's hats that are branded with their major and signed by classmates. The homecoming activities (M Week) encompass a week of events that feature coronation, a parade, an all-school picnic, and the "M-Hill climb" to white wash the school's initials. M Week concludes with the "frosh" wearing their beanies and running around the track during half time of the football game. Once the run is completed, they transition from "frosh" to "freshmen" and beanies are retired to memorabilia. Other traditions include Honors Convocation and the Senior Design Fair held each spring. Traditional December and May commencements highlight outstanding

alumni in an effort to motivate graduating students to aspire to successes that equal or surpass those who have previously graduated.

- Student ambition, drive, and focus can be seen in the success of the approximately 150 juniors and seniors involved yearly in our Center for Applied Manufacturing and Production (CAMP) program and the enterprise teams that compete and excel in national competitions. Our student teams in the Concrete Canoe, West Regional Mini Baja, IEEE Robotics, Human Powered Vehicle, SAE Aero Design, and International Aerial Robotics competitions have triumphed over teams from significantly larger and more prestigious universities. For example, the SDSM&T team placed first in the 2005 SAE Aero Design international competition and received two honorable mentions in the 2005 International Aerial Robotics Competition.
- Our six-year graduation rate as of 2004 was roughly 38% and far lower than our newly established goal of 65%. We received approval to raise admission standards in March 2005 and anticipate that this will lower the percentage of applicants we admit (currently at 94%).
- SDSM&T students fare well in the job market. During the 2004-2005 academic year, approximately 100 companies recruited SDSM&T students. Companies that have hired SDSM&T graduates this year include Boeing, Cargill, Caterpillar, Dow Corning, Dow Chemical, DuPont, Gateway, Microsoft, and Raytheon—to name a few.
- The placement rate for students who graduated in 2003 was 92% for engineering graduates and 88% for science graduates. The average initial offer for 2003 graduates overall was \$47,061.
- We rely on alumni reports to estimate the percentage of students who undertake graduate studies. Of our 11,381 living alums in August 2004, over 1/4th (or 3,325) had earned the Master of Science and 432 had earned a Doctorate.

The Faculty Context

- As of fall 2005, we had 142 faculty members. These 142 faculty members can be further classified as follows:
 - 107 are full-time instructional faculty members
 - 25 are part-time instructional faculty members, or “adjuncts”
 - 10 are “full-time but have a mix of roles, including “researcher,” and “research / administrative,” with limited or no teaching duties
- As of AY 2004-05, terminal degrees are held by 86.5% (90 out of 104) of full-time tenure-track faculty members. We note that 4.4% of these 90 full-time terminal degrees are from SDSM&T.
- Tenure is held by 63 of 107 full-time faculty members, or 58.9%. This figure is for fall of 2005.
- All faculty members are represented by the Council on Higher Education (COHE), which is the legally recognized bargaining agent for faculty in negotiating terms of employment with the Board of Regents. Faculty members are represented by COHE whether or not they formally become dues-paying members. Very few SDSM&T faculty members have chosen to join COHE, and SDSM&T sends no representatives to the Council.

- SDSM&T faculty switched to a Faculty Senate form of shared governance in 2003. Initially, the Senate had 10 elected senators, but in spring 2006, the general faculty will voted whether or not to modify the senate membership to include one representative from each department. This change will increase the number of senators from 10 to 16. Overall, the Senate has been extremely active since its inception. Minutes of Senate meetings can be found at <http://www.mcs.sdsmt.edu/facsenate>.
- Workload is perceived as high by all faculty members, and SDSM&T is more thinly staffed than most comparable institutions elsewhere. In the absence of release time or time allocated for research, the average teaching load is approximately 9 credit hours per semester. Overall, the SDSM&T faculty is very hard working.

The Curricular Context

- The curriculum at all regents' institutions governed by the Board of Regents is unified to a much greater degree than in most state systems. Since 2003 the 6 institutions share a single common student database. Course numbering and academic policies are uniform throughout the system. For incentive-funding purposes, student retention is measured as retention within the system.
- We have a common General Education Program within the South Dakota system; however, individual schools may add learning outcomes and/or institutional graduation requirements. SDSM&T follows the common program with no additional, institution-specific, requirements.
- We have a common freshman course (Professionalism in Science and Engineering, GES115) for engineering and science majors and are working on creating a more fully integrated first-year experience to improve the way freshman students are advised, mentored, and integrated into the life of the campus.
- A distinctive feature of our curriculum is our CAMP (Center of Excellence for Advanced Manufacturing and Production) program and the enterprise teams it supports. Students from all majors and all class levels may elect to join a team and work on an engineering design project. Many of our CAMP teams travel nationwide to participate in competitions. (See <http://camp.sdsmt.edu>.) Students are generally well prepared technically from the formal engineering curriculum; however, projects falter and fall short of their potential due to non-technical issues. Most students major in engineering because they are interested in designing, building, and testing. They do not enjoy documentation, developing (and sticking with) schedules, and being required to coordinate with other groups; however, these are the skills that graduates need. The goal of CAMP is to aid students in learning goal setting, scheduling, fulfilling commitments, establishing priorities, problem solving, and conflict resolution in an environment that works to develop open communication, trust, commitment, cooperation, and responsibility to others.
- In 2000, the CAMP program beat Purdue University and Brigham Young University to win the Boeing Outstanding Educator Award. The award recognizes faculty members who have made outstanding contributions to undergraduate engineering education.
- Also of note is the curricular watershed SDSM&T experienced in 2003 when we decided to close the mining engineering program, which had been integral to the identity of the school since its founding. A program in mining engineering and management was created in its stead and is flourishing.

The Research Context

- Our steadily building research productivity seems to have achieved the beginning of critical mass. Since 1996, external funding for research has quadrupled, from \$3,210,173 to \$11,922,155 in FY 2004. More important was the doubling of external funding that occurred between FYs 2000 and 2001, which suggests we are building the critical mass needed to sustain a high level of research funding. We are confident in our ability to sustain and grow this level of increased external funding. The recent dramatic increase in research at SDSM&T is seen in the recent additions of research centers and institutes. Historically the Engineering Mining and Experiment Station was established, in 1903, to provide analytical services for local industry. In 1959 the first research institute, The Institute of Atmospheric Sciences (IAS), was created. In 2001 and 2004 two important centers were added.
 - In 2001, the Advanced Materials Processing center was established and in 2004 was reorganized into the Advanced Materials Processing and Joining Laboratory (AMP-J) and the Additive Manufacture Laboratory (AML). (See <http://ampcenter.sdsmt.edu> for details.) AMP-J conducts leading-edge research on friction stir processing which led to the creation, in 2004, of the National Science Foundation's Industry/University Cooperative Research Center for Friction Stir Processing with SDSM&T as the lead institution. A recent addition to AML, which focuses on laser deposition technologies, is the maskless mesoscale materials deposition technology which allows placement of electronics on materials that are one-thousandth of an inch wide. An example application of this new technology involves the advanced antenna research for national defense uses.
 - In July 2004, the Center for Accelerated Applications at the Nanoscale (CAAN) was established by a competitive state grant process (see <http://www.hpcnet.org/caan>.) A permanent center director was hired in 2004. CAAN-related work focuses on nanotechnology research in the areas of nanoparticles and associated nanosensors, with particular emphasis on South Dakota mineral development.
- Research in physics is closely aligned with the CAAN through expertise in condensed matter physics, such as experimental characterization and theoretical analysis of electronic materials. Physics faculty members will play a major role in the new nanoscience and nanoengineering Ph.D. program.
- In October 2004, SDSM&T, Brigham Young University, the University of South Carolina, the University of Missouri- Rolla and more than 18 industry partners announced the National Science Foundation Friction Stir Processing Industry/University Cooperative Research Center (I/UCRC). The Center will address the needs of the aerospace, aeronautic, energy, military and commercial industries in developing the rapidly growing friction stir processing technology. Currently, this center is housed in the Civil / Mechanical Building, but more appropriate facilities are being sought.
- In October 2004, SDSM&T dedicated its Tech Development Laboratory (TDL). This is a limited liability corporation established near campus for researchers working in the areas of composites, laser deposition, super lightweight materials, and polymers. The TDL houses cutting-edge research activities and projects designed to solve the problems of industry, the military and government and to create economic development opportunities for South Dakota.

- In 2005 a Computational Mechanics Laboratory was added to the Civil/Mechanical Engineering Building. The laboratory provides much needed space for a variety of high-end computing activities and provides students access to the computational mechanics hardware and software currently used by industry. As its uses are developed, it will greatly benefit faculty and researchers involved in externally-funded projects. We anticipate that the facility will be open by the time of the team visit in March 2006.
- Research in computer science includes significant efforts in database design, including data warehousing and data mining, image processing and signal processing, pattern recognition, with applications to remote sensing, neural networks, distributed and parallel computing, and artificial intelligence.
- SDSM&T has been an Experimental Program to Stimulate Competitive Research (EPSCoR) state since 1989, and has received approximately \$3.5M in EPSCoR funding since 1996. Two notable ongoing EPSCoR-funded projects involve the investigation of thermoplastic matrix composites and the development of new optically clear polycarbonate plastics for use in protective armor and new explosive materials using nano-particles.
- Two new Ph.D. programs were created in 2004, one in atmospheric and environmental science and one in nanoscience and nanoengineering.
- Two significant research awards have been recently earned by faculty members: In 2003 Dr. Andre Petukhov (Physics) received the Alan Berman Award recognizing the most important publication in 2003 originating from the U. S. Naval Research Laboratory. Dr. Paul Smith (Institute of Atmospheric Sciences) was appointed an associate member of the National Academy of Sciences in January 2005, based on an outstanding career in atmospheric science at SDSM&T.
- Since 2001, SDSM&T has been near the center of a statewide effort to have the former Homestake gold mine in Lead, SD converted to a Deep Underground Science and Engineering Laboratory (H-DUSEL) supported by the National Science Foundation and the Department of Energy. Creation of the lab is a goal of the Governor's 2010 initiative. The successful creation of such a lab would have tremendous implications for science and engineering initiatives at SDSM&T

The Administrative Context

- Administrative changes have occurred in the last three years. In 2002, Dr. Richard Gowen retired after 14 years as president. In June 2003, Dr. Charles Ruch became the school's 17th president, and in fall 2003 launched the school's first major strategic planning process since 1989.
- In 2003, the faculty switched to a Faculty Senate form of shared governance.
- The position of Vice President for Research was created in 2004.
- In spring 2004, the institutional self-study was begun, and, in the fall of 2004, the campus began a year-long reconsideration of its organizational structure.
- In June 2005, we reorganized from a four-college structure to a two-college structure. A search is underway for a dean of the College of Engineering and a dean of the College of Science and Letters. The position of Associate Vice President for Academic Affairs was also created.

- The self-study working groups and our tri-annual 5-hour long all-campus meetings have been our primary means of holding campus “discussions” during this time of rapid change.

The Community / Economic Development Context

- SDSM&T has the reputation of being an academically challenging school. Our sister institution, Black Hills State University (BHSU), is universally regarded as the university attended by most local high school graduates.
- With notable exceptions, we had less-than-close relationships with the community during the 1990s; however, dramatic changes in SDSM&T’s community links and role in economic development have occurred in the last two years.
- In spring 2005, ground was broken for a 60,000 square-foot business incubator on the SDSM&T campus. The Governor’s Office of Economic Development in concert with the Rapid City Economic Development Foundation has funded the creation of center to be called the Black Hills Business Development Center ([RR141](#)). As a University / community venture, the incubator is a vivid and tangible symbol of the school’s increased involvement in technology transfer and economic development.
- SDSM&T has assumed a leadership role in the State’s bid to locate a national underground laboratory in the former Homestake gold mine in nearby Lead, South Dakota. The principle investigators for this project, one from Lawrence Berkeley National Laboratory and one from SDSM&T, are funded through the National Science Foundation (NSF) to create a conceptual design report for the proposed Homestake Deep Underground Science and Engineering Laboratory (H-DUSEL). The conceptual design will be submitted to the NSF in June, 2006. Later in 2006, an award of \$1.5 million will be awarded to the group selected to produce a Technical Design Report.
- Since 1991, we have participated in the Small Business Innovation Research (SBIR) and the Small Business Technology Transfer (STTR) grants from the Small Business Administration. Seventeen SBIR/STTR grants have involved Tech faculty and graduates as contractors or consultants performing specific research for one of 11 government agencies. As of 2004, the West River Coordinator for the SBIR/STTR program is located on the SDSM&T campus and will occupy space in a new business incubator facility currently under construction on campus. In addition, SBIR/STTR proposal submission will be increased due to the construction of the new business incubator facility on campus, the creation of Tech Ventures for the creation of formal entrepreneurial business entities, and the development of the entrepreneurial minor.
- SDSM&T has been involved since 2004 with the Governor and the greater Black Hills community in the “Black Hills Vision” project. This project includes the Black Hills Technology Corridor Project which seeks to make the region home to more than 1,000 technology-based businesses and organizations.
- A significant research / economic-development event involving Black Hills Vision funding occurred in October 2005 when the campus hosted the 2005 Powder River Basin Coalbed Methane Education Conference for 110 representatives of industry, federal and state government, consulting firms, advocacy groups, as well as faculty and students. Topics included production operations, future technology, and gas supply and marketing. The 2006 conference is currently being planned.

Chapter 2: Significant Developments Since the 1996 Team Report

This chapter reports on major developments since 1996 and is organized according to the “old” criteria, with subject headings derived from the content of the 1996 team report, pages 10 through 82 ([RR1](#)).

Topics mentioned under Criterion 1 (pages 10-12 of the 1996 team report)

Mining Programs

In fall 2001, the mining engineering program had 20 students, 15 of whom were to graduate that year. After examining ways to preserve our mining heritage and our civil and geological engineering focus of mining, we developed the Mining Engineering and Management program to replace the former mining program in fall 2004.

Center of Excellence

In 1997, the Center for Advanced Manufacturing and Production (CAMP) program was established as our institutional “Center for Excellence.” It has flourished. Currently, there are 10 multidisciplinary teams involving approximately 200 students in design and performance competitions on a local, regional, and national basis. All teams work on engineering projects in areas such as robotics, aircraft, concrete canoes, helicopters, racecars, off-road vehicles, and industrial design projects. The role of engineers has changed in recent years from solitary designers in the laboratory to members of teams that have to sell their ideas and work with customers. CAMP was formed to develop students’ abilities to excel on multidisciplinary teams and the program uses these projects as a means to grow these skills.

Increase of “Resources Available to the Institution”

Since 1996, our external (non-state) funding through grants and contracts has increased from \$3 million/year to more than \$12 million/year. A summary breakdown of all external funding (state, federal, and other) for the years 1996 to 2005 can be found in the Resource Room as [RR182](#).

Giving has increased since 1995 when we began our first ever capital campaign. Our goal was to raise \$16 million, and the campaign ended in July 2000 with over \$20 million raised. In 2004 we began planning for a second, \$50 million capital campaign by examining institutional priorities. We have begun taking our case statement to potential donors.

Partnerships with business and industry have yielded significant support for specific programs. Caterpillar Inc. funded the creation of a specialized lab for the Center for Advanced Manufacturing and Production (CAMP) program, Cargill funded development of a bioengineering specialization, Dow Chemical supported our Chemistry program, and Steven J. Miller and Agilent provided significant support to our Electrical Engineering program. Since 2001, SDSM&T has worked with the Genesis of Innovation for South Dakota, a non-profit group that advocates for entrepreneurial-minded individuals, businesses, and

agricultural producers who are pursuing innovative research and development for the purpose of incubating and fostering South Dakota owned businesses. In 2003, Realtronics Corp. of Rapid City, partnered with an SDSMT faculty member in a Small Business Innovation Research Phase I grant from the National Science Foundation to develop a through-wall electromagnetic imaging system. Recently, in 2005, SDSM&T signed a formal Memorandum of Understanding (MOU) with RESPEC, Inc., a Rapid City-based business founded (by SDSM&T graduates) almost 40 years ago from entrepreneurial activities associated with SDSM&T. The MOU allows SDSM&T and RE/SPEC to work collaboratively on research projects in broad technical areas such as environmental engineering, waste treatment, and national defense.

Government / Military Partnerships

Since 2001 federal appropriations to SDSM&T have totaled nearly \$60 million through partnerships with the Army Research Laboratory (ARL) and the Air Force Research Laboratory (AFRL). \$15.2 million are included in the federal FY 2005 defense budget and include continued funding through ARL and AFRL and funding through the U.S. Army's Armament Research, Development and Engineering Center (ARDEC). The appropriations have been used primarily to enhance infrastructure for materials-related research and development and include laboratory construction, acquisition, and renovation. State-of-the-art equipment for friction stir welding and laser additive manufacturing and support for faculty and student research were also funded.

Our government partnerships include partnerships with other universities and industry and are focused on the transition and commercialization of new technologies. One such partner is RPM & Associates of Rapid City which employs laser additive manufacturing. Partnerships have also been established with the Edison Welding Institute of Columbus, Ohio and Florida A&M University for the advancement and development of joining and polymer technologies, respectively. An advisory board comprised of defense contractors has been engaged in identifying applications for the capabilities available through SDSM&T. Members represent companies such as Sikorsky, Boeing, United Technologies, and United Defense. Upon occasion, student engineering teams form government partnerships. For instance, a Center for Advanced Manufacturing and Production (CAMP) team collaborated with the NASA Glenn Research Center for the data acquisition and transmission control of the Advanced Power Technologies experiment on the Starshine III satellite launched in 2001.

Topics mentioned under Criterion 2 (pages 12 – 38 of the 1996 team report)

Relationship of the Board and the Institution

The regents have continued to increase their emphasis on collaboration between and among the six universities in the regents' system. Unifying initiatives and policies include a common general education program, common course numbering, the Electronic University Consortium, the implementation of a unified student database, the creation of statewide discipline councils, and statewide human resources / finance system currently being implemented. The 1997 policy that established the statewide discipline councils was based on the premise that the "regental system shall continue to work as a Unified System of Public Higher Education." The South Dakota public higher education system continues to be one of the most unified state systems in the country. This said, some faculty and staff members do

not regard this as a positive philosophy or direction and regard the Board of Regents as too controlling and intrusive in campus affairs.

State Funding

State funding of SDSM&T in 1996 was not generous but has not been subject to the rise (and subsequent fall) of state funding for higher education seen in most of the country; in fact, state funding has increased slightly every year since 1996. In 1998 the legislature allowed the university system to retain state funding due to be lost as result of decreased enrollments and to use these funds to fund a Salary Enhancement Program.

Institutional Governance Structures

The Executive Council consists of the following people:

- President
- Provost and Vice President for Academic Affairs
- Vice President for Business and Administration
- Vice President for Student Affairs and Dean of Students
- Vice President for University Relations
- Vice President for Research
- President of the SDSM&T Foundation
- Director of the SDSM&T Alumni Association
- Chair of the Faculty
- Assistant to the President

The Council meets at the call of the President (usually weekly) and provides direction for the administration of the University.

The University Cabinet consists of the following people:

- President
- Provost and Vice President for Academic Affairs
- Vice President for Business and Administration
- Vice President for Student Affairs and Dean of Students
- Vice President for University Relations
- Vice President for Research
- President of the SDSM&T Foundation
- Director of the SDSM&T Alumni Association
- Chair of the Faculty
- Assistant to the President
- College Deans
- Dean of Graduate Education
- Director of Facilities
- Chair of Career Service Council
- Chair of Exempt Employees
- President of the Student Association

The Cabinet meets monthly (or at the call of the President) to advise the President concerning the development of policy, the governance of the university, strategic planning, and the fiscal operation of the University.

A small expansion was made to the Executive Council in 2003 when the Chair of the Faculty and the Director of the Alumni Association were added. In 2004, a Vice President for Research was hired and added. No changes have been made in either the Career Service Advisory Council or the Exempt Employees' Advisory Council. However, in 2002-03, the Town Hall form of governance embodied in the Faculty Advisory Council (FAC) was

reexamined and, in 2004, the faculty opted to adopt a Faculty Senate on a trial basis. The by laws were revised and the Senate form of faculty governance was piloted during AY 2004-05.

Four-College Structure

In 1996, our four-college structure (with one dean of interdisciplinary sciences and three deans of science and engineering) was still relatively new. The structure offered an equitable distribution of faculty and programs and a means of fostering interdisciplinary collaboration. This structure has been mixed in its success, and a wide range of opinions are held as to its effectiveness. Under the four-college structure, the deans divided their time between administrative (40%) and faculty (60%) duties. The College of Interdisciplinary Sciences clearly succeeded under this structure in creating an identity for itself and building a strong degree program; in fact, four “specializations” (Atmospheric Sciences; Business Applications in Science and Technology; Pre-Professional Health Sciences; and Science, Technology, and Society) were defined within the interdisciplinary sciences program, effective fall 2005.

During AY 2004-05 the organizational structure was reconsidered by the faculty and staff as part of one of our strategic initiatives. The Co-chairs for Criterion 1 of the self-study led this campus-wide effort. In July 2005, the University changed to a two-college structure ([RR223](#)).

Graduate Education

In AY 1998-99 the masters programs in chemistry, physics, and metallurgy were combined into a Masters of Science in the materials engineering and science program. In 2003, a half-time position of Associate Dean for Graduate Education was created to alleviate the workload of the Dean for Research and Graduate Education. In July 2004, a Vice President for Research was hired, and in 2005 the Associate Dean of Graduate Education’s position was elevated to that of Dean.

Changes in Faculty

In the period from fall 1996 to fall 2004, the number of full-time state funded faculty members increased 3.7% from 108 to 112 while student headcount increased 4.33% from 2218 to 2314. However, student full time equivalents (FTE) fell by 2.94% 1942 FTE to 1885 FTE during the same period. The percentage of doctorally prepared faculty members increased from 83.33% to 87.5%, of tenured faculty members from 47.22% to 55.36%, and of faculty members over the age of 45 from 59.26% to 72.32%. While the percentage of female faculty increased only slightly from 17.59% to 18.75%, the number of female faculty members in science and engineering departments increased from 10 to 14 and women were hired for the first time into tenure-track positions in civil engineering, electrical engineering and industrial engineering. The only areas where part-time instructors are used on a regular basis are those areas, such as foreign language, where demand does not justify a full time position. This practice has not changed since the last visit.

Faculty work loads remain generally heavy, and faculty members are increasingly concerned about balancing research and teaching obligations. The Colleague database provides some information about workload but does not offer the entire picture, and precise, uniform data on workload is difficult to collect because of differences among programs. While current policy grants programs (specifically, the program chair) flexibility in distributing teaching loads in

order to achieve the most effective use of human capital, exercising this flexibility is rarely as easy as it seems to be on paper.

COHE (Council of Higher Education)

COHE is the legally recognized bargaining agent for all faculty members with 50% or more teaching duties and no administrative duties. Faculty members at SDSM&T are covered by COHE; however, few faculty members are dues-paying members. In 2004, SDSM&T members numbered just two, and we did not send a representative to the council.

Faculty Salaries

Efforts have been made to enhance faculty salaries and to narrow the gap between the salaries of the humanities and social sciences faculty members and their colleagues in science and engineering. Program Improvement Fee (PIF) funds raised through a student fee approved in 1984 were applied, and salary enhancement funds continue to be distributed on a yearly basis to raise and, when needed, equalize salaries. For a time, the additional monies were allocated to support faculty summer projects or as salary bonuses; currently salary enhancement funds are part of base salary. In 1998, a Salary Enhancement Program commenced which resulted in average salary increases of 7% per year for three years. Salary increases were tied to performance and the COHE-Board of Regents Agreement specified precisely how this was to be done. In each year subsequent to this program the Board of Regents has authorized an additional 1% over and above the salary package approved by the legislature. Typically, increases have averaged 4% per year with the exception of the 3.25% increase for 2005-06. These actions by the Board of Regents have narrowed the gap between South Dakota salaries and those of surrounding states. Nevertheless, most faculty salaries remain below the average by discipline and rank as published annually by Oklahoma State University.

Research

In 1994 the Office of Graduate Education and Sponsored Programs set the goal of facilitating collaborative research across disciplines. The late 1990s was when EPSCoR programs including NSF, DOE and NASA became significant funding sources for our state institutions. The Dean of Graduate Education and Sponsored Programs was actively involved in these programs and worked successfully to encourage collaborative research. Multidisciplinary centers on materials research were established among SDSM&T, the University of South Dakota, and South Dakota State University and in other areas such as Atmospheric, Environmental, and Water Resources (AEWR).

SDSM&T introduced four multidisciplinary post-graduate programs. Examples include the Atmospheric, Environmental, and Water Resources (AEWR) Ph.D. program, the Materials Engineering and Science (MES) M.S. and Ph.D. programs, a nanoscience and nanoengineering Ph.D. program, and our recently approved biomedical engineering Ph.D. program. Under the Governor's 2010 initiative the Accelerated Applications at the Nanoscale Center (CAAN) was established in 2004 as a multidisciplinary and multi-institution research center.

Creation of the position of Vice President for Research in 2004 illustrates the university's commitment to research programs. The Office of Research Affairs provides administrative oversight, leadership and mentorship in the development and implementation of campus-wide

research and graduate studies. The Office of Sponsored Programs, which oversees and coordinates all pre- and post-award functions and compliance actions for externally funded programs, is housed in the Office of Research Affairs. All intellectual property, licensing, and patenting activity, along with technology transfer, economic development, and federal relations activities are also coordinated by the Office of Research Affairs. Since his arrival in 2004, the Vice President for Research has met individually with every faculty member on campus to discuss research plans and possible interdisciplinary collaborations. SDSM&T faculty members have become so successful recently in securing external funding that some of the nearly \$60 million dollars in Department of Defense funding that has been directed to SDSM&T through the South Dakota congressional delegation since 2001 has been used to create the Tech Development Laboratory and provide needed space.

The four-college structure was put into place in 1994 with the explicit aim of fostering interdisciplinary research. Work on reducing administrative barriers to multidisciplinary research has been underway since then. With the creation of the Vice President for Research position, initiatives to better support research projects and collaborations have been renewed and redoubled. We envision a time in the near future when administrative barriers are minimal for all faculty members interested in seeking research funding or conducting funded projects. The Vice President for Research's current priorities are to expand and improve the sponsored programs office, to expand the number of graduate degrees, and to enhance the technology-transfer process.

Research Support from the State

Since the election of Governor Mike Rounds in 2003, state initiatives and funding to support economic development through university research have increased dramatically. In July 2004, a system-level Vice President of Research position was created for the Board of Regents, with responsibility for working with the six state universities, state and federal agencies and the private sector to stimulate and build research capacity and performance within the state. Also in 2004, a Director of Commercialization in the Office of Tourism and State Development was appointed with responsibility for facilitating commercialization of innovations and inventions resulting from university research and coordinating entrepreneurship activities in South Dakota. For the regents' university system a Research Affairs Council was established to provide leadership and coordination for the System's research agenda and for maximizing the System's investment in infrastructure.

The 2004 legislature appropriated \$3,715,861 for the Governor's 2010 Research Initiative. Approximately \$2.7 million of this was awarded to state universities to develop four highly focused, highly competitive research centers. The Center for Accelerated Applications at the Nanoscale or CAAN was created at SDSM&T for research on nanoparticles and associated nanosensors, with particular emphasis on South Dakota mineral development. The governor also established the South Dakota 2010 Research and Commercialization Council. This council oversees the 2010 Research Initiative and makes recommendations for funding of 2010 Research Centers. It also aids in the commercialization process for technology transfer and innovation. In summer 2005, the governor awarded nearly \$445,000 to 19 faculty members statewide as "seed grants" to spur their research work. Targeted research at the public universities and its commercialization potential are part of Governor Rounds' 2010 Initiative, which calls for the state to "become a recognized leader in research and technology development by 2010." Of the 19 grants awarded, 14 came from just 2 schools, and SDSM&T faculty members secured 5 of the awards ([RR302](#)).

EPSCoR Funding

South Dakota has been an Experimental Program to Stimulate Competitive Research (EPSCoR) state since 1989. From 1996 to the present, SDSM&T has received approximately \$3.5 Million in NSF EPSCoR funding.

Centers and Research Institutes Already Established in 1996

The Engineering and Mining Experiment Station (EMES) was established by the state legislature in 1903 to provide analytical services to the public and to serve the institution's academic and research programs. Since 1996, EMES has received over \$1 million in federal funds to upgrade instrumentation for electron microscopy, X-ray diffraction, and elemental analysis.

The Institute of Atmospheric Sciences (IAS) was founded in 1959 to study the physical, chemical, and biological processes that affect the composition and dynamics of the atmosphere. Until 1996, the focus of the IAS was on meteorology; since 1996, the IAS has built upon its strong foundation in physical meteorology to evolve into a research group that focuses on scientific issues that are regionally relevant, nationally important and of global concern. Key scientists, instrumentation and observational facilities have been added and the curriculum for undergraduate, M.S. and Ph.D. students greatly strengthened. The IAS is currently trying to replace their T28 storm-penetrating aircraft with a new A10 aircraft. This would elevate them to a center of research and experimentation.

The Institute for Minerals and Materials (IMM) was closed in 2002-2003 because of a lack of activity. In 2004, the creation of an Institute for Multiphase / Multiscale Materials was proposed and a search for a director begun; however, the search was cancelled with the hiring of a Vice President for Research in September 2004 as the position seemed unnecessary.

In 2005, the structure of the Museum of Geology was reorganized to better integrate the M.S. program in paleontology into the academic structure of the university. The Museum personnel who support the program are now faculty members of the Department of Geology and Geological Engineering, which has a paleontology track at the undergraduate level and whose faculty also supports the M.S. program. The Collections Manager position was restructured as Collections and Museum Manager. This position has responsibility for the operation and development of the public display museum and its collections.

The Geographic Information Systems Laboratory (GIS) lab was new in 1996 and just six students used the two computers the lab contained to take the one GIS class offered that year. Since 1996, the lab has expanded to 15 computers and approximately 90 students a year select among three different GIS classes offered yearly. In 2004 we began offering the Introduction to GIS both semesters and in 2005 are adding a summer Internet section. The lab is being renovated for fall 2005 with new furniture, a projection system, and a new generation of computers. The new space will be a boon both to classes and to the three to four GIS workshops taught every year.

New Centers, Research Institutes, and Labs

In 2001, the Advanced Materials Processing (AMP) center was created under a contract with the Army Research Laboratory with a focus on two leading edge technologies. The latest

state-of-the-art equipment in friction stir welding was designed, procured and installed at SDSM&T with the assistance of our industrial partner, MTS Systems Corporation of Eden Prairie, MN. A laser deposition system was similarly acquired. In 2004, AMP was reorganized into two separately administered laboratories: the Advanced Materials Processing and Joining (AMP-J) Laboratory and the Additive Manufacturing Laboratory (AML).

The friction stir welding equipment provided the SDSM&T with the most versatile, fully instrumented friction stir welding and processing research and development tools found anywhere in the world. Since 2001, the Advanced Materials Processing and Joining Laboratory has developed internal research programs at SDSM&T and has provided support for over 40 graduate and undergraduate students and release time or summer support for six faculty members.

In 2004, SDSM&T announced, as the lead institution, the creation of the National Science Foundation's Friction Stir Processing Industry/University Cooperative Research Center (I/UCRC). SDSM&T joined with three university and 18 industry partners to create the first NSF I/UCRC and national research center to focus on friction stir processing. The Center addresses the need of the aerospace, aeronautic, energy, military and commercial industries for the development of the rapidly growing friction stir processing technology. Also in 2004, the Center for Accelerated Applications at the Nanoscale (CAAN) was created at via a special legislative appropriation to focus on research on nanoparticles and associated nanosensors, with particular emphasis on South Dakota mineral development. The doors were opened on the Tech Development Laboratory (TDL) in October 2004. The SDSM&T Foundation purchased a building near the campus' southern border and renovated it to provide 14,600 square feet of state-of-the-art research laboratory space. The TDL also contains office, classroom, laboratory and processing areas for several funded projects.

The Additive Manufacturing Laboratory performs applied research in the area of Direct Write (DW) and Laser Powder Deposition (LPD). With the addition of Direct Write Laboratory (DWL) in the summer of 2004, the AML became a unique organization focused on additive manufacturing techniques covering six orders of magnitude from microns to meters.

The Earth Resources Observation Systems (EROS) Data Center is a unit of the U.S. Geological Survey (USGS) and has offices at SDSM&T and at the South Dakota State University. It is a data management, systems development, and research field center where researchers work to increase the accuracy and resolution of remotely-sensed data of the type obtained at the EROS Data Center. The data is used to develop models that link weather patterns, precipitation levels, and ground cover which are used to provide vital information in water resource management and flood forecasting.

The South Dakota Space Grant Consortium (SDSGC), based at SDSM&T, enhances faculty development through summer faculty fellowships at the EROS Center. The South Dakota Center for Biocomplexity Studies builds upon previous EPSCoR support for scientific clusters in Biological Response to Stress and Geophysical Processes of the Northern Plains. The center is a virtual center utilizing the intellectual and physical resources at South Dakota State University, the University of South Dakota, SDSM&T, and the EROS Data Center. Construction of a computational mechanics laboratory will be completed by the time of the team visit. The laboratory will provide much needed space for a variety of high-end computing activities, as well as classrooms, office space and meeting rooms. The laboratory will provide our students access to the computational mechanics hardware and software

currently used by industry and will benefit faculty and researchers involved in externally-funded projects.

The West River Foundation, in concert with the Rapid City Area Economic Development Partnership, is building a regional incubator/accelerator facility on campus. The new building will be completed by summer 2006 and house new and expanding businesses with significant growth potential. The incubator will have the specific task of starting and growing innovative high growth companies; facilitating the networking between researchers, entrepreneurs, public entities and private professionals; and developing ideas into commercial applications.

The Graduate Education Research Council (GERC)

The Graduate Education and Research Council (GERC) plays an advisory role on items related to graduate education and research to the administration and campus community. The committee consists of the Vice President for Research (Ex-Officio), Associate Dean of Graduate Education (Ex-Officio), four College Deans, four representatives from four colleges and one representative from the University Senate. Since 1996, the major issues addressed by the GERC are as follows:

- development of policies for graduate education and research
- effective implementation of various policies for graduate education and research
- development of various programs to recruit graduate students
- assistance to the faculty in identifying financial support to graduate students
- assistance in allocating teaching assistants to various programs and departments
- assistance in prioritizing various research activities on campus
- assistance in the development the strategy in acquiring state-of-the-art equipment

In 2005, the GERC will be reformed to reflect the 2-college structure and the hiring of a Vice President for Research. The GERC will be renamed the Graduate Education Council (GEC).

Research and Teaching Balance

In 1996, the team noted some tensions between faculty members regarding commitment to research versus teaching. Considerable efforts have been made to address the support for undergraduate teaching needed on campus; however, SDSM&T's reconfirmation in 2004 of its focus on science and engineering and its goal of developing a national student base have heightened, rather than lessened, this tension. Since 1998, funding for faculty development has been very strong, particularly in the areas of pedagogy and assessment. In fall 2002, SDSM&T's promotion and tenure guidelines were revised to include "curriculum development," including "innovations in curriculum" and "improving pedagogy" as evidence of "scholarly activity." Our strategic planning work and college restructuring are creating opportunities for discussing and possibly resolving the conflict of demands seen by some faculty. At least part of the tension felt relates to workloads as research involvement has increased without a corresponding increase in state-funded faculty positions. To address the need for more faculty members, the creation of more endowed faculty positions has been identified as a goal for SDSM&T's second capital campaign, for which a feasibility study is underway. The feasibility study involves taking our case statement to potential donors nationwide.

Staff and Student Changes

No significant changes have been made to the career service staff (i.e., hourly workers) component of the University. In Student Affairs, numerous programs have been created and the Dean of Students position was elevated to Vice President for Student Affairs and Dean of Students. The student profile has become slightly more female and diverse. Attracting women and minority students to science and engineering is particularly challenging for a small, specialized, and relatively isolated Midwestern school. We have, however, led the nation in the past two years in graduating American Indian students with B.S. degrees in engineering. This is a significant accomplishment considering we graduated approximately 40 Native American students between 1970 and 2000. Between 2002 and 2004, SDSM&T has graduated 16 Native Americans; in 2004 SDSM&T recruited 18 first-time freshman Native Americans and now ranks third in the nation behind the University of Oklahoma and Oklahoma State in its fostering of Native American students in STEM (i.e., science, technology, engineering, and math) areas. In 2005, SDSM&T awarded its first Ph.D. to a Native American.

Enrollment Management Plan

A reorganization of service areas in summer 2005 has placed us in a new situation regarding the development of a comprehensive Strategic Enrollment Management (SEM) plan. Admissions, recruitment, and financial aid functions were moved from the Academic and Enrollment Services (AES) area (under Academic Affairs) to the University and Public Relations (UPR) area. At the same time, the Vice President for Academic Affairs assumed the title and role of Provost. One of the VPAA/Provost's priorities for AY 2005-06 is to oversee the development of a comprehensive Strategic Enrollment Management plan (SEM) that reflects the dramatic changes made in the system to unify student data and the new division of key services between AES and UPR. A draft plan was completed in October 2005 and will be further refined by the time of the team visit ([RR289](#)).

Progress on Creating a “Wellness” Program

The Wellness Center went through a major remodel in 2002; state of the art equipment (treadmills, weight machines, etc.) was purchased and the Student Association has committed \$.50 per credit hour for continual equipment upgrades and replacements. An innovative intramural sports program was developed that provides students as well as faculty/staff members and their spouses with the opportunity to participate in a variety of team and individual sports. Currently offered sports include co-ed soccer, co-ed water polo, 1-on-1 basketball (men's and women's), 3-on-3 basketball (men's and women's), 5-on-5 basketball (men's and women's), 6-on-6 volleyball (men's, women's, and co-ed), co-ed dodgeball, flag football (men's and women's), co-ed kickball, and a racquetball tournament. Almost 100 teams have participated in these various sports in the previous calendar year. In addition, a full-size swimming pool supervised by certified student lifeguards is open between 30 and 40 hours a week. Our two-credit PE requirement for all four-year degree programs underscores our commitment to student wellness.

To address high risk behaviors, a Campus Community Prevention Coalition was formed in 2004 to improve and coordinate substance abuse prevention activities among young adults. Two important grants have been recently funded for Student Affairs in this area are: a two year HEC high risk alcohol prevention program which includes a positive norming campaign

and bystander training and a three year SAMHSA campus suicide prevention grant to include wellness education for students, intervention training for staff and assessment and treatment for depressed students.

Financial Resources

Unsurprisingly, the cost of instruction per student FTE has risen since 1996. Budgeted amounts for instruction (NACUBO program 1) per FTE student were \$3492 in FY 1996 and \$5490 in FY 2005, an increase of 57% over 10 years. Resident undergraduate tuition and fees increased from \$2789 to \$4836 from FY 2006 to FY 2005, an increase of 73%. Resident graduate tuition and fees increased from \$2805 to \$4548 or 62% over the same period. Undergraduate non resident rates increased from \$5621 to \$10003 (78%) and graduate non resident rates increased from \$5649 to \$9805 (74%). An important development occurred in October 2005 when the regents approved the creation of a uniform out-of-state tuition of 150% of in-state tuition. The move seeks to make a South Dakota public university education more attractive to regional and international students. This reduction in fees for non-residents further enhances our “Best Buy” status, a distinction the School of Mines has achieved for eight consecutive years ([RR290](#)).

Physical Facilities

Our most recent campus-wide space utilization audit was presented to the campus at an all-campus planning session in May 2005. The campus has been able to keep pace with expanding/changing space needs, but just barely. With the increased emphasis on research comes an increased need for research space. Only three sources of funding are available for buildings: 1) federal research funding, 2) state (Board of Regents) funding through the Higher Education Facilities Funds (HEFF) which comes from student-paid tuition fees, and 3) private donations.

The 2005 space audit affirmed that SDSM&T is a typical college campus. Classrooms are heavily utilized on certain days and times, but capacity exists for expansion if classes are offered at non-traditional times. Classroom space was determined to be adequate at the present time. Based on square footage, 70% of the classroom and lab area on campus is in excellent or good condition, and only 6% was judged inadequate or unsuitable.

Board of Regents’ policy prohibits significant increases to square footage for academic purposes. Therefore, as old buildings become obsolete or decrepit, the space can be replaced only by razing the building. To finance the replacement of facilities the Board of Regents places 20% of tuition paid by students in the Higher Education Facilities Fund (HEFF). HEFF are allocated via a statewide project priority list. Since 1996, SDSM&T has received HEFF funding for the renovation of the Civil/Mechanical building (\$3,750,000) and the Devereaux Library (\$881,000), and for electrical upgrades (\$767,795) and a central chiller project (\$2,131,000). Replacement of the Chemistry Building is currently SDSM&T’s highest priority on the list.

Since the last visit, the following major improvements to the physical plant have been made:

- 2005: Construction of a computational mechanics addition to the Civil/Mechanical Building to be operational by spring 2006; \$1,821,000 funded through a contract with

the Army Research Laboratory. Once complete, the addition will house 9,550 square feet of teaching laboratories, faculty and grad student offices, and research labs.

- 2005: Training Room was renovated to improve use and better support the Title IX objectives of the University. The renovation removed a room divider, enlarged the space, moved the laundry facilities, replaced the ceiling and lighting, and improved the use of the room by both male and female athletes (as well as male or female trainers). The total cost of the project was \$25,000.
- 2004: Renovation of the Devereaux Library; \$881,000 funded through the HEFF fund. This renovation opened the fourth floor (12,000 square feet) of the Library that had not been finished when the building was originally completed. The main floor was also remodeled to increase the ADA access, add restrooms to all floors, improve exiting (fire code issues), and add study space for students.
- 2003-2004: Acquisition and remodeling of the Tech Development Laboratory (TDL), a building adjacent to campus that houses research activity; \$500,000 funded through a contract with the Army Research Laboratory. The TDL was a former printing building purchased by the Foundation and renovated into 14,000 square feet of state-of-the-art laboratory space. The TDL currently houses an Army Research Laboratory and a Nanotechnology laboratory.
- 2003-2004: Addition of the Hardrock Hall of Fame room to the King Center; \$525,000 funded through alumni donations. The Hall of Fame was developed as a 4,000 square foot place to bring new athletes / recruits to show them the history of the University and to demonstrate the commitment the University has to current athletes. It was financed by alumni and now it is also used as a University meeting room with state-of-the-art projection and sound systems.
- 2003-2004: Construction of a new residence hall, Howard Peterson Hall; \$4,300,000 funded through a bond issuance. Howard Peterson Hall is a 53,000 square foot, 297 bed addition to the Surbeck Student Center. The building was designed and funded with student fees and input. As a result, Howard Peterson Hall has a variety of room types (from suites to dorm style rooms) that meet the needs of new students. Each room has its own temperature controls for heat and air conditioning served by the central plant. The entire facility aids in the recruitment of new students and allows for summer conferences that help fund future student improvements.
- 2003-2004: Renovation of the Surbeck Student Center; \$1,200,000 funded through student fees. The renovation occurred at the same time as the construction of the new residence hall, and the two structures are joined in order to increase the use of the student center and promote more interaction between students and peers. Impromptu meetings and study groups are the result of this shared space and the students have more of a sense of "home" than in older residence halls. A new student organization area was constructed over the former bowling alley which also adds to the atmosphere of the building as a complete student center.
- 2003: Construction of a Wellness Center within the King Center; \$460,000 funded through student fees. The wellness center was constructed at the same time as the new residence hall. The students themselves voted for a better facility for daily life on campus. Three rooms were made into a state-of-the-art workout facility that incorporates \$100,000 worth of new weight lifting and aerobic equipment, and two new locker rooms that allow for Title IX compliance in the athletic department.

- 2003: Renovation of the Varsity Weight Room (located in a former rifle range) removed the steel trap wall, renovated the ventilation, installed a new floor, replaced the ceiling and lighting, repainted the room, and repaired the ceiling. The total cost of the project was \$40,000.
- 2002: O'Harra Track Renovation was a cooperative project between Rapid City School District, City of Rapid City and SDSM&T. The project replaced (at a cost of \$1,000,000) the existing urethane track that had failed and was no longer suitable for track meets. The cost of the project was shared with \$400,000 for the Rapid City School District, \$400,000 for the City of Rapid City, and \$200,000 for SDSM&T. The new track required a new asphalt base and drainage system before the rolled Mondo Surface was installed. The new Mondo surface is an all weather track that can be used for practices as well as meets.
- 1999-00: Renovation of the Civil/Mechanical Building; \$3,750,000 funded through the HEFF fund, and \$500,000 through a grant from the Kresge Foundation. The renovation of the 43,542 square foot Civil/Mechanical building involved a complete gutting of the building and rebuilding from the inside out. The new space was designed with student interaction and team building in mind. Student teams can now share tools, ideas, and personnel. This new design was a factor in the selection of SDSM&T as the winner of the Boeing Engineering Excellence Award.
- 1999-00: addition of the Caterpillar Student Laboratory to the Civil/Mechanical Building; \$150,000 funded through a grant from the Caterpillar Foundation. This laboratory added 4,600 square feet of specialized lab space for the student teams involved in the CAMP program. The Mini-Indy, human powered vehicle, Mini-Baja, Aero, concrete canoe, and other competition teams all utilize this space.
- 1999-00: addition of a civil engineering laboratory wing to the Civil/Mechanical Building; \$150,000 funded through alumni donations. This expansion added 4,600 square feet of new lab and test space to house the concrete lab. The concrete canoe team also utilizes this space for testing and building. Many hours of research into new concrete formulas have been done in this lab in the last six years.

Library

Longstanding plans to renovate the Devereaux Library moved ahead in 2004 when the legislature authorized funding to complete the unfinished 4th floor. Carpeting, paint, drop ceilings and lights were put on to the barren floor, along with a secure, climate controlled vault for special collections and archives. The 2nd floor of the library also received some attention, getting new tile, flooring, paint and a new Circulation Desk. Both floors also had restrooms installed. The Library was also included in the central chiller project resulting in a new air handling system being installed while renovation of the 4th floor was underway. Some progress has been made since 1996 in securing funding for the general collection and for research. The library was allocated 3% of Facilities and Administration (F&A) charges to research grants. These funds allocated to the Library are to be focused on research areas.

Topics mentioned under Criterion 3 (pages 38-70 of the 1996 team report)

General Education

Since 1996, the two most significant developments in our general education program have been 1) the system-wide adoption of the CAAP (Collegiate Assessment of Academic Proficiency) test as our the general education assessment and 2) the creation of general education objectives and outcomes that are common to all of the regents' institutions.

All "rising junior" students, i.e., students who have completed their general education courses, must be assessed via the CAAP; moreover, they are not able to progress in their degree programs unless they meet "cut scores" set by the regents. The CAAP scores are used in conjunction with the ACT scores of incoming students in order to produce a campus "gains" report that indicates (by cohort) the gains made by students via the general education program. The common general education objectives and outcomes were defined in 1998 and then reviewed and revised effective fall 2005. Much more detail is given about this in subsequent chapters.

The newly designed computer-based Individual Educational Program (IEP) in development at the time of the last visit was replaced in 1998 by the Colleague student information system. In 1998, the Board of Regents began the process of centralizing student information through the implementation of Datatel's Colleague software. SDSM&T resources were refocused on the new student information system and the IEP project was discontinued. A freshmen mentoring program was developed and is still in place. Between 2002 and 2005, the centralization of student information was completed, and a centralized HR / finance system project was begun in 2005.

Tremendous gains have been made in the area of assessment since 1996; in fact, it is fair to assert that the campus has developed a culture of assessment. A ½-time administrative position to oversee academic assessment was created in fall 2001. And in 2004 nine of our ABET-accredited programs underwent ABET review under the new EC2000 criteria which require program curricula to address and assess 11 specific learning outcomes. A General Education Assessment Committee (GEAC) and an Engineering Assessment Committee (EAC) were functioning by spring 2002, and by spring 2004, the General Education Assessment Plan was created and beginning to "close the loop" on key outcomes, such as effective written and oral communication. Progress made on creating a culture of assessment was reinforced by the rising expectations of the National Science Foundation and other granting agencies for thorough and authentic assessment of grant-funded projects. The campus as a whole shares a vocabulary of "objectives" and "outcomes" when planning any initiative and takes assessment for granted as a natural and desired dimension of what we, as faculty and staff members, do. Under the 2005 reorganization of the colleges, assessment oversight has become part of the deans' description of duties.

Collaboration with Black Hills State University (BHSU)

Black Hills State University (BHSU) is our "sister" institution in the region and is located 50 miles away in Spearfish. In collaboration with BHSU and the nearby Western Dakota Tech (WDT), we are able to serve the region's higher education needs by serving different constituents. BHSU, for instance, is known for its high quality teacher education program and serves the teacher training and staffing needs of the region. WDT serves those in the

region who seek a post-secondary education combined with preparation for employment in the trades. And SDSM&T is known as a science and engineering institution and a center of research and development. In 2004, our intent to collaborate on educational programming was formalized through the creation of the Higher Education Center – West River located in Rapid City.

Developments Within the Colleges

Within the College of Materials Science and Engineering, the chemical engineering faculty developed a biochemical engineering focus with financial assistance from Cargill and have redesigned their approach to laboratory experiences with funding from Dow Chemical. This college has seen a growth in research activity and has played a major role in the development of the Ph.D. in nanoscience and nanoengineering. Enrollments in chemical engineering declined by approximately 50% but show signs of turning around. Chemistry has shown an increase while physics enrollments have declined.

In 2002 the decision was made by the College of Earth Systems to phase out the mining engineering program and to develop a mining engineering and management program as a replacement. This transformation was achieved with a \$300,000 investment from the mining industry raised by our alumni. Enrollments in civil engineering have declined significantly, while interest in the paleontology masters program has increased. In 2004, the AEW Ph.D. program, shared with SDSU, was replaced by a Ph.D. in atmospheric and environmental science. A baccalaureate program in environmental engineering was authorized by the Board of Regents for implementation in fall 2000 and is seeking accreditation.

With our recommitment in 2004 to our traditional focus on science and engineering, the College of Interdisciplinary Studies undertook to redesign their interdisciplinary science program and to create four “specializations” clearly focused on science. These four specializations are as follows: Atmospheric Sciences; Business Applications in Science and Technology; Pre-Professional Health Sciences; and Science, Technology and Society. The Business Applications in Science and Technology specialization requires a minor in business or entrepreneurship from Black Hills State University (BHSU). This specialization is part of the cooperative efforts being made with (BHSU).

Within the College of Systems Engineering, Mechanical Engineering and Industrial Engineering both experienced significant growth in enrollments (about 50% in mechanical engineering and 100% in industrial engineering). Within this college, 5.25 new faculty members have been added, 2.25 in industrial engineering and 3 in mechanical. Following a high in fall 2001, enrollments in both computer engineering and computer science have declined significantly following national trends. The faculty of this college has played a major role in the development of the Advanced Materials Processing and Joining Laboratory. The institution’s first endowed chair, funded at 50%, was established in electrical engineering in 2001. Mechanical engineering and electrical engineering have collaborated in the development of a shared focus in mechatronics.

2004 ABET Review

In 1998 the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC-ABET) reviewed the engineering programs and renewed the accreditation. The new major of computer engineering received its first accreditation. In

2002, the Computing Accreditation Commission of ABET reviewed the computer science program resulting in continued accreditation for the full six-year period. The 2004 accreditation visit by EAC-ABET resulted in six-year continued accreditation for all currently accredited programs. The program in environmental engineering was deemed not yet accreditable. The chair of the Department of Civil and Environmental Engineering is working with the program's faculty to prepare the program for an accreditation visit in fall 2007.

Graduate Programs

The quality and quantity of our graduate education programs have improved since 1996. During the last two years, we have seen a decline in international students in our graduate programs. Average enrollment in our M.S. programs increased 36%. Between 1995 and 1999 average M.S. enrollment was 195; between 2000 and 2004 average M.S. enrollment was 266. Average enrollment in our Ph.D. programs increased 44%. Between 1995 and 1999 average Ph.D. enrollment was 30; between 2000 and 2004 average Ph.D. enrollment was 43. This increase reflects the administration's strong support for graduate education and research. The AEWR Ph.D. program was replaced by the AES Ph.D. program in fall of 2005 and we have a new Ph.D. program in nanoscience and nanoengineering which started in fall 2005.

Computing and Networking Services

The networking environment on campus is both local area network (LAN) and wireless enabled, and our personal computer infrastructure is very good. LAN speeds moved from 10mbps in 1996 to 100 mbps to the desktop in all buildings. Our network backbone has increased from 100mbps to 1gbps across campus. All student computer lab machines have been upgraded so that all lab machines can run any application on campus, and all faculty machines have been upgraded. We are piloting a tablet PC program for students and plan to fully implement it for all incoming freshman in fall 2006. Roughly 1/4th of the faculty now uses tablet PC computers. Our virtual conferencing capabilities are via five polycom units, three in classrooms and two in conference rooms. Our Internet 2 bandwidth and routes have been established to route Internet 2 traffic between the other regents' institutions and other cooperating Internet 2 sites.

Distance Education Offerings

SDSM&T is a contributing partner in the South Dakota Electronic University Consortium (EUC), which was accredited by the Higher Learning Commission in 2004. However, we continue to play a relatively small role in the creation of online curricula and courses. We have one program, the M.S. in technology management delivered via a distance mode. The Chemistry Department has offered CHEM 106, 112, and 114 online for three years now. SDSM&T faculty members create specialty courses, such as Geographical Information Systems, for online delivery. Several of our general education faculty members have created online versions of lower-level courses, such as introductory psychology, for delivery via the EUC.

Institute of Atmospheric Sciences

(See above under "Centers and Research Institutes Already Established in 1996.")

Engineering and Mining Experiment Station

(See above under "Centers and Research Institutes Already Established in 1996.")

Technology Fellows Program

In 2000, the Technology Fellows (Tech Fellows) program was funded (primarily by the State with campus matching funds) to provide a unique opportunity for undergraduate students to develop professional level technology skills, learn to work in a team-based environment and to be remunerated while learning. The program is designed so that Tech Fellow students assist faculty members in learning new technology that can be integrated into their course curricula. The scope and type of projects are determined by the needs of the faculty. In addition to their assigned projects and tasks, Tech Fellows spend one hour per week in a seminar course. This course draws on the expertise of various faculty members, staff members and even the Tech Fellows themselves. For AY 2005-06 we have 15 Tech Fellows.

High Plains Center for Technology (HPCnet)

HPCnet is the name of the software that supports our University web presence. In December 2003 The High Plains Center was closed as a profit center and its staff was integrated into our Information Technology Services (ITS). The few external contracts existing at that time continue to be supported. In 2004, we contracted with Stamats for assistance with a web site redesign, and in fall 2005 a search for a director of communications was begun.

Museum of Geology

(See above under "Centers and Research Institutes Already Established in 1996.")

Apex Gallery

Since 1996 the "New Gallery" has been officially named the Apex Gallery. A director was hired in 1999 to curate eight to ten exhibits annually, many by artists who are nationally or internationally known. Each exhibit has interpretive material or educational programming with the goal of engaging student interest and participation. In 2002, a grant from the Firestone Graham Foundation brought in the internationally known installation artist, Sandy Skogland who worked with the director's Modern and Contemporary Art History (ARTH 321) class as well as Wilson Middle School's 4th grade class to create a complete environment in the gallery. Most recently a grant from the South Dakota Humanities Council brought in the exhibition, China: Exploring the Interior. This exhibition chronicled a Carnegie expedition into China by a man who had also helped to map the Black Hills in the late 1800s.

Ranch A

Ranch A is located along the banks of Sand Creek in the Wyoming part of the Black Hills and continues to be rented by the Department of Geology and Geological Engineering for ten weeks per year to conduct field camps. Currently there are two camps, the geology field camp and geological engineering field camp, each of which is five weeks long. The field camps are operated by the Black Hills Natural Sciences Field Station and are cooperative efforts between SDSMT, the University of North Dakota, the University of Mississippi, and the University of Wisconsin-Milwaukee.

Black Hills Natural Sciences Field Station

The character of the Black Hills Natural Sciences Field Station has evolved over a period of more than 35 years. For the past 25 years it has functioned as a summer field program for geology and geological engineering. It is now a cooperative effort among four universities that send students to joint field camps (one for geology and one for geological engineering) at Ranch A (see above). In the past two years this effort has expanded to include an international geology field camp based at the countryside town of Taskesti in northwestern Turkey. Approximately 55 students participate in the six-credit field experiences each summer. The success of this program was demonstrated in 2005 when 12 students from non-consortium universities from across the United States participated in the geology field camp in Turkey.

Exchange Programs and Other International Programs

There have been no changes in our exchange program with the Bergakademie Technical University in Freiberg, Germany or with the University of Mining and Metallurgy in Krakow, Poland. Since 1996 a relationship with the Mongolian University of Science and Technology (MUST) has developed. We have updated our overall Memorandum of Understanding (MOU) and have signed a specific MOU for our technology management program. We also had one faculty member spend a one-year sabbatical at MUST and are attracting many Mongolian graduate students ([RR280](#) and [RR291](#)). We have secured agreements with two universities in Norway's Gjøvik University College and Telemark University College. Two students spent the 2004-05 academic year at Telemark University College. In 2005, a Memorandum of Understanding was signed with Sri Ramakrishna Engineering College in Coimbatore, India, which includes faculty and student exchanges and other opportunities for collaboration. A similar MOU was signed with China Three Gorges University in October 2005.

Other exciting developments in this area have been pilot projects involving international humanitarian engineering projects. The effort was begun by a single environmental engineering professor who designed the projects (in Guatemala and Uganda) for seniors completing Senior Design. He funded the trips through on-campus grants and personal resources. His efforts have incited the interest and involvement of other faculty members, and a small group of engineers and one administrator are piloting a project to develop an international / humanitarian alternative to Senior Design under the auspices of CAMP. They await news about NSF funding and plan to field a project team to Uganda in winter 2005-2006.

The geology program sponsors biannual geology international trips that have proven extremely popular. Groups of faculty, students, staff, and community members have traveled recently to Spain, New Zealand, and Mongolia. Every three years, our choir director leads a contingent of the SDSM&T chorus on an international trip that involves performances and collaborative experiences.

The Center for Advanced Manufacturing and Production P

(See page 9 above under Criterion 1 and “Center of Excellence.”)

Topics mentioned under Criterion 4 (pages 70-77 of the 1996 team report)

The “Tech Quality Plan” and the Reinvestment Plan

In 1995-1996 the Board of Regents approved the Tech Quality Plan. The plan focused on more efficient use of resources by restricting entry to the high-cost majors in science and engineering but was never implemented due to faculty opposition and generally declining enrollments. In 1996, the Legislature required the state university system to reduce its appropriated budget by 10% and, subsequently, allowed the universities to retain this funding as a “reinvestment” pool. Each university was required to use 1/3 of these savings to establish a center of excellence and to use the remaining funds in six specified areas: technology infrastructure, redesign of the university curriculum, protecting assets, economic development, linkages to the K-12 community, investment in change. Our Center of Excellence is our CAMP Program (Center for Advanced Manufacturing and Production) established in 1997. SDSM&T sends a reinvestment plan to the regents each year. Since 1998 reinvestment funds have been used for projects such as the development of the freshman engineering course, GES 115, and other curricular projects, laboratory improvements, outfitting all classrooms with ceiling mount projectors and computers, and membership in Internet 2.

System-Wide Services and Centralization of Student Services

The Colleague student information system by Datatel was installed in the regents’ system in 1997, at which time admissions paper processing became handled centrally by the Enrollment Services Center (ESC) in Vermillion, South Dakota. Web Advisor became fully operational on the SDSM&T campus soon after, and is used by students, faculty, and staff. In 2004 the centralization of student data was completed via the STUDENT project, and all academic policies of all universities in the regents’ system were aligned. Successful completion of the STUDENT project in 2004 is now making possible development of centralized online student services. In 2005 a system-wide Human Resources and Finance System project was begun, this time with SCT, Inc. software. The project is ongoing, but the goal is to create system-wide shared services and to achieve dramatic efficiencies in resources and personnel.

Reduction of Small Sections and Programs

In 1996 the regents implemented a policy that called for the reduction of the percentage of small sections (to 2% overall) exclusive of independent study, thesis, design courses, etc. “Small” was defined as fewer than ten students at the undergraduate level and fewer than

seven students at the graduate level. In 2001 this policy was revised to permit universities to offer up to 4% of its monitored sections as small classes. In 1998, the masters programs in chemistry, physics, and metallurgy, all of which had single-digit enrollments, were phased out and replaced by a masters program in materials science and engineering. The masters program in mining engineering was also eliminated at this time.

Redirection of State Appropriations (Incentive Funding)

Incentive funding (not to be confused with the reinvestment program described above under the “Tech Quality Plan and the Reinvestment Plan”) is part of the five-year funding plan presented to the legislature. The five-year plan we currently function under replaced the previous “formula funding” approach which based annual state appropriations on a three-year rolling average of enrollment, weighted by discipline and course level. The five-year plan approach was a political strategy at a time when declining enrollments would have meant a significant decrease in state appropriations for certain schools in the system. The Legislature approved the five-year plan approach with the understanding that a percentage of state funds would be given to the universities on an “incentive” basis. Each year, the regents and each school formulate incentive goals that are of interest to the state.

Developments in Academic Advisory Council (AAB)

In 1996, an institutional level advisory group, the Academic Advisory Board, was established to provide the university with external input on longer range trends of which it should be cognizant. Comprised of industry executives and leading researchers, this group meets twice annually. Its 2001 report, Drivers for Science and Engineering Education at SDSM&T, has provided guidance over the past several years as we have developed our vision of our future.

K-12 Linkages

SDSM&T continues to cultivate a wide array of linkages to area schools; however, we do not have any single office that coordinates the full range of involvements. For instance, the Children’s Science Center was established and run by the office of University and Public Relations while our yearly Engineers Week is coordinated by Academic Affairs. Half of our discussion under Criterion 5 is devoted to the many ways we serve and engage the K-12 community.

Campus Master Plan and Facilities

We concluded our first capital campaign in 2000 very successfully by raising \$20.4 million; the target for that campaign had been set at \$16 million. We are now preparing for a second capital campaign with a possible target of \$50 million and are identifying industrial partners to help build needed facilities. Our academic departments have articulated five-year plans for how new capital funds could be used to build and expand existing programs.

In 1996 we had recently completed construction of our classroom building. Since then, numerous renovations and additions have been built. A 300-bed residence hall was constructed in 2004 and has been functioning at capacity ever since. Ground was broken in spring 2005 for a business incubator facility, and a three-story addition has been built to our Civil and Mechanical Engineering building to house a new computational mechanics

laboratory. In 2005, the Board of Regents authorized planning for the replacement of our chemical and chemical engineering facility.

Much of our renovation work has been directed at developing facilities to enable us to attract and host conferences and other educational or cultural programming. To this end, we have made extensive renovations to the Surbeck Student Center, reorganized out conferencing and scheduling staff, and hired a Director of Educational Programs and Professional Conferences in 2004.

Our O'Harra stadium has undergone continual upgrades to keep pace with the needs of the School of Mines and area athletes. In 2002 the track was updated to a state of the art "mondo" surface at a cost of slightly less than \$1 million. Current plans are to partner with the City of Rapid City and the Rapid City School District to upgrade our grass playing surface to artificial field turf. This project is expected to be completed in the summer of 2006.

The Campus Master Plan created in 1989 included the creation of a High Plains center technology center and fine arts center. The vision involved joining the Old Gym, our administrative building (O'Harra) and the Civil and Mechanical Engineering building into one continuous structure. That approach to unifying the campus was not sustained, and a different approach was taken in the new Campus Master Plan released in spring 2005. The new plan is discussed in detail under Criterion 2.

Topics mentioned under Criterion 5 (pages 77-82 of the 1996 team report)

Representation of Women and Minorities on Campus

Campus demographics are strongly affected by location and size. The campus is geographically isolated for specialty schools of its type, and over 70% of the students are South Dakota natives. In terms of overall racial and gender diversity, the student body continues to be predominantly composed of white male students. Native Americans make up just over 8% of the state population but less than 3% of the student body. However, in 2003, seven Native American students earned B.S degrees in engineering at SDSM&T, the largest number granted by any single institution in the country. Over 50% of entering Native American freshman in 2004 were female.

In AY 2003-04, women accounted for just 13% of the freshman enrolled in science, technology, engineering, and math majors (i.e., STEM areas). In the graduating class in 2003, 15% of those who received B.S. degrees in STEM majors were female and only 9.8% of the engineering B.S. graduates were female. If we include interdisciplinary sciences students in the SDSM&T numbers, we can note that 23.5% of the fall 2005 incoming class of first-time freshman is female.

Nationally, women make up a persistently small percentage of faculty members in science, engineering, and technology fields. In 2001, less than 9% of all engineering faculty were female. In science, 31% of all faculty members were female nationally. At SDSM&T in fall 2005, the percentages of full-time female faculty members are 14% for science programs (excluding interdisciplinary sciences) and 9% for engineering programs. Women account for 17% of full-time faculty members in the social sciences and 55% of faculty in the

humanities. The gender division for all faculty campus wide as of fall 2004 was 19.7% female and 80.3% male, or 27 women and 110 men. For a breakdown of full-time faculty members by gender, program, and rank, please see [RR292](#).

Foundation

Student scholarship funding has grown substantially in the past ten years, primarily as a result of the Vision 2000 Capital Campaign, to the point where close to \$1 million is awarded annually in scholarships through the SDSM&T Foundation.

The number of named professorships and endowed chairs have increased since 1996. In 2001, the Steven J. Miller chair was established to assist the Department of Electrical Engineering in establishing a research focus. This endowment funds half of a position in that department. In addition, we have the following endowed professorships:

- The Douglas W. Fuerstenau Professorship supports faculty members from the mineral industries areas of study, with special focus on metallurgical engineering programs.
- The John C. Mickelson Professorship supports faculty members from the Geology and Geological Engineering program, with preference to individuals with expertise related to petroleum or geology/ground water.
- The William J. Hoffert Professorship supports faculty members from the Electrical and Computer Engineering Department at SDSM&T.
- The Pietz Professorship supports faculty members from the Industrial Engineering Department at SDSM&T.
- Robert L. Sandvig Professorship supports faculty members from the Chemical Engineering Department at SDSM&T.

Academic Program Enhancement

In excess of \$1 million annually is made available, primarily to departments, for academic program enhancements ranging from funding for faculty travel to upgrading of laboratory and specialized computing facilities.

Capital Improvements

As can be seen from the list of building projects provided under “Physical Facilities” above, substantial upgrades to our facilities have been made since 1996 for a campus of our size and resources. In 2003-2004 we made a \$767,795 capital investment in our electrical system to finish a long-term upgrade project begun in 1980. We now have fully looped 12kV service to every building on campus, and this provides increased reliability and the additional load capability we need to meet the current campus master plan. We also made a \$2,131,000 investment in our central chiller in order to add 900 tons of cooling capabilities that connect to five current buildings. Our chiller capacity is now sufficient to serve the additional building projected for construction on the current master plan.

Other External Relationships

The most significant relationships we, as a campus, have developed since 1996 promise to have a tremendous impact on the institution’s future. We have formalized our relationship with Black Hills State University and Western Dakota Tech as the institutions that serve the

higher education needs of the region through the creation in 2004 of the Higher Education Center – West River (HEC-WR). The HEC-WR center facilitates the sharing of curriculum between and among the institutions. In 2004, we worked with Black Hills Vision on the establishment of Ph.D. programs in nanoscience and nanoengineering in order to ensure that these new programs would serve the economic-development interests of the region. We are currently working with them as we develop our proposed biomedical engineering Ph.D. program.

In 2004, President Ruch persuaded the economic development community to locate a regional business incubator building on the campus in lieu of a site across town. We believe that completion of this facility in 2006 will open a new expansive chapter for SDSM&T in its relations with regional business and industry.

In 2003, our former president, Dr. Richard Gowen, led a formidable effort to obtain state support for the selection of the Homestake Mine in Lead, South Dakota as the site for a new underground national laboratory (known as “H-DUSEL” for Homestake Deep Underground Science and Engineering Laboratory). An SDSM&T Professor of Geology and Geological Engineering is a member of the steering committee which prepared the NSF document entitled, “EarthLab: A Subterranean Laboratory and Observatory to Study Microbial Life, Fluid Flow, and Rock Deformation.” He is now the Co-PI on the NSF project to prepare a Conceptual Design Report for the H-DUSEL.

We continue to participate in the West River Nursing Consortium and partner with three other regents’ universities and Rapid City Regional Hospital to provide two-year, four-year and graduate nursing programs in Western South Dakota. Students in the undergraduate nursing programs take their general education and general science coursework at SDSM&T or Black Hills State University under this agreement.

Chapter 3: Response to the Concerns and Suggestions of the 1996 Team Report

The 1996 Team Report details the review team's concerns and offers its advice and suggestions for moving forward (See pages 84 to 90 of [RR1](#)). This chapter summarizes how we have responded to the concerns, advice, and suggestions the 1996 team had to offer. This chapter is organized according to the topics in the 1996 report and the headers are derived from the language of the 1996 report ([RR1](#)).

Concerns

General Education fragmented in implementation and development

Considerable attention has been given to general education since the last visit, both at the system level and at the institutional level. In 1998-99 and again in 2003-04 the Board of Regents requested a review of general education requirements. Conducted by the academic officers together with faculty representatives, this review led to adoption of common requirements across the system effective in fall 2000 with modifications effective in fall 2005. Course syllabi were reviewed to ensure that the approved courses meet the general education objectives and outcomes. The Collegiate Assessment of Academic Proficiency[®] (CAAP) exam was adopted as a rising junior exam to assess general education. Students failing to meet standards are placed on a development plan and given a year to retake the exam and meet standards.

At the institutional level, a General Education Assessment Committee (GEAC) was fully functioning by 2002. General education faculty worked with engineering faculty to develop rubrics for writing and speaking. Questions focused on general education gains and designed to be compared with similar questions on the incoming freshman survey were added to the Student Satisfaction Inventory[®] taken by all students. The institution has participated in the National Survey of Student Engagement (NSSE) since 2002. Results have been used to identify actions items for curricular improvement reflected in the institution's strategic plan.

Assessment not yet fully implemented and feedback loop not functioning

The efforts to fully implement effective assessment at both the institutional and programmatic level were greatly enhanced in 2001 with the creation of an administrative position with responsibility for assessment and faculty development. In addition to the GEAC, an Engineering Assessment Committee (EAC) was created to address assessment issues in common to engineering programs. For example, in 2003-04 the EAC considered Fundamentals of Engineering exam results related to mathematics and enlisted the assistance of the mathematics faculty to review the coverage and sequencing of topics in the calculus courses. A plan for modification of these courses was presented in fall 2004.

As a result of the fall 2004 accreditation review visit by the Accreditation Board for Engineering and Technology (ABET), all engineering programs were required to demonstrate a functioning assessment program and were able to provide convincing evidence that the "loop had been closed." The focus on assessment by ABET and by funding agencies such as

the National Science Foundation have reinforced on campus the need to develop a culture of assessment that has as its goal the improvement of student learning.

Vulnerability of graduate programs because of low enrollment, and lack of distinction, recruitment, assessment

Enrollments in both the M.S. and Ph.D. programs have increased since the previous visit. Average enrollment in our M.S. programs increased 36% while average enrollment in the Ph.D. programs increased by 44%. Currently, however, graduate enrollments remain a concern as the number of international students continues to decline. The increase in funded research in recent years has enabled the institution to provide research assistantships to a growing number of graduate students. In fall 2005 a new Ph.D. program in nanoscience and nanoengineering, one of only a few in the nation, was implemented with an initial enrollment of seven students. Approval was received in December 2005 for a Ph.D. in biomedical engineering in collaboration with the School of Medicine at the University of South Dakota. While closing the loop in assessment at the graduate level lags behind that at the undergraduate level, most graduate programs have now developed and are in the process of implementing their assessment plans.

Faculty not fully engaged in leading curriculum design and changes in instructional delivery

The increased participation of the faculty in the development and implementation of assessment plans has provided the stimulus to look at the curriculum and its design and delivery. In each program, faculty members have instituted curricular changes based on assessment results. A freshman introduction to science and engineering course has been developed by the faculty and is now required by all but a few programs. Over the course of four summers, approximately 25% of our faculty members received full summer support to redesign courses to utilize technology to improve student learning through the governor's Technology for Teaching and Learning program.

The desire by a growing group of faculty members to address student intellectual development, not just subject matter mastery, is reflected in the growing number of proposals to funding agencies to support curriculum improvement. Our assessment data, in particular the NSSE data, provided convincing evidence that our student engagement in the first two years was significantly less than of other engineering and science students nationally. In response, the administration provided funding for a small cohort of faculty members to spend summer 2005 in studying the research on active learning and pedagogies of engagement and in planning changes to their courses based on this research.

Insufficient appointment of women and minorities

Some progress has been made in recruiting women faculty members in the engineering disciplines with the addition of women faculty members in civil, electrical, and industrial engineering. The percentage of women faculty members in engineering programs is 9% which is also the national average. Women account for 14% of the full time faculty for science programs (excluding interdisciplinary sciences), for 17% in the social sciences, and for 55% in the humanities. The gender division for all faculty campus wide as of fall 2004 was 19.7% female and 80.3% male, or 27 women and 110 men.

Insufficient State funding

While the amount of state funding available in a sparsely populated state with an economy based on agriculture and tourism is limited, the state is supportive of higher education as evidenced by two significant actions since the last visit. While the rest of state government reduced its budgets by 10% in response to taxpayer actions, the legislature allowed higher education in 1997 to retain its 10% cut as a reinvestment pool. When enrollments declined in the latter half of the 1990's and state funding should have been reduced based on the funding formula in use at that time, the legislature allowed the universities in the regents' system to retain the funds due to be lost and use them in a salary enhancement program. More recently, the governor's 2010 Plan places emphasis on developing a technology-based component of the economy and recognizes the role of higher education in this initiative. As a result, close to \$500,000 in new base funding was added to the 2005-06 state appropriation to support the new Ph.D. in nanoscience and nanoengineering and a similar annual amount for five years was appropriated for SDSM&T's Center for Accelerated Applications at the Nanoscale (CAAN).

Recognizing that state appropriations will likely never be sufficient for us to attain all our goals, we have actively and successfully sought additional funding through the SDSM&T Foundation's capital campaign, from industry partners who have a vested interest in the quality of our graduates, and from federal sources.

Demographic trends, state funding, rising tuition and fees, and decreased enrollments

In the past decade we have responded to the enrollment challenge through collaboration with other institutions, further development of the interdisciplinary sciences program, and increased focus on the needs of non-traditional students. While there have been no dramatic shifts in overall enrollment, student numbers dipped in the late 1990's, increased in the early 2000's and have shown a decrease in each of the past two years. We recognize that we must approach recruitment differently and have engaged the services of Stamats in developing new recruitment strategies which are being implemented in the current recruiting cycle.

Low retention rate at freshman / sophomore levels

Retention at a narrowly focused institution such as ours is a particular challenge since students who change career goals must leave the institution to pursue them. The institution has undertaken a variety of initiatives to ensure that students who want to study science and engineering have the academic and social support necessary for persistence. The freshmen mentoring program, peer advising program, and advisor training are well established and provide new students with support and guidance in their adjustment to the academic demands of our programs. In spring 2003 over twenty SDSM&T faculty members participated in the Foundations of Excellence in the First College Year project. The conversation begun then has continued to this day and has led the administration to create the position of Director of Retention in 2004, to provide funding for a first year program coordinator position in 2005, and to identify the first year as a priority in the institution's strategic plan. In fall 2004, the FIRST program, based on the learning community concept, was instituted and, while it is too early to form solid conclusions, shows promise in increasing student engagement in the life of the university.

Retention of first year students varies from year to year but been consistently in the low 70% with the exception of fall 2004 when it fell to 66%. While this was due in part to the reclassification of pre-nursing students when the student data bases from the six regents' institutions were merged, it has led the president to identify retention as an institutional priority. We anticipate that two recent actions will, in the long term, result in an improvement in first year retention. In March 2005, the Regents authorized increased admission standards for SDSM&T. Since inadequate preparation, particularly in mathematics, is a strong predictor of attrition, in summer 2005 a summer "bridge" program was piloted to prepare students to begin our published curricula in the fall.

Limited integration and impact of interdisciplinary faculty

The creation of the College of Interdisciplinary Studies has given this faculty an identity of its own. In 2004-05 members of the Departments of Humanities and of Social Sciences redesigned the baccalaureate program in interdisciplinary sciences, creating a degree program with four specializations. These four specializations, Atmospheric Sciences; Business Applications in Science and Technology; Pre-Professional Health Sciences; and Science, Technology and Society, clearly align with our mission of science and engineering. Faculty from this college are active members of the Faculty Senate, are represented on major committees, and have worked with their science and engineering colleagues on such projects as the development of rubrics for writing and speaking that can be employed in all classes.

Advice and suggestions

Administrative or faculty support of faculty development

In 2001 an administrative position, Director of Academic Initiatives, was created with responsibility for faculty development and assessment. A grant, the fourth three-year grant received, from the Bush Foundation has provided \$100,000 annually for the past three years and has been supplemented by approximately \$50,000 annually in institutional funds. Between 2001 and 2005 over 250 separate project proposals were funded, including teaching enhancement projects, travel, and workshops.

Establishment of teaching and learning / curriculum center or campus resource

The establishment of a true Center for Teaching and Learning remains a dream on our campus. However, funding from our Bush grant and the SDSM&T Foundation, together with fund-raising lunches put on by faculty and staff members, have enabled us to create a "reading corner" in the Faculty Lounge. Over \$4,200 in grant funding plus an additional \$2,200 in foundation funds have been spent to equip the reading corner and to stock it with books on teaching, learning, assessment, leadership and other topics. Faculty members are encouraged to identify books they would like to have added to the collection.

Reduce dorm rates as compensation for poor condition

The first phase of a plan to replace our aging residence halls was completed in August 2004 with the opening of Howard Peterson Hall, a modern, air-conditioned residence connected to the Surbeck Student Center.

Provide incentives for faculty teaching core freshman / sophomore courses, working on curricular revisions, and on assessment

Each year since 1997, significant funding has been allocated through the reinvestment program to provide support for curricular revision and assessment activities, most often in the form of summer support for these activities. Whenever possible, year-end funding has also been directed toward these areas. The development of the freshmen engineering and science course, GES 115, and development of supplementary learning materials for chemistry courses are two examples of curriculum projects supported. The institution is a member of The Collaboration for the Advancement of College Teaching and Learning and is well represented at The Collaboration's conferences. In addition to institutional incentives, between 2001 and 2004 over 20 faculty members received full summer support from the Office of the Governor for curriculum redesign projects.

Encourage more cross-disciplinary work among faculty

The introduction of multidisciplinary graduate programs and the increase in research activity along with the focus by funding agencies on collaborative project have provided the stimulus for faculty to work together across disciplines.

Raise research requirements / standards for tenure

As our research agenda has grown, so has the attention paid to research involvements by our Tenure and Promotion Committees. In fall 2005 the institutional faculty performance standards will be reviewed to ensure that these adequately reflect the current expectations and will support our mission and goals.

Address faculty concerns about impact of student evaluations

Beginning in 2001, the COHE/Board of Regents Agreement has stipulated that a major portion of faculty pay increases be based on performance in each of the three areas of teaching, scholarship and service. Faculty members and their department chairs agree on percentages of effort for each of these areas which then feed into the salary computation. Nevertheless, many faculty members continue to feel that undue importance is given to student opinion surveys when assessing teaching performance while many students feel that little if any attention is paid to these.

Lessen anxiety among faculty about implementation of Tech Quality Plan

The Tech Quality Plan was not implemented due to faculty opposition and generally declining enrollments that made restriction of entry to the major a moot point.

Increase percentage of pay (within COHE) devoted to merit pay to more strongly reward contributions in key areas

Each year the college deans have been given authority over the discretionary portion of the performance-based section of salary policy so they could provide additional rewards to strong contributors in key areas. That being said, it remains true that the COHE/Board of Regents

agreement puts a limit on the percentage that is discretionary so that the amount of money available annually to each dean has been between \$3000 and \$8000 depending on the size of the college.

Chapter 4: Design of the Self-Study and Request for Continued Accreditation

Special circumstances of this self-study process

The same year we began our self-study planning (2003), Dr. Charles Ruch became the school's 17th president. Our former president, Dr. Richard Gowen had retired after 14 years of service. In fall 2003, Dr. Ruch launched the school's first major strategic planning process since 1989.

The special circumstance SDSM&T faced was the need to conduct strategic planning at the same time as a self-study. As a small, thinly staffed institution, we questioned our ability to do both in tandem in a thorough and meaningful manner unless we found a way to align the two tasks.

The goals of the SDSM&T self-study process

As an institution that had not experienced a fully participatory strategic-planning process since 1989, we had much to gain from a thorough, fair, and inclusive self-examination and self-evaluation. As explained below, the people entrusted with leading this effort took very seriously the chance they were given to craft a self-study approach that would genuinely help the institution during a time of considerable challenge and change. The culture of SDSM&T is very practical, hard working, and results driven. We cannot spare good people unless a project is meaningful.

The goals the self-study steering committee set for itself are reflected in the slogan it adopted: "*leading accreditation and strategic change.*" The leadership team aimed for a process that was genuine, inclusive, and useful to our broader efforts to move the institution forward.

Structure of the SDSM&T self-study process

We successfully aligned strategic-planning and self-study by focusing first on strategic planning. Dr. Ruch initiated the "all-campus planning session" technique to campus, and the first session held in October 2003 attracted 148 participants who remained the full six hours of the event. The purpose of the all-campus session was to give everyone associated with the University an opportunity to set institutional priorities. The small round-table discussions employed at the October 2003 and January 2004 sessions generated a phenomenal amount of written input.

Dr. Ruch created a small "think group" comprised of 12 faculty, staff, and community members who he asked to study and analyze campus input. The small group met with the president throughout spring 2004 to distill an initial set of campus-wide strategic initiatives.

Once the institutions needs and priorities were established though debate and analysis, the president published the first iteration of our Strategic Agenda ([RR122](#)). He took care to fairly and effectively address each of the priorities identified in the planning process under one of the five accreditation criteria. The alignment between our strategic priorities and the criteria are shown below in Figure 4.1.

Strategic Initiatives	Accreditation Criteria
	Mission and Integrity
Prepare for our Future as a National Player in Science and Engineering Education and Research	Preparing for the Future
Reshape the Learning and Teaching Experience	Student Learning and Effective Teaching
Promote the Acquisition, Discovery, and Application of Knowledge	Acquisition, Discovery, and Application of Knowledge
Engage and Serve the Broader Community	Engagement and Service

Figure 4.1 Alignment of Strategic Initiatives to Accreditation Criteria

The timeline

Below is a basic chronology of our aligned self-study and strategic Planning processes. The public record and the results of specific all-campus sessions can be found at <http://www.hpcnet.org/presidentcampusplanning>. Additional detail can be found in [RR123](#).

September 2003:	Planning for October 29, 2003 all-campus strategic planning event
October 29, 2003:	All-campus strategic planning session, 148 attendees
November and December 2003:	Small “think group” designated by the president met to analyze the transcribed input from the October 29 session and to draft preliminary statements about strategic planning areas and priorities
January 22, 2004:	Second all-campus strategic planning session
February 2004:	Small “think group” met to formulate a strategic planning statement to share with the Board of Regents in March 2004
February to March 2004:	The Strategic Initiatives / Self-Study Steering Committee is formed
March 2004:	Six Steering Committee members attend the HLC self-study planning workshop and annual conference in Chicago
March 2004:	Strategy for aligning the self-study process with the strategic planning and implementation work is refined and set
March 25, 2004:	Dr. Ruch meets with the regents to discuss the draft strategic plan

May 4, 2004:	Steering Committee meets via conference call with HLC liaison Karen Solomon
May 11, 2004:	Final AY 03-04 all-campus planning session to set priorities for strategic initiatives and to introduce the plan for aligning the self-study process with the strategic planning and implementation
Summer 2004:	Steering Committee works to finalize AY 04-05 strategic initiative action items and to collect data needed for SWOT analyses in fall 2004
August 27, 2004:	Steering Committee planning retreat
November 4, 2004:	Self-study “Co-chairs” run the 6-hour session. Strategic initiatives under criteria 3, 5, and 1 discussed.
February 3, 2005:	Strategic initiatives under Criterion 2, 1, and 4 discussed. Campus Master plan and space-utilization study presented.
April 2005:	10 Steering Committee members attend and present at the HLC annual meeting in Chicago
May 10, 2005:	Briefings on critical issues were given and progress on our strategic initiatives at the close of year one were assessed.
September 9, 2005:	Draft self-study distributed to all campus offices and posted online. Online forms created for submission of input between September 9 and November 13.
October 6, 2005:	Year two iteration of our Strategic Agenda presented, and the draft self-study and academic advising were discussed.

This timeline lists major events or meetings. Much work went on that is not documented here, particularly the work done by each of the co-chairs in conjunction with their working groups. The Faculty Senate and the Executive Council was kept apprised of the work of the co-chairs via written reports created by the co-chairs every 5-6 weeks during the critical time period between September 2004 and May 2005.

The 2nd-year iteration of our Strategic Agenda can be found in the Resource Room as [\(RR293\)](#).

The leadership team

Two co-chairs were appointed in association with each self-study criteria, for a total of 10 co-chairs. Because we had merged self-study with work on our strategic initiatives, the co-chairs (and the self-study steering committee as a whole) had a hybrid charge that was not easy to explain in simple terms.

The full steering committee spent much time debating and discussing the priorities and identity of the team. At last, a title and unifying slogan emerged, and the Campus Action Team (CAT) was introduced to campus. The “CATs,” as the team became known, adopted “Leading Accreditation and Strategic Change” as its slogan. Figure 4.2 on the following page shows the CATs organizational chart. More details can be found at <http://www.hpcnet.org/SelfStudy>.

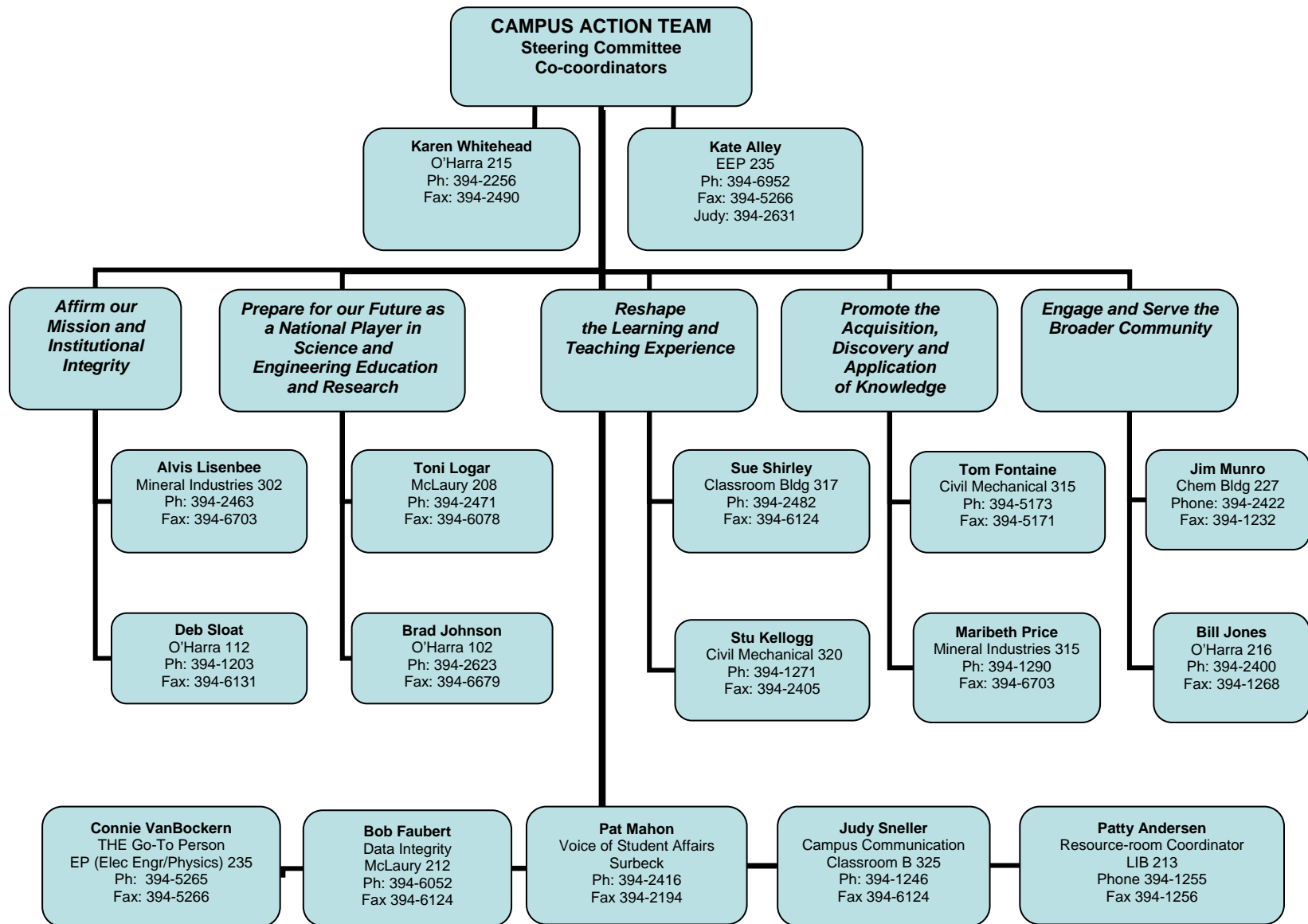


Figure 4.2 CATs Organizational Chart

Process

Once the CATs gained a handle on the complexities of conducting a self-study while furthering work on the strategic initiatives, they set to work with the practical determination for which our faculty and staff are known. Each co-chair created a working group while taking care to ensure the broadest representation of all constituents who had a stake in their work.

The people working on each of the accreditation criteria organized themselves in slightly different ways, as best suited their goals. The co-chairs for Criterion 1, for instance, had a single large goal: to gather campus input on the college structure and to formulate recommendations for the president to consider. The “work” conducted under Criterion 1 concerned everyone on campus, and the working group for Criterion 1 met weekly toward the conclusion of AY 2004-05. The reports submitted by the co-chairs can be seen at [RR294](#).

Community involvement and input

Community leaders were invited to the first two all-campus planning sessions when the needs and priorities of the institution were being identified. Several community leaders were appointed to the small “think group” the president consulted on his distillation of all the input created by the all-campus sessions. The self-study co-chairs met with the Academic Advisory Board on three separate occasions to gather input on the content of the text. The largest number of community leaders involved directly in the self-study was included in the working group for Criterion 5.

Once the self-study was in draft form, it was distributed in digital and hard copy to the Alumni Board and the Academic Advisory Board (AAB). Input was sought from all board members, and a special session was held with the AAB to gather input on the text. Bruce Rampleberg, a member of the original small “think group” appointed by the President to discuss input from the all-campus sessions was also given a draft text and asked for input.

Once the self-study was in final, published form, clearly visible notices were run in January and February in the Rapid City Journal, the Lakota Times, and the Argus Leader, which is the main newspaper for the eastern half of the state. As of the printing of this document, requests have been sent to key constituent groups in the community, such as the education sub-committee of the Chamber of Commerce, asking that SDSM&T’s self-study be placed on the February agenda for discussion. A record of all input and comment received will be made available to the visiting team.

Campus input

The draft self-study was printed and distributed to all campus offices on September 9, 2005. The draft was posted online in PDF format, and an online form was created to enable everyone and anyone to submit comments and textual edits via online forms. These forms can be viewed at <http://interact.sdsmt.edu/SelfStudy/input.htm>. At the close of the public comment period (November 13, 2005), all comments and edits submitted online were organized into a spreadsheet which was posted on the Campus Planning website and sent to the co-chairs for consideration. The time between mid-November and early December was used for considering all input and making changes as needed. The draft was finalized and formatted by late December, then printed and sent to Commission staff in mid-January 2006.

For a record of all input received via the online form as of the printing of this document, please see ([RR312](#)).

Request for continued accreditation

The South Dakota School of Mines and Technology has examined itself thoroughly and presented in this document specific and unbiased evidence that the institution is meeting accreditation criteria. We therefore respectfully request that the Higher Learning Commission of the North Central Association of Colleges and Schools grant the South Dakota School of Mines and Technology continued accreditation.

Chapter 5: Criterion One, Mission and Integrity

The organization operates with integrity to ensure the fulfillment of its mission through structures and processes that involve the Board, administration, faculty, staff, and students.

Core Component 1a. The organization's mission documents are clear and articulate publicly the organization's commitments.

Evaluative statement for all of Component 1a

SDSM&T recognizes the need to periodically review and assess its mission documents. In June 2003, the South Dakota Board of Regents released its report entitled "South Dakota Opportunities" that included recognition of SDSM&T as the state's technological university. At that time, the University began discussions with its constituents to review and revise the University's mission documents. The discussions resulted in a published Strategic Agenda and other documents that clearly express the University's mission, its commitments to its constituents ([RR122](#)), and an operation of openness and integrity.

The following section illustrates the clarity of our mission statements. It, and succeeding sections, gives insights into our recent efforts to redefine these documents as well as examples showing that actions support the words.

Evidence Cited

1. 2004-05 Strategic Agenda
2. 2004-05 Undergraduate and Graduate Catalog

1st item of evidence in support of Core Component A

2004-05 Strategic Agenda

Discussion of 1st example of evidence

A series of all-campus meetings, including hundreds of faculty, staff, students, alumni, and community members, were held to discuss the University's mission and the steps we should take to achieve the University's goals ([RR123](#)). These meetings resulted in publication in May 2004 of a strategic agenda that included a revised university mission Statement and four strategic initiatives. The mission Statement and the four 2004 strategic initiatives read as follows:

The South Dakota School of Mines and Technology serves the People of South Dakota as their technological university. Its mission is to provide a well-rounded education that prepares students for leadership roles in engineering and science; to advance the state of knowledge and application of this knowledge through research and scholarship; and to benefit the state, region, and nation through collaborative efforts in education and economic development.

The South Dakota School of Mines and Technology is dedicated to being a leader in twenty-first century education that reflects a belief in the role of engineers and scientists as crucial to the advancement of society. Our vision is to be recognized as a premiere technological university in the United States.

Most immediately, our goal is to be recognized as the University of choice for engineering and science within South Dakota and among our peer group of specialized engineering and science universities.

- Strategic Initiative 1: Reshape the learning and teaching experience
- Strategic Initiative 2: Promote the acquisition, discovery, and application of knowledge
- Strategic Initiative 3: Engage and serve the broader community
- Strategic Initiative 4: Prepare for our future as a national player in science, engineering education, and research

The strategic initiatives listed above were set at a May 2004 all-campus meeting. One year later, in May 2005, the campus community gathered again to “grade” our progress and to assist the Executive Council in creating the AY 2005-06 version of our strategic plan. Our current plan was published in September 2005 ([RR293](#)).

Our mission Statement and strategic initiatives appear in various media, including: President’s Report 2004, the University website, and has been adopted for the 2005-06 Undergraduate and Graduate Catalog. This self-study contains other evidence of efforts towards achieving our mission and strategic initiatives.

2nd item of evidence in support of Core Component A

2004-05 Undergraduate and Graduate Catalog

Discussion of 2nd example of evidence

SDSM&T’s commitment to students is articulated in the undergraduate and graduate catalog. The catalog includes statements regarding University information, academic information, educational resources and outreach services, and student information.

Each academic year, this catalog is reviewed and updated as the University’s contract with incoming students. This review and update addresses changes in Board of Regents’ policies, University policies, and academic programs.

The catalog appears as a printed document published and disseminated to the community by the Office of University and Public Relations. The catalog also appears on the University’s website at www.sdsmt.edu/catalog ([RR201](#)).

Core Component 1b. In its mission documents, the organization recognizes the diversity of its learners, other constituencies, and the greater society it serves.

Evaluative statement for all of Component 1b

SDSM&T continues to do well in expressing commitment to diversity and has recently taken steps to clarify the role it plays in the region and the constituents it serves. Although our

faculty is internationally diverse and has recently added a number of women faculty members, our undergraduate student body is not diverse. Our students are representative of the South Dakota population with the exceptions of 1) women (the percent of women in the science and engineering programs reflects the low national average), and 2) Native Americans (this fastest growing portion of the South Dakota population is under represented). The language of our mission statement is matched by the significant efforts we have made to fulfill that mission. This is particularly reflected in the very significant increase in Native American student numbers, and in a new initiative to increase the number of female students in engineering.

Evidence Cited

1. South Dakota Board of Regents Policy Manual System Mission Statement
2. Our 2002 Statement of Purposes and the progress we have made toward achieving specific strategic initiatives, e.g., increasing numbers in under-represented groups
3. General education requirements for graduation

1st item of evidence in support of Core Component B

South Dakota Board of Regents Policy Manual System Mission Statement

Discussion of 1st example of evidence

The South Dakota Board of Regents Policy Manual System Mission Statement ([RR88](#)) specifically recognizes the diversity of its learners, other constituencies, and the greater society it serves:

The Board affirms a commitment to diverse campus communities through serving the needs of all persons including minorities, handicapped, and part-time students and by seeking racial and ethnic diversity among the faculty and staff. The diversity of the campus community embodies the basic principles of an open democratic society in which free speech and thought respectful of differing opinions is encouraged among the students, faculty and staff.

Although this is the mission statement of the Board of Regents, it sets the context for the operation of the institutions within its purview.

2nd item of evidence in support of Core Component B

Our 2002 Statement of Purposes and the progress we have made toward achieving specific strategic initiatives

Discussion of 2nd example of evidence

Campus-wide discussions resulted in the creation of a Statement of Purposes in AY 2002-03 that reads as follows ([RR71](#)):

SDSM&T is dedicated to being a leader in twenty-first century education that reflects a belief in the role of engineers and scientists as crucial to the advancement of society. Responding to the unprecedented challenges facing today's world, SDSM&T will seek opportunities to benefit the educational, civic, and economic activities of the

community, state, and region. SDSM&T will maintain and expand its role in research, scholarship, and creative endeavors that advance knowledge, solve problems, develop individual potential, and explore the human condition. Through its rigorous academic programs and co-curricular activities, SDSM&T is committed to developing informed and responsible scientists and engineers who behave ethically, value a global perspective, and accept the duties and responsibilities of citizenship.

Our strategic planning efforts and progress made on specific strategic initiatives are strong evidence that we take the language of our Statement of Purposes seriously. During AY 2003-04, the entire campus community participated in a major effort to clarify our mission and to articulate “strategic initiatives” based on the mission. Four strategic initiatives were formulated ([RR122](#)), and under each initiative, action items were articulated. Initiatives 1 and 3 are relevant to this example of evidence.

Strategic Initiative 1: *Reshape the learning and teaching experience* includes the following Action Items:

- Introducing a campus-wide multidimensional strategy to increase minority representation on campus as initiated by the Multicultural Committee,
- Supporting collaboration on global awareness initiatives,
- Developing curricula for orientation and other sessions in career planning/job search, health issues, globalization, diversity awareness, and leadership development,
- Implementing the Women in Science and Engineering project.

First Action Item cited: One important thing included under the heading of serving the “region” and accepting the “responsibilities of citizenship” is to encourage and support Native Americans to pursue careers in science and engineering (as reiterated in our statement on constituents, ([RR172](#))). In the 2003-04 academic year, a renewed effort to increase Native American representation on campus resulted in the formation of the Multicultural Committee, which set as its goals: 1) increasing Native American recruitment and retention at the undergraduate and graduate level by targeting the Rapid City district Native American population; 2) increasing K-12 representation on South Dakota’s reservations, and; 3) increasing the number of program participants and graduates ([RR73](#) and [RR97](#)).

As evidence of the efforts to include Native American Students, in fall 2003, SDSM&T had the highest number of first-time freshmen and transfer Native Americans (22 in all) in the history of the institution. The lead institutions in the United States, Oklahoma State University and University of Oklahoma, reported 33 and 35 respectively. In the spring of 2003, SDSM&T graduated seven American Indians with degrees in engineering, the highest in school history. This was also the highest number nationwide from any one college/university. In the spring of 2005, the first Native American Ph.D. candidate was granted his degree. Recent efforts to increase Native American student representation include an articulation agreement with Ogalala Lakota College (OLC) and the He Sapa extension of that institution.

Second action Item cited: In 2001, our attention was brought to the need to increase global awareness among our students by a year-long study of the “drivers” for engineering and science education that was conducted by our Academic Advisory Board ([RR138](#)). To follow up on the report’s recommendations, the Vice President for Academic Affairs hosted a series

of roundtable discussions on global issues in spring 2002 ([RR177](#)). The most recent significant development in this area is an effort that is underway to expand the array of student enterprise teams that the Center for Advanced Manufacturing and Production (CAMP) program supports to include multi-year and multi-class-level team projects that solve engineering and science problems in third-world countries ([RR189](#)). This development also supports Outcome “j” of ABET Criterion 3 “the broad education necessary to understand the impact of engineering solutions in a global and societal context”. In this context, the Department of Geology and Geological Engineering has bi-annual international field trips (Italy, Turkey, New Zealand, and Spain) and a yearly geology field camp in Turkey; the Department of Civil and Environmental Engineering has initiated a program utilizing real international projects in the Senior Design component. Work is now underway to establish international projects within the Advanced Materials Processing (AMP) area.

Third action Item cited: Currently, we have some very successful “pockets” of teaming and leadership development opportunities for our students. Existing programs include course content in numerous classes, such as a psychology course entitled “Teams and Teaming.” The course has now been taught three consecutive semesters with relatively small class sizes primarily comprising engineering students. The student-led CAMP program and the Leadership Development Team are very active, but only reach 20% of the undergraduate population. In June 2005, a team of 9 faculty and staff members spent a week at a summer institute for curriculum development, June 7-11, 2005, in Northfield, Minnesota, where they analyzed existing teaming/leadership activities, identified teaming and leadership techniques and skills that graduating bachelor’s candidates will ideally possess, and mapped out the “gaps” in the undergraduate teaming and leadership development experience. The team returned and briefed campus on a draft action plan for getting a larger percentage of the campus community involved ([RR221](#)).

In fall 2005, the team published a white paper on leadership that outlined their vision: *As promised in our Mission, all School of Mines students will receive “a well-rounded education that prepares [them] for leadership roles in engineering and science”* ([RR71](#)). The metaphor of leadership development as a road each person must travel underlies our analysis of how the SDSM&T experience affects students. Figure 5.1 below summarizes current teaming and leadership development opportunities.

Status	Classroom Experience	Co-Curricular Experience	Outcomes	Tools/Benchmarks	Recognition
1 st year Build bridges, not piers...	GES115 and GES115M MSC 101,111 – Intro to Org. Dev. 1 st -yr initiatives MEM120 WISE, M&M program, FIRST cohort courses	Orientation Wk. Leadership Dev. Workshop Attendance LDT-Emerging Leaders Institute Freshman Senators MWeek FIRST *See below	Personal awareness Understanding Tech traditions Understanding Gender & diversity issues, Safety/risk management	Myers-Briggs/Colors Story telling LASSI <u>Mouton</u> Rube Goldberg Contest	LDT all campus leadership recognition dinner CAMP Honors Convocation Department and student organizations celebrations/recognitions Recognition in Raver, hometown newspapers, Website--
2 nd year Bridging troubled waters	EE 211/212 – Intro to Electrical Engr. CENG 244 – Intro to Digital Systems ME 262 – Product Dev. MSC 201, 211, 290, 291 Space Grant Professional Development Seminar WISE Sophomore Design—NEW	Sophomore Senator *See below All students participate in a co-curricular activity through the Sophomore Design Course--NEW	Involved – all students are in at least 1 extra-curricular activity	Relationship diagrams Myers-Briggs inventory Sophomores mentor freshmen in Rube Goldberg competition	LDT all campus leadership recognition dinner; presentation of rising star award for outstanding sophomore CAMP Honors Convocation Department and student organizations celebrations/recognitions Recognition in Raver, hometown newspapers, Website--
3 rd year Stay on your side of the road...	IENG 345 – Entrepreneurship PSYCH 331 – Industrial & Org. Psych; IENG 366 Management; ME/EE 351 Mechatronics; MSC 201 ROTC Psych 392, Teaming	CAMP Member Junior Senator *See below	Leadership style and ideology Values – tool? Ethic-Character-Experience in co-curricular-		LDT all campus leadership recognition dinner CAMP Honors Convocation Department and student organizations celebrations/recognitions Recognition in Raver, hometown newspapers, Website--
4 th year Running on full, Not empty...	Senior Design MSC 331 – ROTC Cadets only New Course – 8 week Capstone leadership experience	CAMP Leadership Dev, Team (LDT); Emerging Leaders Institute; Leadership presentations Gender issues Globalization & Diversity Ethics & Integrity Alumni experiences	Capstone year experience Mentor underclass persons Legacy transition	Oath of the Engineer CAMP team successes	Order of the Engineer LDT all campus leadership recognition dinner—Leadership Hall of Fame Recognition CAMP Honors Convocation Department and student organizations celebrations/recognitions Recognition in Raver, hometown newspapers, Website--

Figure 5.1 SDSM&T Teaming and Leadership Development Opportunities 2005.

Students can develop leadership skills by serving in one or more of the following rolls: Peer Advisor, Resident Assistant, Student Ambassador, Orientation Leader, Athletic Team Captains, Athletics, ROTC, Leadership Development Team Leaders, CAMP Coordinating Council, CAMP Team Leaders, Student Association, Inter-fraternity Council Members, Greek organization officers, officers and members of the 80 student clubs and organizations (includes social, recreational and professional associations), co-ops and internships.

The following leadership models and opportunities contribute to students' efforts to develop leadership skills: Faculty members commonly invite leaders in various fields of endeavor into their classrooms to speak to students. The Classroom without Walls is a series of presentations for faculty, staff and students to come together to work on teaming and leadership skills sponsored by the Division of Student Affairs. The campus as a whole also nominates "Outstanding Alumni" who have become nationally recognized leaders, and select alumni are invited three times a year to speak at fall and spring commencements and during Engineers Week.

The following student leadership development tools are available: An on-line Student Organization Handbook <http://www.hpcnet.org/studorghandbook> gives risk management, organizational, and team-building guidelines; co-op and internship forums; and information on business etiquette dinners.

Our current needs in the area of student leadership development include the following: Safety and risk management; awareness of diversity, gender and global issues; ethical issues.

Fourth action Item cited: The National Science Foundation has funded the creation at SDSM&T of a "Women in Science and Engineering" (WISE) program and a Director was hired in fall 2005. The Director will establish a mentoring program for women based on the successful Mentors and Mentees Program at Purdue University and secure funding for ongoing development of the program. The objective is to establish a women's mentoring program to increase the retention and recruitment of females in the science, technology, engineering and mathematics (STEM) fields. The broader impact of this project is to increase the diversity of the engineering and science workforce through the increased retention of women STEM students. In the past two years, SDSM&T has added three women in tenure-track engineering faculty positions within the civil, electrical and industrial engineering departments.

Strategic Initiative 3: "Engage and Serve the Broader Community" includes the following **Action Item:**

- Seek external funding for minority student scholarships and support for under-represented, under prepared, or economically disadvantaged students

The National Science Foundation has recently funded a Research Experience for Undergraduates (REU) grant in which faculty members from multiple engineering departments will work with Native American students.

A Summer Bridge Program ([RR180](#)) seeks to improve the success rate for non-traditional students or students with moderate mathematics background not ready to enter the science and engineering curriculum. The first Summer Bridge program, immersing students in both algebra and basic chemistry, was offered for 4 weeks at the end of the summer of 2005. This group consists of students who placed into college algebra rather than calculus. This first group consisted of bright and dedicated students from small high schools (many of which offer only limited advanced math courses) and non-traditional students whose math skills were rusty.

The Bridge Program is based on the belief that such students have the potential to be productive scientists and engineers. However, since many first year engineering and science courses have mathematics prerequisites, they cannot begin the normal course sequence for their intended majors until they have completed college algebra. Thus, they spend their first

year doing little but preparatory work. Many become disenchanted and fail to return the following year. Historical data shows that this group has a less than 4 in 10 chance of graduating within six years. Program objective and outcomes are as follows:

- OBJECTIVE: First-time college students that face remediation often experience failure in their first semester of college. The purpose of this program is to provide the opportunity and support to prepare these students for college coursework in chemistry and mathematics.
 - Outcome 1: The percentage of Summer Bridge students that pass Bridge classes with a C or better will be ten percentage points higher than the baselines for Math 102 and Chemistry 106 respectively.
 - Outcome 2: The percentage of Summer Bridge students that pass Math 120 and Chemistry 112 with a C or better will be ten percentage points higher than the baselines for Math 102 and Chemistry 106 respectively.
 - Outcome 3: The percentage of Summer Bridge students that return to campus for the next academic year will be ten percentage points higher than the baselines for Math 102 and Chemistry 106 respectively.

3rd item of evidence in support of Core Component B

General education requirements for graduation

Discussion of 3rd example of evidence

Our revised general education requirements ([RR186](#)) became effective fall 2005; two of the seven broad objectives make explicit reference to diversity:

- *Students will understand the organization, potential, and diversity of the human community through study of the social sciences. (6 credit hours)*
- *Students will understand the diversity and complexity of the human experience through study of the arts and humanities. (6 credit hours)*

Also effective fall 2005 is a new Board of Regents' globalization/global issues requirement ([RR148](#)). Our campus has decided that this requirement must be satisfied by courses at the 300 level or above. Each program has identified one or two courses within the major which meet the following guidelines:

- *The syllabus clearly articulates the goals, learning outcomes, and assessments related to global issues.*
- *The student's understanding of the issues addressed in the course is evaluated through graded assignments, reports, papers, tests, etc.*
- *Performance on such assignments contributes to the student's grade for the course.*

ABET Criteria Three for accreditation of our engineering and computer science programs explicitly requires demonstration that our students achieve the following outcomes by graduation:

- (h) the broad education necessary to understand the impact of engineering solutions in a global and societal context*
- (j) knowledge of contemporary issues*

In order to meet ABET accreditation requirements, each program currently addresses global issues in a distributed fashion throughout the curriculum. The adequacy of current efforts to

address global issues in this manner was recently confirmed by the ABET accreditation review team that visited SDSM&T in October 2004.

Core Component 1c. Understanding of and support for the mission pervade the organization.

Evaluative statement for all of Component 1c

The revised mission statement for SDSM&T successfully guides the everyday workings of the campus, especially in the planning and implementing of new programs. There is general (and growing) support for choices we have made in the investment of time, energy and resources in moving to a new mission and new structure for the University.

Evidence Cited:

1. Existing programs and new academic initiatives respond effectively to our mission commitment “to provide a well-rounded education that prepares students for leadership roles in engineering and science” and “to advance the state of knowledge and application of this knowledge through research and scholarship.”
2. Our strategic planning process and the administration’s commitment to shared governance is reflected clearly in funding priorities and decisions.
3. Co-curricular activities are designed to assist in providing a well-rounded education including leadership and wellness skills, as emphasized in the mission statement.

1st item of evidence in support of Core Component C

Existing programs and new academic initiatives respond effectively to our mission commitment “to provide a well-rounded education that prepares students for leadership roles in engineering and science” and “to advance the state of knowledge and application of this knowledge through research and scholarship.”

Discussion of 1st example of evidence

SDSM&T has always focused on keeping engineering and science at the core of our academic programs. This has been a dynamic process rather than a static identity. The following section cites several examples of such changes.

- In 1996, the Board of Regents designated our Center for Advanced Manufacturing and Production (CAMP) program as our institutional “Center for Excellence,” thereby recognizing that engineering is at the heart of our enterprise. CAMP is comprised of multidisciplinary student-project teams that span multiple class levels. Currently, there are 10 teams involving over 200 students in design and performance competitions on a local, regional, and national basis. All of these teams are involved in engineering challenges such as robotics, aircraft, concrete canoes, helicopters, racecars, and off-road vehicles. The array of projects has expanded over the past several years, and work is now underway to establish international CAMP projects. Donors recognize CAMP as part of SDSM&T’s identity, and Caterpillar Inc. funded the creation of a specialized lab for our student project teams; the lab opened in fall 2000. In addition, in response to an annual request, Caterpillar provides an annual \$25,000 gift to fund five \$2,500 scholarships for students in mechanical, electrical,

and metallurgical engineering. Each year for the past decade, in addition to these scholarships, Caterpillar has made an annual investment of \$12,500 alternating between the mechanical and metallurgical engineering departments for curriculum and faculty development. We are awaiting news from Caterpillar on our request for an additional \$10,000 per year for five \$2,000 recruiting scholarships for Native American and/or female students.

- Investments in campus infrastructure and equipment also reflect clear support of our research and scholarship mission in science and engineering. To provide a facility to support enhanced engineering education, SDSM&T received legislative approval in 1998 to expend \$3.75 million in HEFF funds (Higher Education Facilities Fund, a fund into which 20% of all state support tuition revenue is placed) to renovate the Civil/Mechanical Building. Funds from Title III, the Great Plains Foundation, and the SDSM&T Foundation provided an additional \$500,000 for student project and laboratory space dedicated to undergraduate instruction and equipment. Outdated experimental equipment was replaced with commercially available, turnkey, self-contained modular experiments, using state-of-the-art controls and sensors. The Civil/Mechanical building houses departments with total enrollments approaching one-third of the student population on campus. The renovation was completed in 2000, and, in 2005, installation of a Super Sonic Wind Tunnel (SSWT) in front of the building was completed. The SSWT is used for instructional demonstrations and student projects at the junior and senior level and for the mechanical engineering Capstone Design course. It will also be used as a demonstration facility for the mechanical engineering fluid mechanics, Thermo II, gas dynamics courses. Lastly, in April 2005, the Regents approved plans for construction of a new chemistry building. The impact of this investment is discussed below under Criterion 2.
- Programmatic initiatives show our commitment to keeping abreast of advances in knowledge. For example, a new major in environmental engineering has been established (http://www.hpcnet.org/EnvE_selfstudy_04). The traditional mining engineering major has closed and a new degree program in mining engineering and Management established in fall 2004 (RR236). In the institution's striving to stay abreast of industrial needs and in keeping with our mission, the industrial engineering program has grown from two faculty members to five and the number of students majoring in this discipline is now well over ninety. There has been a realignment of the interdisciplinary sciences program so that the four new specializations it offers, atmospheric sciences; business applications in science and technology; pre-professional health sciences; and science, technology and society, are now in much closer alignment to our mission and reflect the institution's ongoing commitment to keeping abreast of current educational needs within the scope of our mission (RR66).
- In order to assure that entering freshmen are better prepared to succeed in rigorous engineering and science curricula, the Board of Regents approved higher admission standards for SDSM&T in March 2005. System-wide admissions standards grant automatic admission for students who have an ACT composite score of 18 or better or who have a high school GPA of at least 2.6 or who are in the top 60% of their high school class. Under the new standards approved for SDSM&T only, applicants will be considered for admission if they have an ACT composite score of at least 21 or an ACT math subscore of at least 21 or a high school GPA of at least 2.75. Students whose ACT scores are at least 25 or who have taken four years of high school math and have a high school GPA of 3.5 will be automatically admitted. Other applications will be reviewed by an admissions committee. It is expected that these

higher standards will be phased in and fully operational by fall 2006, and that these changes will result in a student population that is even better prepared to forge successful careers in science and engineering ([RR206](#)).

2nd item of evidence in support of Core Component C

Funding priorities and decisions

Discussion of 2nd example of evidence

Over the past two years, frequent campus-wide planning sessions have been held to translate our mission into a shared vision accompanied by goals and specific strategic initiatives. We have also worked collectively to develop action plans to achieve these strategic initiatives. Faculty members, researchers, staff, administration and students have actively participated in these events ([RR122](#) and [RR123](#)). Results of the campus-wide planning sessions have been consistently communicated to the campus community through convocations, a campus planning web site, and e-mails (See <http://www.hpcnet.org/PresidentCampusPlanning>). As a result, the focus of most campus activities and funding priorities is in support of the strategic initiatives and mission. A few recent examples include the following:

- The SDSM&T Budget Advisory Committee weights 80% of their funding decisions toward the support and achievement of the institution's strategic initiatives.
- Consultants were recently retained to develop a campus facilities master plan to help ensure we have the necessary facilities to enable us to provide excellence in engineering and science education and to conduct nationally recognized research.
- In order to prepare for our future as a national player in science and engineering research, a Vice President of Research position was created and filled in June 2004.
- In order to support faculty and student research efforts, reference search engines were purchased with initial \$79,000 one-time FY 2005 funding. Examples of these search engines include Engineering Village 2 (Compendex), GeoRef/GeoBase, and Kluwer/Springer.
- A campus-wide retention strategy is being implemented to support the "reshaping the learning and teaching experience" strategic initiative. A Director of Retention and Testing was hired to coordinate these efforts ([RR226](#)). Early successes of this program include an enhanced early alert system for at-risk students and the Freshman Introduction to Real Success at Tech (FIRST) program. FIRST was implemented for approximately 100 first time freshman living in the dorms in FY05 and integrates academics and residence hall neighborhoods. Plans are underway to expand the program to include first-year students who do not live on campus. Nationally, these types of programs have shown great success ([RR215](#) and [RR216](#)). A new faculty position responsible for first-year experience coordination has been funded and a search is in progress.

3rd item of evidence in support of Core Component C

Co-curricular activities are designed to assist in providing a well-rounded education including leadership and wellness skills, as emphasized in the mission statement.

Discussion of 3rd example of evidence

The SDSM&T co-curricular structure supports the mission of the institution. Leadership and citizenship skills among students are taught and reinforced with a number of campus programs. Student Activities and Leadership involves SDSM&T students in participating and leading in 80 student organizations, including professional societies, six Greek organizations, the Student Association governing body and the Leadership Development Team which offers workshops and speakers on leadership ([RR221](#)). The Center for Advanced Manufacturing and Production (CAMP) also is extremely active in promoting teaming, leadership and interdisciplinary collaboration through competitions, training and speakers.

Residence Life offers an on-campus living experience with the Living/Learning/Leading model and sponsors the FIRST program which is a freshman experiential program in which a cohort of students live together in the residence halls, take classes, study, and have orientation programs together in an effort to integrate academic and co-curricular activities ([RR215](#) and [RR216](#)). Students also learn leadership through serving on the Residence Hall Council.

The Multicultural Affairs Office, as well as the Multicultural Committee and the Ivanhoe International Center, work to promote domestic diversity and global awareness by recruiting and working to retain international and under-represented American populations with activities and projects that include all students such as bulletin board displays, speakers for Martin Luther King Day, Cultural Expo and the Diwali Celebration ([RR212](#)).

Counseling and Student ADA Services, the Dean of Students Office, Career Planning, Campus Ministries and Student Health Services work together to focus on the wellness of students in body, mind and spirit through education, risk management and early intervention with students who have problems. In June of 2005 the institution was granted \$284,000 from the Department of Education for two years to address high risk drinking behaviors of 18 to 24 year olds. The grant focuses on: increasing the number, awareness, and participation of alcohol free social and recreational options including late night and weekend programs; developing a comprehensive community alcohol abuse prevention program; developing and implementing an information and education program regarding impact of high risk drinking on future career options; and developing skills of bystanders to recognize and intervene with problem behaviors. The Dean of Students and Student Affairs staff work with great determination to forge educational partnerships with academics to advance student learning and development.

The objectives for the Mentors & Mentees Program (under the Women in Science and Engineering program) for are to share effective strategies that lead women students to successful completion of their engineering education and prepare them for future careers as engineers; to enhance personal support of students through contact with peers, female role models and mentors on a regular basis; and to build confidence in students through affirmation of their skills and values.

Core Component 1d. The organization’s governance and administrative structures promote effective leadership and support collaborative processes that enable the organization to fulfill its mission.

Evaluative statement for all of Component 1d

SDSM&T has three major areas of governance: the SDSM&T administration; the South Dakota Board of Regents; and the Faculty Senate. Within this governance, the institutional governance consists of the Executive Council, the University Cabinet, and the Faculty Senate. The constituencies of the latter three groups are as follows:

Executive Council

*President
Vice Presidents
Alumni Director
Foundation Director
Faculty Senate Chair
Assistant to the President*

University Cabinet

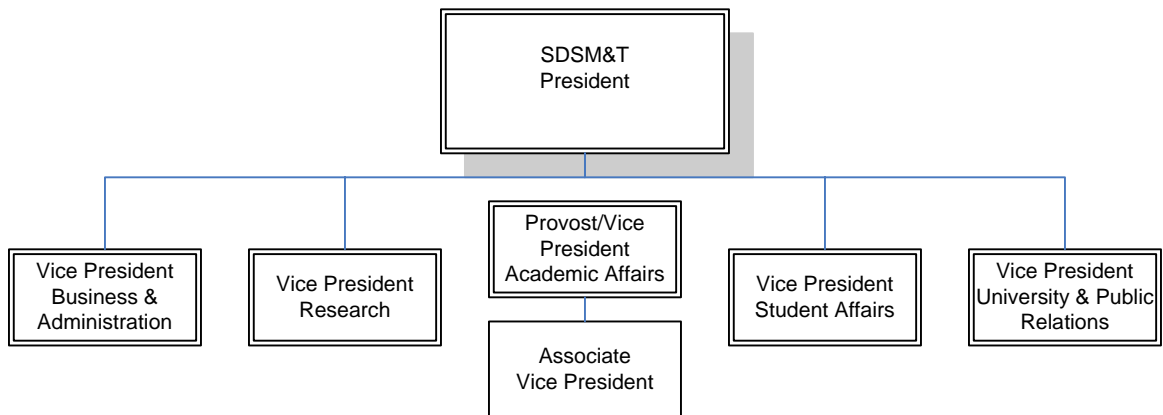
*President
Vice Presidents
Alumni Director
Foundation Director
Faculty Senate Chair
Assistant to the President
Deans
NFE Employee Chair
CSA Employee Chair
Student Association President
Facilities Services Director*

Faculty Senate

*Chair of the Faculty
*Engineering Division
*Science Division
*Arts Division
Ex-Officio Members:
VPAA/Provost
Dean of Graduate Education

(3) Senators elected from each division; a bylaws change is under review which would elect one senator from each academic department

SDSM&T’s administrative structure consists of the president, vice presidents, deans, directors and department chairs:



Many positive outcomes have been realized since July 2003 with the change of presidential leadership. Some of these changes include presidential encouragement to involve all members of the campus in assessing our institutional needs, mission, identity, strategic initiatives, and to support, collaborate and implement the necessary changes identified by the process. Although the members of the Board of Regents have been quite supportive of the new directions at SDSM&T, they continue to be viewed by some as micro-managing and obstructionist. The Faculty Senate was created as a governing body in December of 2003 and is gaining ground in building the trust and confidence of the faculty body.

Evidence Cited:

1. The change in administrative leadership style of the president has been empowering for the campus community and has led to substantial collaboration in assessing the state of the institution.
2. The institutional “system” functions well in encouraging individual efforts and collaboration, especially within our limited resources, relative to the campus, the community, the region, the State, and the nation.
3. There is participatory and shared governance on the campus.

1st item of evidence in support of Core Component D

Change in administrative leadership style of the president

Discussion of 1st example of evidence

Under the guidance of a new president, in the fall of 2003, discussions and planning regarding strategic initiatives, refinement of mission and goals, and a general review of our campus identity, was begun. This effort is coordinated with the ongoing self-study effort and involves numerous committees working on various aspects of the campus organization. A continuing series of all-campus meetings was implemented to provide the campus a means to study, discuss, and make decisions relevant to the campus’ needs. To date, many of the suggested changes identified through this effort have been implemented and supported by the campus and the Board of Regents.

Because the academic structure of the last 15 years was only partially viewed as successful by the four deans, the department chairs, and the faculty at large, the president assigned the HLC Criterion 1 committee, as an additional project, to review the academic structure and to provide him with recommendations representative of the study. As a result of the year-long study by the Criterion 1 committee, the Faculty Senate, and all members of the campus community who elected to become informed and involved, a restructuring plan was announced June 16, 2005 and implementation began on July 1, 2005 ([RR223](#)). Under this new plan, two dean searches are underway; the Vice President for Academic Affairs’ duties and responsibilities are now as a Provost; and an Associate Vice President for Academic Affairs position has been added. The guiding goals of this restructuring effort are to improve the leadership and success of the academic mission; this is nearly a cost-neutral event. In August 2005, the Faculty Senate approved the position descriptions for the chairs and deans ([RR281](#)).

We consider the following as three very significant achievements under the new style of leadership. In refining “who we are,” SDSM&T has reaffirmed its mission and articulated strategic objectives and institutional goals. We have gained South Dakota Board of Regents’ approval for implementing new admissions standards and have re-defined our nickname, which will be used in advertising and in our public presence, as the “School of Mines.” We are focusing heavily on enrolling and retaining the students who will best reflect our mission.

2nd item of evidence in support of Core Component D

The institutional “system” functions well in encouraging individual efforts and collaboration, especially within our limited resources, relative to the campus, the community, the region, the State, and the nation.

Discussion of 2nd example of evidence

Members of SDSM&T are involved in numerous collaborative efforts, both internally and externally. Internal collaborative efforts are evidenced by the presence of research centers, the increasing amount and variety of research activity, and job and project sharing between departments. Our internal research centers include the following:

- The Additive Manufacturing Laboratory
- The Engineering and Mining Experiment Station
- The Advanced Materials Processing and Joining Laboratory
- The Center for Accelerated Applications at the Nanoscale
- The Institute of Atmospheric Sciences
- The Computational Mechanics Laboratory
- The Polymer Technology, Processing and Composites Laboratory
- The Ultra-Lightweight Systems Laboratory
- The National Science Foundation Industry/University Cooperative Research Center (NSF I/UCRC) for Friction Stir Processing (SDSM&T is the lead institution in this regional center)

Researchers in industry and from other universities partner with SDSM&T to perform research sponsored by the Army Research Laboratory and the Air Force Research Laboratory. The Center for Advanced Manufacturing and Production (CAMP) is a multidisciplinary educational approach to promote learning and hands-on production in a team-building environment. The paragraphs that follow highlight illustrative collaborative efforts.

In March 2005, the world's leading supplier of molecular nanotechnology tools, Zyvex Corp., selected SDSM&T as the exclusive provider of integrated circuit (IC) failure analysis services to the semi-conductor industry. Zyvex will outsource its testing services to the Center for Accelerated Applications at the Nanoscale (CAAN), located on campus. The Governor presented \$250,000 of State funding to the school under his 2010 economic development initiative to make possible the acquisition of the specialized equipment needed to perform research at the nanoscale.

Externally, SDSM&T is working closely with the City of Rapid City's 2012 Project to: 1) build a connector road to St. Patrick Street which will provide ease in traveling to and from the campus to our Tech Development Lab and enable constituents better access to the economic development business incubator; 2) install artificial turf on the O'Harra Stadium football field, a complex that is shared with the City and the Rapid City School District; and 3) acquire portable bleachers.

Our strong participation in and our hosting of the economic development business incubator is certainly evidence of our local collaborative efforts. In June 2005 ground was broken on campus for an economic development incubator building, a prime example of current town-gown collaboration. The facility, which is funded and will be operated by area economic

development entities, was originally to be built across town in an industrial park. Discussions between Dr. Ruch and community leaders led to the recognition of the advantages of physical proximity to research activity and an offer by SDSM&T to provide the land for the building.

The Multicultural Committee spent the 2004-05 academic year defining the role of multicultural concerns on this campus, particularly concerning Native Americans. Central to the committee's work was this issue: how best to recruit, retain, and graduate Native American students in engineering and science. The committee's complete work, including agendas, committee minutes, and meeting videos, can be found at this web location: <http://www.mcs.sdsmt.edu/mcc>. Beginning in the 2005-06 academic year, and based upon the initial committee's work, the Multicultural Committee was subdivided into the following working teams:

- Coordination Team— providing institutional, committee, and team direction
- Student Rights and Responsibilities—providing a safe campus
- Campus Climate—providing a welcoming environment
- Funding—providing necessary financial resources
- Recruiting and Retention—providing student base
- Campus Connection—providing a critical mass for minority/international students

In response to the original charge to the Multicultural Committee, the working teams are in the final planning stages of developing pilot programs to be implemented in 2006-07 academic year.

The Higher Education Center – West River was created in 2004 and located in Rapid City to assist western South Dakota residents pursuing higher education goals. The Center is a collaborative effort of five universities and the local technical institute (each of which has a representative on staff) and is run jointly by SDSM&T and Black Hills State University. The concept is to offer a one-stop shop for all students in the region and to offer the six institutions a clearinghouse to avoid duplicate coursework and facilitate the sharing of professors and curricula. At the center, students can access information about financial aid and application procedures, meet with school representatives, and even take classes. Class offerings support bachelors, masters, and doctoral degrees in a wide range of disciplines.

The alumni of SDSM&T continue to be active partners in furthering the University's mission and strategic objectives both on a local, regional, and national level.

3rd item of evidence in support of Core Component D

There is participatory and shared governance on the campus.

Discussion of 3rd example of evidence

As previously stated, SDSM&T implemented a Faculty Senate, the governing body that represents the faculty to the administration, under the reign of the new president. This body involves electing three representatives from 3 divisions: engineering, science, and arts/humanities. In addition to its previous membership on the University Cabinet, the chairman of the Faculty Senate was installed by the president as an active governing member of the Executive Council.

The Career Service Act (CSA) employees and the non-faculty exempt (NFE) employees have employee associations and councils that are elected from within their memberships. The associations provide their members information, assistance, and camaraderie. The chairs of each association represent the members' views on the University Cabinet. The student association is the governing body for the student population and it also holds elections for its senator positions, and its president also serves on the University Cabinet.

In addition to these University Cabinet members, the president, vice presidents, deans, directors of the Alumni, Foundation, Facilities Services and Campus Dining Services, all share in the campus governance. Specifically, the University Cabinet is designed to be all-encompassing and its role is to make decisions on various issues related to the campus and to approve policy.

The Executive Council, comprising the president, the vice presidents, the directors of the Alumni Association and the Foundation, the Faculty Senate chairman, and the assistant to the president, provides executive decisions affecting the campus.

External governance is provided by the South Dakota Board of Regents, which is a governing branch of the State of South Dakota.

The collective bargaining unit for faculty representation within the South Dakota Board of Regents' system is the Council of Higher Education (COHE).

Core Component 1e. The organization upholds and protects its integrity.

Evaluative statement for all of Component 1e

Tech continues to do a good job of expressing, maintaining, and supporting its identity and role in the region, and has taken recent steps to further clarify its role, the constituents it serves, and the image of the institution in the region.

Evidence Cited:

1. Our recently formulated Statement of Purposes, Strategic Initiatives, and reaffirmed Mission
2. Our campus- and Board-level administrative and grievance structures
3. Our clear statements about the external constituents and interests we serve

1st item of evidence in support of Core Component E

Our recently formulated Statement of Purposes, Strategic Initiatives, and Reaffirmed Mission

Discussion of 1st example of evidence

The entire campus community has participated in two major efforts aimed at clarifying and communicating our Mission.

During 2002-03, the Vice for President Academic Affairs chaired a faculty group charged by the President to formulate a "Statement of Purposes" to lend greater detail and specificity to

our institutional mission. The Statement of Purposes that was developed and approved by the faculty is short but clear and appears above under the discussion of Core Component B. This self-study contains many references to the multiple efforts we are making to uphold this statement, in particular through economic development and research initiatives and efforts to integrate ethics and global perspectives into the curriculum.

Beginning in fall 2003, the entire campus spent a year collaborating on the formulation of our strategic initiatives. These were presented to campus in May 2004 and are being revisited each year thereafter in a continuous quality-control and planning process ([RR122](#) and [RR293](#)). Publication of our strategic initiatives coincided with a reaffirmation by the Board of Regents of the mission of the institution. While our mission was not altered, the campus and the community were publicly reminded that we are clearly focused on engineering and science programs and their constituents.

2nd item of evidence in support of Core Component E

Our campus- and Board-level administrative and grievance structures

Discussion of 2nd example of evidence

SDSM&T is governed by a system-level Board of Regents, and the executive staff includes legal counsel for the system; we also use the services of Lynn, Jackson, Shultz, and LeBrun for legal consultations. The Board staff offers system-wide administrative oversight for academic, business, and student affairs; human resources; information systems; research; and the Electronic University Consortium. The personnel who administer these areas hold advisory councils comprised of representatives from all regents' institutions. The president of the Student Senate also serves on a system-level council and meets regularly with the regents. These dual-level administrative oversight structures and array of peer councils provide an extra layer of accountability.

All laws, rules, regulations, policies and procedures related to governance and personnel are published and/or linked to the SDSM&T Human Resources web site <http://www.hpcnet.org/sdsmt/policies>, including the Board of Regents, SDSM&T, Administrative Rules of South Dakota, South Dakota Codified Law, and Council for Higher Education (COHE). The institution has clear and separate grievance processes for students, unit faculty, non-unit faculty, exempt employees, and, career service act employees. Since our last institutional review we have had numerous formal and informal grievances that all were resolved at the institutional and/or the Board of Regents level, and in no instance was the University cited for a breach of ethics or policy. The University also received two Equal Employment Opportunity (EEO) charges which were found to have no merit by the EEO.

3rd item of evidence in support of Core Component E

Our clear statements about the external constituents and interests we serve.

Discussion of 3rd example of evidence

Work on our strategic initiatives led to considerable discussion of who, precisely, our external constituents are. A clarification of who SDSM&T serves and how we work in conjunction

with other regents' institutions in the Black Hills to ensure that the entire region is well served was created and approved in March 2004 ([RR181](#))

In fall 2004 and spring 2005 we retained marketing consulting firms (Noel Levitz and Stamats, respectively) to conduct a marketing and recruitment study and to provide consulting on enrollment management, including recruiting strategy and the redesign of our institutional web site. Their reports were developed during spring 2005 and marketing and recruitment ([RR196](#)), and web redesign ([RR197](#)) plans were all put into final form by May 2005. Since 2002 we have reinforced our image and our focus through the advertising slogan "preparing tomorrow's scientists and engineers." We believe these words fairly represent to the public our activities and commitments.

Questions that arose from the self-study process relative to Criterion 1

1. Early in the self-study process, the committee working on Criterion 1 discovered at least three differing published mission statements. This lack of standardization had resulted from failure to update various publications as the mission evolved or was supplemented with our Statement of Purposes. Currently, a variation of the mission statement published in Board of Regents' policy appears in the president's annual report and in our strategic agenda documents. The creation of a Statement of Purposes in 2003 may have added to the confusion some people feel about the mission's precise wording. Even though mission wording has now been standardized, effort is still needed to make the mission more accessible on the web site, standard in all publications, and better understood across campus and in the community.
2. How well are the new (May 2004 and September 2005) mission and strategic agendas understood by the campus community? Does everyone fully appreciate that significant changes are taking place?

Most significant actions taken relative to Criterion 1

1. The establishment of the all-campus session as central to our strategic planning and self-study process has altered the culture of the campus. Three years after their inception, these five-hour sessions (held three times a year) continue to be very well attended and continue to serve as a vital input from faculty, staff, students, alumni, and community members. Participants even report that they are fun.
2. A reorganization of the campus administrative structure, guided by the goals of our strategic agenda, was accomplished in July 2005. The previous four-college model was changed to a two-college model (College of Engineering and College of Science and Letters). National searches for deans are underway (January 2006) and these individuals should assume their roles in late spring or early summer of 2006.
3. The Chair of the (new) Faculty Senate was made an active member of the President's Cabinet. Additionally, the Director of the Alumni Association also was made an active member of the President's Cabinet.
4. The management style of President Ruch has established an inclusive campus atmosphere. There is a feeling of "rebirth" across the campus under his leadership.

5. As a result of much contemplation, and with the assistance of an outside consulting company, the campus “brand” has now been defined as the “School of Mines.” Subsequently the campus logo also has been defined and now has replaced our former usage of the school seal.

Recommendations for moving forward

1. Continue to ensure that the most current Mission and strategic agenda statements be presented on our web site, in the SDSM&T Catalog, in the Student and Faculty/Staff Handbooks, and in all campus publications and marketing materials.
2. Revise the SDSM&T web site.
3. Ensure that the new deans and the department chairs function with a thorough understanding of their roles, responsibilities, and authority within the new organizational structure.
4. Keep our eyes, hearts, and minds on our mission and strategic agenda.