

EARTH SCIENCE IN TEXAS: A PRIMER ON PETTY POLITICS

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In 1999, the Texas Legislature passed SB 103, which requires that every high school student pass an exit science examination (TAKS) in the eleventh grade covering "...at least biology and integrated physics and chemistry" in order to graduate. The State Board of Education (SBOE), an elected board consisting of 15 members representing geographic districts, responded by eliminating earth science from the list of courses accepted for high school core science graduation credit. In January 2002, 74 Texas earth scientists representing the oil and gas, mining, groundwater, environmental, public and higher education sectors, and state and federal agencies urged the SBOE to reinstate earth science as a course carrying core science credit for high school graduation. The SBOE Committee on Instruction responded by authorizing the appointment of an Earth Science Task Force (ESTF), charged to recommend ways to restore earth science to the core curriculum.

In June 2002, 12 individuals were appointed to the task force—three from the public education (K–12) sector, three from higher education, two from the for-profit sector, one each from the Bureau of Economic Geology and the Science Teachers Association of Texas and two from the Texas Education Agency (TEA). Edward C. Roy Jr. was appointed chair and David E. Dunn was appointed vice-chair of the task force.

From July 2002 through June 2003, the ESTF held seven meetings at locations throughout the state, and at five of those meetings, public comment was solicited and received. Additionally, members of the task force made presentations to various groups and solicited public comments at the State Governors Conference, Texas Earth Science Teachers Association,

Texas Science Education Leadership Association, Texas Science Summit, Geological Society of America, and American Association of Petroleum Geologists. Summaries of the mission and work of the ESTF were published in *Geotimes*, *AAPG Explorer*, and *GSA Today*.

The ESTF submitted its final report in June 2003. The report made eight recommendations, three of which could have been implemented in the fall of 2005, and five of which required substantially longer lead times for implementation. Recommendation number I would have allowed two courses, either Advanced Placement environmental science or geology, meteorology, and oceanography (GMO), to satisfy the third-year science graduation requirement for those high school students in the Recommended or Distinguished Achievement Plans who had previously completed biology and integrated physics and chemistry. Simply put, Recommendation I allowed students the option of choosing either a year of chemistry, a year of physics or a year of earth science to fulfill the third-year science requirement. The TEA determined that the cost of implementing Recommendation I was essentially nil.

Recommendation VII of the task force report would have required four years of science, consisting of a year each of biology, chemistry, physics, and earth science for high school graduation. The task force recognized the sweeping nature of the recommendation and the long lead time required for its implementation. Recommendation VII would have increased the number of high school laboratory science classes in Texas by 33%, raising issues of teacher availability, laboratory space, additional supply expenses, etc. In the judgment

of the task force, addressing those issues could not be done precipitously.

In September 2003, the ESTF presented its report to the SBOE Committee on Instruction (COI). After minimal discussion, the COI instructed ESTF to prepare an implementation timetable for all eight recommendations. At the November meeting, the COI, after substantial discussion, accepted the timetable presented by ESTF and unanimously agreed to present the report and timetable to the SBOE at its meeting in February 2004.

When the SBOE meets, it first convenes as a Committee of the Whole. At that time, it hears public testimony on agenda items and may engage in extensive discussion. The Committee of the Whole does not take action; it merely makes recommendations to the SBOE, even though the membership of the two bodies is identical. Any action item must be approved by the SBOE, sitting as the board, on two separate readings at two separate bimonthly meetings.

The ESTF presented its report to the Committee of the Whole on February 26, 2004, seeking approval of Recommendation I effective in the fall of 2005. The ESTF also suggested that approval of the other recommendations be deferred until the effects of Recommendation I could be assessed. The committee heard testimony from 24 Texas earth scientists and received supporting letters from another 46. During the discussion after testimony ended, it became obvious that there was substantial opposition to Recommendation I. Led by board member Pat Hardy, opponents raised a number of questions that had been addressed in the ESTF report, making it obvious that many board

members had never read the report or understood its recommendations. Interestingly, Hardy, a member of the COI, had acquiesced in the committee decision to seek approval of Recommendation I in the first place. After lengthy discussion, the Committee of the Whole rejected Recommendation I by a vote of eight to seven. Joe Bernal, Chair of the COI, and Geraldine Miller, Chair of SBOE, made it clear that they intended to revisit the issue the next day.

When the SBOE convened on February 27, 2004, Bernal moved to approve Recommendation I. With almost no discussion, the board ignored the Committee of the Whole vote and approved Recommendation I on first reading by a vote of nine to six. Later, it was revealed that Don McLeroy and David Bradley had reversed their Committee of the Whole votes in deference to Chairwoman Miller. Second reading was scheduled for May 6 and 7, 2004.

At the Committee of the Whole meeting on May 6, 2004, public testimony in opposition to Recommendation I was orchestrated by John Stevens, executive director of the Texas Education and Business Coalition (TBEC). ESTF testimony focused on correcting misinformation about, and misinterpretation of, Recommendation I. It was emphasized that the TBEC position was directly contrary to the National Science Education Standards developed by the National Academy of Science/National Research Council. Also, it was emphasized that earth science courses being recommended address two thirds of the chemistry and physics concepts necessary for the high school science exit test in Texas (TAKS); therefore, the earth science courses were excellent preparation for that test. Nevertheless, the Committee of the Whole rejected Recommendation I by a vote of eight to seven. Two board members who had voted for Recommendation I on February 27, Cynthia Thornton and David Bradley, reversed their votes on May 6.

At the SBOE meeting on May 7, 2004, Recommendation I was introduced once again for approval on second and final reading. Pat Hardy moved to amend Recommendation I by deleting the original language and substituting the motion that all students be required to have four years of science for high school graduation. Her amendment was similar to the ESTF Recommendation VII, but without the stipulation that one of the four years must be earth science. Gail Lowe introduced language clarifying which courses would satisfy the fourth year requirement. Earth science classes constituted six of the fourteen courses on the final list. The Hardy-Lowe amendment was approved by a vote of thirteen to two and the motion as amended was approved by a vote of fourteen to one. Four years of science had received approval on first reading without *any* consideration of the personnel and cost issues that had made the ESTF seek step by step implementation of its Recommendation VII. Second and final reading of the amended motion was scheduled for July 15 and 16.

The task force now faced a real quandary. Some members believed that the Hardy-Lowe amendment was simply a cynical ploy to defeat Recommendation I, and that costs and other issues would not permit its passage on second reading. Other task force members saw the amendment

as too important to oppose, arguing that most students would choose earth science as the fourth-year option if four years of science were required. The ESTF did not adopt an official position, but some individual task force members did attempt to marshal support for the four-year requirement.

When the Committee of the Whole met on July 15, 2004, Bob Craig moved to amend the Hardy-Lowe amendment by returning to ESTF Recommendation I and to refer the four years of science issue to the COI for detailed analysis. Craig and others supporting his motion argued that it was the only way to gain a thorough understanding of the cost, space, and personnel implications of the Hardy-Lowe amendment. After substantial debate, the Craig motion was defeated by a vote of eight to seven.

Pat Hardy then moved to amend the Hardy-Lowe amendment by inserting two key provisions: (1) the four years of science requirement would take effect with students entering the ninth grade in 2007–2008; (2) on or before September 1, 2007, the SBOE would have to determine that the Texas Legislature had provided “adequate” funding to support four years of science. Opponents, especially Dan Montgomery, argued that such a determination was impossible because the Legislature appropriates lump sum funding without earmarking funds for specific programs. Since the sum appropriated is always less than the sum requested, how could the SBOE determine that “adequate” funds had been provided? Nevertheless, the Hardy amendment to the Hardy-Lowe amendment carried eight to seven, and then the Hardy-Lowe amendment as amended carried by the same eight to seven tally.

On July 16, 2004, the SBOE received the recommendations from the Committee of the Whole. By identical eight to seven votes the SBOE (1) approved the Hardy amendment to the Hardy-Lowe amendment; and (2) defeated an attempt by Bob Craig to return to the original Recommendation I. Finally, the Board approved the Hardy-Lowe amendment as amended on second and final reading by a vote of eight to seven (the vote as cast was nine to six but one member withdrew an affirmative vote before the minutes of the

meeting were prepared). If the Hardy-Lowe amendment is ever implemented, Texas will join Alabama, Illinois, Indiana, Nebraska, South Dakota, and Virginia as the only states requiring four years of science for high school graduation. The specific language of the requirement follows.

74.61. High School Graduation Requirements.

Sections (a) through (h) describe non-science requirements. Courses designated by an asterisk are classified as earth science by TEA.

(i) In addition to the requirements of this subchapter, a student entering Grade 9 in the 2007–2008 school year is required to demonstrate proficiency in science by earning four science credits to complete the recommended high school program or the distinguished achievement program, as specified in this subsection.

(1) One credit must be a biology credit (Biology, Advanced Placement [AP] Biology, or International Baccalaureate [IB] Biology). Students must choose two credits from subparagraph (A) and one credit from subparagraph (B) of this paragraph to complete the four-year science requirement.

(A) In addition to a biology course, a student must select two credits from the following areas. Not more than one credit may be chosen from each of the areas to satisfy this requirement.

- (i) Integrated Physics and Chemistry (IPC);
- (ii) Chemistry, AP Chemistry, or IB Chemistry; and
- (iii) Physics, Principles of Technology I, AP Physics or IB Physics.

(B) After successful completion of a biology course and two credits from IPC, a chemistry course, and/or a physics course, a student may select the fourth required credit from any of the following courses.

- (i) Geology, Meteorology, and Oceanography (GMO)*;
- (ii) Environmental Systems*;
- (iii) Aquatic Science*;
- (iv) Astronomy*;
- (v) Anatomy and Physiology of Human Systems;
- (vi) AP/IB Biology;
- (vii) Chemistry;
- (viii) AP/IB Chemistry;
- (ix) Physics;
- (x) AP/IB Physics;
- (xi) AP Environmental Science*;
- (xii) IB Environmental Systems*;
- (xiii) Scientific Research and Design; and
- (xiv) Principles of Technology I.

On seven separate recorded votes, the SBOE rejected the advice of the ESTF by a vote of eight to seven. The eight consistent naysayers were Rene Nunez (District 1), Mary Helen Berlanga (District 2), Terri Leo (District 6),

David Bradley (District 7), Linda Bauer (District 8), Cynthia Thornton (District 10), Pat Hardy (District 11) and Gail Lowe (District 14). Hardy and Thornton were clearly the leaders of this anti–earth science coalition. Texas voters will find their SBOE district listed on the back of their voter registration cards.

Linda Bauer was defeated in her reelection bid and will be leaving the board next year. Leo, Bradley, and Lowe are avowed creationists who have voted to include intelligent design creationism in biology textbooks. Their opposition to earth science was not unexpected, and probably will continue as long as they remain on the board. Their present terms expire on January 1, 2005, and all ran for reelection in November 2004. Nunez and Berlanga appear to have voted from a sincere, if misguided, conviction that Recommendation I would not serve the best interest of Hispanic students in Texas. Thornton's change of position from early support of Recommendation I to consistent opposition is particularly vexing because of her family's involvement in oil and gas production! Her present term does not expire until January 1, 2007. Pat Hardy's consistent and skillful opposition made her the most effective opponent, and it is fair to say that if she were not a member of SBOE, Recommendation I would have been adopted. Hardy ran for reelection in November 2004.

If the SBOE determines that adequate funding has not been appropriated by the Legislature, the four-year requirement will not take effect and there will be no earth science in the core curriculum. If the state does fund the fourth-year requirement, it will not be until 2010–2011 that earth science courses will count toward core science credit for graduation. In that case, earth science courses will remain electives for the next seven years. Given the major decline in enrollments since earth science was removed from the core curriculum in 1999, it is likely that only a tiny fraction of Texas high school students will be exposed to earth science in the foreseeable future. For more than a decade, Texas will have failed to provide for the scientific literacy of its students.

The members of the Earth Science Task Force and others have devoted an enormous amount of time to the Texas earth science issue since the fall of 2001, but our efforts have not been successful. We believe that ultimate success requires new leadership at the state level, and we take this opportunity to urge that earth scientists across the state of Texas give public science education a high priority for their time, resources, and influence.