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APPENDIX B

Academic Initiatives

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UNIVERSITY OF WYOMING

School of Energy Resources

209 Bureau of Mines

Dept. 3012, 1000 E. University Ave.,

Laramie, WY 82071

(307) 766-6254 • Frost@uwyo.edu • <http://uwacadweb.uwyo.edu/ser/>

1 March 2007

Call for Proposals:

SCHOOL OF ENERGY RESOURCES

GRADUATE ASSISTANTSHIPS

The School of Energy Resources (SER) is pleased to announce a call for proposals for Graduate Assistantships (GAs) for AY2007-2009. Funding is available beginning in August of 2007 and will be allocated for a two-year period. Each assistantship includes a \$20,000 annual GA stipend and up to an additional \$4,200 annually for tuition and fees. Although the SER seeks broad participation from across the campus, there is no limit to the number of GAs requested from any department or college. Moreover, GAs are considered to be renewable based on subsequent applications and demonstration of success in previous proposals.

Guidelines for the GA allocation are grounded to the SER Academic and Financial Plan submitted to the Wyoming Legislature in October 2005. The School's mission includes supporting Wyoming's energy industry (present and future) through a collection of academic, research, and outreach programs. The organizing principles underlying the SER are broadly framed by the following core questions:

- How can Wyoming sustain and optimize the long-term production of fossil energy resources?
- To what extent can Wyoming produce energy from renewable and sustainable sources?
- What are the state's roles in the emerging potential markets for CO₂ sequestration, hydrogen production, and transportation fuels derived from coal?
- What measures will smooth Wyoming's transition to a long-range energy economy?
- What curricula are appropriate to prepare students for careers in Wyoming's current and future energy economy?

The above questions touch a broad spectrum of UW's academic enterprise and are interdisciplinary in nature. As such, a fundamental goal of the SER is to develop and maintain a lasting presence that transcends individual colleges and departments, reaching all appropriate corners of the University. In order to achieve this objective the SER seeks:

Strong integration of energy issues in UW's academic mission with additional emphasis on interdisciplinary teaching in energy-related undergraduate and graduate programs.

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Using the above statement as an anchor of the SER academic mission, we are releasing this call for 16 GAs to be distributed across the University. Proposals should address one or more of the following topics.

Interdisciplinary Programs: The School of Energy Resources is committed to creating an interdisciplinary culture at UW where students and faculty from different disciplines routinely combine their talents to work on common energy-related problems. Interdisciplinary efforts can not only lead to extraordinary advances in science, they give students the well-rounded experience that is necessary to excel in solving energy problems where disparate disciplines often merge.

Evidence of SER's commitment to an interdisciplinary approach to academics is seen in several current and proposed research centers for the School. For example, UW's Enhanced Oil Recovery Institute combines expertise from geology, engineering, economics, and mathematics to form a powerful scientific effort aimed at improving Wyoming's recovery rates for oil. A proposed Center for Alternative and Renewable Resources may address efficient generation of chemical fuels from solar photocatalytic systems (e.g., artificial photosynthesis), and generation of electrical power using microbial- and bio-fuel cells. Such a program may involve faculty from Chemistry, Zoology and Physiology, Geology and Geophysics, and Chemical and Petroleum Engineering. A more traditional wind energy theme in sustainable power involving Electrical and Mechanical Engineering as well as Atmospheric Science is yet another example of interdisciplinary energy research.

The SER invites GA proposals for students to work specifically on interdisciplinary research programs of interest that cross department and/or college lines. Proposals should clearly document the specific problem of interest and identify all departments where significant contributions are expected. Although, the research program must be truly interdisciplinary in nature, a home department and adviser should be identified.

Course Modification: The University of Wyoming already offers a significant array of courses at the undergraduate and graduate level that are focused directly on energy issues—from Geology and Geophysics to Economics and Finance, from Mechanical Engineering to Renewable Resources, etc. That said, we believe there are substantial opportunities to expand the depth of energy content in courses or modify existing courses to include specific energy applications. For instance, the College of Engineering is in the midst of reorganizing ES 1060, Introduction to Engineering Problem Solving, to have a single overarching theme of energy. Similarly, could a course devoted to mathematical modeling of partial differential equations develop a strong emphasis on the multiphase flow aspects of enhanced oil recovery? Moreover, should aspects of parallel computing be introduced in numerical analysis courses in support of our new NCAR computing efforts in the geosciences?

The possibilities for course modification across several colleges as well as the School of Environment and Natural Resources are substantial. SER invites proposals for GA support that contribute to *substantive and meaningful* changes to courses in support of the SER mission.

Course Development: As noted above, UW already possesses an impressive portfolio of energy-related courses crossing multiple colleges. Proposals to modify existing courses to include an aspect of energy will provide further opportunities to support the SER academic mission. However, clearly some cases can be made for development of new courses to address pressing scientific, business, and energy-related policy issues—or to further complement and encourage interdisciplinary programmatic development. For example, the growing international concern over atmospheric CO₂

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abatement may give rise to a course devoted to CO₂ capture and storage. The need to accurately and systematically monitor carbon trading may give rise to demands for a course in carbon accounting.

World energy consumption is soaring to support burgeoning economic expansion in China and India. An international energy security class could explore the political ramifications of the emerging global competition among states to secure their access to scarce natural resources such as oil, natural gas, coal, platinum for fuel cells, and other strategic resources. Particular attention may be paid to the changing global geopolitical context that makes energy exporting states such as Russia and countries in the Middle East and North Africa increasingly important to the continued prosperity of the rest of the world.

Increasingly, compliance with environmental laws and regulations dictates the pace and manner of energy development. Courses may provide students with a basic understanding of how environmental laws and regulations are created and enforced in the context of energy development.

Impressive examples of interdisciplinary success stories related to energy teaching already exist. Civil Engineering and the School of Environment and Natural Resources have teamed up to study the engineering, environmental, and social aspects of piping coalbed methane water discharge from the Powder River Basin to the North Platte River. Geology and Geophysics offers an upper division, non-majors course that addresses a variety of energy issues from scientific, political, social, and cultural viewpoints.

While we are cautious about open-season on new course development due to UW's finite resources of faculty and academic professionals, there may be compelling reasons to develop entirely new courses to support the SER academic mission. We seek *innovative* proposals for GA support to assist in developing these new courses provided a strong case can be made for their introduction.

Basic and Applied Energy Research: The SER recognizes the cornerstone of diversifying and sustaining Wyoming's energy economy lies in solid scientific research exploring new territory. To that end, we seek to provide GA support for research programs addressing basic and applied research related to energy.

UW is home to several laudable research programs aimed directly at assisting every major sector of the Wyoming energy economy. A host of outstanding researchers are at the forefront of modeling fundamental aspects of porous media flow for enhanced oil recovery as well as geologic storage of CO₂. Research programs exist for clean coal technologies to convert coal to hydrogen and other liquid fuels. Plasma processing to remove hydrogen sulfide from natural gas and nitrous oxides from combustion processes are also being investigated. Advances in the technical and environmental issues associated with coalbed methane water quality and discharge are continuous. Finally, UW boasts an impressive collection of colleagues devoted to reclamation, restoration, and rehabilitation of disturbed ecosystems.

There is also strong interest on the campus in advancing energy science beyond the traditional carbon-based fossil fuels. Alternative energy research includes advances in fuel cell technology and hydrogen production using photovoltaics. UW also has a sustained history of interdisciplinary research in wind energy.

The SER seeks outstanding single or multi-investigator proposals for GA support to advance any aspect of energy science or energy-related technology transfer. While a history of demonstrated excellence related to energy research is a positive, the SER also encourages well thought out

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proposals from our colleagues who seek to enter the energy research arena. Exploring new fields of interest is a valued hallmark of the academic environment and UW and the state represent an ideal field laboratory for energy research. The pressing energy issues facing the world today provide additional incentives for studying in this important field.

Some closing general remarks related to this request for proposals are appropriate. First, any proposal for GA support does not have to reside entirely within one of the categories discussed above and may well cross multiple topics. Secondly, we wish to reinforce our commitment to interdisciplinarity as well as course modification and development. In the nascent stages of the School, our emphasis is clearly focused on raising the SER profile within the core of UW's mission—the academic classroom.

For additional information, or clarification, please contact Professor Andy Hansen, Academic Coordinator, School of Energy Resources, hansen@uwyo.edu.

GA Proposal Guidelines

SER/GA proposals are to be limited to three pages (11 point font) with no supplementary information and should address the following topics.

General Information: Begin by supplying the following information at the beginning of the proposal:

- Academic Adviser and Rank
- Department/Division
- Title of Proposal

Current GAs: Provide a brief description of current advising of GAs including the total number of MA, MS, Ph.D.'s and/or Ed.D.'s; the project each student is working on; and sources of funding for these students. Please also briefly describe your history of GA advising.

Project Description: Provide a narrative description of your proposal that addresses the purpose, importance, and potential impact to the SER mission outlined previously. Proposed course modifications should be substantial and clearly documented while arguments for new courses must be compelling. Interdisciplinary proposals should provide strong links among participating departments. Proposals addressing basic and applied energy research should document additional activities related to the effort such as external funding or additional graduate or undergraduate involvement.

All proposals should address whether they are seeking students for a masters degree, Ph.D., or Ed.D.

Reporting: The SER will require a written report from all GA awardees on an annual basis to be delivered by April 1 of each year. The report should be limited to three pages and should provide the background of the original proposal, the specific goals of the work, and the results of the effort including the academic status (e.g., progressing to degree, graduated, left the program, etc.) of the students who were supported with the grant. Please list all students supported by the grant and the semesters during which the support was provided. Compliance with the reporting requirements will be viewed as a condition of future renewals of GA support from the School.

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Conditions:

- 1) The recipient of an SER/GA grant will return to the School any funds unused due to unfilled GA positions on a prorated basis. However, failure to fill a GA slot immediately (i.e., Fall of 2007) will not result in a loss of the position.
- 2) GA funding under this RFP is valid through Spring semester of 2009.
- 3) Funding from the grant may be used to support students in the summer as well as during the academic year.
- 4) Recipients of an SER/GA agree to enroll in GRAD 5910, ECTL's course in graduate student teaching. See:
http://www.uwyo.edu/ctl/Grad_Student_Resources/CollegeTeach.asp.
- 5) During at least one semester of an SER/GA appointment, GA duties must include a *meaningful* teaching assignment. Such assignments include, but are not limited to, course modification and course development as outlined previously, teaching of a laboratory or lecture course, conducting discussion sessions, etc. Grading papers and holding office hours are examples that are not considered meaningful.
- 6) Publications resulting from SER-sponsored GAs should acknowledge the School of Energy Resources funding.

Submission: All proposals are to be submitted electronically in *Microsoft Word* or *Adobe PDF* formats. Submit proposals to serpros@uwyo.edu with "GA Proposal" listed as the subject line. The deadline for this solicitation is 2 April 2007. Notification of awards will be provided by 16 April 2007.

Evaluation Criteria: The overriding criterion for evaluation of any request to the SER/GA allocation pool is reflected in SER's educational objectives. That is, we seek strong integration of energy issues in UW's academic mission with additional emphasis on interdisciplinary teaching in energy-related undergraduate and graduate programs.

Proposals will be reviewed by Interim Director Carol Frost and Academic Coordinator Andy Hansen with additional guidance from the SER *Academic Council* comprised of faculty colleagues from across the University who have an interest in energy-related research. The SER may accept, decline, or table proposals to a later decision date.

Timing: The SER is keenly aware of the timing of this program as it relates to recruitment of outstanding graduate students. While some positions may be filled in the fall, it is entirely possible that some GAs will not be able to be filled until Spring of 2008, or perhaps later. One can expect future GA solicitations to occur in the fall semester in order to capitalize on the main recruiting season for graduate students.