

Grant and Cooperative Agreement

CHOOSE ONE:
 COOPERATIVE AGREEMENT
 GRANT

CHOOSE ONE: EDUCATION FACILITIES RESEARCH SDCR TRAINING

1. GRANT/COOPERATIVE AGREEMENT NUMBER NRC-HQ-84-14-G-0048	2. SUPPLEMENT NUMBER M0002	3. EFFECTIVE DATE 06/30/2017	4. COMPLETION DATE
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5. ISSUED TO NAME/ADDRESS OF RECIPIENT (No., Street, City/County, State, Zip) PURDUE UNIVERSITY 401 SOUTH GRANT ST WEST LAFAYETTE IN 479072024	6. ISSUED BY U.S. NRC - HQ Mailing Address: Acquisition Management Division Mail Stop: TWFN-8E06M Washington DC 20555-0001
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7. TAXPAYER IDENTIFICATION NO. (TIN)	9. PRINCIPAL INVESTIGATOR/ORGANIZATION'S PROJECT OR PROGRAM MGR. (Name & Phone) SEE SCHEDULE
8. COMMERCIAL & GOVERNMENT ENTITY (CAGE) NO.	

10. RESEARCH, PROJECT OR PROGRAM TITLE
SEE SCHEDULE

11. PURPOSE
See Schedule

12. PERIOD OF PERFORMANCE (Approximately)
08/01/2014 through 06/29/2020

13A.	AWARD HISTORY	13B.	FUNDING HISTORY
PREVIOUS	\$430,000.00	PREVIOUS	\$430,000.00
THIS ACTION	\$450,000.00	THIS ACTION	\$450,000.00
CASH SHARE	\$0.00	TOTAL	\$880,000.00
NON-CASH SHARE	\$0.00		
RECIPIENT SHARE	\$300,000.00		
TOTAL	\$880,000.00		

14. ACCOUNTING AND APPROPRIATION DATA
2017-X0200-IUPNSE-60-60D099-52-S-164-1148-4110

PURCHASE REQUEST NO.	JOB ORDER NO.	AMOUNT	STATUS
RES-17-0174			

15. POINTS OF CONTACT

	NAME	MAIL STOP	TELEPHONE	E-MAIL ADDRESS
TECHNICAL OFFICER	NANCY V. HEBRON-ISREAL	TWFN10B56	301-415-6996	Nancy.Hebron-Isreal@nrc.gov
NEGOTIATOR				
ADMINISTRATOR	M'LITA R. CARR		301-415-6869	MLita.Carr@nrc.gov
PAYMENTS				

16. THIS AWARD IS MADE UNDER THE AUTHORITY OF:
PURSUANT TO SECTION 31B AND 141B OF THE ATOMIC ENERGY ACT OF 1954, AS AMENDED

17. APPLICABLE STATEMENT(S), IF CHECKED: <input type="checkbox"/> NO CHANGE IS MADE TO EXISTING PROVISIONS <input type="checkbox"/> FDP TERMS AND CONDITIONS AND THE AGENCY-SPECIFIC REQUIREMENTS APPLY TO THIS GRANT	18. APPLICABLE ENCLOSURE(S), IF CHECKED: <input type="checkbox"/> PROVISIONS <input type="checkbox"/> SPECIAL CONDITIONS <input type="checkbox"/> REQUIRED PUBLICATIONS AND REPORTS
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UNITED STATES OF AMERICA	COOPERATIVE AGREEMENT RECIPIENT
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CONTRACTING/GRANT OFFICER M'LITA R. CARR	DATE 06/28/2017	AUTHORIZED REPRESENTATIVE	DATE
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Grant and Cooperative Agreement

ITEM NO. (A)	ITEM OR SERVICE (Include Specifications and Special Instructions) (B)	QUANTITY (C)	UNIT (D)	ESTIMATED COST	
				UNIT PRICE (E)	AMOUNT (F)
	<p>CFDA Number: 77.006 RES-17-0174</p> <p>The purpose of this modification is to revise the grant in it's entirety:</p> <ol style="list-style-type: none"> 1. Add an additional program to the existing grant: Program B: entitled "Faculty Development Grant for Nuclear Faculty at Purdue University"; 2. Update the Terms and Conditions; 3. Extend the grant's period of performance as a result of the addition of Program B. <p>As a result of this modification:</p> <ol style="list-style-type: none"> 1. Block 9, PRINCIPAL INVESTIGATOR/ORGANIZATION'S PROJECT OR PROGRAM MGR, delete in its entirety and replace with the following: <div style="background-color: black; height: 15px; width: 100%; margin-bottom: 5px;"></div> <div style="background-color: black; height: 15px; width: 90%; margin-bottom: 5px;"></div> <div style="background-color: black; height: 15px; width: 70%;"></div> 2. Block 10, RESEARCH, PROJECT, OR PROGRAM TITLE, delete in its entirety and replace with the following: "Program A: U.S. NUCLEAR REGULATORY COMMISSION NUCLEAR EDUCATION PROGRAM FACULTY DEVELOPMENT GRANT PROGRAM AT PURDUE UNIVERSITY; Program B: FACULTY DEVELOPMENT GRANT FOR NUCLEAR FACULTY AT PURDUE UNIVERSITY" 3. Attachments A, B, & C, delete in its entirety and replace with the following, see attached beginning on page 4. <p>Please see attached for detailed information. Continued ...</p>				

Grant and Cooperative Agreement

ITEM NO. (A)	ITEM OR SERVICE (Include Specifications and Special Instructions) (B)	QUANTITY (C)	UNIT (D)	ESTIMATED COST	
				UNIT PRICE (E)	AMOUNT (F)
	<p>LIST OF CHANGES:</p> <p>Period Of Performance End Date changed from 2017-07-31 00:00:00 to 2020-06-29 00:00:00</p> <p>Payment:</p> <p style="padding-left: 40px;">ASAP GRANT FUNDS REIMBURSEMENT SYS US TREASURY</p> <p>Period of Performance: 08/01/2014 to 06/29/2020</p>				

Attachment A - Schedule

A.1 PURPOSE OF GRANT

The purpose of this Grant is to provide support to two distinct programs with Purdue University, as described in Attachment B entitled "Program Description."

1. **Program A:** U.S. Nuclear Regulatory Commission Nuclear Education Program Faculty Development Grant Program At Purdue University
2. **Program B:** Faculty Development Grant For Nuclear Faculty At Purdue University

A.2 PERIOD OF GRANT

The effective date of this Grant is:

Program A: U.S. Nuclear Regulatory Commission Nuclear Education Program Faculty Development Grant Program at Purdue University – The effective date of this grant is August 1, 2014. The estimated completion date of this Grant is July 31, 2017. Funds obligated hereunder are available for program expenditures for the estimated period: August 1, 2014 – July 31, 2017.

Program B: Faculty Development Grant for Nuclear Faculty at Purdue University – The effective date of this grant is June 30, 2017. The estimated completion date of this Grant is June 29, 2020. Funds obligated hereunder are available for program expenditures for the estimated period: June 30, 2017 – June 29, 2020.

A.3 AMOUNT OF AWARD AND PAYMENT PROCEDURES

1. **Program A:** The total estimated amount of this program is \$580,000.00 for the three year period; inclusive of \$150,000.00 in cost share. NRC hereby obligates the amount of \$430,000.00 for program expenditures during the period set forth above and in support of the Budget above. NRC is not obligated to reimburse the Grantee for the expenditure of amounts in excess of the total obligated amount.

2. **Program B:** The total estimated amount of this program is \$600,000.00 for the three year period; inclusive of \$150,000.00 in cost share. NRC hereby obligates the amount of \$450,000.00 for program expenditures during the period set forth above and in support of the Budget above. NRC is not obligated to reimburse the Grantee for the expenditure of amounts in excess of the total obligated amount.

3. Payment shall be made to the Recipient in accordance with procedures set forth in the Automated Standard Application for Payments (ASAP) Procedures set forth below.

A.5 BUDGET

Revisions to the grant award budget shall be made in accordance with Revision of Grant Budget in accordance with [2 CFR § 200.308](#).

Program A

1. Total Estimated NRC Amount: \$430,000.00

2. Total Obligated Amount: \$430,000.00
 3. Cost-Sharing Amount: \$150,000.00
 4. Activity Title: U.S. Nuclear Regulatory Commission
 Nuclear Education Program Faculty
 Development Grant Program at Purdue
 University
 5. NRC Project Officer: Nancy Hebron-Isreal
 6. DUNS No.: 072051394

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>
Personnel			
Fringe			
Travel			
Equipment			
Supplies			
Other			
Total Direct Cost			
Indirect Costs			
Total	\$ 143,333.00	\$ 143,333.00	\$ 143,334.00

Program B

1. Total Estimated NRC Amount: \$450,000.00
 2. Total Obligated Amount: \$450,000.00
 3. Cost-Sharing Amount: \$150,000.00
 4. Activity Title: Faculty Development Grant for Nuclear Faculty
 at Purdue University
 5. NRC Project Officer: Nancy Hebron-Isreal
 6. DUNS No.: 072051394

SECTION B - BUDGET CATEGORIES

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY				Total (5)
	(1) NRC-HQ-60-17- FOA-0001 (Period 1)	(2) NRC-HQ-60-17- FOA-0001 (Period 2)	(3) NRC-HQ-60-17- FOA-0001 (Period 3)	(4)	
a. Personnel	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]
b. Fringe Benefits	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
c. Travel	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
d. Equipment	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
e. Supplies	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
f. Contractual	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
g. Construction	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
h. Other	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
i. Total Direct Charges (sum of 6a-6h)	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	\$ [REDACTED]
j. Indirect Charges	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	\$ [REDACTED]
k. TOTALS (sum of 6i and 6j)	\$ 214,541.00	\$ 116,706.00	\$ 118,753.00	\$ [REDACTED]	\$ 450,000.00
7. Program Income	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]	\$ [REDACTED]

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ATTACHMENT B - PROJECT DESCRIPTION

Program A: U.S. Nuclear Regulatory Commission Nuclear Education Program
Faculty Development Grant Program at Purdue University

Principal Investigator: [REDACTED]

1. Nuclear Faculty Development at Purdue University

The proposed program is designed to help junior faculty members develop the skills required for success in an academic career and to provide support for activities that will enhance faculty members' capability in research, teaching, and engagement so to prepare them for career advancement as a tenured faculty member. This proposed program's strength is that it is structured to integrate the faculty members into the Schools of Nuclear Engineering and Health Sciences at Purdue University such that their interactive career paths, supported by this fund, will allow them to develop collaborative education and research programs and contribute to the education of nuclear professionals for many years to come.

To earn tenure, junior faculty members are required to establish themselves as independent researchers in their chosen research fields. They must write successful research proposals, conduct research, publish the results of their work in reputable journals, mentor and graduate masters and doctoral students, teach undergraduate and graduate level courses, participate in professional conferences, and serve on department, college, university, and national or international committees. They will also be expected to lead or participate in outreach activities designed to attract students to the nuclear field. In short, over a period of six years, they will be expected to build a national reputation in their area of expertise while serving as effective teachers and mentors of the next generation of professionals specialized in nuclear engineering and safety.

The proposed Nuclear Faculty Development program at Purdue University has several characteristics:

- A. The funding will be used to help the junior faculty to purchase equipment and conduct initial research to provide preliminary results to strengthen their proposals for external funding by allowing the faculty members to purchase equipment that extends the capabilities of their laboratories.
- B. The funding will be used to support travel to professional conferences, to visit funding agencies, to meet with current or potential collaborators at national laboratories, universities, or other research organizations, and to recruit graduate students.
- C. Mentoring will be provided by the Heads of both Schools and other senior nuclear engineering and health sciences faculty members to include:
 - preparing a long-term plan for building a resume that will lead to tenure
 - reviewing the plan annually, at least, and revising it as necessary
 - helping identify appropriate journals for publication
 - reviewing and commenting on articles prepared for publication
 - introducing the junior faculty members to colleagues at national meetings or at agencies that have potential sources of funding
 - reviewing and commenting on proposals the junior faculty members prepare
 - helping the junior faculty members build a collegial relationship with other faculty members within both Schools

- helping the junior faculty member identify potential collaborators within Purdue and at other universities or national laboratories.
- D. New faculty will have access to talented graduate students, including those who are awarded fellowships either from the university, government agencies, or nationally recognized foundations.
 - E. The program will limit teaching responsibilities for the first two years of the faculty appointment.
 - F. Opportunities will be provided to develop new courses in their areas of expertise so the junior faculty members can prepare students to effectively contribute to the faculty members' research programs.
 - G. Nomination by the Heads of Nuclear Engineering and Health Sciences will be to serve on only those committees that provide the faculty members with experience and visibility important to building their resumes in preparation for tenure.
 - H. Heads and senior faculty will provide identification of opportunities to serve on national committees and review boards, and nomination to those committees or boards.
 - I. At the appropriate time, the junior faculty will be nominated for college, university, and national awards.

2. Selection Process

Faculty members who will receive NRC Faculty Development funds at Purdue must have demonstrated excellence and experience that make them highly likely to be successful, tenured faculty members and outstanding teachers who will attract students to nuclear engineering and prepare them for careers in related fields. The junior faculty members in the Schools of Nuclear Engineering and Health Sciences were brought to Purdue on the basis of their technical expertise, experience in obtaining grants and managing programs, publication record, and enthusiasm for teaching and mentoring students. These same criteria have been used to select junior faculty members for the Nuclear Faculty Development program.

The three faculty members selected are [REDACTED]

[REDACTED] All three professors came to Purdue from prestigious programs in the U.S. and all of them already have an excellent track record of research and teaching. Their resumes are attached and clearly demonstrate the quality of these individuals.

The research, education, and outreach plans for these professors are described below. The budget to support these plans is described in the budget description attachment. Cost sharing will be provided by both the School of Nuclear Engineering and the School of Health Sciences. The cost sharing funding will allow additional release for the three faculty during the academic year to focus on development activities.

2.1 [REDACTED] Plan

2.1.1 Research Program

[REDACTED] expertise is in nuclear nonproliferation and safeguards practices, with a focus on improved radiation detection methods to provide the baseline accountancy information. He has an ongoing collaboration with Oak Ridge National Laboratory and Sandia National Laboratories investigating the use of Continuity of Knowledge in assessing the safeguards of a country, and has begun the development of a radiation detection laboratory to perform research on new solid state and scintillation crystal radiation detector systems. A portion of the funding will be used to support travel to meet with potential collaborators and to present research results at technical conferences.

2.1.2 Educational Program

██████████ currently teaches the Introduction to Nuclear Engineering course, and supports the undergraduate and graduate radiation detection courses taught by ██████████. Beginning in Fall 2014, ██████████ will continue to teach the Intro. Course and will teach the second of the undergraduate courses (with topics that include neutron detectors and reactor instruments and control) and, in the spring, the graduate radiation detection course. Prof. Bean will be working to develop a follow-on laboratory course that will complement the existing nuclear nonproliferation lecture course, as well as a criticality safety course. Longer term, ██████████ will work with ██████████ to develop a reactor operations course to teach nuclear engineering students about the systems and operations commonly encountered in a nuclear plant and to provide additional experience operating the Purdue University reactor.

2.1.3 Outreach Program

██████████ primary outreach is through the Radiation Laboratories, and the PUR-1 nuclear reactor (the only reactor in the state of Indiana). Tours of the reactor are provided to outside groups, student organizations, University classes, and visiting prospective students. These tours expose hundred of people per year to the field of nuclear engineering and the use of reactors for research, teaching, and power generation. Additionally, the teaching laboratory is used for groups such as the Boy Scouts of America and local high schools to provide a one day radiation detection experience, where the visitors learn about and get to use clud chambers, survey meters, and gamma spectroscopy systems.

2.2. ██████████ Plan

2.2.1 Research Program

██████████ research group, the BioElectrics and ElectroPhysics Laboratory (BEEP) focuses on developing and modeling pulsed power and plasma technology and these technologies' interactions with materials, particularly biological cells and organisms. The primary focus of the BEEP Lab involves using engineering techniques, biological assays, and mathematical models to investigate biomedical applications of pulsed electric fields, including nervous system cell manipulation, cellular delivery of normally impermeant molecules, stem cell manipulation, platelet activation for tumor treatment, cancer treatment, and sterilization. ██████████ is currently starting various programs in these areas, including measuring the changes in electrical properties in treated cells, measuring changes in cell population dynamics following treatment, and collaborating with GE and Air Force Research Laboratory (AFRL).

While fundamental for all these applications, a full analysis of cell population dynamics for a broad range of pulse parameters remains incomplete. Anecdotal evidence AFRL suggests that low intensity PEFs may induce a hormetic effect in population dynamics analogous to that postulated for low level ionizing radiation. BEEP is currently conducting experiments at various pulse durations to assess cell population dynamics in vitro. This data can then be fit to a set of coupled differential equations to estimate steady state cell population. Executing a full design of experiment over a wide regime of pulse parameters would lend insight to various applications. A natural extension of this study involves applying pulsed electric fields to stem cells to assess the resulting changes in stem cell proliferation and differentiation. Electric fields can stress the cell membrane of stem cells and induce differentiation. ██████████ has built collaborations with faculty in Animal Sciences with expertise in stem cells to collaborate in this area. Such effects could then be potentially compared to those induced by ionizing radiation with potential for research funding from NIH and DoD.

A fraction of the funding will be used for domestic travel to meet with research collaborators and to present results at conferences or workshops.

2.2.2 Teaching Program

██████████ is currently teaching the two semester undergraduate nuclear engineering laboratory sequence in radiation detection and the one semester graduate nuclear engineering radiation detection laboratory. Starting in Fall 2014, ██████████ will start an undergraduate engineering mathematics course. In subsequent Spring Semesters, ██████████ will teach the undergraduate radiation detection course and create graduate courses in the biological effects of nonionizing radiation and the generation of this nonionizing radiation (or pulsed power and directed energy).

2.2.3 Outreach Program

██████████ is committed to outreach to the community through leveraging his unique background with government and industrial laboratories to demonstrate to prospective students the multiple career paths available in traditional and nontraditional nuclear engineering specialties, particularly in developing multidisciplinary areas. ██████████ will accomplish this through providing laboratory tours for current university students and high school students to show them basic university research and show them how government and industrial laboratories further develop the technologies. These outreach activities will introduce the broader area of nuclear technology to prospective and current students to show that a nuclear engineering education can provide them with multiple career options in power generation, security, and medicine.

2.3 ██████████ Plan

2.3.1. Research program

██████████ research program has three key focus areas: radiation dosimetry, radiation instrumentation, and health effects of low dose radiation. The dosimetry study seeks the best models and methodologies to assess radiation dose for external and internal radiation exposures. Currently Prof. Nie is leading two projects in this area, one is on bone microdosimetry and the other is the dose characterization of CT scan especially for pediatric patients. The program for radiation instrumentation focuses on the development of x-ray fluorescence (XRF) and neutron activation analysis (NAA) technologies to quantify toxic metals in human body *in vivo*. Current projects in this area include the development of x-ray fluorescence (XRF) technologies to assess lead and cadmium in bone, and arsenic and silver in skin, and the development of neutron activation analysis (NAA) technologies to assess manganese in bone and cadmium in kidney *in vivo*. The program for health effects of low dose radiation integrates the health physics program and the toxicology program in School of Health Sciences to investigate the association between health effects and multiple stressors in general population and the interaction between these stressors.

██████████ has already set up a spacious newly renovated laboratory for radiation instrumentation development. A large fraction of the funds will be used to directly support research activities through minor equipment purchases and laboratory maintenance. A fraction of the funds will be applied to provide for faculty summer time research salary, travel to meetings with potential collaborators in support of potential new research programs, and travel to national and international meetings in the proposed research area.

2.3.2. Educational program

Education is a critical component of [REDACTED] development program, and involves both the graduate and the undergraduate students. [REDACTED] is currently teaching two core classes for the school's RHS program, one is on applied health physics and the other is on radiation instrumentation. Both classes are closely related to her career goal of promoting safe use of radiation. She designed real life radiation emergency response training program for the students with the assistance from [REDACTED], the [REDACTED]. She plans to further upgrade the equipment used for radiation instrumentation class.

2.3.3. Outreach program

Global expansion and safe conduct of nuclear power generation and research are of imminent demand as the nuclear power has now become a major source of green energy. A dynamic, high-profile research and educational program at Purdue for the last half century has built the solid foundation on which [REDACTED] can further conduct nuclear safety education to the local and national audience. [REDACTED] will continue her visits to local communities and schools to present her research in the context of its relevance and impact on the pressing societal issues today, continue her effort on identifying the future talented engineers and scientists, and continue her efforts on providing trainings to the students and general public on radiation emergency response.

3. Management and Administrative Structure

The program will be conducted as a joint effort between Schools of Nuclear Engineering and Health Sciences. [REDACTED] together with the Heads from both Schools, will be responsible for the management of the Nuclear Faculty Development program. The School of Nuclear Engineering at Purdue has 14 active faculty members, most of whom are full professors and are in a position to mentor young faculty members effectively. The School of Health Sciences has 12 active faculty members and over 30 adjunct faculty members, and one third of them are dedicated to Health Physics and Radiation Sciences.

In accordance with the concept of shared responsibility for the success of junior faculty members, the faculty development plan sets expectations for the junior professors, for senior professors serving as mentors, and for the Heads of the School of Nuclear Engineering and Health Sciences. Upon receiving the NRC Faculty Development Grant funding, the School Heads will work with the junior and senior faculty members to identify a mentoring team for each junior faculty member. Within the first 6 months of the Nuclear Faculty Development program at Purdue, each participating junior faculty member will meet with his or her School Head and the senior faculty mentoring teams to develop a timeline for the junior faculty's developmental activities and expected accomplishments toward tenure evaluation. Activities assessed and discussed will include those related to research, teaching, graduate student mentoring, professional organization participation, and other items mentioned in the faculty development plan in Section 1. The junior faculty members, Heads, and mentors will also develop a specific plan for senior faculty mentoring activities. The School Heads will prepare a list of their responsibilities for the junior faculty member based on the faculty development plan. The Head of the School of Nuclear Engineering will also be responsible for preparing a progress report to the NRC every six months and providing the final report on the project.

4. Evaluation Plan

Since the three junior faculty members who will be supported by the Nuclear Faculty Development program at Purdue University are already faculty members here, the evaluation

plan will focus on the effectiveness of the development program in preparing and retaining these junior Professors. In the final analysis, the success of the development program will be determined by whether the junior faculty members are granted tenure, continue their faculty careers, and successfully prepare undergraduate and graduate students for careers in the nuclear industry. However, a good evaluation plan requires a series of intermediate measures that will allow us to identify and remedy any weaknesses in the development program before those weaknesses can have a negative effect on the careers of the junior faculty members. As a result, the Nuclear Faculty Development program at Purdue will be assessed annually to determine progress toward preparing the junior faculty members for success in an academic career and retaining them in faculty positions. The assessment will be based on monitoring each individual faculty member's plan: the timeline for each junior faculty member's activities and accomplishments, the plan for senior faculty mentoring, and the plan for the Head's efforts in support of the junior faculty member. Each year, the Head of each School will review progress in implementing the plans for the junior faculty members and the senior faculty mentors, and determine whether activities have been performed as specified in the three plans. The Heads will convey the results of the review to the junior faculty members and the senior faculty mentors. If there are lapses in execution or identified weaknesses in the plans, the Heads, junior faculty members, and mentors as a group will determine the necessary changes to ensure the junior faculty member is on a path to success.

Program B: Faculty Development Grant for Nuclear Faculty at Purdue University

Principal Investigator: [REDACTED]

1. Nuclear Faculty Development at Purdue University

The proposed program is designed to help junior faculty members develop the skills required for success in an academic career and to provide support for activities that will enhance faculty members' capability in research, teaching, and engagement so to prepare them for career advancement as a tenured faculty member. This proposed program's strength is that it is structured to integrate the faculty members into the Schools of NE and MSE at Purdue University such that their interactive career paths, supported by this fund, will allow them to develop collaborative education and research programs and contribute to the education of nuclear professionals for many years to come.

To earn tenure, junior faculty members are required to establish themselves as independent researchers in their chosen research fields. They must obtain competitive funding, conduct cutting edge research, publish the results of their work in reputable journals, mentor and graduate masters and doctoral students, teach undergraduate and graduate level courses, participate in professional conferences, and serve on department, college, university, and national or international committees. They are also expected to lead or participate in outreach activities designed to attract students to the nuclear field. In short, over a period of six years before they obtain tenure, they will be expected to build a national reputation in their area of expertise while serving as effective teachers and mentors of the next generation of professionals specialized in nuclear engineering and safety.

The proposed Nuclear Faculty Development program at Purdue University has several characteristics:

- A. The funding will be used to help the junior faculty to support graduate students and conduct high quality research. This will also include purchasing equipment that extends the capabilities of their laboratories.

- B. The funding will also be used to support travel to professional conferences, to visit funding agencies, to meet with current or potential collaborators at national laboratories, universities, or other research organizations, and to recruit graduate students.
- C. Mentoring will be provided by the Heads of both Schools and other senior nuclear engineering and materials engineering faculty members to include:
 - preparing a long-term plan for building a dossier that will lead to tenure
 - reviewing the plan annually, and revising it as necessary, particularly based on each department's promotion committees
 - introducing the junior faculty members to colleagues at national meetings or at agencies that have potential sources of funding
 - helping the junior faculty members build a collegial relationship with other faculty members within both Schools and across the college and the university
 - helping the junior faculty member identify potential collaborators within Purdue and at other universities or national laboratories.
- D. The two faculty will have access to talented graduate students.
- E. The program will limit teaching responsibilities for the first two years of the faculty appointment.
- F. Opportunities will be provided to develop new courses in their areas of expertise.
- G. The Heads will nominate both faculty to serve on committees that provide the faculty members with experience and visibility important to building their credentials for tenure.
- H. At the appropriate time, the junior faculty will be nominated for college, university, and national awards.

2. Selection Process

Faculty members who receive NRC Faculty Development funds at Purdue must have demonstrated excellence and experience that make them highly likely to be successful, tenured faculty members and outstanding teachers who will attract students to nuclear engineering and prepare them for careers in related fields. The junior faculty members in the Schools of NE and MSE were brought to Purdue on the basis of their technical expertise, experience in obtaining grants and managing programs, publication record, and enthusiasm for teaching and mentoring students. These same criteria have been used to select junior faculty members for the Nuclear Faculty Development program.

The two faculty members selected are [REDACTED]. Their resumes are attached and clearly demonstrate the high quality of these individuals.

The research, education, and outreach plans for these faculty are described below. The budget to support these plans is described in the budget description attachment. Cost sharing will be provided by both the Schools of NE and MSE. The cost sharing funding will allow additional release for the faculty during the academic year to focus on development activities.

2.1 [REDACTED] Plan

2.1.1 Research Program

The proposed research aims 1) to develop and benchmark integrated models for advanced computer simulations and optimization of laser induced breakdown spectroscopy (LIBS) devices in application to nuclear materials and nuclear energy systems and 2) to improve the accuracy of nuclear materials detection and monitoring. The advantages of LIBS technique include fast elemental and isotopes identification, minimum materials required, non-destructive character of materials analysis, avoiding physical contact with the sample, and simple device configuration.

██████████ research interests and experience include modeling and experiments for the analysis and development of advanced methods for the description of materials evolution and materials characteristics under extreme conditions of particles/plasma irradiation. One of the topics of current research is related to the modeling of laser produced plasmas (LPPs) for various applications. These include development and implementation of 3D models for the simulation of LPP systems and models benchmarking with in-house and world-wide experiments. These includes also optimization of LPP sources for extreme ultraviolet lithography and Water-window microscopy, fundamental studies of colliding plasmas properties for nanoparticles formation. Among other ██████████ research activities are development of Dynamic Monte Carlo algorithms (ITMC-DYN package) for modeling ions and particles transport in materials and material surface modification; modeling and analysis of plasma facing components response during transient abnormal events and normal operation in Magnetic Fusion Energy systems, e.g., in support of ITER reactor. ██████████ group includes currently two postdocs, three graduate and one undergraduate students involved in both numerical simulations and experiments.

The proposed research will be based on the models developed in the framework of the HEIGHTS simulation package developed at CMUXE center and has been used in numerous scientific and engineering research areas. The package combines state-of-the art models of energy deposition, vapor/plasma formation and evolution and magneto hydrodynamic (MHD) processes, thermal conduction in material and in plasma, atomic physics and resulting opacities, detailed photon radiation transport, and interaction between plasma/radiation and target material. The models and the entire package are continuously tested with in-house experiments at CMUXE labs.

Future research aims to extend the above models and methods in connection with LPP experiments to the conditions and parameters of LIBS devices in the application to nuclear materials and nuclear energy systems. While experimental studies show continuous progress in LIBS technique and comparative methods, modeling lacks in sufficient details and accuracy of models and methods which restricts application of computer simulations for the predictive analysis of elemental composition. ██████████s preliminary simulations of LIBS systems showed the importance of advanced methods for integrated modeling of material erosion, plasma radiation and hydrodynamic confinement in vacuum and ambient gas for the precise materials detection and analysis.

The proposed research plan includes 1) extension of current models and methods and their relevance to LIBS applications; 2) models benchmarking for LIBS relevant parameters with CMUXE experiments; 3) LIBS devices optimization for nuclear materials detection and structural materials monitoring; 4) modeling of dual-pulse systems to increase elements detection accuracy; 5) implementation of models for ultra-short laser for further optimization of LIBS technique.

A fraction of the funding will be used for domestic travel to present results at conferences and workshops, to give seminars and to meet with research collaborators.

2.1.2 Teaching Program

██████████ developed and has been teaching courses on computational methods for the solution of physics/engineering problems. The courses include interpolation and integration methods, numerical solutions of differential equations, linear equations system and implicit methods, application of Monte Carlo technique in various problems such as integration, particles interaction, and radiation transfer. These courses are composed of lectures as well as of computer

lab sessions for in hand implementation of solution methods. Starting in Spring 2017, [REDACTED] will start teaching the undergraduate course "Introduction to Nuclear Engineering". She is planning in the future to develop the course for graduate students on the advanced methods with parallel implementation for modeling of complex systems and devices.

2.1.3 Outreach Program

[REDACTED] is committed to outreach to the community through leveraging her multidisciplinary expertise in several plasma physics/engineering and computational science areas. Tours at the CMUXE labs and demonstration to prospective students current research capabilities in areas of nuclear materials detection and monitoring, new materials design, photon sources for nanotechnology in actual and virtual reality domains will show the opportunities for multiple career paths and for the advancement of nuclear energy and related systems. This will help guiding and attracting high school students to the top current areas of studies and research. Indiana high school students will visit CMUXE labs where numerical and experimental simulations of powerful laser systems and intense particle beams will be demonstrated using various visualization technique and movies showing, e.g., the entire process of laser produced plasma development in experiments and in modeling at the same time. Graduate and undergraduate students will be involved in these demonstrations sharing their experience in the research. [REDACTED] is planning also to give seminars for underrepresented minority students at Tuskegee University. [REDACTED] is supervising currently one student from this university who applied to NE at Purdue after participation in SURF and NSF PIRE programs conducted at CMUXE center.

2.2. [REDACTED] Plan

2.2.1 Research Program

[REDACTED] research focus is on understanding the connections between the microstructure of nuclear fuels and materials and their physical properties. Her fuels and materials interests span multiple generations and designs of nuclear reactors, including the existing light water reactor fleet, high performance research and test reactors, high temperature gas cooled reactors, as well as accelerator driven systems. The microstructural evolution within these fuels and materials is studied as a function of radiation damage and/or fabrication and processing of the nuclear systems. Her work also utilizes both experimental and modeling techniques in a complementary fashion. This overall philosophy has enabled [REDACTED] to work closely with fuel fabricators to optimize the fabrication process.

In order to study the structure-properties relationships in these nuclear systems, [REDACTED] has also worked to develop and expand capabilities of existing techniques to apply to nuclear fuels and materials, including positron annihilation spectroscopy, nanoindentation, synchrotron X-ray diffraction and tomography, neutron diffraction, and focused ion beam/scanning electron microscopy applications. These techniques span spatial ranges from the atomistic to the mesoscopic levels. Moreover, many of these techniques have the capability to assess materials from a three-dimensional (3D) perspective. For example, recent advances in synchrotron high-energy diffraction techniques allow for 3D, non-destructive analysis of materials providing information regarding the overall microstructure, phases, and strain. [REDACTED] has recently conducted these 3D experiments on both in-pile irradiated transmutation fuels and high performance research reactor fuels. This research involves the collaboration of Idaho National Laboratory and Argonne National Laboratory. Through the use of the nano/microindentation system requested in this proposal, it is possible to also connect the microstructure to 3D mechanical properties. Finally, [REDACTED] is collaborating with a

faculty member in the School of Aeronautics and Astronautics Engineering to assess the thermal properties of these systems.

██████████ is in the process of establishing a nuclear fuels and materials characterization laboratory at Purdue. This grant will enable her to expand these capabilities, particularly in the area of nano/micromechanical testing in 3D. This mechanical testing can be applied to a number of challenges faced in the industry, such as weld integrity, lifetime extensions, testing of new alloys for nuclear applications, and assessment of additively manufactured materials.

A portion of this funding will be used to present research results at conferences/workshops and to travel to meet with collaborators within the U.S.

2.2.2 Teaching Program

██████████ is currently teaching an undergraduate laboratory course on Materials Properties. In the Spring semester (2017) she will teach a graduate course in microstructural characterization techniques. In Spring 2018, ██████████ will develop a new course on Material Behavior and Properties of Nuclear Fuels and Structural Materials that includes both upper level undergraduates and graduate students. Within this course, she will utilize the equipment purchased within this grant to incorporate within the course curriculum.

2.2.3 Outreach Program

██████████ will conduct a multi-pronged approach to community outreach. She will partner with the Women in Engineering Program (WIEP) at Purdue, specifically contributing to the Introduce a Girl to Engineering Day (IGED) through conducting hands-on nuclear science and technology demonstrations to ninth and tenth graders. This event attracts a diverse number of students from throughout the Midwest and provides a unique opportunity to introduce the discipline of nuclear engineering to first and second year high school students. Moreover, ██████████ is committed to providing tours in her nuclear fuels and materials characterization laboratory to the community and prospective Purdue undergraduate and graduate students.

3. Management and Administrative Structure

The program will be conducted as a joint effort between Schools of NE and MSE.

██████████, ██████████, ██████████ will act as the PI for this program. ██████████ will collaborate with ██████████, the ██████████ and be responsible for the management of the Nuclear Faculty Development program. The School of NE at Purdue has 17 active faculty members, many of whom are full professors and are in a position to mentor young faculty members effectively. The School of MSE has 32 active faculty members and many full professors who will contribute to the mentoring of the junior faculty.

Both faculty will benefit of a multitude of programs made available through the College of Engineering. These include a New Faculty Learning Community” (NFLC) where assistant professors in their first year meet about three/four times each semester to discuss topics such as recruitment and mentoring of graduate students, navigation of the campus research infrastructure and contacts, insights on navigating relationships with senior faculty, teaching/learning effectiveness and promotion and tenure. In research performed on this activity, it was found that benefits of NFLC included providing opportunities to connect with other new faculty, fostering a sense of community, and learning professional development strategies.

Both faculty will also benefit from Teaching and Learning workshops conducted by nationally known experts who deliver the 1.5 day workshop at Purdue.

In accordance with the concept of shared responsibility for the success of junior faculty members, the development plan sets expectations for the junior professors, for senior professors serving as mentors, and for the Heads of the Schools of NE and MSE. Upon receiving the NRC Faculty Development Grant funding, the School Heads will work with the junior and senior faculty members to identify a mentoring team for each junior faculty member. Within the first 6 months of the Nuclear Faculty Development program at Purdue, each participating junior faculty member will meet with her School Head and the senior faculty mentoring teams to develop a timeline for the junior faculty's developmental activities and expected accomplishments toward tenure. Activities assessed and discussed will include those related to research, teaching, graduate student mentoring, professional organization participation, and other items mentioned in the faculty development plan in Section 1. The junior faculty members, Heads, and mentors will also develop a specific plan for senior faculty mentoring activities. The Head of the School of NE will also be responsible for preparing a progress report to the NRC every six months and providing the final report on the project.

Finally, the College of Engineering at Purdue has a policy of conducting a review of each assistant professor by the school level promotions committee in order to provide an assessment of progress faculty make towards promotion. Both candidates will receive annual written feedback as a result of this review, to ensure that they continue to be successful.

4. Evaluation Plan

The evaluation plan will focus on the effectiveness of the development program in preparing and retaining the two junior faculty. Ultimately, the success of the development program will be determined by whether the junior faculty members are granted tenure, continue their faculty careers, and successfully prepare undergraduate and graduate students for careers in the nuclear industry. However, a good evaluation plan requires a series of intermediate measures that will allow us to identify and remedy any weaknesses in the development program before those weaknesses can have a negative effect on the careers of the junior faculty members. As a result, the Nuclear Faculty Development program at Purdue will be assessed annually to determine progress toward preparing the junior faculty members for success in an academic career and retaining them in faculty positions. The assessment will be based on monitoring each individual faculty member's plan: the timeline for each junior faculty member's activities and accomplishments, the plan for senior faculty mentoring, and the plan for the Head's efforts in support of the junior faculty member. Each year, the Head of each School will review progress in implementing the plans for the junior faculty members and the senior faculty mentors, and determine whether activities have been performed as specified in the two plans. The Heads will convey the results of the review to the junior faculty members and the senior faculty mentors. If there are lapses in execution or identified weaknesses in the plans, the Heads, junior faculty members, and mentors as a group will determine the necessary changes to ensure the junior faculty member is on a path to success.

ATTACHMENT C – STANDARD TERMS AND CONDITIONS

The Nuclear Regulatory Commission's Standard Terms and Conditions for U.S. Nongovernmental Recipients

Preface

This award is based on the application submitted to, and as approved by, the Nuclear Regulatory Commission (NRC) under the authorization [42 U.S.C. § 2051\(b\)](#), pursuant to section 31b and 141b of the Atomic Energy Act of 1954, as amended, and is subject to the terms and conditions incorporated either directly or by reference in the grant or cooperative agreement. The following also apply:

- Restrictions on the expenditure of Federal funds in appropriation acts, to the extent those restrictions are pertinent to the award.
- Code of Federal Regulations/Regulatory Requirements – [2 CFR Part 200 Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards](#).

Any inconsistency or conflict in terms and conditions specified in the award will be resolved according to the following order of precedence: public laws, regulations, applicable notices published in the Federal Register, Executive Orders (E.O.), Office of Management and Budget (OMB) Circulars, the NRC's Mandatory Standard Provisions, special award conditions, and standard award conditions.

Certifications and Representations: These terms incorporate the certifications and representations required by statute, executive order, or regulation that were submitted with the SF424B application through [GRANTS.GOV](#).

I. Mandatory General Requirements

The order of these requirements does not make one requirement more important than any other requirement.

1. Applicability of 2 CFR Part 200

All provisions of 2 CFR Part 200 and all Standard Provisions attached to this grant/cooperative agreement are applicable to the Recipient and to sub-recipients which meet the definition of "Recipient" in 2 Part [§200.86](#), unless a section specifically excludes a sub-recipient from coverage. The Recipient and any sub-recipients must, in addition to the assurances made as part of the application, comply and require each of its sub-awardees employed in the completion of the project to comply with [Subpart D](#) of [2 CFR Part 200](#) and include this term in lower-tier (sub-award) covered transactions.

Recipients must comply with monitoring procedures and audit requirements in accordance with [2 CFR Part 200, Subpart F—AUDIT REQUIREMENTS](#).

2. Award Package

The Recipient is obligated to conduct project oversight as may be appropriate, to manage the funds with prudence, and to comply with the provisions outlined in [2 CFR Part 200](#). Within this framework, the Principal Investigator (PI) named on the award face page, is responsible for the scientific or technical direction of the project and for preparation of the project performance

reports. This award is funded on a cost-reimbursement basis, not to exceed the amount awarded as indicated on the face page, and is subject to a refund of unexpended grant funds to the NRC.

The non-Federal entity alone must be responsible, in accordance with good administrative practice and sound business judgment, for the settlement of all contractual and administrative issues arising out of procurements related to its grant award. These issues include, but are not limited to, source evaluation, protests, disputes, and claims. These standards do not relieve the non-Federal entity of any financial or fiduciary responsibilities or obligations arising under its grant, including sub-contracts and sub-awards, or any other contractual or financial obligation. The Federal awarding agency will not substitute its judgment for that of the non-Federal entity unless the matter is primarily a Federal concern. Violations of law will be referred to the local, State, or Federal authority having proper jurisdiction. See [2 CFR § 200.318\(k\)](#), General Procurement Standards.

Subawards

[Appendix II to Part 200](#) Contract Provisions for Non-Federal Entity Contracts Under Federal Awards

Sub-recipients, sub-awardees, and contractors have no relationship with NRC under the terms of this grant/cooperative agreement. All required NRC approvals must be directed through the Recipient to NRC. See [2 CFR § 200.318](#).

Nondiscrimination

This provision is applicable when work under the grant/cooperative agreement is performed in the U.S. or when employees are recruited in the U.S.

The Recipient agrees to comply with the non-discrimination requirements below:

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. §§ 2000d et seq.), which prohibits discrimination on the grounds of race, color, or national origin in any program or activity receiving federal financial assistance.
- Title IX of the Education Amendments of 1972 (20 U.S.C. §§ 1681 et seq.), which prohibits discrimination on the basis of sex in any education program or activity receiving federal financial assistance.
- Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. § 794), which prohibits discrimination on the basis of disability in any program or activity receiving federal financial assistance.
- The Age Discrimination Act of 1975, as amended (42 U.S.C. §§ 6101 et seq.), which prohibits discrimination on the basis of age in any program receiving federal financial assistance.
- The Americans with Disabilities Act of 1990 (42 U.S.C. §§ 12101 et seq.), which prohibits recipients from discriminating on the basis of disability in employment (Title I); State and local government services (Title II); and places of public accommodation and commercial facilities (Title III).
- Parts II and III of E.O. 11246, as amended by E.O. 11375, 11478, 12086, 12107, 13279, 13665, and 13672, which prohibits federal contractors and federally assisted construction contractors and subcontractors, who do over \$10,000 in Government business in one year, from discriminating in employment decisions on the basis of race,

color, religion, sex, or national origin and requires that government contractors take affirmative action to ensure that equal opportunity is provided in all aspects of their employment.

- E.O.13166, "Improving Access to Services for Persons with Limited English Proficiency," which clarifies that national origin discrimination under Title VI includes discrimination on the basis of limited English proficiency (LEP) and requires that the recipient take reasonable steps to ensure that LEP persons have meaningful access to programs and activities.
- Any other applicable non-discrimination law(s).

Generally, Title VII of the Civil Rights Act of 1964, 42 U.S.C. § 2000e et seq, provides that it shall be an unlawful employment practice for an employer to discharge any individual or otherwise to discriminate against an individual with respect to compensation, terms, conditions, or privileges of employment because of such individual's race, color, religion, sex, or national origin. However, Title VII, 42 U.S.C. § 2000e-1(a), expressly exempts from the prohibition against discrimination on the basis of religion, a religious corporation, association, educational institution, or society with respect to the employment of individuals of a particular religion to perform work connected with the carrying on by such corporation, association, educational institution, or society of its activities.

Applicants must ensure that individuals selected as beneficiaries of support under this grant meet the legal requirements consistent with Supreme Court Decisions including *Fisher*, *Gratz*, and *Grutter*.

Modifications/Prior Approval

NRC's prior written approval may be required before a Recipient makes certain budget modifications or undertakes particular activities. If NRC approval is required for changes in the grant or cooperative agreement, it must be requested and obtained from the NRC Grants Officer in advance of the change or obligation of funds. All requests for NRC prior approval, including requests for extensions to the period of performance, must be made, in writing (which includes submission by e-mail), to the designated Grants Officer at least 30 days before the proposed change. The request must be signed by the authorized organizational official. Failure to obtain prior approval, when required, from the NRC Grants Officer, may result in the disallowance of costs, or other enforcement action within NRC's authority.

Lobbying Restrictions

The Recipient will comply, as applicable, with provisions of the Hatch Act (5 U.S.C. §§ 1501-1508 and 7324-7328) which limits the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.

The Recipient will comply with provisions of 31 U.S.C § 1352. This provision generally prohibits the use of Federal funds for lobbying in the Executive or Legislative Branches of the Federal Government in connection with the award, and requires disclosure of the use of non-Federal funds for lobbying.

The Recipient shall submit, at the time of application, a completed "Certification Regarding Lobbying" form, regardless of dollar value.

If applicable, the Recipient receiving in excess of \$100,000.00 in Federal funding shall submit a completed Standard Form (SF-LLL), "Disclosure of Lobbying Activities" for any persons engaged in lobbying activities, as discussed at 31 U.S. Code § 1352 – Limitation on use of appropriated funds to influence certain Federal contracting and financial transactions. The form concerns the use of non-Federal funds for lobbying within 30 days following the end of the calendar quarter in which there occurs any event that requires disclosure or that materially affects the accuracy of the information contained in any disclosure form previously filed. If the Recipient must submit the SF-LLL, including those received from sub-recipients, contractors, and subcontractors, to the Grants Officer.

Debarment And Suspension – (See [2 CFR Part 180](#); [2 CFR § 200.205](#); [2 CFR § 200.113](#); and [2 CFR Part 200, Appendix II.](#))

The Recipient agrees to notify the Grants Officer immediately upon learning that it or any of its principals:

- (1) Are presently excluded or disqualified from covered transactions by any Federal department or agency;
- (2) Have been convicted, within the preceding three-year period preceding this proposal, of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, tax evasion, receiving stolen property, making false claims, or obstruction of justice; commission of any other offense indicating a lack of business integrity or business honesty that seriously and directly affects the recipient's present responsibility;
- (3) Are presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (1)(b); or
- (4) Have had one or more public transactions (Federal, State, or local) terminated for cause or default within the preceding three years.
- (5) The Recipient agrees that, unless authorized by the Grants Officer, it will not knowingly enter into any subaward or contracts under this grant/cooperative agreement with a person or entity that is not included on the System for Award Management (SAM) (<https://www.sam.gov>).

The Recipient further agrees to include the following provision in any subaward or contracts entered into under this award:

Debarment, Suspension, Ineligibility, and Voluntary Exclusion

The Recipient certifies that neither it nor its principals is presently excluded or disqualified from participation in this transaction by any Federal department or agency. The policies and procedures applicable to debarment, suspension, and ineligibility under NRC-financed transactions are set forth [2 CFR Part 180](#) and [2 CFR Part 200](#).

Drug-Free Workplace

The Recipient must be in compliance with The Federal Drug Free Workplace Act of 1988. The policies and procedures applicable to violations of these requirements are set forth in [41 U.S.C. §§ 8101-8106](#).

Implementation of E.O.13224 – Executive Order on Terrorist Financing

The Recipient is reminded that U.S. Executive Orders and U.S. law prohibits transactions with, and the provision of resources and support to, individuals and organizations associated with terrorism. It is the legal responsibility of the Recipient to ensure compliance with these Executive Orders and laws. This provision must be included in all contracts/sub-awards issued under this grant/cooperative agreement.

The Recipient must comply with E.O. 13224, Blocking Property and Prohibiting Transactions with Persons who Commit, Threaten to Commit, or Support Terrorism. Information about this Executive Order can be found at:

[Implementation of Executive Order 13224 Blocking Property and Prohibiting Transactions With Persons Who Commit, Threaten To Commit, or Support Terrorism amended by E.O. 13268, 13284, and 13372.](#)

Procurement Standards - 2 CFR §§ 200.318-200.326

Sections 200.318 - 200.326 set forth standards for use by Recipients in establishing procedures for the procurement of supplies and other expendable property, equipment, real property and other services with Federal funds. These standards are furnished to ensure that such materials and services are obtained in an effective manner and in compliance with the provisions of applicable Federal statutes and executive orders. No additional procurement standards or requirements will be imposed by the Federal awarding agencies upon Recipients, unless specifically required by Federal statute, executive order, or approved by OMB.

Travel and Transportation

Travel must be in accordance with the Recipient's Travel Regulations or the U.S. Government Travel Policy and Regulations at: <http://www.gsa.gov/portal/category/21222> and the per diem rates set forth at: <http://www.gsa.gov/portal/content/104877>, absent Recipient's travel regulations. Travel and transportation costs for the grant must be consistent with provisions as established in [2 CFR § 200.473-474](#).

All other travel, domestic or international, must not increase the total estimated award amount for the grant.

The Recipient will comply with the provisions of the Fly America Act (49 U.S.C 40118), as implemented at 41 CFR §§ 301-10.131 through 301-10.143.

Federal funds may not be used to travel to countries identified as "Foreign Policy Restricted Countries", as identified by the U.S. Department of State or the U.S. Agency for International Development.

Property Standards

Property standards of this award shall follow provisions as established [2 CFR §§ 200.310-200.316](#).

Intangible Property

Intangible and intellectual property of this award shall generally follow provisions established in [2 CFR § 200.315](#).

Inventions Report - The Bayh-Dole Act (P.L. 96-517) affords Recipients the right to elect and retain title to inventions they develop with funding under an NRC grant award ("subject inventions"). In accepting an award, the Recipient agrees to comply with applicable NRC policies, the Bayh-Dole Act, and its Government-wide implementing regulations found at Title 37, Code of Federal Regulations (CFR) Part 401. A significant part of the regulations require that the Recipient report all subject inventions to the awarding agency (NRC) as well as include an acknowledgement of federal support in any patents.

Patent Notification Procedures - If the NRC or its Recipients, without making a patent search, knows (or has demonstrable reasonable grounds to know) that technology covered by a valid United States patent has been or will be used without a license from the owner, E.O.12889 requires NRC to notify the owner. If the Recipient uses or has used patented technology under this award without license or permission from the owner, the Recipient must notify the Grants Officer. This notice does not imply that the Government authorizes and consents to any copyright or patent infringement occurring under the financial assistance.

Data, Databases, and Software - The rights to any work produced or purchased under a NRC federal financial assistance award, such as data, databases or software are determined by [Subpart D](#) of [2 CFR Part 200](#). The Recipient owns any work produced or purchased under a NRC federal financial assistance award subject to NRC's right to obtain, reproduce, publish or otherwise use the work or authorize others to receive, reproduce, publish or otherwise use the data for Government purposes.

Copyright - The Recipient may copyright any work produced under a NRC federal financial assistance award subject to NRC's royalty-free nonexclusive and irrevocable right to reproduce, publish or otherwise use the work or authorize others to do so for Government purposes. Works jointly authored by NRC and Recipient employees may be copyrighted, but only the part authored by the Recipient is protected because, under [17 U.S.C. § 105](#), works produced by Government employees are not copyrightable in the United States. On occasion, NRC may ask the Recipient to transfer to NRC its copyright in a particular work when NRC is undertaking the primary dissemination of the work. Ownership of copyright by the Government through assignment is permitted under [17 U.S.C. § 105](#).

Record Retention and Access

Recipient shall follow established provisions in [2 CFR §§ 200.333-337](#).

Conflict Of Interest

Conflict of Interest standards for this award will follow the Organizational Conflict of Interest (OCOI) requirements set forth in Section 170A of the Atomic Energy Act of 1954, as amended, and provisions set forth at [2 CFR § 200.112](#), Conflict of Interest.

Dispute Review Procedures

- a. Any request for review of a notice of termination or other adverse decision should be addressed to the Grants Officer. It must be postmarked or transmitted electronically no later than 30 days after the postmarked date of such termination or adverse decision from the Grants Officer.
- b. The request for review must contain a full statement of the Recipient's position and the pertinent facts and reasons in support of such position.
- c. The Grants Officer will promptly acknowledge receipt of the request for review and shall forward it to the Director, Office of Acquisition Management Division, unless otherwise delegated, who shall appoint an intra-agency Appeal Board to review a recipient appeal of an agency action, if required, which will consist of the program office director, the Deputy Director of Office of Administration, and the Office of General Counsel, or their designees.
- d. Pending resolution of the request for review, the NRC may withhold or defer payments under the award during the review proceedings.
- e. The review committee will request the Grants Officer who issued the notice of termination or adverse action to provide copies of all relevant background materials and documents. The committee may, at its discretion, invite representatives of the Recipient and the NRC program office to discuss pertinent issues and to submit such additional information as it deems appropriate. The chairman of the review committee will insure that all review activities or proceedings are adequately documented.
- f. Based on its review, the committee will prepare its recommendation to the Director, Office of Administration, who will advise the parties concerned of his/her decision.

Remedies for Noncompliance

Termination of this award will follow provisions as established and described above in "Dispute Review Process" in [2 CFR §§ 200.338-342](#).

Performance and Financial Monitoring and Reporting - 2 CFR §§ 200.327-329

Recipient Financial Management systems must comply with the provisions in [2 CFR § 200.302](#).

- Payment – [2 CFR § 200.305](#)
- Cost Share or Matching – [2 CFR § 200.306](#)
 - Recipients are to be careful with providing excessive cost share or match since at the end of the grant, if the identified match has not been provided, then a portion of the federal share may be required to be returned to the Government.
- Program Income – [2 CFR § 200.307](#)
 - Earned program income, if any, will be added to funds committed to the project by the NRC and Recipient and used to further eligible project or program objectives or be deducted from the total project cost for the grant, as directed by the Grants Officer or indicated in the terms and conditions of the award.
- Revision of Budget and Program Plans – [2 CFR § 200.308](#)
 - The Recipient is required to report deviations from the approved budget and program descriptions in accordance with – [2 CFR § 200.308\(b\)](#) and request prior written approval from the Project Officer and the Grants Officer.

- The Recipient is not authorized to re-budget between direct costs and indirect costs without written prior approval of the Grants Officer.
 - The Recipient is authorized to transfer funds among direct cost categories up to a cumulative 10 percent of the total approved budget. The Recipient is not allowed to transfer funds if the transfer would cause any Federal appropriation to be used for purposes other than those consistent with the original intent of the appropriation.
 - Allowable Costs – [2 CFR §§ 200.403](#)
- See section [2 CFR §§ 200.330-332](#) for Subrecipient Monitoring and Management.

FEDERAL FINANCIAL REPORTS

Federal Financial Reports (SF-425) are semi-annually, for the periods ending March 31 and September 30. Reports are due within 30 calendar days following the end of the reporting period and must be emailed to the Project Officer at the email addressed indicated in the Notice of Award, and to the Grants Officer at: Grants_FFR.Resource@nrc.gov. (NOTE: There is an underscore between Grants and FFR in the email address.) The SF-425 form and instructions are available at the following URL: http://www.whitehouse.gov/omb/grants_forms/.

PERFORMANCE PROGRESS REPORTS

The performance (technical) reports indicated below are subject to [2 CFR §200.328](#).

Faculty Development

Performance reports must be submitted semi-annually, for the periods ending March 31 and September 30, or any portion thereof, regardless of the award date. Reports are due within 30 days following the end of each reporting period and must be emailed to the Project Officer at the email addressed indicated in the Notice of Award, and to the Grants Officer at: Grants_PPR.Resource@nrc.gov. (NOTE: There is an underscore between Grants and PPR in the email address.)

Final Reports - The Recipient is required to submit final reports, both Financial (SF-425) and Performance (SF-PPR, SF-PPR-B, SF-PPR-E) within 90 days of the grant expiration. In addition to these reports, a final SF-428, Tangible property report, is also required, if applicable. The final PPR (for Scholarship, Fellowship, and Trade School and Community College Scholarship awards) must include the names of all students with up to date contact information (mailing address, telephone/cell phone, email address). The reports must be emailed to the Project Officer at the email addressed indicated in the Notice of Award, and to the Grants Officer at: Grants_FFR.Resource@nrc.gov and Grants_PPR.Resource@nrc.gov. (NOTE: There is an underscore between Grants and FFR and Grants and PPR in the email addresses.)

For grant awards that are modified to add additional Program Descriptions, the recipient is required to address the applicable grant performance metrics associated with all programs. Further, these metrics should be broken out by individual program (e.g. Program A and Program B). This can be done utilizing Block 10, Performance Narrative,

of the SF-PPR form. If this block does not have sufficient space, additional pages will be accepted. Sf-PPR-B and SF-PPR-E should be used to address both programs as well.

Period of Performance – 2 CFR § 200.309

The recipient may charge to the Federal award only allowable costs incurred during the period of performance and any costs incurred before the NRC or pass-through entity made the Federal award that was authorized by the NRC or pass through entity.

Unless otherwise authorized in [2 CFR Part 200](#) or by special award condition, any extension of the award period can only be authorized by the Grants Officer in writing. Assurances of funding from other than the Grants Officer shall not constitute authority to obligate funds for programmatic activities beyond the expiration date.

The NRC Grant Officer may authorize a no cost extension of the period of performance. The recipient must submit a no cost extension request no less than 30 days prior to the award end date. Any request for a no cost extension after the grant has expired will not be approved. However, the NRC has no obligation to provide any additional prospective or incremental funding. Any modification of the award to increase funding and/or to extend the period of performance is at the sole discretion of the NRC.

Automated Standard Application For Payments (ASAP) Procedures

Unless otherwise stated, Recipient payments are made using the Department of Treasury's Automated Standard Application for Payment (ASAP) system, [ASAP.gov](#), through preauthorized electronic funds transfers. To receive payments, Recipients are required to enroll with the Department of Treasury, Financial Management Service, and Regional Financial Centers, which allows them to use the on-line method of withdrawing funds from their ASAP established accounts. The following information is required to make ASAP withdrawals: (1) ASAP account number – the award number found on the cover sheet of the award; (2) Agency Location Code (ALC) – 31000001; and Region Code. Recipients enrolled in the ASAP system do not need to submit a "Request for Advance or Reimbursement" (SF-270).

II. Audit Requirements

Audits

Organization-wide or program-specific audits are performed in accordance with the Single Audit Act of 1996, as amended, and as implemented by [2 CFR Part 200, Subpart F—AUDIT REQUIREMENTS](#). Recipients are subject to the provisions of this subpart if they expend \$750,000 or more in a year in Federal awards. See [2 CFR 200.501](#).

The Form SF-SAC and the Single Audit Reporting packages for fiscal periods ending on or after January 1, 2008 are submitted online, as follows:

1. Create the recipient's online report ID at:
<http://harvester.census.gov/fac/collect/ddeindex.html>;
2. Complete the Form SF-SAC;
3. Upload the Single Audit;
4. Certify the Submission; and
5. Click "Submit."

Organizations expending less than \$750,000 a year are not required to have an annual audit for that year but must make their grant-related records available to NRC or other designated officials for review or audit.

III. Programmatic Requirements

The recipient is responsible for providing documentation to the NRC that tracks each student's progress in achievement of the academic program for which federal funds were provided. This includes: (1) ensuring the service agreement is signed by the student prior to providing support; (2) providing the NRC with student contact information upon student entry into the program, upon completion or withdrawal from the program, and upon request by the NRC; and (3) monitoring the student's fulfillment of the service agreement for the duration of the award. The NRC shall be notified immediately if a student is not fulfilling the academic program or the service agreement.

Grant Performance Metrics

The Office of Management and Budget requires all Federal Agencies providing funding for educational scholarships and fellowships as well as other educational related funding to report on specific metrics. These metrics are part of the Academic Competitiveness Council's (ACC) 2007 report and specifically relates to Science, Technology, Engineering, and Mathematics (STEM) curricula.

As part of the OMB requirements indicated above (for metric reporting), the recipient shall address the following questions and submit responses with the required progress reports:

Faculty Development Metrics:

1. How many Faculty have been sponsored by NRC funding?
 - a. Response is the number of faculty sponsored, for this reporting period and cumulative to the grant.

2. How many items have the sponsored faculty produced, for example, Professional Journal articles, publications, patents, or conference reports?
 - a. Response is the type and number of items (not a bibliography), for this reporting period and cumulative to the grant.

Unsatisfactory Performance

Failure to perform the work in accordance with the terms of the award and maintain at least a satisfactory performance rating may result in designation of the Recipient as high risk and the assignment of special award conditions. Further action may be required as specified in the standard term and condition entitled "Remedies for Noncompliance."

Failure to comply with the award provisions may result in a negative impact on future NRC funding. In addition, the Grants Officer may withhold payments; change the method of payment from advance to reimbursement; impose special award conditions; suspend or terminate the grant.

Other Federal Awards With Similar Programmatic Activities

The Recipient will immediately notify the Project Officer and the Grants Officer in writing if after award, other financial assistance is received to support or fund any portion of the program description stated in the NRC award. NRC will not pay for costs that are funded by other sources.

Prohibition Against Assignment By The Recipient

The Recipient will not transfer, pledge, mortgage, or otherwise assign the award, or any interest to the award, or any claim arising under the award, to any party, banks, trust companies, or other financing or financial institutions without the written approval of the Grants Officer.

Site Visits

The NRC, through authorized representatives, has the right to make site visits to review project accomplishments and management control systems and to provide technical assistance as required. If any site visit is made by the NRC on the premises of the Recipient or contractor under an award, the Recipient shall provide and shall require his/her contractors to provide reasonable access to all facilities and provide necessary assistance for the safety and convenience of the Government representative in the performance of his/her official duties.

IV. Additional Requirements

Criminal and Prohibited Activities

The Program Fraud Civil Remedies Act ([31 U.S.C. §§ 3801-3812](#)), provides for the imposition of civil penalties against persons who make false, fictitious, or fraudulent claims to the Federal government for money (including money representing grant/cooperative agreements, loans, or other benefits).

False statements ([18 U.S.C. § 287](#)), provides that whoever makes or presents any false, fictitious, or fraudulent statements, representations, or claims against the United States shall be subject to imprisonment of not more than five years and shall be subject to a fine in the amount provided by 18 USC §287.

False Claims Act ([31 U.S.C. § 3729 et seq.](#)), provides that suits under this Act can be brought by the government, or a person on behalf of the government, for false claims under federal assistance programs.

Copeland "Anti-Kickback" Act ([18 U.S.C. § 874](#)), prohibits a person or organization engaged in a federally supported project from enticing an employee working on the project from giving up a part of his compensation under an employment contract.

American-Made Equipment and Products

Recipients are encouraged to purchase American-made equipment and products with funding provided under this award.

Increasing Seat Belt Use in the United States

E.O. 13043, amended by E.O. 13652, requires Recipients to encourage employees and contractors to enforce on-the-job seat belt policies and programs when operating company-owned, rented or personally-owned vehicle.

Federal Leadership of Reducing Text Messaging While Driving

E.O. 13513 requires Recipients to encourage employees, sub-awardees, and contractors to adopt and enforce policies that ban text messaging while driving company-owned, rented vehicles or privately owned vehicles when on official Government business or when performing any work for or on behalf of the Federal Government.

Federal Employee Expenses

Federal agencies are barred from accepting funds from a Recipient to pay transportation, travel, or other expenses for any Federal employee unless specifically approved in the terms of the award. Use of award funds (Federal or non-Federal) or the Recipient's provision of in-kind goods or services, for the purposes of transportation, travel, or any other expenses for any Federal employee may raise appropriation augmentation issues. In addition, NRC policy prohibits the acceptance of gifts, including travel payments for Federal employees, from Recipients or applicants regardless of the source.

Minority Serving Institutions (MSIs) Initiative

Pursuant to E.O.s 13230 and 13270, [amended by E.O. 13316](#) and [13385](#), 13532, 13592, 13555, 13515, and 13621, NRC is strongly committed to broadening the participation of MSIs in its financial assistance program. NRC's goals include achieving full participation of MSIs in order to advance the development of human potential, strengthen the Nation's capacity to provide high-quality education, and increase opportunities for MSIs to participate in and benefit from Federal financial assistance programs. NRC encourages all applicants and Recipients to include meaningful participations of MSIs. Institutions eligible to be considered MSIs are listed on the Department of Education website: <http://www.ed.gov/about/offices/list/ocr/edlite-minorityinst.html>

Research Misconduct

Scientific or research misconduct refers to the fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results. It does not include honest errors or differences of opinions. The Recipient organization has the primary responsibility to investigate allegations and provide reports to the Federal Government. Funds expended on an activity that is determined to be invalid or unreliable because of scientific misconduct may result in a disallowance of costs for which the institution may be liable for repayment to the awarding agency. The Office of Science and Technology Policy at the White House published in the Federal Register on December 6, 2000, a final policy that addressed research misconduct. The policy was developed by the National Science and Technology Council ([65 FR 76260](#)). The NRC requires that any allegation be submitted to the Grants Officer, who will also notify the OIG of such allegation. Generally, the Recipient organization shall investigate the allegation and submit its findings to the Grants Officer. The NRC may accept the Recipient's findings or proceed with its own investigation. The Grants Officer shall inform the Recipient of the NRC's final determination.

Publications, Videos, and Acknowledgment of Sponsorship

Publication of the results or findings of a research project in appropriate professional journals and production of video or other media is encouraged as an important method of recording and reporting scientific information. It is also a constructive means to expand access to federally funded research. The Recipient is required to submit a copy to the NRC and when releasing information related to a funded project include a statement that the project or effort undertaken was or is sponsored by the NRC. The Recipient is also responsible for assuring that every publication of material (including Internet sites and videos) based on or developed under an

award, except scientific articles or papers appearing in scientific, technical or professional journals, contains the following disclaimer:

“This **[report/video]** was prepared by **[Recipient name]** under award **[number]** from **[name of operating unit]**, Nuclear Regulatory Commission. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the view of the **[name of operating unit]** or the US Nuclear Regulatory Commission.”

Trafficking In Victims Protection Act Of 2000 (as amended by the Trafficking Victims Protection Reauthorization Act of 2003)

Section 106(g) of the Trafficking In Victims Protection Act Of 2000 (as amended as amended, directs on a government-wide basis that:

“...any grant, contract, or cooperative agreement provided or entered into by a Federal department or agency under which funds are to be provided to a private entity, in whole or in part, shall include a condition that authorizes the department or agency to terminate the grant, contract, or cooperative agreement, without penalty, if the recipient or any subrecipient, or the contractor or any subcontractor (i) engages in severe forms of trafficking in persons or has procured a commercial sex act during the period of time that the grant, contract, or cooperative agreement is in effect, or (ii) uses forced labor in the performance of the grant, contract, or cooperative agreement.” (See 22 U.S.C. §7104(g).)

EXECUTIVE COMPENSATION REPORTING

2 CFR § 170.220 directs agencies to include the following text to each grant award to a non-federal entity if the total funding is \$25,000 or more in Federal funding.

Reporting Subawards and Executive Compensation.

a. Reporting of first-tier subawards.

1. *Applicability.* Unless you are exempt as provided in paragraph d. of this award term, you must report each action that obligates \$25,000.00 or more in Federal funds that does not include Recovery funds (as defined in section 1512(a)(2) of the American Recovery and Reinvestment Act of 2009, Pub. L. 111–5) for a subaward to an entity (see definitions in paragraph e. of this award term).

2. Where and when to report.

i. You must report each obligating action described in paragraph a.1. of this award term to <http://www.fsrs.gov>.

ii. For subaward information, report no later than the end of the month following the month in which the obligation was made. (For example, if the obligation was made on November 7, 2010, the obligation must be reported by no later than December 31, 2010.)

3. *What to report.* You must report the information about each obligating action that the submission instructions posted at <http://www.fsrs.gov> specify.

b. Reporting Total Compensation of Recipient Executives.

1. *Applicability and what to report.* You must report total compensation for each of your five most highly compensated executives for the preceding completed fiscal year, if—

i. the total Federal funding authorized to date under this award is \$25,000.00 or more;

ii. in the preceding fiscal year, you received—

(A) 80 percent or more of your annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at [2 CFR § 170.320](#) (and subawards); and

(B) \$25,000,000 or more in annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at [2 CFR § 170.320](#) (and subawards); and

iii. The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 ([15 U.S.C. 78m\(a\), 78o\(d\)](#)) or section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the compensation information, see the U.S. Security and Exchange Commission total compensation filings at <http://www.sec.gov/answers/execomp.htm>.)

2. *Where and when to report.* You must report executive total compensation described in paragraph b.1. of this award term:

i. As part of your registration profile at <http://www.sam.gov> .

ii. By the end of the month following the month in which this award is made, and annually thereafter.

c. Reporting of Total Compensation of Subrecipient Executives.

1. *Applicability and what to report.* Unless you are exempt as provided in paragraph d. of this award term, for each first-tier subrecipient under this award, you shall report the names and total compensation of each of the subrecipient's five most highly compensated executives for the subrecipient's preceding completed fiscal year, if—

i. in the subrecipient's preceding fiscal year, the subrecipient received—

(A) 80 percent or more of its annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at [2 CFR § 170.320](#) (and subawards); and

(B) \$25,000,000 or more in annual gross revenues from Federal procurement contracts (and subcontracts), and Federal financial assistance subject to the Transparency Act (and subawards); and

ii. The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the compensation information, see the U.S. Security and Exchange Commission total compensation filings at <http://www.sec.gov/answers/execomp.htm>.)

2. *Where and when to report.* You must report subrecipient executive total compensation described in paragraph c.1. of this award term:

i. To the recipient.

ii. By the end of the month following the month during which you make the subaward. For example, if a subaward is obligated on any date during the month of October of a given year (*i.e.*, between October 1 and 31), you must report any required compensation information of the subrecipient by November 30 of that year.

d. *Exemptions*

If, in the previous tax year, you had gross income, from all sources, under \$300,000.00, you are exempt from the requirements to report:

i. Subawards,

and

ii. The total compensation of the five most highly compensated executives of any subrecipient.

e. *Definitions.* For purposes of this award term:

1. *Entity* means all of the following, as defined in 2 CFR Part 25:

i. A Governmental organization, which is a State, local government, or Indian tribe;

ii. A foreign public entity;

iii. A domestic or foreign nonprofit organization;

iv. A domestic or foreign for-profit organization;

v. A Federal agency, but only as a subrecipient under an award or subaward to a non-Federal entity.

2. *Executive* means officers, managing partners, or any other employees in management positions.

3. *Subaward:*

i. This term means a legal instrument to provide support for the performance of any portion of the substantive project or program for which you received this award and that you as the recipient award to an eligible subrecipient.

ii. The term does not include your procurement of property and services needed to carry out the project or program (for further explanation, see Sec. __.210 of the attachment to OMB Circular A-133, "Audits of States, Local Governments, and Non-Profit Organizations")

iii. A subaward may be provided through any legal agreement, including an agreement that you or a subrecipient considers a contract.

4. *Subrecipient* means an entity that:

i. Receives a subaward from you (the recipient) under this award; and

ii. Is accountable to you for the use of the Federal funds provided by the subaward.

5. *Total compensation* means the cash and noncash dollar value earned by the executive during the recipient's or subrecipient's preceding fiscal year and includes the following (for more information see [17 CFR § 229.402\(c\)\(2\)](#)):

i. *Salary and bonus.*

ii. *Awards of stock, stock options, and stock appreciation rights.* Use the dollar amount recognized for financial statement reporting purposes with respect to the fiscal year in accordance with the Statement of Financial Accounting Standards No. 123 (Revised 2004) (FAS 123R), Shared Based Payments.

iii. *Earnings for services under non-equity incentive plans.* This does not include group life, health, hospitalization or medical reimbursement plans that do not discriminate in favor of executives, and are available generally to all salaried employees.

iv. *Change in pension value.* This is the change in present value of defined benefit and actuarial pension plans.

v. *Above-market earnings on deferred compensation which is not tax-qualified.*

vi. Other compensation, if the aggregate value of all such other compensation (e.g., severance, termination payments, value of life insurance paid on behalf of the employee, perquisites or property) for the executive exceeds \$10,000.00.