

**U.S. NUCLEAR REGULATORY COMMISSION  
NOTICE OF GRANT/ASSISTANCE AWARD**

1. GRANT/AGREEMENT NO. NRC-38-09-909	2. MODIFICATION NO. <u>2</u>	3. PERIOD OF PERFORMANCE FROM: 7/1/2010 TO: 6/30/2011	4. AUTHORITY Pursuant to Section 31b and 141b of the Atomic Energy Act of 1954, as amended
5. TYPE OF AWARD <input checked="" type="checkbox"/> GRANT <input type="checkbox"/> COOPERATIVE AGREEMENT	6. ORGANIZATION TYPE Public State-Controlled Institution of Higher ED DUNS:079121448	7. RECIPIENT NAME, ADDRESS, and EMAIL ADDRESS Alabama A&M University 4900 Meridian Street Normal, Alabama 35762	

8. PROJECT TITLE:  
**Innovative Nuclear Engineering Materials and Corrosion Modules for Enhancement and Expansion**

9. PROJECT WILL BE CONDUCTED PER GOVERNMENT'S/RECIPIENT'S PROPOSAL(S) DATED See Program Description AND APPENDIX A-PROJECT GRANT PROVISIONS	10. TECHNICAL REPORTS ARE REQUIRED <input checked="" type="checkbox"/> PROGRESS AND FINAL <input type="checkbox"/> FINAL ONLY <input type="checkbox"/> OTHER (Conference Proceedings)	11. PRINCIPAL INVESTIGATOR(S) NAME, ADDRESS and EMAIL ADDRESS Alabama A&M University Attn: Dr. Matthew E. Edwards Email: mathew.edwards@aamu.edu 256-372-8119
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12. NRC PROGRAM OFFICE (NAME and ADDRESS) NRC Attn: Randi Neff Office of Human Resources MS: GW5A6 (301) 492-2301 11545 Rockville Pike Rockville, Maryland 20852	13. ACCOUNTING and APPROPRIATION DATA APPN. NO: 31X0200 B&R NO: 0-8415-5C1116 JOB CODE: T8453 BOC NO: 4110 OFFICE ID NO: RFPA: HR-09-909	14. METHOD OF PAYMENT <input type="checkbox"/> ADVANCE BY TREASURY CHECK <input type="checkbox"/> REIMBURSEMENT BY TREASURY CHECK <input type="checkbox"/> LETTER OF CREDIT <input checked="" type="checkbox"/> OTHER (SPECIFY) Electronic ASAP.gov (See Remarks in Item #20 "Payment Information")
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15. NRC OBLIGATION FUNDS THIS ACTION <u>\$120,000</u> PREVIOUS OBLIGATION _____ TOTAL <u>\$120,000</u>	16. TOTAL FUNDING AGREEMENT NRC <u>\$120,000</u> RECIPIENT _____ TOTAL <u>\$120,000</u> This action provides funds for Fiscal Year in the amount of <u>See Page Two</u>
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17. NRC ISSUING OFFICE (NAME, ADDRESS and EMAIL ADDRESS)  
U.S. Nuclear Regulatory Commission  
Div. of Contracts  
Attn: Sheila Bumpass  
Mail Stop: TWB-01-B10M  
Rockville MD 20852

18. Signature Not Required	19. NRC CONTRACTING OFFICER <u>Sheila Bumpass</u> (Signature) _____ NAME (TYPED) <u>Sheila Bumpass</u> TITLE <u>Contracting Officer</u> TELEPHONE NO. <u>301-492-3484</u> <u>7/1/10</u> (Date)
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20. PAYMENT INFORMATION  
Payment will be made through the Automated Standard Application for Payment (ASAP.gov) unless the recipient has failed to comply with the program objectives, award conditions, Federal reporting requirements or other conditions specified in 2 CFR 215 (OMB Circular A110).

21. Attached is a copy of the "NRC General Provisions for Grants and Cooperative Agreements Awarded to Non-Government Recipients. Acceptance of these terms and conditions is acknowledged when Federal funds are used on this project.

22. ORDER OF PRECEDENCE  
In the event of a conflict between the recipient's proposal and this award, the terms of the Award shall prevail.

23. By this award, the Recipient certifies that payment of any audit-related debt will not reduce the level of performance of any Federal Program.

**TEMPLATE - ADM001**

**SUNSI REVIEW COMPLETE**

**JUL 8 2010**

**ADM002**

## ATTACHMENT A - SCHEDULE

### A.1 PURPOSE OF GRANT

The purpose of this Grant is to provide support to the "Nuclear Education and Outreach Program" as described in Attachment B entitled "Program Description."

### A.2 PERIOD OF GRANT:

1. The effective date of this Grant is July 1, 2010. The estimated completion date of this Grant is June 30, 2011.

2. Funds obligated hereunder are available for program expenditures for the estimated period: July 1, 2010 – June 30, 2011.

### A. GENERAL

1. Total Estimated NRC Amount:	\$120,000
2. Total Obligated Amount:	\$120,000
3. Cost-Sharing Amount:	\$0
4. Activity Title:	Nuclear Education and Outreach Program
5. NRC Project Officer:	Randi Neff
6. DUNS No.:	079121448

### B. SPECIFIC

RFPA No.:	HR-09-909-002
FFS:	N/A
Job Code:	T8453
BOC:	4110
B&R Number:	0-8415-5C1116
Appropriation #:	31X0200
Amount Obligated:	\$120,000

### A.3 BUDGET

Revisions to the budget shall be made in accordance with Revision of Grant Budget in accordance with 2 CFR 215.25.

	Year 1
Direct Participant Cost	\$90,260.87
Indirect Cost	<u>\$29,739.13</u>
Yearly Total	\$120,000.00

All travel must be in accordance with the Alabama A&M University Travel Regulations or the US Government Travel Policy absent Grantee's travel regulation.

### A.4 AMOUNT OF AWARD AND PAYMENT PROCEDURES

1. The total estimated amount of this Award is \$120,000 for the (1) year period.

2. NRC hereby obligates the amount of \$120,000 for program expenditures during the period set forth above and in support of the Budget above. The Grantee will be given written notice by

the Contracting Officer when additional funds will be added. 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 Grantee in accordance with procedures set forth in the Automated Standard Application For Payments (ASAP) Procedures set forth below.

## **Attachment B – Program Description**

### **Nuclear Development and Outreach Program**

There are presently concerns on how to replace the estimated 50 percent of individuals employed in the nuclear industry who will retire within the next ten years. This calls for innovative, practical and productive initiatives that support and advance nuclear education infrastructure and fields that are critical to the National Regulatory Commission (NRC). We propose an innovative and result-oriented initiative in this project.

The proposed initiative, Alabama A&M University Nuclear Education and Outreach Program (AAMU-NEOP) Phase 2, builds on the results of a Phase 1 of the program, which was funded by a one-year curriculum grant from the NRC. These results include 1) successful content infusion of nuclear science into existing physics courses, 2) the development and teaching of introductory nuclear engineering course to 24 students, and 3) recommendations from the Phase-1 Advisory Board on the direction of Phase-2 of the AAMU-NEOP.

The results from the Phase-1 project (including the advisory board recommendations), the hiring of senior faculty member and a research professor with expertise in nuclear science and engineering, plus newly established education and research collaborations with national laboratories and nuclear power industries, form a solid foundation and merit for the proposed Phase-2 project. These efforts underscore the commitment of Alabama A&M University to institutionalizing, supporting, and advancing nuclear educational infrastructure and science/engineering fields that are critical to the NRC mission. Our initiative also enhances the participation of women and underrepresented minorities in nuclear related research activities.

#### **B.1. Potential for Supporting and Advancing Nuclear Educational Infrastructure and Fields Critical to NRC Mission**

##### **B. 1.1. Long-Range Goals**

The long-range goals of the Alabama A&M University Nuclear Education and Outreach Program (AAMU-NEOP) are to:

1. Produce top-notch graduates, including women and minorities, who will work in a variety of nuclear energy and security related positions, including 1) nuclear industries, DOE laboratories and facilities, regulatory agencies, and consulting work,
2. Establish a sustainable educational infrastructure that will support and advance workforce development in fields critical to the Nuclear Regulatory Commission (NRC), including: *Reactor physics; Nuclear power plant design and operations; Dosimetry and measurements; and Nuclear safeguards and security.*
3. Develop and institutionalize a pipeline for women and underrepresented minorities to participate in research at national laboratories and proceed to graduate schools in nuclear science/engineering/technology fields.

The results from the Phase-1 project, supported with a one-year curriculum grant from the NRC,

are within our long-range goals, and are discussed in details in section C (Summary of Results from Past NRC Research Funding) of this proposal. The hiring of a senior faculty member and one additional research faculty, both with expertise in nuclear science and engineering, shows a very strong indication of AAMU's commitment and progress towards the above long-term goals. The specific goal of the proposed Phase-2 project is to increase nuclear science content in physics and engineering technology curricula. The objectives from this goal are stated and discussed in section 8.2.2 (Objectives).

### ***B.1.2. Identification of Areas of Critical Needs and Opportunities to be Addressed***

We have identified the following areas of critical need: Dosimetry and Measurements; and Power Generation and Distribution.

*Dosimetry and measurements* are critical to radiation monitoring in nuclear power plants, environmental monitoring, nuclear safety, radiobiology and health physics.

*Power generation and distribution* is critical to our economy and the need to reduce our dependence on foreign oil. Nuclear power generation will be infused into engineering technology courses.

### ***B.1.3. Project justification***

The major problem in the nuclear sector is how to replace the estimated 50 percent of individuals currently hired in the nuclear industry that will retire within the next ten years. In addition, the need for more energy production to combat the rising cost of energy has increased interest in nuclear energy for power generation. This proposal is very important, since it is aimed at developing curriculum development activities that directly address these problems.

In addition to the above justifications, there is also the need to provide more nuclear science and technology awareness and curricula to communities in Northern Alabama to better serve the nuclear power plants and other nuclear industries in Alabama and in neighboring states.

The proposed curriculum development activities also address the need to increase the participation of women and underrepresented minorities in the nuclear workforce pipeline.

The strong commitment of Alabama A&M University to nuclear science, engineering and technology education, as indicated by the hiring and senior and research faculty members in this subject area, is also a justification to the proposed project.

### ***B.1.4. Innovation and Effectiveness***

The approach we have developed is quite innovative and is geared towards effectiveness and sustainability. This is illustrated in Figure 1.

### ***B.1.5. End Results and Project/Curriculum Outcomes***

To address the critical needs and problems identified in this proposal, the goals and objectives of the proposed project provide opportunities that will produce top-notch scientists, engineers and engineering technologists who will work in the following nuclear energy-related entities:

1. Nuclear Industries
2. The Nuclear Regulatory Commission (NRC) and other regulatory agencies
3. Department of Energy (DOE) laboratories and facilities
4. Homeland security related agencies and industries

The project and curriculum outcomes include the production of graduates who understand the science and engineering of the nuclear industry such that they are capable of the followings:

1. Sustaining the current nuclear facilities, operating and maintaining nuclear power plants;
2. Establishing policies that will enhance nuclear safety and safeguard.

The outcome of the proposed Phase-2 project will include two physics and two engineering technology courses with infused nuclear contents, two underrepresented minority undergraduates (women and African Americans) participants in summer research/internships at national laboratories, and two students that coauthored nuclear research papers published in journals and/or conference proceedings.

### ***B.2.1. Proposed Approach***

The proposed approach is illustrated in Figure 1. Nuclear contents will be infused into physics and engineering technology courses. These, together with other fundamental physics and engineering technology courses, will prepare students for practical training in summer research internships at Brookhaven National Laboratory and Oak Ridge National Laboratory.

### ***B.2.2. Objectives***

As stated in section 8.1.1 (Long-Range Goals), the specific goal of this project is to increase nuclear science content in physics and engineering technology curricula. The specific objectives of the AAMU-NEOP Phase-2 Project are:

1. Increase nuclear science/engineering knowledge base in physics and engineering technology curricula through content infusion into existing courses in physics and engineering technology at the undergraduate level.
2. Increase the participation of women and underrepresented minorities in nuclear fields through summer research activities/internships at national laboratories.

### ***B.2.3. Methodology***

The details of the curriculum to be offered and the methodology of the proposed project are described in this section.

#### ***8.2.3.1. Nuclear Content Infusion into Physics Courses***

We will continue to infuse nuclear content into the following two courses:

1. Physical Science I (PHY 101) - elementary particles, binding energy, unstable isotopes.
2. Introduction to Nuclear Physics (PHY 453) - isotopes and instrumental sources of radiation.

#### ***B.2.3.2. Nuclear Content Infusion into Engineering Technology Courses***

The content infusion emphases in engineering technology courses are in the critical areas of dosimetry and measurements, and nuclear power generation and distribution.

### ***B.2.4. Operating Plan and Management***

The operating plan consists of the administration and institutionalization of the program, and the implementation of proposed Phase-2 objectives and activities. Each component of the project is assigned a coordinator from among the principal investigators and other project participants.

### ***B.2.6. Expected Products and Results (Project Outcomes)***

1. Two physics courses and two engineering technology courses infused nuclear contents.
2. Twelve underrepresented minority undergraduates (women and African Americans)

participants in summer research/internships at national laboratories.

3. One capstone/senior projects in nuclear fields.

4. Two students that coauthored nuclear research papers published in journals and/or conference proceedings.

### ***B.2.7. Evaluation***

The AAMU-NEOP Phase-2 project will use an advisory board that will consist of members outside and independent of the project, to analyze assess and evaluate data provide advice and feedback to the principal investigators for improvement. The advisory team will also be given the responsibility of monitoring the progress and results of the project to check if there are meeting the objectives and outcomes.

The goal of the evaluation process and the advisory board is to ensure that the proposed objectives and outcomes of the project are accomplished, and results are documented and disseminated, in a timely fashion. The measurement parameters are the project outcomes listed in section 6.2.0 (Project Results and Products). The participants in-charge of infusing nuclear contents into the curricula, and in coordinating summer research for students, will be responsible for assessment/evaluation data collection, and they will work together to analyze the data.

### ***B.2.8. Dissemination Plans***

The dissemination of results from this project will be conducted through oral and poster presentation at professional scientific meetings. The curriculum materials developed will also be widely disseminated through the web, and will be made available for students to access and download as needed. The Phase-2 project is designed to provide a platform for the integration of core activities: curricular development, research internship, and professional development targeted at benefiting the nuclear workforce and areas critical to the NRC mission.

### ***B.2.9. Partnerships and Collaborative Initiative***

The proposed project has very strong partnerships and collaborative initiatives that provide the infrastructures and expertise for success. The initiative is summarized in Figure 1, shown at the beginning of section B.2 (Proposed Approach and Collaborative Linkages), and collaboration listed below:

1. Internal Partnership at Alabama A&M University - Physics and engineering technology departments.
2. DOE Laboratories.-. Brookhaven National Laboratory (BNL). (Student internships at BNL).

### ***B.2.10. Potential Cooperative Linkages***

More evidence of our very high potential cooperative linkages is found in a collaboration initiative that has accepted a tenure-track faculty from the Department of Technology, Dr. Wing Chan, to enhance his nuclear technology education capabilities through training and research in "advanced detectors for nuclear radiations" at Brookhaven National Laboratory (BNL) this summer (2010). Dr. Chan will also lead a group of three undergraduates to participate in summer research and education activities in the field of nuclear radiation detection technologies for national security and nuclear non proliferation.

### **B.3. Institutional Capability and Capacity Building**

AlabamaA&M University has the capability to perform the project objectives. Our institutional capabilities and capacity building efforts are discussed in the following subsections.

#### ***B.3.1. Institution's commitment to the project***

University funds were used to hire a senior faculty member, Dr. Stephen Egariyewe, with expertise in nuclear science and engineering to chair the Department of Technology in the School of Engineering and Technology. Dr. Egariyewe serves as Co-Principal Investigator to the proposed Phase-Z project, and has started the development of the new course [n "Radiation Detection and Nuclear Instrumentation" that he is currently teaching (spring 2Q10) as special topics to give hands-on skills to 14 students and prepare them to qualify for summer internships, at national laboratories and nuclear industries, in areas of interests to the NRC.

In addition to the above effort, funding from the National Nuclear Security Administration (NNSA) was used to hire a post-doctoral research assistant professor, Dr. Stephen Babalola, with expertise in nuclear science and radiation detection. Dr. Babalola serves as Co-PI in the proposed project. He also has started developing a new course, titled "Introduction to Nuclear Engineering" that he is currently teaching (spring 2010) as special topics to 26 students.

#### ***B.3.2. Adequacy of institutional resources (administrative, facilities, equipment, and materials)***

The administrative resources provided for the proposed project span from the top-level of the Deans of two schools, down to the coordinator of the Electrical Engineering Technology degree program. See Figure 2 in section 8.2.4 (Operating Plans and Management) for the overwhelming commitment of administrative resources to the proposed project. The Dean of Arts and Science, Dr. Matthew Edwards, is the PI to the proposal. The Dean of Engineering and Technology, Dr. Trent Montgomery, is a co-PI, and Dr. Egariyewe and Babalola are co-PI's. We have adequate facilities and major equipment for the proposed project activities. OUF Center for Irradiation of Materials of the Department of Physics has the following research capabilities that are relevant to the proposed project: ion implantation, ion milling, Nuclear Reaction Analysis (NRA), and Ion Beam Assisted deposition, and radiation effects. Relevant major equipments include: X-Ray Emission (PIXE) Station, Gamma-Ray Emission (PIGE) Station, and MeV Implantation Unit.

A laboratory space in the Engineering and Technology Building (ETB) has been allocated to the proposed Radiation Detection and Instrumentation Laboratory for students' lab exercises and hands-on instructional equipments to enhance student-learning of nuclear concepts. The lab space is equipped with fume hood, emergency and first-aid equipments, and vacuum evaporation thin-film deposition system (available in the ETB dean-room to be shared by the new lab and other labs). The following laboratory materials currently being procured using Title-III and other university funds:

1. Fabrication of solid-state nuclear radiation detectors: diamond wire saw, polishing pads,  $Al_2O_3$  powder (3, 0.5 and 0.03 microns), hand lapping tray, etching station, etching chemicals and consumables, chemical containers, contact deposition station, and gold chloride solutions.
2. Radiation detectors testing and response measurements: radiation sources. ( $Cs-137$  for gamma-rays,  $^{90}Sr$  for beta-particles) at 5 *microCi* level from United Nuclear, aluminum test box, high voltage source measurement unit, Ortec multichannel analyzer, and a desktop computers.

3. Electrical characterization of nuclear detectors: Keithley DC high voltage power supply, programmable electrometer, aluminum testing box. Ortec 142PC preamplifier. and a desktop computer (with accessories).

To accommodate multiple student experiments running in parallel, additional materials will be acquired from funds for the proposed project.

### ***B.3.3. Academic enhancement potential and Strengthening of Course Offerings, Curriculum, and Teaching Capacity***

The proposed project has noteworthy potential in academic enhancement This is evident from the interwoven initiative of combining nuclear content infusion into six existing physics and engineering technology courses, hand-on laboratory exercises, co-op experience at nuclear plants and facilities, and summer research internships at DOE laboratories.

The nuclear instructional lab and student lab exercises will strengthen teaching capacity. They also serve as tools to enhance student-learning. It will also enhance other academic areas and curricula such as digital signal processing, data visualization of scientific data, and image processing in nanotechnology. The transformation of 2-D images to 3-D images for better understanding of Pocket's effect in semiconductor nuclear detectors is also useful in nanotechnology.

As part of our collaboration initiatives and support of Brookhaven National Laboratory (BNL) for the proposed project, a tenure-track faculty, Dr. Wing Chan, has been accepted from the Department of Technology to enhance his academic potentials and nuclear technology education capabilities through training and research in "advanced detectors for nuclear radiations» at this DOE laboratory this summer (2010). Dr. Chan will also lead a group of one graduate student and three undergraduates to the summer research and education activities.

### ***B.3.5. Plans to continue or expand the project beyond the NRC support period***

Part of the long-term goals of the Alabama A&M University Nuclear Education and Outreach Program is to establish a sustainable educational infrastructure that supports and advances workforce development in fields critical to the nation's nuclear industries, nuclear power plants, nonproliferation/safeguard and domestic nuclear security, and related government agencies. Our plans to continue the project beyond NRC support are listed below. Some of these plans have already been implemented.

1. Institutionalize the developed nuclear curricula through content infusion into existing courses, and future development of concentrations in nuclear engineering technology. Edwards to
2. Institutionalize the Radiation Detection and Instrumentation Laboratory for students, by putting its operational costs in the budget of Engineering Technology programs.
3. Hire a senior faculty member with expertise in nuclear science and engineering to chair the Technology Department. This was implemented this last fall (2009) by hiring Dr. Egarievwe, who is a co-PI in this proposal.
4. Build faculty and post-doctoral research capacities in nuclear science and engineering areas with internal funds and funds from grants proposals to be submitted to other agencies such as the NSF, DOE, DHS, and NNSA. Part of this has been implemented through the hiring of a postdoctoral research assistant professor, Dr. Babalola.
5. Establish long-term collaboration with nuclear industries and DOE laboratories, specifically TVA, BNL, ORNL, and Boeing Inc.

## **Attachment C – Standard Terms and Conditions**

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

## Preface

This award is based on the application submitted to, and as approved by, the Nuclear Regulatory Commission (NRC) under the authorization 42 USC 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 following:

- Grant program legislation and program regulation cited in this Notice of Grant Award.
- 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 215 Uniform Administrative Requirements For Grants And Agreements With Institutions Of Higher Education, Hospitals, And Other Non-Profit Organizations (OMB Circulars), as applicable.

To assist with finding additional guidance for selected items of cost as required in 2 CFR 220, 2 CFR 225, and 2 CFR 230 these URLs to the Office of Management and Budget Cost Circulars are included for reference:

A-21 (now 2CFR 220): <http://www.whitehouse.gov/omb/circulars/a021/print/a021.html>  
A-87 (now 2CFR 225): <http://www.whitehouse.gov/omb/circulars/a087/print/a087-all.html>  
A-122 (now 2CFR 230): <http://www.whitehouse.gov/omb/circulars/a122/print/a122.html>  
A-102, SF 424: <http://www.whitehouse.gov/omb/circulars/a102/print/a102.html>  
Form 990: <http://www.irs.gov/pub/irs-pdf/i990-ez.pdf>

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 (EOs), Office of Management and Budget (OMB) Circulars, the Nuclear Regulatory Commission's (NRC) Mandatory Standard Provisions, special award conditions, and standard award conditions.

By drawing funds from the Automated Standard Application for Payment system (ASAP), the recipient agrees to the terms and conditions of an award.

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 215**

a. All provisions of 2 CFR Part 215 and all Standard Provisions attached to this grant/cooperative agreement are applicable to the Grantee and to sub-recipients which meet the definition of "Grantee" in Part 215, unless a section specifically excludes a sub-recipient from coverage. The Grantee 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 C of 2 CFR 215 Part 180 and include this term in lower-tier (subaward) covered transactions.

b. Grantees must comply with monitoring procedures and audit requirements in accordance with OMB Circular A-133. <

[http://www.whitehouse.gov/omb/circulars/a133\\_compliance/08/08toc.aspx](http://www.whitehouse.gov/omb/circulars/a133_compliance/08/08toc.aspx) >

## **2. Award Package**

### **Grant Performance Metrics:**

The Office of Management and Budget requires all Federal Agencies providing funding for 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 FY 2010 HR curriculum development grant awards, in addition to the customary performance progress report requested on the SF-PPR, SF-PPR-B, and SF-PPR-E forms, HR requires the following metrics to be reported on by the awardees as follows:

1. Overall number of new courses developed in NRC designated STEM areas;
2. Number of students enrolled in new STEM courses;
3. Number of these enrolled students retained in STEM major.

### **§ 215.41 Grantee responsibilities.**

The Grantee is obligated to conduct such project oversight as may be appropriate, to manage the funds with prudence, and to comply with the provisions outlined in 2 CFR 215.41. Within this framework, the Principal Investigator (PI) named on the award face page, Block 11, 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, Block 16., and is subject to a refund of unexpended funds to NRC.

The standards contained in this section do not relieve the Grantee of the contractual responsibilities arising under its contract(s). The Grantee is the responsible authority, without recourse to the NRC, regarding the settlement and satisfaction of all contractual and administrative issues arising out of procurements entered into in support of an award or other agreement. This includes disputes, claims, protests of award, source evaluation or other matters of a contractual nature. Matters concerning violation of statute are to be referred to such Federal, State or local authority as may have proper jurisdiction.

### **Subgrants**

#### **Appendix A to Part 215—Contract Provisions**

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 Grantee to NRC. See 2 CFR 215.180 and 215.41.

### **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.)

No U.S. citizen or legal resident shall be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity funded by this award on the basis of race, color, national origin, age, religion, handicap, or sex. The Grantee agrees to comply with the non-discrimination requirements below:

Title VI of the Civil Rights Act of 1964 (42 USC §§ 2000d et seq)  
Title IX of the Education Amendments of 1972 (20 USC §§ 1681 et seq)  
Section 504 of the Rehabilitation Act of 1973, as amended (29 USC § 794)  
The Age Discrimination Act of 1975, as amended (42 USC §§ 6101 et seq)  
The Americans with Disabilities Act of 1990 (42 USC §§ 12101 et seq)  
Parts II and III of EO 11246 as amended by EO 11375 and 12086.  
EO 13166, "Improving Access to Services for Persons with Limited English Proficiency."  
Any other applicable non-discrimination law(s).

Generally, Title VII of the Civil Rights Act of 1964, 42 USC § 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 USC § 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.

#### **Modifications/Prior Approval**

NRC prior written approval may be required before a Grantee 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 of, and obtained from, the NRC Grants Officer in advance of the change or obligation of funds. All requests for NRC prior approval must be made, in writing (which includes submission by e-mail), to the designated Grants Specialist and Program Office no later than 30 days before the proposed change. The request must be signed by both the PI and the authorized organizational official. Failure to obtain prior approval, when required, from the NRC Grants Officer may result in the disallowance of costs, termination of the award, or other enforcement action within NRC's authority.

#### **Lobbying Restrictions**

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

The Grantee shall comply with provisions of 31 USC § 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 Grantee receiving in excess of \$100,000 in Federal funding shall submit a completed Standard Form (SF) LLL, "Disclosure of Lobbying Activities," regarding 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. The Grantee must submit the SF-LLL, including those received from sub-recipients, contractors, and subcontractors, to the Grants Officer.

**§ 215.13 Debarment And Suspension.**

The Grantee 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 been convicted 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 your 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); and
- (4) Have had one or more public transactions (Federal, State, or local) terminated for cause or default within the preceding three years.

b. The Grantee agrees that, unless authorized by the Grants Officer, it will not knowingly enter into any subgrant or contracts under this grant/cooperative agreement with a person or entity that is included on the Excluded Parties List System (<http://epls.arnet.gov>).

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

'Debarment, Suspension, Ineligibility, and Voluntary Exclusion

The Grantee 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 in 2 CFR Part 180.'

**Drug-Free Workplace**

The Grantee 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 USC 702.

**Implementation of E.O. 13224 -- Executive Order On Terrorist Financing**

The Grantee 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 Grantee 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.

Award Grantees must comply with Executive Order 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: [www.fas.org/irp/offdocs/eo/eo-13224.htm](http://www.fas.org/irp/offdocs/eo/eo-13224.htm).

#### **Procurement Standards, § 215.40**

Sections 215.41 through 215.48 set forth standards for use by Grantees 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 shall be imposed by the Federal awarding agencies upon Grantees, unless specifically required by Federal statute or executive order or approved by OMB.

#### **Travel**

Travel is an appropriate charge to this award and prior authorization for specific trips are not required, as long as the trip is identified in the Grantee's original program description and original budget. All other travel, domestic or international, must not increase the total estimated award amount. Trips that have not been identified in the approved budget require the written prior approval of the Grants Officer.

Travel will be in accordance with the US Government Travel Regulations at: [www.gsa.gov/federaltravelregulation](http://www.gsa.gov/federaltravelregulation) and the per diem rates set forth at: [www.gsa.gov/perdiem](http://www.gsa.gov/perdiem).

Travel costs to the grant must be consistent with provisions as established in Appendix A to 2 CFR 220 (J.53)

#### **Property Management Standards**

Property standards of this award shall follow provisions as established in 2 CFR 215.30.

**Equipment** procedures shall follow provision established in 2 CFR 215.34.

#### **Procurement Standards**

Procurement standards of this award shall follow provisions as established in 2 CFR 215.40.

#### **Intangible and Intellectual Property**

Intangible and intellectual property of this award shall generally follow provisions established in 2 CFR 215.36.

**Inventions Report** - The Bayh-Dole Act (P.L. 96-517) affords Grantees the right to elect title and retain ownership to inventions they develop with funding under an NRC grant award ("subject inventions"). In accepting an award, the Grantee 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 Grantee report all subject inventions to the awarding agency (NRC) as well as include an acknowledgement of federal support in any patents. NRC participates in the trans-government Interagency Edison system (<http://www.iedison.gov>) and expects NRC funding Grantees to use this system to comply with Bayh-Dole and related intellectual property reporting requirements. The system allows for Grantees to submit reports electronically via the Internet. In

addition, the invention must be reported in continuation applications (competing or non-competing).

**Patent Notification Procedures-** Pursuant to EO 12889, NRC is required to notify the owner of any valid patent covering technology whenever the NRC or its financial assistance Grantees, 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. To ensure proper notification, if the Grantee uses or has used patented technology under this award without license or permission from the owner, the Grantee must notify the Grants Officer. This notice does not necessarily mean 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 are determined by 2 CFR 215.36. Such works may include data, databases or software. The Grantee 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 Grantee 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 Grantee employees may be copyrighted but only the part authored by the Grantee is protected because, under 17 USC § 105, works produced by Government employees are not copyrightable in the United States. On occasion, NRC may ask the Grantee 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 USC § 105.

**Records retention and access requirements** for records of the Grantee shall follow established provisions in 2 CFR 215.53.

#### **Organizational Prior Approval System**

In order to carry out its responsibilities for monitoring project performance and for adhering to award terms and conditions, each Grantee organization shall have a system to ensure that appropriate authorized officials provide necessary organizational reviews and approvals in advance of any action that would result in either the performance or modification of an NRC supported activity where prior approvals are required, including the obligation or expenditure of funds where the governing cost principles either prescribe conditions or require approvals.

The Grantee shall designate an appropriate official or officials to review and approve the actions requiring NRC prior approval. Preferably, the authorized official(s) should be the same official(s) who sign(s) or countersign(s) those types of requests that require prior approval by NRC. The authorized organization official(s) shall not be the principal investigator or any official having direct responsibility for the actual conduct of the project, or a subordinate of such individual.

**Conflict Of Interest Standards** of this award shall follow provisions as established in 2 CFR 215.42 Codes of Conduct.

### **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 Grantee'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 Administration, who shall appoint a review committee consisting of a minimum of three persons.
- 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 Grantee 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.

**Termination and Enforcement.** Termination of this award by default or by mutual consent shall follow provisions as established in 2 CFR 215.60.

### **Monitoring and Reporting § 215.51**

a. Grantee Financial Management systems must comply with the established provisions in 2 CFR 215.21

- Payment – 2 CFR 215.22
- Cost Share – 2 CFR 215.23
- Program Income – 2 CFR 215.24
  - Earned program income, if any, shall be added to funds committed to the project by the NRC and Grantee and used to further eligible project or program objectives.
- Budget Revision – 2 CFR 215.25
  - In accordance with 2 CFR 215.25(e), the NRC waives the prior approval requirement for items identified in sub-part (e)(1-4).
  - The Grantee is not authorized to rebudget between direct costs and indirect costs without written approval of the Grants Officer.
  - Allowable Costs – 2 CFR 215.27

### **b. Federal Financial Reports**

Effective October 1, 2008, NRC transitioned from the SF-269, SF-269A, SF-272, and SF-272A to the Federal Financial Report (SF-425) as required by OMB:

[http://www.whitehouse.gov/omb/fedreg/2008/081308\\_ffr.pdf](http://www.whitehouse.gov/omb/fedreg/2008/081308_ffr.pdf)  
[http://www.whitehouse.gov/omb/grants/standard\\_forms/ffr.pdf](http://www.whitehouse.gov/omb/grants/standard_forms/ffr.pdf)  
[http://www.whitehouse.gov/omb/grants/standard\\_forms/ffr\\_instructions.pdf](http://www.whitehouse.gov/omb/grants/standard_forms/ffr_instructions.pdf)

The Grantee shall submit a "Federal Financial Report" (SF-425) on a quarterly basis, for the periods ending 3/31, 6/30, 9/30 and 12/31, or any portion thereof, unless otherwise specified in a special award condition. Reports are due no later than 30 days following the end of each reporting period. A final SF-425 shall be submitted within 90 days after expiration of the award.

**Period of Availability of Funds 2 CFR § 215.28**

- a. Where a funding period is specified, a Grantee may charge to the grant only allowable costs resulting from obligations incurred during the funding period and any pre-award costs authorized by the NRC.
- b. Unless otherwise authorized in 2 CFR 215.25(e)(2) or a special award condition, any extension of the award period can only be authorized by the Grants Officer in writing. Verbal or written assurances of funding from other than the Grants Officer shall not constitute authority to obligate funds for programmatic activities beyond the expiration date.
- c. The NRC has no obligation to provide any additional prospective or incremental funding. Any modification of the award to increase funding and to extend the period of performance is at the sole discretion of the NRC.
- d. Requests for extensions to the period of performance shall be sent to the Grants Officer at least 30 days prior to the grant/cooperative agreement expiration date. Any request for extension after the expiration date shall not be honored.

**Automated Standard Application For Payments (ASAP) Procedures**

Unless otherwise provided for in the award document, payments under this award will be made using the Department of Treasury's Automated Standard Application for Payment (ASAP) system < <http://www.fms.treas.gov/asap/> >. Under the ASAP system, payments are made through preauthorized electronic funds transfers, in accordance with the requirements of the Debt Collection Improvement Act of 1996. In order to receive payments under ASAP, Grantees 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 will be required to make withdrawals under ASAP: (1) ASAP account number – the award number found on the cover sheet of the award; (2) Agency Location Code (ALC) – 31000001; and Region Code. Grantees enrolled in the ASAP system do not need to submit a "Request for Advance or Reimbursement" (SF-270), for payments relating to their award.

**Audit Requirements**

Organization-wide or program-specific audits shall be performed in accordance with the Single Audit Act Amendments of 1996, as implemented by OMB Circular A-133, "Audits of States, Local Governments, and Non-Profit Organizations."

<http://www.whitehouse.gov/omb/circulars/a133/a133.html> Grantees are subject to the provisions of OMB Circular A-133 if they expend \$500,000 or more in a year in Federal awards.

The Form SF-SAC and the Single Audit Reporting packages for fiscal periods ending on or after January 1, 2008 must be submitted online.

1. Create your 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
5. Click "Submit."

Organizations expending less than \$500,000 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**

#### **Performance (Technical) Reports**

a. The Grantee shall submit performance (technical) reports electronically to the NRC Project Officer and Grants Officer as specified in the special award conditions in the same frequency as the Federal Financial Report unless otherwise authorized by the Grants Officer.

b. Unless otherwise specified in the award provisions, performance (technical) reports shall contain brief information as prescribed in the applicable uniform administrative requirements 2 CFR §215.51 which are incorporated in the award.

#### **Unsatisfactory Performance**

Failure to perform the work in accordance with the terms of the award and maintain at least a satisfactory performance rating or equivalent evaluation may result in designation of the Grantee as high risk and assignment of special award conditions or other further action as specified in the standard term and condition entitled "Termination".

Failure to comply with any or all of the provisions of the award may have a negative impact on future funding by NRC and may be considered grounds for any or all of the following actions: establishment of an accounts receivable, withholding of payments under any NRC award, changing the method of payment from advance to reimbursement only, or the imposition of other special award conditions, suspension of any NRC active awards, and termination of any NRC award.

#### **Other Federal Awards With Similar Programmatic Activities**

The Grantee shall immediately provide written notification to the NRC Project Officer and the Grants Officer in the event that, subsequent to receipt of the NRC award, other financial assistance is received to support or fund any portion of the program description incorporated into the NRC award. NRC will not pay for costs that are funded by other sources.

#### **Prohibition Against Assignment By The Grantee**

The Grantee shall not transfer, pledge, mortgage, or otherwise assign the award, or any interest therein, or any claim arising thereunder, to any party or parties, banks, trust companies, or other financing or financial institutions without the express written approval of the Grants Officer.

#### **Site Visits**

The NRC, through authorized representatives, has the right, at all reasonable times, to make site visits to review project accomplishments and management control systems and to provide such technical assistance as may be required. If any site visit is made by the NRC on the premises of the Grantee or contractor under an award, the Grantee shall provide and shall require his/her contractors to provide all reasonable facilities and assistance for the safety and convenience of the Government representative in the performance of their duties. All site visits and evaluations shall be performed in such a manner as will not unduly delay the work.

#### **IV. Miscellaneous Requirements**

##### **Criminal and Prohibited Activities**

- a. The Program Fraud Civil Remedies Act (31 USC §§ 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.)
- b. False statements (18 USC § 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.
- c. False Claims Act (31 USC 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.
- d. Copeland "Anti-Kickback" Act (18 USC § 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**

Grantees are hereby notified that they are encouraged, to the greatest extent practicable, to purchase American-made equipment and products with funding provided under this award.

##### **Increasing Seat Belt Use in the United States**

Pursuant to EO 13043, Grantees should encourage employees and contractors to enforce on-the-job seat belt policies and programs when operating company-owned, rented or personally-owned vehicle.

##### **Federal Employee Expenses**

Federal agencies are generally barred from accepting funds from a Grantee 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 Grantee'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 Grantees or applicants regardless of the source.

##### **Minority Serving Institutions (MSIs) Initiative**

Pursuant to EOs 13256, 13230, and 13270, 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 Grantees 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 Grantee 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 Grantee organization shall investigate the allegation and submit its findings to the Grants Officer. The NRC may accept the Grantee's findings or proceed with its own investigation. The Grants Officer shall inform the Grantee 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 Grantee 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 Grantee 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 [Grantee 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."