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

1. GRANT/AGREEMENT NO.	2. MODIFICATION NO.	3. PERIOD OF PERFORMANCE	4. AUTHORITY
NRC-38-10-965		FROM: 7/1/2010 TO: 6/30/2012	Pursuant to Section 31b and 141b of the Atomic Energy Act of 1954, as amended

5. TYPE OF AWARD	6. ORGANIZATION TYPE	7. RECIPIENT NAME, ADDRESS, and EMAIL ADDRESS
[X] GRANT [ ] COOPERATIVE AGREEMENT	Public State-Controlled Institution of Higher ED DUNS: 064271570	Stevens Institute of Technology Castle Point on the Hudson Hoboken, New Jersey 07030

8. PROJECT TITLE:
Development of a Practice-Oriented Graduate Certificate Program in Nuclear Power Engineering

9. PROJECT WILL BE CONDUCTED	10. TECHNICAL REPORTS ARE REQUIRED	11. PRINCIPAL INVESTIGATOR(S) NAME, ADDRESS and EMAIL ADDRESS
PER GOVERNMENT'S/RECIPIENT'S PROPOSAL(S) DATED See Program Description AND APPENDIX A-PROJECT GRANT PROVISIONS	[X] PROGRESS AND FINAL [ ] FINAL ONLY [ ] OTHER (Conference Proceedings)	Stevens Institute of Technology Attn:Hamid Hadim Email: ahadim@stevens.edu 201-216-5569

12. NRC PROGRAM OFFICE (NAME and ADDRESS)	13. ACCOUNTING and APPROPRIATION DATA	14. METHOD OF PAYMENT
NRC Attn: Randi Neff Office of Human Resources MS: GW5A6 (301) 492-2301 11545 Rockville Pike Rockville, Maryland 20852	APPN. NO: 31X0200 B&R NO: 0-8415-5C1116 JOB CODE: T8453 BOC NO: 4110 OFFICE ID NO: RFPA: HR-10-965	[ ] ADVANCE BY TREASURY CHECK [ ] REIMBURSEMENT BY TREASURY CHECK [ ] LETTER OF CREDIT [X] OTHER (SPECIFY) Electronic ASAP.gov (See Remarks in Item #20 "Payment Information")

15. NRC OBLIGATION FUNDS		16. TOTAL FUNDING AGREEMENT		
THIS ACTION	$186.081	NRC	$186.081	This action provides funds for Fiscal Year in the amount of See Page Two
PREVIOUS OBLIGATION		RECIPIENT		
TOTAL	$186.081	TOTAL	$186.081	

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.	19. NRC CONTRACTING OFFICER
Signature Not Required	Sheila Bumpass 7/1/2010 (Signature) (Date) NAME (TYPED) Sheila Bumpass TITLE Contracting Officer TELEPHONE NO. 301-492-3484

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 ADM002

ATTACHMENT A - SCHEDULE

A.1 PURPOSE OF GRANT

The purpose of this Grant is to provide support to the "Development of a Practice-Oriented Graduate Certificate Program in Nuclear Power Engineering" 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, 2012.

2. Funds obligated hereunder are available for program expenditures for the estimated period: July 1, 2010 – June 30, 2012.

A. GENERAL

1. Total Estimated NRC Amount:	$186,081
2. Total Obligated Amount:	$186,081
3. Cost-Sharing Amount:	$0
4. Activity Title:	Development of a Practice-Oriented Graduate Certificate Program in Nuclear Power Engineering
5. NRC Project Officer:	Randi Neff
6. DUNS No.:	064271570

B. SPECIFIC

RFPA No.:	HR-10-965
FFS:	N/A
Job Code:	T8453
BOC:	4110
B&R Number:	0-8415-5C1116
Appropriation #:	31X0200
Amount Obligated:	$186,081

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	Year 2
Direct Participant Cost	$54,670.00	$76,621.00
Indirect Cost	$18,148.00	$36,642.00
Yearly Total	**$72,818.00**	**$113,263.00**

All travel must be in accordance with the Stevens Institute of Technology 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 $186,081 for a two (2) year period.

2. NRC hereby obligates the amount of $186,081 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

PROGRAM DESCRIPTION

Development of a Practice-Oriented Graduate Certificate Program in Nuclear Power Engineering

The main goal of the proposed certificate program is to provide participating mechanical engineering students and working professionals with the skills and training that are needed for a successful career in the nuclear power industry through a practice-oriented graduate certificate program in nuclear power engineering. To *achieve* this goal, the following program objectives are defined:

Objective 1: Develop the educational and skills profile needed for next-generation nuclear power engineers.

Objective 2: Develop the graduate certificate courses in the form of competency-based modules combining fundamental theoretical knowledge with skill-building activities enhanced with industry-based case-study modules, in collaboration with industry and government partners.

Objective 3: Develop experimental and software simulation laboratories for more effective student learning through "hands-on" experimentation and modeling and simulation techniques.

Objective 4: Develop a practice-oriented co-op program component in collaboration with industry and government partners, which provides the practical training needed of next-generation entry-level nuclear power engineers.

Objective 5: Develop effective program assessment and program dissemination and promotion strategies.

Detailed tasks related to each of these objectives are described in the following sections, and a detailed project timeline that includes all activities for this program is included in Table 1.

2. Proposed Approach and Collaborative Linkages:

The proposed *practice-oriented* graduate certificate program will leverage existing infrastructure and key program components of the IPI-CET Consortium. It will rely on the strategic partnership that has been forged as part of the IPI-CET which includes: Stevens Institute of Technology, Bergen Community College, Public Service Enterprise Group (PSEG) services Co., Burns and Roe Enterprises Inc., Electric Power Research Institute (EPRI), Brookhaven National Laboratory (BNL), PJM Interconnection, and Erin Engineering Co. Industry and government experts from program partners will assist in the proposed program design and development by:

1. providing participating students the opportunity to engage in a Master's-level cooperative education (Co-op) assignment at any of the program's industrial sponsors for one semester, and

2. facilitating the incorporation of vital nuclear engineering practice knowledge into the course modules based on the needs of the nuclear power stakeholders, including the development of industry-based case studies.

3.

The proposed certificate program consists of two required (core) courses, namely:

- Introduction to Nuclear Engineering, and
- Nuclear Power Plant Design and Operations,

and three technical electives including:

- Nuclear Reactor Theory and Design
- Thermal-Hydraulics Design of Nuclear Power Reactors and
- Nuclear Reactor Reliability, Safety and Waste Disposal.

In-line with the NRC program goals, the proposed graduate certificate program will include substantial emphasis on safety, security and environmental compliance. A plan for seamlessly integrating the proposed program and its courses into existing engineering curricula at Stevens is described below followed by a description of the course development and course delivery methods and the practice-oriented co-op component of the program.

The proposed certificated program will be developed to meet the objectives listed in Section 2. The main tasks needed to meet each objective are described as follows.

Objective 1: Identify the educational and skills profile needed for next-generation nuclear power engineers

The proposed program is designed to address the skills and training needs of next-generation entry-level nuclear power engineers as well as working professionals as identified by key stakeholders of the nuclear power industry. Accordingly, to design a program that effectively meets such needs, a systematic approach for program and course development will be adopted in collaboration with key industry and government partners most of whom are members of **IPIeET** (see attached letters of support). A workshop will be organized to provide a forum for experts from industry and academia to share their knowledge and experience related to best practices in nuclear power education and training in addition to identifying industry standard skill-sets for nuclear power occupations targeted by graduates of the proposed program. Our industry partners will also facilitate the incorporation of vital nuclear engineering practice knowledge into the course modules, based on long term experience of nuclear industry and government experts as it relates to design, operation, safety, security, environmental protection, and regulatory standards of the nuclear industry. In addition, a comprehensive survey of existing nuclear engineering education programs is being conducted to compile a review of demonstrated best-practices.

Objective 2: Develop the graduate certificate courses in the form of competencybased modules combining fundamental theoretical knowledge with skillbuilding activities enhanced with industry-based case-study modules, in collaboration with industry and government partners.

The course content and pedagogical methods that will be developed are motivated by industry demand for entry-level employers having more practical decision making experience, exposure to more realistic and real world nuclear power engineering problems, and the need to reduce the gap in student learning and real world problem solving as graduates prepare to enter the nuclear engineering workforce. Accordingly, the courses will be developed in the form of competency-based modules that will cover fundamental principles in nuclear science and engineering, extensive design experience including industry-sponsored design projects, and "hands-on" practice enhanced through the co-op experience.

Course module development will be conducted in close collaboration with program partners. Effective procedures have been developed by the Pis in collaboration with the **IPI-CET** consortium members for this purpose. Such procedures are continuously being enhanced. A key initial step for module development is to generate a comprehensive body of knowledge combining fundamental principles in nuclear science and engineering and "hands-on" practice while addressing related competencies and skill sets identified with the help of program partners. This body of knowledge is then classified into an appropriate set of competency-based modules. This organization is designed to achieve an integrated and focused modular approach to the delivery of learning and training needed to achieve the competencies necessary for next generation nuclear power engineers as they relate to fundamental principles, design, construction, operation, safety, security, environmental protection and regulatory standards in nuclear power engineering.

Industry-based Case Studies

As indicated in the attached letters of support, industry partners are highly interested in collaborating closely with program faculty in developing industry-based case-studies related to nuclear plant design, operation, safety, security, environmental protection, and regulatory standards. Such case-studies are expected to transform the classroom into a real-world, more enjoyable learning experience. One of the greatest challenges that most students face during their course of study in engineering is relating classroom topics to real-life situations. The industry-based case-study approach has been demonstrated as a highly effective solution to this challenge. For maximum effectiveness, the case studies will be designed to be highly interdisciplinary, multi-media enhanced, open-ended, and use active collaborative learning.

Training in case-based instruction will be provided to participating faculty and industry partners through workshops and seminars covering important aspects of case study development and implementation. Industry site visits by participating faculty will be organized to expose the team members to best practices as well as the latest industrial technological practices and provide the basis for real-world based problems that can be used in case studies.

Upon completion of their development, the case-studies will be reviewed by a team of program faculty and industry experts for their technical and pedagogical content while carefully mapping the competencies required in each course module with such case-studies. Piloting of the case studies will be performed before their full implementation into appropriate courses.

A **systems approach** to problem solving will be incorporated into the industry-based case study modules. In traditionally-taught courses, problems are carefully restricted in scope to focus on a particular phenomenon or method, and data is specified such that there is only one "right answer". Students have become accustomed to this highly structured environment, which does not represent well real world engineering problems. In the proposed program, multi-disciplinary case-studies spanning multiple subjects/topics such as nuclear reactor physics, thermal/hydraulics, materials, manufacturing, economics, environmental impact, and political and social issues, among others will be developed. Such case-studies will be analyzed using a "systems-based" approach allowing students to develop a higher comfort level and appreciation for the deeper understanding which comes with studying system behavior from multiple perspectives. A Systems Engineering approach is used to identify and document stakeholder requirements, establish a project baseline, and use a requirements driven methodology to manage and control the project throughout its system development life-cycle. With this approach, fundamental systems engineering principles are used to analyze concurrently cost, performance, and scheduling aspects of projects as well as to manage and control project risk. Entrepreneurial principles are used as part of the cost-benefit analysis in project evaluation.

Additional Effective Learning Techniques

The program courses will be developed in the form of competency-based course and laboratory modules which will take advantage of significant educational reform efforts that are ongoing at Stevens, including the development of experiential (case-based) learning modules, integration of self-directed software

tutorials and integration of multi-media learning tools. Laboratory modules will be integrated within the courses to provide "hands-on" learning of the fundamental principles in nuclear science and engineering combined with application of instrumentation and measurement techniques. Complementing the experimental laboratory, a computer simulation laboratory will be developed for detailed modeling and simulation of the overall plant operations and performance as well as individual components and processes.

For more effective learning, courses within the proposed program will be developed in the form of competency-based modules that emphasize innovative learning techniques as opposed to the traditional lecture-based approach. These modules will combine fundamental knowledge of subject matter with experiential, case-based and inquiry-based, hands-on approaches to learning. The modules will include classroom multimedia presentations, collaborative in-class exercises, as well as web-based and self-paced instructional modules. Such modern learning methods have been adopted throughout our mechanical engineering program for the past several years. As discussed earlier, our strong industrial partnership will be tapped to provide real-world case studies and design projects that will incorporated into the course modules.

Self-learning software tutorials - To enhance learning, guided self-learning software training modules will be developed. These modules will be designed to achieve several objectives including:

- Reinforce fundamental nuclear science and engineering principles and highlight how these principles are applied to solve practical nuclear power engineering problems.
- leverage the visualization capabilities of the CAE software to facilitate the adaptation of more complex and ill-defined problems within the traditional lecture format,
- Equip instructors with additional curricular tools to adapt more inductive and active teaching methods.

To promote student learning through these software tutorials and as part of the program assessment as discussed below, "Software Certificates" will be awarded to students that complete a specified set of these tutorials in each category. For the past few years, Dr. Chassapis (PI) has been leading the initiative for developing guided self-learning software tutorials within several undergraduate level courses in Mechanical Engineering which has received very good reviews by participating students and has led to measurably enhanced student learning.

Multi-media learning modules will be developed within a Virtual Learning Environment (VLE) to improve student learning outcomes and overcome a variety of existing educational challenges. The latest advancements in multimedia technology which integrate various media with 3D graphics, video clips, animated gifs, Java and JavaScript applets and screen captures, and hypertext, can be used to present a case study, to explain the procedure of a solution method, to demonstrate how a device works, to supplement a theory, and to visualize a

concept. Using these multimedia components, students are engaged more effectively in the learning process and have a better understanding of the fundamental concepts and their applications to real-world situations. Multimedia modules are being used by the principal investigators and others with great success in a variety of courses within the mechanical engineering program at Stevens.

Course delivery and piloting - In the proposed program, the modules will be delivered in a format that includes substantial implementation of active, collaborative and project-based learning techniques that are widely used in our mechanical engineering program and which have now been well-established and have been shown to be very effective in addressing the full spectrum of student learning styles, thus promoting more favorable attitudes toward learning, leading to greater academic achievement and increased retention. The modular courses will initially be delivered as a pilot study to a small sub-set of students and evaluators which will allow comprehensive review and revision of the modules before their formal integration into the program.

Objective 3: Develop experimental and software simulation laboratories for more effective learning through hands-on experiments and modeling and simulation techniques.

Complementing the competency-based modules discussed above, experimental and software simulation laboratory modules will be developed for more effective student learning through "hands-on" experiments and modeling and simulation techniques.

Experimental and Computer Simulation Laboratories

Laboratory modules will be integrated within the courses to provide "hands-on" learning of the fundamental principles in nuclear science and engineering combined with familiarization with instrumentation and measurement techniques. To complement our existing laboratories in energy systems, a nuclear radiation detection and measurements laboratory will be developed to provide fundamental instruction on the design and use of various radiation detectors and spectrometers. Laboratory modules will relate to fundamental measurements of beta particles, alpha particles, gamma rays, and neutrons. The laboratory will be equipped with a pulse height spectroscopy system with appropriate instrumentation including oscilloscope, multichannel analyzer, pre-amplifier, shaping amplifier, time-to-amplitude converter, and a variety of detectors and scintillators. Each laboratory session will be limited to a small number of students for more effective learning.

Complementing the experimental laboratory, a computer simulation laboratory will be developed for detailed modeling and simulation of the overall plant operations and performance as well as individual components and processes. As part of the proposed simulation laboratory, a list of industry standard software packages that are currently available in the department (except for PCTRAN which is to be acquired for the proposed program) is presented in Table 2.

Table 2. List of Available Simulation Software

Software	Capabilities
PCTRAN	PCTRAN is the most successful desk-top simulator for all types of light water nuclear reactors including PWR, BWR and advanced AREVA EPR, Westinghouse AP1000 and GE ABWR and ESBWR. Simulation scope is extended to severe accidents and dose dispersion.
MFIX	MFIX (Multiphase Flow with Interphase eXchanges) is a general-purpose computer code developed at the National Energy Technology Laboratory

	(NETL) for describing the hydrodynamics, heat transfer and chemical reactions in fluid-solids systems.
ANSYS: **CFX** **Fluent**	ANSYS Multiphysics software is a comprehensive integrated multiphysics simulation tool combining structural, thermal, computational fluid dynamics (CFD), acoustic and electromagnetic simulation capabilities in a single engineering software solution.
CosmosWorks	Integrates a broad range of mechanical CAD, multiphysics simulation, design validation, product data management, design communication, and CAD productivity tools in a single, affordable, and easy-to-use package.

The PCTRAN software package (http://www.microsimtech.com/pctranl) is selected as a complete teaching platform for nuclear power technology. PCTRAN was first introduced in 1985 by Micro-Simulation Technology, Inc. Since then it has been selected by IAEA as the training software for its annual Advanced Reactor Simulation workshop. Plant specific models using PCTRAN were installed at nuclear power plants and institutions all over the world for practical application in training, analysis, probabilistic safety assessment and emergency exercises. PCTRAN is also highly suitable for classroom teaching. The PCTRAN simulation code has the capability to simulate the various aspects of a nuclear plant including basic concepts involving reactor physics, thermal-hydraulics, and plant control. Actual plant designs can be analyzed for a wide variety of reactors including experimental pool reactor and advanced PWR and BWR, among others. Plant operations such as normal start-up, shutdown, and power operation to transient and accident mitigation can also be simulated along with Defense-in-depth concept involving fuel element, reactor coolant and containment boundary, severe accident and offsite dose dispersion. The author of PCTRAN software, Dr. Li-chi Cliff Po from Micro-Simulation Technology, Inc., in Montville, New Jersey, has agreed to visit Stevens periodically to provide participating students with the technical support needed for effective use of the PCTRAN software.

Along with PCTRAN additional software tools such as MFIX (Multiphase Flow with Interphase eXchanges; http://www.mfix.org.) an open source computational Fluid Dynamics (CFD) tool developed at NETLIDOE, Morgantown, WV will be used for detailed modeling and simulation of flow and thermal behavior in the plant. Dr. Boyalakuntla (PI) has been involved extensively in MFIX development and implementation. Other CFD software packages including ANSYS (http://www.ansys.com/products/) and CosmosWorks (http://www.solidworks.com/) software suites are available in the department for more detailed multi-physics (fluid flow, heat transfer, structural, vibrations, etc.) analysis of nuclear reactors and other plant components.

In line with the emphasis of the proposed program on safety, security and environmental protection, additional software modules related to nuclear plant risk assessment have been offered by one of our program partners, Erin Engineering Inc., to be integrated into the related course modules. Professionals from Erin Engineering will provide the necessary training on the software use.

In addition to the laboratory and software modules to be integrated within the courses, students are expected to gain substantial additional laboratory experience during their co-op assignments at our program partners' training facilities as discussed below.

Objective 4: Develop a practice-oriented co-op program component in collaboration with industry and government partners, that provides the practical training needed of next-generation entry-level nuclear power engineers.

A distinguishing feature of the proposed program is a practice-oriented cooperative education (Co-op) component to be supported by our industry and government partners as confirmed in each of the attached letters of supports. Currently up to 50% of our ME undergraduate students are enrolled in Co-op and the program has recently been expanded to graduate students pursuing the Masters degree. Leveraging on this well-established and highly successful co-op program infrastructure, students in the proposed certificate program will be afforded the opportunity to participate in a Masters-level cooperative education (Co-op) assignment for one semester at any of our program industrial or government partners, particularly members of our **IPI-CET** consortium.

The main features of this practice-oriented co-op component of the program are:

- Students take one semester (four to seven months) away from coursework to work fulltime at one of the program's industry or government partners (co-op sponsors), to gain real world practical experience in nuclear power engineering. This experience does n01 need to be coordinated with the student's research thesis or project. Accordingly, the assignment is designed to be related to the sponsor's as well as the student's mutual interests in the field while providing challenge and progress in responsibility.

- The Stevens' Co-op Office Staff, along with the proposed program coordinator review potential assignment descriptions to assist in identifying candidate students in the program for the positions.

- Student resumes are forwarded to the organization for review, then potential interviews of the candidates are scheduled.

- Once a student has been identified for hire, the program coordinator meets with the technical advisor from the sponsoring organization to determine the specific aspects of the co-op effort, and coordinate the technical aspects and reporting requirements of the assignment.

- When all of the details are determined and coordinated as described above, the student begins the co-op assignment.

Distance Learning

The award-winning Stevens' WebCampus online learning unit *(http://webcampus.stevens.edu/)* will be used to offer appropriate online courses to students while they are on co-op assignment as well as to working professionals that are interested in career change or advancement. WebCampus was created in 2000 to open up new opportunities for students not onlyin areas that the Stevens traditionally served, but for others around the country and around the world. The list of awards and honors that Stevens had won through WebCampus operations had given the school an enviable reputation as a leader in online education. Among them, recent award was received from the Sloan Foundation who selected the Stevens WebCampus as the "Most Outstanding Online Teaching & Learning Program" nationally.

Objective 5: Develop effective program assessment and program dissemination and promotion strategies.

To determine the extent to which the program meets its projected outcomes, specific performance measures will be developed and periodically monitored. Performance measures for the proposed program include registrations, co-op assignments, "software certifications", academic certificate awards, graduation rate, and placement of graduates in the nuclear industry. A database will be developed to track these metrics, collect information from training enrollees, and follow up with graduates of the program. These activities will be integrated into the overall program assessment process.

The program partnership as described above will assume an important role in effective program assessment which will include formative and summative evaluation of the program goals and objectives,

including both qualitative and quantitative methods.

In addition to the partnership listed above, the program will establish an External Advisory Board (EAB) to include representatives from the program partners as well as other experts selected from industry and academia that have a deep knowledge of best practices in nuclear power education and the skills needed of next-generation nuclear power engineers. The EAB will provide guidance to help ensure that graduates of the program will have received the highest quality preparation for their professional careers, consistent with the program's mission and objectives and will provide input related to program assessment.

Comprehensive program assessment will be conducted using feedback from the five main constituencies of the proposed program which will include: (1) current students within the program, (2) employers of graduates, including employers of co-op students, (3) program faculty, (4) program External Advisory Board (EAB), and (5) graduates of the program (alumni). An intemal Program Committee will be established and will be responsible for ensuring that the contributions from the different courses are correctly integrated into the overall program in order to achieve the desired program objectives and outcomes.

To promote the program and to demonstrate it as a model for potential replication at other institutions, the principal investigators will disseminate the program at national and international conferences where effective strategies and lessons learned from this program will be presented. In addition, a program website will be developed and flyers and brochures will be sent to industry and universities nationwide. The program partnership as described above will assume an important role in effective program promotion and dissemination.

Integration into Existing Programs

The proposed program will be seamlessly integrated into the Master of Engineering degree program in Mechanical Engineering *(hftp://www.stevens.edu/ses/me/Graduate/index.htm/).As* illustrated in **Figure 1,** the M.S. program offers four main tracks including: Thermal Engineering Product Design, Manufacturing Systems, and Pharmaceutical Manufacturing Systems. Each track requires 15 credits (five courses) in the core areas and 15 credits (five courses) offered as elective courses. In addition to the core tracks, the department offers several graduate certificates that students can select from as illustrated in **Figure** 1. Each graduate certificate is self-contained and highly focused, carrying four courses (12 graduate credits). All of the courses may be used toward the Master of Engineering degree, as well as for the graduate certificate. Accordingly, the department has gained a vast experience in establishing and successfully offering graduate certificates in areas of current and future importance to industry. The proposed program will target primarily mechanical engineering students pursuing the Thermal Engineering or Product Design tracks within the Master of Engineering program as illustrated in **Figure** 1. Accordingly, the existing core requirements within the Masters program provide students the necessary engineering and science fundamentals and management skills that will complement the disciplinary knowledge provided within the proposed nuclear power engineering certificate as discussed below.

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In addition to their integration into the Master of Engineering program in Mechanical Engineering, the courses within the proposed graduate certificate will also be made available to other students outside of Mechanical Engineering who can use these course(s) in several ways including:

Technical electives (maximum of two courses) for graduate students pursuing the Master of Engineering degree in any of the available disciplines (chemical engineering, civil engineering, environmental engineering, electrical engineering, engineering management, and engineering physics).

Technical electives (maximum of two courses) for students pursuing the newly created graduate certificate in sustainability engineering

"General" electives (maximum of three courses) for upper-level undergraduate students pursuing the Bachelor's degree in any of the engineering disciplines listed above including those pursuing the recently created "Green Engineering Minor."

Expected Enrollments in Program Courses

The Master of Engineering program in Mechanical Engineering at Stevens currently has a total student enrollment of approximately 300 students. A minimum enrollment of 15 students in each course within the proposed graduate certificate program can be expected based on the following conservative estimates:

1. Only 5% of the students may select to pursue the proposed graduate certificate,
2. Other ME students may select one or more course(s) within the proposed graduate certificate as technical elective(s) towards the Master of Engineering (Mechanical) degree (see Figure 1), and
3. Students outside of the ME program may select one or more course(s) within the proposed graduate certificate as described above.

3. Institutional Capability and Capacity Building

The Department of Mechanical Engineering at Stevens has included as part of its strategic plan nuclear power education as one of its initiatives for future growth. The Principal Investigators are highly qualified to manage and develop the proposed program as they have demonstrated extensive experience in successfully developing similar programs. As discussed above, with prior funding from the New Jersey Department of Higher Education, the PIs have recently established the New Jersey Innovation Partnership Institute in Clean Energy Technology (I PICET) with its main focus on nuclear power engineering. Dr. Hadim (PI) has also received additional funding from one of the IPI-CET industrial partners, the Electric Power Research Institute (EPRI), to develop a short course on Pressurized Water Reactors (PWRs) whose main objective is to introduce new and experienced, transferred professionals at EPRI to the design and operational principles of pressurized water reactor (PWR) nuclear power plants. In these projects, the PIs have established effective processes for collaboration with industry partners to develop courses and programs that meet industry needs. Dr. Chassapis (PI) founded the graduate Masters program in Pharmaceutical Manufacturing designed to serve the needs of the Pharmaceutical Industry (which has a large base in New Jersey) which has now grown to more than 700 students enrolled in the program. An important component of the program is its focus on FDA regulatory requirements. Similar focus on nuclear regulatory requirements is planned for the proposed program as discussed above. Additional ongoing relevant funded projects that are being conducted by the PIs are listed in the attached summary of relevant funding support.

The interdisciplinary nature of the nuclear power engineering field motivates the need to educate and train engineers and scientists in a variety of fields such that in addition to Mechanical Engineering students that are the main target of the proposed program, it is expected that the program will expand to include graduate certificates in other engineering disciplines including: Chemical Engineering, Civil Engineering, Environmental Engineering, Electrical Engineering, Engineering Physics, and Engineering Management, thus providing additional motivation for institutional support and long-term program sustainability. The expanded version of the program will include a set of multidisciplinary "core" courses common to each certificate combined with disciplinary electives as illustrated in Table. 3. Such a model has been adopted as a tradition within the Stevens engineering curriculum since its founding. Similar to various industry oriented programs that have been ongoing at Stevens, the proposed program which targets a growing industry as described above will be highly supported and sustainable.

Table 3. Program Expansion to Other Disciplines

"Core" **Courses (required for**	**ME** 5xx: **Introduction to Nuclear Engineering**

each certificate)	ME 5xx: **Nuclear Plant Operations and Safety**	
Disciplinary Electives	*Civil Engineering*	Choose two from: CE 5xx: Construction Management of Nuclear Plants CE 5xx: Management of Aging Nuclear Plants CE 5xx: Structural Design of Nuclear Reactors
	Environmental Engineering	EN 5xx: Nuclear Plant Safety and Waste Disposal EN 5xx: Nuclear Radiation Detection and Shielding
	Electrical Engineering	EE 5xx: Nuclear Plant Instrumentation and Control Systems EE 5xx: Nuclear Power Generation and Distribution
	Engineering Management	MGT 5xx: Construction Planning Management of Nuclear Plants MGT 5xx: Management and Administration of Nuclear Plants (including regulations and standards).

The proposed expansion will build on the course development activities of the proposed graduate certificate. As illustrated in Table 3, for each discipline, the courses needed for the graduate certificate include two "core" courses from mechanical engineering that will be available as par the currently proposed program and two new "disciplinary electives". This expansion to several other engineering majors will serve to insure that the nuclear power industry workforce will be staffed with highly trained engineers from various disciplines to conduct nuclear plant design and operations in more effective, a safe, secure and environmentally sound manner.

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 CRF 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 >

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.

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 and the per diem rates set forth at: 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/grants/standard_forms/ffr.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 herby 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 form 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."