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

1. GRANT/AGREEMENT NO.	2. MODIFICATION NO.	3. PERIOD OF PERFORMANCE	4. AUTHORITY
NRC-38-10-961		FROM: 7/1/2010 TO: 6/30/2011	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: 078052313	Florence Darlington Technical College 2715 West Lucas Street Florence, South Carolina 29602

8. PROJECT TITLE:
Construction and Maintenance of New and Aging Nuclear Power Plants in the Southeast: Valve Technician Program

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)	Florence Darlington Technical College *Attn:Ross Gandy* Email: ross.gandy@fdtc.edu 843-661-8330

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-10-961	[ ] 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	$139,642	NRC	$139,642	This action provides funds for Fiscal Year in the amount of See Page Two
PREVIOUS OBLIGATION		RECIPIENT	$51,992	
TOTAL	$139,642	TOTAL	$191,634	

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

2. NRC hereby obligates the amount of $139,642 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

Project Description

INNOVATIVE INSTRUCTIONAL APPROACHES OR TECHNIQUES TO ENHANCE STUDENT LEARNING

Florence-Darlington Technical College (FDTC), in Florence, South Carolina, is developing and implementing an innovative educational and recruitment program to support the construction of new nuclear energy production facilities planned for the southeastern region as well as to service existing nuclear power plants. A collaborative planning and development process with regional employers has made possible a new, successful Pipe Welding Academy with a shared commitment for the creation of a complementary Valve Technician Program. This proposal requests support for the development of a new and innovative curriculum, teaching approaches, and instructional materials for the Valve Technician Program. This component of the plan will be complemented by industry-donated personnel, supplies, and equipment as well as the laboratory renovation and educational personnel and infrastructure support provided by the College. *The Power Up - Construction and Maintenance of New and Aging Nuclear Power Plants in the Southeast: Valve Technician* program will complement the College's U.S. Nuclear Regulatory Commission-funded Pipe Welding Academy (being renamed the Pipe and Valve Academy to reflect the commitment of FDTC and its partners to extend the training, education and hiring of other, complementary crucial construction and maintenance trades). The Pipe Welding Academy originally consisted of the first pipe welding program offered in the Southeast region by an academic institution. It now includes the Pipe Fitting curriculum currently under development and validation and the newest component which is the Valve Technician Program. Many of the FDTC nuclear industry partners have been on-board since the establishment of the Pipe Welding program (in August 2008). Impressed by the quality of the graduates and with a knowledge of upcoming personnel shortages, industry has supported the development of additional programs including the Pipe Fitting program and is committed to supporting the Valve Technician Program.

This request for $139,642 will support the development of curriculum that is critically needed to replace the inconsistent way in which Valve Technicians are currently trained (primarily on the job, one-by-one, and with little quality control). Safety will be an integral part of every course, as is the case with the existing welding academy. Each module not only will have an extensive concentration on safety, but a 10 hour OSHA safety course will be a requirement for every matriculating Valve Technician. A competency-based, broadly accessible, customized approach is necessary to attract more diverse and talented students; transfer the skills and knowledge of the retiring skilled craftsmen/technicians; establish an academic program in valve maintenance and repair; and, increase capacity to meet current and anticipated employer demand. *The Power Up* project will take advantage of the symbiosis of existing partnerships among FDTC, the regional nuclear power industry and national workforce suppliers to the

nuclear power industry.

FDTC is committed to workforce development to support the energy industry. FDTC's educational programs are comprehensive and routinely adapted to meet the workforce development needs of regional employers. This plan will enable the College to support existing nuclear power plants as well as support construction of new reactors. In collaboration with the Nuclear Energy Institute, the College is a partner in a national initiative to develop a uniform curriculum across community colleges for nuclear plant operators. Progress Energy is serving as a mentoring partner in this effort, and implementation plans are in progress. A population of younger students and incumbent workers will be recruited and prepared to support not only the operation of existing facilities but also the growth and new construction in the industry.

Academic Focus. The specific focus area for this proposal to the Nuclear Regulatory Commission is Material and Mechanical Engineering, Management of Aging Plants; specifically educating and training Valve Technicians. Valve Technicians are crucial in both existing nuclear reactors and the new planned construction of nuclear reactors (a nuclear power plant contains at least 13,000 valves) which must be maintained and repaired in the most efficient, economical, safe, and appropriate manner available using the most appropriate equipment to create economies and reduce wasted materials). The goal of the FDTC Valve Technician Program is to produce highly qualified valve technicians to do this work. Innovative features of the program include: (1) a dynamic curriculum capable of instantaneous refinement in response to formative evaluation; (2) state-of-the-art equipment for teaching valve installation, maintenance and repair; (3) effective alumni-student-teacher networking including graduates returning to mentor and teach current students; (4) a strong, existing partnership among the regional nuclear industry, maintenance personnel suppliers, and FDTC; (5) a focus on safety and security in valve installation and maintenance in the nuclear industry as well as a knowledge of relevant equipment policies, procedures and strategies to promote effective local, state or national security operations for the protection of people, data, property and institutions; (6) a Success Coach/advisor for each student; (7) faculty with the highest credentials and extensive industry experience; and (8) a vigorous recruitment program employing proven strategies and the newest web-based technologies to reach the widest diversity of people. Innovative instructional approaches: In addition to daily hands-on instruction and practice (experiential learning) being interwoven with the appropriate math and science competencies, the program will feature specially designed 3-D images for virtual reality instruction in valve installation, maintenance, and repair to be developed by the EON Reality studio at FDTC's Southeastern Institute of Manufacturing and Technology (only one of six Interactive Digital Centers in the world).

Team projects to be developed from actual workplace scenarios provided by industry partners will allow students to practice working together in Pipe Welder/Pipe Fitter/Valve Technician teams ("mini-crews") as is the practice in the industry. This type of hands-on, real-world training is specific to FDTC as very few, if any, technical/community colleges have in place, on-site Pipe and valve training facilities as well as the qualified staff and instructors. The emphasis on creating skilled Valve Technicians who take ownership of their work will include focusing on skills specific to pride of craftsmanship including: giving full attention to what teammates and supervisors are saying and taking time to understand the points being made; asking questions to clarify as appropriate; troubleshooting; equipment maintenance; critical thinking to develop logic and reasoning skills to identify the strengths and weaknesses of alternative solutions and active learning to understand the implications of new information for both current and future problem-solving and decision-making.

The ability of each technician to do his or her job efficiently and expertly is directly dependent on the quality of the work of the others in their mini-crew. Team members must work hand-in-hand, understanding and appreciating the contribution each makes to the safe and

efficient operation of the facility. Students will be provided with the ten-hour OSHA training (with certificate and wallet card), and each instructional unit will have a rigorous emphasis on safety. While it is not feasible to hire instructors who are skilled or have experience with all types of valves constructed from all types of materials, partnering companies who do have personnel with particular expertise will donate skilled technicians who will conduct workshops on valves made from less common materials. Where appropriate, multi-modal, hybrid instruction will be provided to accommodate multiple learning styles and student schedules. Upon program completion, graduates have numerous nuclear-energy related career pathway options and may immediately continue their education to achieve an associate degree or return after gaining work experience. For example, in collaboration with Progress Energy and the Nuclear Energy Institute, FDTC is implementing an engineering technology option in Nuclear Power Operation.

As the only accredited welding testing and training facility in South Carolina, FDTC is well positioned to expand to valve technician laboratories and training. Welders, pipe fitters and valve technicians are needed for all nuclear power plants, and they work closely together on the job. However, valve technicians are also crucial for maintenance work for existing nuclear power plants. More advanced instruction for valve technicians is becoming critical due to the increasingly complex environments in which they must work. According to energy industry partners, the current venues for training and educating valve technicians are not producing enough highly skilled technicians to keep up with the demand. The FDTC Valve Technician Program will be one of only a handful of providers of this education in the nation and the only publicly offered training in the Southeast.

How the Project will improve the education infrastructure, teaching competencies, subject matter expertise, and skills in serving students in the target disciplines.

The comprehensive education gained by these technicians has other advantages including:

- Valve Technicians are generally hired to work in a "helper" position, and the time to journeyman status is four years. This focused program will cut the time in half from apprentice to journeyman.
- Graduates will be more desirable new hires than those with no previous experience or training (the current status quo).
- Graduates will be awarded a Certificate of Mastery.
- Graduates will start at a higher pay rate than someone without certification or experience.
- Graduates will be competent in relevant theories and methodologies and will have practice and experience instead of "hit and miss" skills-only training provided on the job on an as needed basis.
- In-depth modules on safety, precision measuring instruments, and hands on assembly, disassembly, and repair of a wide variety of valves, will ensure that computers have the necessary knowledge and problem-solving skills as they begin work in the field.
- The FDTC Valve Technician Program will provide thorough, one-on-one training focusing on craftsmanship and quality control instead of ad hoc instruction in the field leading to a higher level of pride of craftsmanship and critical thinking skills to allow the valve technician to continue to learn and increase their value to their employer.
- In the field, much of the hands-on learning is often limited to one type of material (whatever is used in the setting where they are training), whereas the classroom setting will provide students with instruction in a diversity of materials and equipment with 3D virtual reality experiences including cut-away views and inside "walk throughs" with valves too large or expensive for hands-on experience in the classroom.
- The quality of the on-the-job training varies significantly and lacks uniform assessment of student learning. Faculty instructors at FDTC uniformly have the highest industry credentials, extensive industry experience, and they routinely assess and certify student competence and skill levels. Mastery of competencies and skills upon completion of each

unit is required to progress to the next unit of study.
- Faculty at FDTC are carefully selected to ensure the highest caliber of craftsmanship and ability to facilitate the transfer of knowledge and skill to the younger generation.

Goal and Objectives

FDTC is committed to a long-term energy initiative to support the region's power industry.

The College is currently engaged in an aggressive and targeted energy-education initiative designed to ensure that the regional energy sector has the workforce necessary to operate and expand to support economic growth. [Even though energy's GDP represents only four percent of the total national GDP, by supplying power to industry, that four percent makes the other 96 percent possible. i] Positions most difficult to fill and in greatest demand by the industry are highly skilled technicians and craftsmen, Industry experts agree that the skilled trades positions within the power industry are ones that will experience the most retirements and will be the most difficult to replace.[ii] Just as energy providers make all other industry possible, highly skilled technicians and craftsmen are critical to the work of scientists and engineers in the nuclear power industry. The College's institutional long-range goals include creating and sustaining a comprehensive continuum of education and training to meet the workforce needs of the region's power providers.

The specific goal of the *Power Up - Construction and Maintenance* of *New and Aging Nuclear Power Plants in the Southeast* project is to develop and implement a curriculum for the FDTC Valve Technician Program to prepare individuals to enter the workforce with the education, skills, training, and safety knowledge to meet regional employer demands. Objectives for the project include: (1) establishing/validating uniform competencies for Valve Technicians; (2) creating and implementing a model curricula with innovative teaching methodologies and program sustainability for Valve Technicians; and (3) documenting and publishing all components of the model program for broad dissemination to US colleges and universities.

How the proposed project will improve education infrastructure, teaching competencies, subject matter expertise, and skills in serving students in the target discipline.

The proposed project will improve the education infrastructure to advance technology, efficiency, and safety in the maintenance of nuclear power facilities. The Department of Labor and Center for Energy Workforce Development have collaboratively defined competencies and developed career lattices for the energy industry. The critical position of Valve Technicians have been categorized as "Control and Valve Installers and Repairers, except mechanical doors." While this job categorization has been expanded within the last year and more detail is included in the Summary Report,iii it does not speak directly to curriculum development. The Summary Report will be consulted as the FDTC Valve Technician curriculum is developed, validated and implemented.

The current system of ad-hoc, on-the-job preparation of individuals for these jobs must be improved to advance technology, promote efficiency, embed quality, and ensure safety. It is essential to strengthen the underlying mechanical, technological understanding and critical thinking of these workers and to verify competencies at every stage of the educational process. Current on-the-job training practices have failed to provide the numbers of workers needed as well as any uniform level of quality. It is difficult to assess the quality of technicians provided by private, for-profit service contractors because they do not share employee screening, training, and assessment information. Even if proprietary training is of the highest quality, valve maintenance contractors such as Crane Nuclear are experiencing shortages of highly skilled technicians and have been in contact with the College regarding hiring from the proposed program. The curriculum that FDTC will develop will have embedded critical employer screening, training and assessment information provided by industry partners and other potential employers.

As technology has advanced and necessary skill levels have increased, well-designed, customized educational programs are becoming increasingly essential to workforce development. Currently, there are very few courses or programs available to specifically prepare a workforce for these jobs, yet the regional employment outlook is excellent due to the planned new construction of nuclear reactors (seven new nuclear reactors in the Southeast) coupled with the retirement of the "baby boomers." The energy industry is understandably anxious for solutions to the shortages of highly skilled crafts people such as valve technicians upon which they are heavily dependent to operate and grow.

A model program for advancing the education infrastructure for technicians for the energy industry is being implemented in South Carolina at FDTC to serve the Southeast region. This model may be specific to the region, but it can quickly be adapted for use across the country to impact the national energy technician education infrastructure. FDTC serves on the Energy Task Force for the Southern Growth Policy Board and is leading efforts to serve the nuclear power industry in the Southeast. FDTC is a participating partner college in a new National Energy Institute initiative for two-year technical and community colleges to implement uniform curricula for critical-need jobs in the nuclear power industry. Specifically, FDTC will be implementing the uniform curricula for nuclear power plant operators within the year.

The proposed *Power-Up* project is a targeted effort within a larger initiative to fill a void and respond to specific requests from energy sector partners. An Industry-College Leadership Group was formed in 2008 to guide the initiative (set goals and objectives, respond to regional challenges, etc.). The College's highly successful Pipe Welding Academy (specifically the Pipe Welding Program) was the first in this effort to respond to a specific energy industry need. A Pipe Fitting curriculum is currently under development and validation. Valve Technicians represent another area of great and immediate need. To support the *Power-Up* project, FDTC has dedicated laboratory space for the new Valve Technician Program on the adjacent campus

at the Southeastern Institute of Manufacturing and Technology (SiMT). The Valve Technician Laboratory is a 30' by 30' space dedicated to mechanical and electrical valves. The students in valve maintenance and repair will be trained to work with the pipe welders and pipe fitters.

The laboratory space at SiMT is in close physical proximity to the facilities for the pipe welders and pipe fitters, thus facilitating teamwork as students can easily travel between laboratories. The academic enhancement potential that the Valve Technician Program will bring to the Pipe and Valve Academy is evident as the College creates a continuum of workforce development opportunities specific to energy providers in the region, ranging from Nuclear Plant Operators to linemen. To make a fast-paced, high volume Valve Technician Program possible, FOTC is committing substantial resources. In addition to the space described above, the College will provide an Academy Director, faculty to teach the classes, personnel to serve on leadership and advisory committees, information technology support, office space and furnishings, meeting space for faculty development and curriculum development activities, free, on-site parking, a Blackberry wireless communication device for the Academy Director, and on-site marketing, print-shop, and video production facilities and expertise. Personnel include: (1) Ross Gandy, Principal Investigator, Overall Administration; (2) David Seagle, Valve Technician Expert/Instructor; (4) Industry Advisors, Subject Area Experts from industry partners; (5) David Brown, OZ Atlantic/Industry Skills Standards Liaison; (6) Elaine Hodges, FOTC Recruitment; and (7) Elaine Craft, Curriculum Development.

National Educational Infrastructure. At this time, training in the field of valve repair and maintenance is primarily provided by private, for-profit companies through proprietary programs and/or as on-the-job training within the nuclear power industry. Public colleges and universities have not contributed significantly in this area of workforce development. Only a handful of facilities in the entire United States teach valve installation, maintenance and repair. Industry officials could name only three schools in the country that teach valve technicians that are accredited by a scholarly accrediting agency. Most such skills are taught in the field, as workers are hired and begin as helpers. Usually the helpers work side-by-side with someone more experienced, with the quality of training varying considerably from person to person and from workplace to workplace. Some experienced workers may be credentialed journeyman while others may only *have* a year or two more experience than the helper. Normally it takes an unskilled helper four years to reach journeyman *level.* ***The Power Up - Construction and Maintenance of New and Aging Nuclear Power Plants in the Southeast*** **project will cut journeyman training time by half and help relieve the skilled workforce shortage.** This project will also provide a model for other colleges to adopt. The processes and procedures undertaken, and the partnerships required to implement and operate the Academy, will be documented and packaged for sharing.

Current teaching competencies will be part of the project's curriculum development. Competencies *have* already been developed for use by proprietary, for-profit providers, but they are not publically available. FDTC partners, however, *have* already begun identifying student competencies for the *Power-Up* project. Through this project, curriculum and teaching materials will be developed to help ensure student mastery of the industry-identified competencies and supporting general education. The *Valve* Technician Program, as part of the new Pipe and Valve Academy at the College will teach the new curriculum. This project will enable content and teaching experts to work together to design lessons, projects, and teaching resources to create a comprehensive curriculum that will help ensure that all students achieve mastery of the required competencies. The industry partners *involved* in this effort are donating their time and expertise in the development of the Academy because of the great demand for these skills and the benefits that will be available to everyone. The development of the curriculum, under the guidance of a curriculum development specialist. will be done by industry professionals who currently supply the nuclear power industry with Valve Technicians and who are themselves

skilled professionals with many years of industry experience. FDTC faculty will provide expertise in teaching methodologies and will design the projects that will enable students to *have* real-world teamwork experiences where pipe welders, pipe fitters, and *valve* technicians work together as they will in the field. The majority of the requested grant funds will be used to develop and test teaching modules for the curriculum which will incorporate industry-defined competencies and bring a coherent, unified theory to teaching the skills and safety knowledge that is essential for working in the industry. All teaching materials and curriculum models will be documented, packaged, and broadly shared with other educators.

Subject area expertise is the primary credential for all instructors hired by the College. All instructors teaching in the Pipe and Valve Academy including in the Valve Technician Program will *have* appropriate, skill-specific certifications and industry experience. Those who *have* been identified to teach courses include practitioners, industry skill standards developers, and those well-versed in the specific needs of nuclear power providers. (The senior instructor identified for the development, validation and implementation of this curriculum has a long history in the nuclear industry including 32 years as a senior control operator at a nuclear power plant.) Credentials for all faculty who teach courses for the Valve Technician Program will meet or exceed the requirements of the College's accrediting agency, the Southern Association of Colleges and Schools. To be most *effective,* content expertise must be coupled with teaching expertise. Those whose experience is primarily in the industry will be provided with faculty development to become *effective* teachers. Instructors at the College are routinely provided with faculty development to update and enhance competence in keeping with technology advances and current industry practice. The College's primary focus is on technical education. As a result, college faculty has exceptional skills and extensive training to meet the needs of nontraditional students and contextual learners. The College's Palmetto Teaching and Learning Institute (PTLI) provide on-going professional development for teachers, especially in effective teaching methodologies. PTLI has a ratified mission and creates modules to promote, "inspire, and enable faculty to develop teaching potential and enhance classroom effectiveness." Modules to contribute to PTLI's mission include Workshops, Lunch and Learn, Reading After Hours, Popcorn and a Movie, and Teaching Circles. Further, they provide "Technology Tips" to introduce methodologies utilized effectively by other instructors. Instructors in the Pipe and Valve are eligible to join PTLI, learn new teaching tips and techniques to enhance their teaching effectiveness. Strong existing partnerships with regional nuclear power providers and equipment manufacturers who serve as advisors will help ensure a dynamic curriculum that can and will be quickly updated to reflect formative evaluation feedback.

Industry partners will be relied upon for the most up-to-date subject area expertise. These industry partners will support development of the curriculum by identifying and validating needed competencies. In addition, they will serve on an advisory committee and the Leadership Group (a steering committee made up of industry partners and FDTC personnel) for the project. An academic focus on nuclear safety will form the basis for the new customized program of study and career pathway option in the Valve Technician Program. A modular instruction design will enable programs of study to be customized in terms of content and delivery method to maximize learning options and accessibility for students. Where possible, hybrid instruction models will be employed so that face-to-face, hands-on, and computer-based instruction will be available. All students will be instructed in teamwork to gain experience working together as is the practice in industry. They will enter the workforce with an appreciation of what each specialist contributes to the safe and efficient operation of the facility. Having the three programs in one location will make this valuable experience possible. The curriculum model will be supplemented with teaching materials, student handouts, and instructor guides for classroom activities, student assignments, interdisciplinary team projects, and assessment tools. This model program will be transportable to other academic institutions and made readily available via Internet and for training purposes at the Southeastern Institute for Manufacturing and Technology adjacent to the FDTC campus.

The project's innovative instructional approaches or techniques to enhance student learning, including distance education and experiential learning.

The curriculum will be integrated and problem-based with collaborative teaching strategies and extensive active learning techniques. The proximity of all three programs within the Pipe and Valve (pipe welding, pipe fitting and valve technician) will enable project-based learning and teamwork across disciplines that will model the workplace. *Power Up* will consist of three parts: (1) classroom lecture; (2) equipment demonstration; and (3) hands-on training, including team projects, to prepare the students to operate the necessary equipment, including the cutting torches, forklift, threading machines, tube cutters, flaring tool, basic hand tools, basic plumbing, basic air tools, pipe stand, lathe, drill press, hand tools, milling machines, gasket and packing removal equipment, hoist, pulley-pullers, test meters and valve reseating tools. Hands-on training will also include cross-discipline teamwork projects with pipe fitting and pipe welding students.

Innovative instructional approaches and techniques include a dynamic curriculum that lends itself to team projects across disciplines and which can be instantly refined in response to formative evaluation; 3-D visualization technology will be employed to bring over sized and/or highly specialized industrial valves into the classroom; state of the art valve maintenance and repair equipment on which students will be trained; collaborative education efforts which allows for industry professionals to be guest lecturers and module instructors and to prepare Valve Technicians to work in the nuclear industry; a focus on safety throughout; an effective alumni-student-teacher network; a Success Coach/advisor for each student to increase student tenacity and program completion; faculty with the highest credentials and extensive industry experience who will undergo rigorous professional development to develop/enhance existing teaching expertise to accommodate multiple learning styles and student schedules; and a vigorous and aggressive recruiting program to reach the widest diversity of people.

The Valve Technician Program's emphasis on developing entire courses of study and curricula, teaching materials with an emphasis on hands-on training and the development of pride of craftsmanship

The Valve Technician Program will feature very focused training and education, with mathematics and other supporting general education embedded into a well-defined course of study. Student cohorts will work together as learning communities, with an emphasis on teamwork and cross-disciplinary projects. The curricula will be designed specifically to meet the workforce needs of the nuclear power industry and developed by industry professionals who are donating their expertise and time to work with curriculum experts at FDTC. Module development will be completed by curriculum specialists with developmental input by the industry skills standards liaison, the Principal Investigator, the Pipe and Valve Academy instructors and the industry professionals affiliated with the Academy. FDTC's *Power Up* will provide training and education and help fill the nuclear power industry's critical and expanding need for installation, maintenance and construction workers trained in safe, secure, up-to-the minute equipment and procedures.

The classroom lectures will include both the program instructors and guest lecturers including prominent business and industry representatives, power plant representatives and others skilled in valve installation, maintenance and repair. The classroom lecture time will be interspersed with hands-on demonstrations and student practice. One-on-one instruction in small classes will allow for content and demonstrations to be customized to the needs of the students. The instructors will conduct the equipment demonstrations which will consist of the set-up and use of the equipment for valve installation, maintenance and repair. Approximately 50 percent of the students' time will be the hands-on training in the laboratory (some of the

laboratory work will occur off-site) and 50 percent will be active learning emphasizing teamwork.

Curriculum

The curriculum will be designed to be dynamic and innovative, anchored in an enriching training and academic environment, and building on long-standing partnerships with regional nuclear and industrial power producers and the institutional support of FDTC. Initial work with industry partners has produced an initial list of competencies and an estimated timeline for instruction. This project will complete the curriculum by completing the identification and validation of student competencies, develop teaching materials, student handouts, and instructor guides for classroom activities, student assignments, interdisciplinary team projects, and assessment tools. Web-based materials will be developed as appropriate to provide additional learning opportunities and increase accessibility.

The envisioned curriculum is based on the belief that experiential learning leads to a deep understanding of critical principles; Success Coaches/advisors encourage and empower students to complete their studies; instruction by certified, experienced instructors/faculty and special industry liaisons will ensure that students become capable, professional Valve Technicians; specially designed safety modules will lead to error-free valve installation, maintenance and repair, and alert, cautious, team-oriented professionals, and institutional support will lead to the sustainability of the *Power Up* program. In addition to not producing enough valve technicians, industry partners say current workforce development strategies fail to produce workers with three critical attributes: technically sound skills, underlying academic knowledge, and high levels of craftsmanship. The FDTC Valve Technician Program will provide all three.

Selected Preliminary Valve Technician Competencies

- Familiarity with the various styles of valves (gate, globe, butterfly, diaphragm, ball and plug valves)
- Connecting valves to test stands, and adjusting operation until specifications are met
- Disassembling and repair mechanical control devices or valves, using power tools, hand tools
- Lubricating wearing surfaces of mechanical parts, using oils or other lubricants
- Recording maintenance information, including test results, material usage, and repairs made
- Lifting and positioning work pieces, manually or with hoists, and securing them in piping or on machine tables, faceplates, or chucks, using clamps
- Setting up, operating, or tending grinding and related tools that remove excess material or burrs from surfaces, sharpen edges or corners, or buff, hone, or polish metal or plastic work pieces
- Setting and adjusting machine controls according to product specifications, utilizing knowledge of machine operation
- Measuring work pieces and laying out work, using precision measuring devices
- Selecting machine tooling to be used, utilizing knowledge of machine and production requirements
- Studying blueprints, work orders or machining instructions to determine product specifications, tool requirements and operational sequences
- Activating machine start-up switches to grind, lap, hone, debar, shear, or cut work pieces according to specifications
- Inspecting, examining, and testing installed systems and pipe lines, using pressure gauge, hydrostatic testing, observation, or other methods
- Measuring and marking pipes and components for cutting and threading
- Laying out full scale drawings of pipe systems, supports and related equipment following blueprints
- Planning pipe system layout, installation or repair according to specifications
- Modifying, cleaning and maintaining pipe systems, units, fittings and related machines and equipment, following specifications and using hand and power tools.

FOTC's capability and capacity to implement the proposed project and long-term ability to sustain the project. Include quantifiable criteria for demonstrating that the program is successful.

FDTC is geographically located in an area of demonstrated and growing need for trained technicians (Pipe Welders, Pipe Fitters and Valve Technicians) and particularly those who are trained to work in a nuclear environment. In NRC Region II, which encompasses the Southeast, there are over 35 existing reactors and seven new reactors are in the permitting processes. The demand for Valve Technicians is expected to skyrocket as the baby boomers retire and new construction begins.

The proposed Valve Technician Program will become part of the FDTC Advanced Welding and Cutting Center which includes the ESAB School of Welding, and the Pipe and Valve Academy. The Advanced Welding and Cutting Center has served approximately 2,500 students in the last eight years. The administrative and management structure and exceptional student success rates have not only sustained but have substantially grown these programs over time. It is anticipated that the Valve Technician Program will experience the same success. As is the case with most programs at academic institutions, student enrollment and success that is supported by employer satisfaction with graduates is a primary indicator of a program's long-term viability. A goal of the FDTC Valve Technician Program will be to serve as the "go to" place

for highly skilled technicians for the energy industry in the region. The Advanced Welding and Cutting Center is supported by the President of FDTC. It falls under the administrative offices of the Southeastern Institute of Manufacturing and Technology (SiMT). The Director of SiMT is also on the President's Executive Staff. He is on the Advisory Board of the Mechanical Engineering Department at the University of South Carolina and is a member of the Society of Automotive Engineers. Ross Gandy, the Director of the Advanced Welding and Cutting Center, reports to the Director of SiMT. Gandy has been the Director of the Center since 1999 and has overseen a 400 percent growth.

Criteria of Sustainability. The long-term sustainability will also be supported by the close relationship the College has with the Pee Dee Workforce Investment Board (WIB). Because this area is one of high need and few resources, the Pee Dee WIB currently has a waiting list of clients who would be eligible to start education and training in *Power Up*. Pee Dee WIB has already agreed to provide recruitment and intake to identify and assess eligible candidates using the WorkKeys Employment System, administer CareerScope for interest and aptitude, and administer a basic skills test. Collaboration with industry and the Pee Dee WIB has proven invaluable to the growth and success of the Pipe Welding Academy at FDTC. *Powel Up* is built upon the Academy model with many of the same components. Both industry and the Pee Dee WIB regularly refer students for that program and industry hires all of the completers (to date, the Pipe and Valve has a 95% certification rate and over 65% job placement rate).

The *Power Up* workforce development model includes a well developed marketing and recruitment plan. Aggressive recruitment is critical to ensure a sufficient number of highly skilled nuclear Valve Technicians. The first phase of marketing will be on recruiting new, diverse people who are interested in having the skills and the higher income that careers as Valve Technicians allow. The second target population will be people who have some knowledge of valve installation, maintenance and repair from having worked in the construction industry. The third market will be students drawn from secondary career and technical education programs. In addition, recruitment efforts will target other regional technical colleges that offer welding and maintenance programs, but not Valve Technician programs.

Recruitment strategies will be designed to raise awareness of the ever-increasing options within the field of valve installation, maintenance and repair. Old perceptions of construction trades as "dirty" occupations will be challenged with visuals of today's clean industry environment and upbeat, diverse role models including women, minorities, and change-of-career adults. Using these strategies, FDTC has been very successful in recruiting women to the Pipe Welding Academy. Recruitment efforts will emphasize that these trades have moved beyond blue collar and are quickly becoming "gold collar" trades.

Other recruitment activities will include using web-based tools such as YouTube for video distribution, the development of new career awareness material (developed with the assistance of industry), and the FDTC website for applications, program descriptions, and job/industry information. New recruitment strategies will cast a wide net for potential students: out-ofschool/out-of-work youth, veterans, underemployed, unemployed, displaced and incumbent workers, and those traditionally underrepresented in the energy industry (e.g., women). The Pee Dee One-Stops have agreed to show the YouTube videos that FDTC will develop in their waiting rooms (as they do with an existing Pipe and Valve YouTube video). Advertising will also be targeted to specific populations through media such as videos shown in One-Stop waiting areas, *She* magazine (targeting females), *The Community Times* (targeting African Americans), and by selecting Career Ambassadors from among current students to provide peer recruiting at vocational schools and outreach/mentoring in their neighborhoods, churches, and clubs. Other innovative marketing and recruitment plans include conducting "Lunch and Learn Seminars" focused on youth, parents, educators and guidance counselors to increase career awareness and by providing support for strengthening science and math at the secondary level by participating in career pathways curriculum alignment (funding provided by the SC Education and Economic Development Act).

Dissemination plans include articles in the American Welding Society newsletter, information distributed through the state-wide peer groups including the Director's Program Managers peer group, and through information distributed on the FDTC Monday Morning news videocasts which are distributed internally and to 200 "friends" of the College, and through information disseminated via Progress Energy's newsletter, and other FDTC Partner newsletters. WeldEd, a National Science Foundation-supported National Advanced Technological Education Center for Welding, will also provide access to an outreach network that targets the nation's two-year technical and community colleges. Additional leverage has been provided by area industry such as Grainger who have been inspired to *offer* scholarships to students in the welding program.

Other notable and complementary programs at FDTC are the National Science Foundation-funded SC Advanced Technological Education Center of Excellence and National Resource Center for Expanding Excellence in Technician Education, the Department of Defense funded National Robotics Training Center and the U.S. Nuclear Regulatory Commission funded Pipe and Valve, all well-positioned to work synergistically with the FDTC *Power Up* program.

Evaluation Plans are designed to assess and document success and impact of the *Power Up* program and to provide formative feedback for continuous improvement. Evaluation for the project has been seamlessly integrated with the goal, objectives, activities, and outcomes as outlined in the table below.

Evaluation information will determine the extent to which: the goal of *Power Up* is being met; the program has been able to meet the growing and specific needs of the region's nuclear power producers; *Power Up* attracts and enrolls students who are able to matriculate and work in the nuclear power industry; Power Up has been able to position itself for sustainability; and the impact of *Power Up* on students and industry. It is anticipated that an experienced external evaluator from the Durham, North Carolina-based Compass Consulting Group, Dr. Amy Germuth, will conduct the evaluation for the *Power Up* project.

Goal: **To develop and implement a curriculum** for the FDTC Valve Te.chnician Program to prepare individuals to enter the workforce with the education, skills training, and safety knowledge to meet regional employer demands.		
Objective 1: Establish and validate uniform competencies for Valve Technicians		
Activity	Outcome	Evaluation

Collaboration with industry to identify and validate essential competencies for valve technicians	Documented, industry-validated essential competencies for valve technicians	Level of involvement of industry in competency identification and validation process (# of employers, types of employers, meeting attendance levels, and timely responsiveness to communications)
Objective 2: Create and implement a model curricula with innovative teaching methodologies and program sustainability for Valve Technicians		
Activity	Outcome	Evaluation
Development of instructional materials with recommended innovative teaching methodolog ies	Instructor guide with instructional content and classroom activities, student handouts and assignments, PowerPoint slides, blueprints and other graphic illustrations, virtual reality (3-D) valve si m u lations/visual izations, web links, interdisciplinary team projects from industry, and assessment tools	Peer review of instructional materials and recommended teaching methodologies to determine if essential competencies are included content is aligned with industry-validated competencies. Also, determine if materials are accurate, clearly presented, have visual appeal, are easy use, and promote student success. Feedback to be used for making improvements.
Survey of employers who employ or anticipate employing program completers	Employer satisfaction with curriculum content and delivery methods, experience identifying job candidates, placement of program completers (extent of	Analysis of employer feedback with recommendations for program improvement • Job candidate pool • Technical knowledge
	advanced placement as a result of completing identification of any or weaknesses in curriculum	• Craftsmanship/pride in workmanship • Safety • Workplace readiness/teamwork
Interviews with program completers (graduates)	Student satisfaction and successful student experiences in completing either the pipe fitting or valve technician program, finding employment, advanced job placement towards becoming a journeyman, and applying acquired knowledge/skills to do the job	Analysis of graduate feedback with recommendations for program improvement • Job placement assistance • Entry job level and potential for advancement • Instructor quality • Technical knowledge • Craftsmanship/pride in workmanship • Safety • Workplace readiness/teamwork
Compare program components with existing	Enough components exist to provide an equal number of	Analysis of recruitment materials, scholarship fund

long-term programs to methods in place (e.g., recruitment, scholarship commitments).	scholarships, students and employers to sustain program.	raising efforts, scholarship commitments, extent of involvement at all levels by nuclear industry partners and rate of employment for com pieters.
Objective 3: Document and publish all components of the model program for broad dissemination to US colleges and universities.		
Activity	Outcome	Evaluation
Combine and publish in hard copy and on the web all components of individual instructional units for pipe fitting curriculum	Published and readily-available competencies, curriculum, instructional materials and recommended teaching methodologies for valve technician programs.	Review of hard copy and web-based published documents with feedback provided related to utility and ease of access.
Broadcast availability of technician program materials and program start-up mentoring via web sites, listservs, employer networks, technician educator professional conferences (e.g. National Career and Technical Education Conference), Journal and news articles.	Curriculum and supporting materials for teaching valve technician programs are readily available to all US colleges and universities and mentoring assistance is provided to those who help in starting programs and using the model curricula.	Number of inquiries, requests for materials, web page "hits", presentations made, articles written, frequency and levels assistance provided.

Summary. FDTC's *Power Up - Construction and Maintenance of New and Aging Nuclear Power Plants in the Southeast* is an innovative, essential step towards increasing the ability of energy companies to increase nuclear power capacity in the Southeastern region. The shortage of highly skilled technicians to replace the retiring workers, coupled with new workforce needs associated with the planned construction of multiple nuclear power plants pose a significant risk to the region's energy viability. This program is a cost-effective, proactive move towards providing the valve technicians that are vital to the future of nuclear power plants in South Carolina and the Southeastern United States.

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."