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

1. GRANT/AGREEMENT NO.	2. MODIFICATION NO.	3. PERIOD OF PERFORMANCE	4. AUTHORITY
NRC-HQ-11-G-38-0071		FROM: 8/22/2011 TO: 08/31/2013	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: 004315578 NAICS:611310	The University of Georgia Research Foundation D.W. Brooks Drive Athens, Georgia, 30602-7411

8. PROJECT TITLE:

GA/SC Regional Environmental Radiation Protection Curriculum

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)	The University of Georgia Research Foundation Prof. John Seaman GA/SC Regional Environmental Radiation Protection Curriculum D.W. Brooks Drive Athens, Georgia, 30602-7411

12. NRC PROGRAM OFFICE (NAME and ADDRESS)	13. ACCOUNTING and APPROPRIATION DATA	14. METHOD OF PAYMENT
NRC Attn: Tanya Parwani-Jaimes Office of Human Resources MS: GW5A06 (301) 492-2308 11545 Rockville Pike Rockville, Maryland 20852 Email: Tanya.Parwani-Jaimes@NRC.GOV	APPN. NO: 31X0200 B&R NO: 2011-84-51-K-134 JOB CODE: T8453 BOC NO: 4110 OFFICE ID NO: RFPA: HR-11-253 FAIMIS GR0037	[ ] 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	$298,598	NRC	$298,598	This action provides funds for Fiscal Year in the amount of See Page Two
PREVIOUS OBLIGATION		RECIPIENT		
TOTAL	$298,598	TOTAL	$298,598	

17. NRC ISSUING OFFICE (NAME, ADDRESS and EMAIL ADDRESS)

U.S. Nuclear Regulatory Commission
Div. of Contracts
Attn: Shashi Malhotra Email: Shashi.Malhotra@NRC.GOV
Mail Stop: TWB-01-B10M
Rockville MD 20852

18.	19. NRC CONTRACTING OFFICER
Signature Not Required	Sheila Bumpass AUG 22 2011 (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 - ABM001

SUNSI REVIEW COMPLETE

ADM002

ATTACHMENT A - SCHEDULE

A.1 PURPOSE OF GRANT

The purpose of this Grant is to provide support to the "CBC Non-Licensed Operator Curriculum Development Program" as described in Attachment B entitled "Program Description."

A.2 PERIOD OF GRANT

1. The effective date of this Grant is August 22, 2011. The estimated completion date of this Grant is August 31, 2013.

2. Funds obligated hereunder are available for program expenditures for the estimated period: August 22, 2011 – August 31, 2013.

A. GENERAL

1. Total Estimated NRC Amount:	$298,598
2. Total Obligated Amount:	$298,598
3. Cost-Sharing Amount:	$0
4. Activity Title:	CBC Non-Licensed Operator Curriculum Development Program
5. NRC Project Officer:	Tanya Parwani-Jaimes
6. DUNS No.:	624285818

B. SPECIFIC

RFPA No.:	HR-11- 253
FFS:	N/A
Job Code:	T8453
BOC:	4110
B&R Number:	2011-84-51-K-134
Appropriation #:	31X0200
Amount Obligated:	$298,598

A.3 BUDGET

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

A.4 AMOUNT OF AWARD AND PAYMENT PROCEDURES

1. The total estimated amount of this Award is $298,598 for the two-year period.
2. NRC hereby obligates the amount of $298,598 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

Objective:

Establishing a university partnership to develop an interdisciplinary *GA/SC Regional Environmental Radiation Protection Curriculum* (ERP) that addresses the technical needs of the expanding nuclear sector beyond nuclear engineering, which accounts for only 1% of the nuclear workforce, while broadening the employment opportunities for students within a diverse range of relevant academic disciplines. The current proposal seeks to establish a university partnership between UGA, USC and USC-Aiken to develop the ERP curriculum addressing the "Radiochemistry/Radiobiology" and "Health Physics" technical areas with an academic focus on *nuclear safety and environmental protection* within the NRC Nuclear Education Grant Program (Announcement HR-FN-0610-EDU5). The ERP curriculum will initially consist of 13 new credit hours to be offered by the participating institutions largely by adding a teaching component to Research Faculty with extensive expertise in their proposed class subject matter. Furthermore, the proposed ERP program makes extensive use of existing laboratory infrastructure and radiological analysis equipment, without the need to build, remodel, and/or equip new facilities, representing a tremendous cost savings when compared to other upstart programs in development. The participating colleges can continue the program without the need to recruit or make long-term tenure commitments to new faculty during these tough economic times, when qualified, experienced candidates in the required specialties may not be widely available, as demonstrated by the NRC education programs.

Curriculum

Academic Participants

The proposed curriculum is based on the class requirements for a degree in Health Physics or Radioecology; however, the classes will be offered as part of a skills certification program, and cross-listed by all participating universities and their respective departments and colleges (Table 3.1). The initial petition to create the certification program within the Georgia University System is already in development. We view the collaboration between the participating Department, Colleges and Universities is essential for expanding student participation within the broader environmental and public health curricula of the participating institutions, and developing a "World Class" training program with very limited initial funding. We also anticipate recruiting additional partnering institutions and academic partners, possible through UGA and USC's participation in the National Center for Radioecology (NCoRE; additional details in Section 4 below), as student interest increases and the ERP training program matures.

Program Timeline

All classes and learning modules will be taught at an advanced level suitable for upper-level undergraduate and graduate students. Eventually the classes can be revised such that graduate students can get full graduate credit by completing additional requirements. Enrollment will be open to UGA, USC and USC-Aiken students, SRS employees and other local professionals with appropriate experience seeking continuing education credits. Classes will be taught in Aiken, SC at the SREL Conference Center during "Maymester" sessions (15 consecutive weekday classes) which are currently offered by UGA and USC. The current proposal seeks sufficient NRC funding to support the ERP program for a period of two years beginning March 1, 2011 and ending February 28, 2013 with the completion of the second "Maymester" session of

classes. Even given the short lead time, the Environmental Geochemistry of Radionuclides, the Radiation Protection and Safety, and the Radioecology classes plus the Seminar can be offered during the first ERP session. The remaining Genotoxicology will likely be offered during the second ERP session.
As indicated above, at least two (possibly three), three-hour lecture classes and the ERP Career Development Seminar will be offered during each session, with students encouraged to enroll in two lecture classes plus seminar each session (7 hrs for each Maymester Session). Additional ERP courses may also be offered if sufficient student interest warrants. Participants can take advantage of dormitory style housing at USC-Aiken to avoid the costly commute from their home institutions ≈($150 for the Maymester session). This approach has been used successfully in the past to provide affordable short-term lodging for DOE summer interns, and students participating in SREL's NSF-Funded Summer REU program. Depending on demand, additional classes may be scheduled on the participating university's campuses during the standard academic calendar year so that students entering the ERP program during the second year are able to complete the required courses during the first two years of the proposed curriculum.

Student Recruitment
An on-campus program coordinator (PC) has been identified for each of the participating institutions to recruit undergraduate and graduate participants in the ERP program. Further, initial discussions with SRS contractors indicate significant interest in the ERP curriculum as an avenue for employees pursuing advanced degrees or seeking continuing education (CE) credits. SREL already provides a similar service to SRS contractors for employees needing CE credits to maintain various certifications. With funding available March 1, 2011, the initial paperwork has been submitted to create the two of the four three-hour classes discussed above so that instruction can begin in May 2011. In addition, student recruitment is already underway, and we anticipate a minimum of ≈ 20 students for the initial class sessions. Classes will also be open to the large number of UGA undergraduate and graduate students that are typically in residence at SREL during summer and semester breaks to conduct research, possibly lessening their need to repeatedly relocate to the Athens campus to fulfill the class requirements for their degrees. The PCs will be responsible for petitioning institutional approval and assignment of departmental course numbers and associated credit hours for the three remaining courses. The PCs will ensure that course descriptions are posted in each university's catalog, and that the course schedules are listed on each institution's extended academic calendar. Additional recruiting activities will include interacting with each department's Instruction Coordinator and attending graduate and undergraduate seminar courses to promote the ERP program by presenting a short seminar discussing the workforce challenges facing the nuclear industry.

Curriculum Review and Program Sustainability
Each course syllabus will be submitted to the appropriate College and/or Department of all participating universities for review and revision prior to initial class offerings. The course syllabus for the Environmental Geochemistry of Radionuclides class has already been approved by the UGA administration, and the instructional position to create the Radioecology class is in development. In accordance with university policy, a standardized confidential evaluation will be completed on-line by each student at the end of each session to obtain specific data regarding each course and instructor. A copy of the standard questionnaire is included in proposal Section C.

The course evaluations will be forwarded to the appropriate university college and department, and reviewed by the instructional team to address any deficiencies in subsequent course offerings. Evaluation of each class will also become a part of the instructor's annual performance review for tenure and promotion. Information regarding student internship and job placement will also be collected. At the end of the NRC funding period, a programmatic assessment will be conducted by UGA, USC, and USC-Aiken, to revise the instructional objectives, goals and learning outcomes (anticipated knowledge and skills derived from each course) for the continuation of the ERP program after NRC funding lapses. Recognizing the potential benefits of the ERP program and the limited resources required for it to continue, the primary collaborating departments have pledged to provide the required EFT to support the after initial NRC funding lapses (See attached support letters in Section G: University Support).

Course Descriptions

A brief syllabus is provided for each course, including a general course outline, class schedule, grading criteria, perquisites, and discussion of the innovative aspects designed to enhance student learning. Current and Pending Support materials are provided for the ERP collaborators in Section D, and two page CVs are provided in Section E.

Introduction to Radioecology: Environmental Behaviors of Radionuclides and the Effects of Radiation on Ecosystems (3 hrs)

UGA Course Listing: CRSS 4###, ECOL 4###, EHSC 4###

USC Course Listing: ENVR

USC-Aiken Course Listing: APHY

Instructors: Eric L. Peters1, J Vaun McArthur2 & I. Lehr Brisbin3 (Section E: Abbreviated CVs)

Instructor Contact Information:

1Professor of Ecology and
Environmental Science
Department of Biological Sciences
Chicago State University
9501 S. King Drive
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2SREL Professor
The University of Georgia
Drawer E, Aiken, SC 29802
803-725-5317
Email: mcarthur@srel.edu
3SREL Emeritus Professor
The University of Georgia
Drawer E, Aiken, SC 29802
(803) 725-5668
Email: brisbin@srel.edu

Course Description:

This course will be an introduction to the fates and effects of radionuclides (radioactive isotopes) and their environmental impacts. The topics will include: natural and anthropogenic sources of radionuclides, the modes of their dispersal, accumulation, and sequestration in the environment, the physical and biological factors influencing their uptake, accumulation, and elimination by biota, and the effects of environmental radioactivity on populations, communities and ecosystems.

Class Schedule and Grading:
This three-week class will consist of five two-hour classes per week with lectures on Mondays and Tuesdays, Case Studies on Wednesdays, a field trip or lab demonstration on Thursdays and discussions/exams on Fridays. Case study participation will comprise a large portion of the final grade. In addition, there will be one mid-term exam, a final exam, and a final group project. For this project, the students will undertake as a group an evaluation of a fictitious nuclear release. They will be expected to develop a preliminary response (e.g., the kinds of data to be collected and their priority) to the incident that will allow a characterization of the potential ecological effects and how they might be assessed and monitored over the long term.

Prerequisites:
General ecology course (or approval from instructor)

Course Innovation:
The case studies that will be presented illustrate the issues of radionuclide release across an increasing scale, both in terms of severity and complexity. The initial case study will involve a localized environmental release of 137Cs from a scrapped therapy source in Goiana, Brazil. The scenarios will progress through increasing levels of environmental impact, culminating in the catastrophic failure of the Chornobyl nuclear reactor in 1986 and its aftermath. The students will be expected to review these case histories, and be guided by the instructor in characterizing potential environmental and ecological impacts from these events.

The course will also include a field trip to Pond B of the Savannah River Site. This location has been extensively studied because it has experienced releases of radionuclides from SRS operations sufficient to allow easy measurement of radionuclides in the biota, but still low enough to permit a safe field experience. Onsite discussions will focus on the history of the site, the radioecological research that has occurred there, and the current and long-term management issues.

Preliminary Course Schedule:
Week 1:
Monday Introduction to radioecology: natural and anthropogenic sources of radionuclides
Tuesday Dispersion mechanisms of radionuclides in the environment
Wednesday Case Study 1 (release of 137CS from an irradiator in Goiana, Brazil) and Case Study 2 (partial core meltdown at Three Mile Island, Pennsylvania)
Thursday Pond B site visit
Friday Discussion/Review

Week 2:
Monday Biochemical properties of radionuclides
Tuesday Uptake, accumulation, and elimination of radionuclides by biota
Wednesday Case Study 3 (release of radionuclides from operations and after a fire at Sellafield/Windscale a commercial and weapons production facility in Great Britain) and Case Study 4 (comparison of nuclear weapons production at the Savannah River Site, USA and the Mayak complex, Russia)
Thursday Lab demonstration of radionuclide kinetics
Friday Mid-term Exam/Discussion

Week 3:
Monday Effects of radiation exposure in aquatic and terrestrial organisms

Tuesday Long-term determination of radiation effects

Wednesday Case Study 5 (explosion of a nuclear waste storage tank at Kyshtym, Russia) and Case Study 6 (the explosion, fire and core meltdown at the Chornobyl Nuclear Power Plant, Ukraine). A Case Study response to a hypothetical nuclear accident will be assigned.

Thursday Implications of future nuclear activities

Friday Final Exam/Course Evaluation

Class References:
Literature references used in developing class materials are listed in the Cited References at
the end of the Project Description (Section C).

Genotoxicology: Genetic Effects of Radiation and Other Environmental Mutagens (3 hrs)
UGA Course listing: ECOL 4###, EHSC 4###, CRSS 4###
USC Course listing: ENVR
USC-Aiken Course Listing: APHY
Instructors: Stacey L. Lance & Tracey D. Tuberville (Section E: Abbreviated CVs)
Instructor Contact Information

Savannah River Ecology Laboratory
The University of Georgia
Drawer E, Aiken, SC 29802
Lance: (803) 725-0988; lancestacey@gmail.com
Tuberville: (803) 725-5757; tracey.tuberville@gmail.com

Genotoxicology Course Description:
The goal of this course is provide students with an in-depth knowledge concerning the genetic effects of radiation and other environmental mutagens. Topics to be covered include: the molecular mechanisms of mutation and mutation repair, biomarkers and biomonitoring, genomic instability, transgenerational effects, and individual susceptibility. In addition to gaining a strong background in genotoxicology, students will learn to 1) interpret and evaluate genetic information from the current literature, 2) use genotoxicity assays and determine their appropriate application in research, 3) understand genetic risk assessment and how data from genetic assays are extrapolated to human health risk. Throughout the class, students will gain hands on experience with genotoxicology assays by conducting a laboratory project using DNA microsatellite loci to directly measure mutation rates in a model organism, the medaka fish, experimentally exposed to chronic low dose radiation.

Class Schedule and Grading:
This three-week class will consist of five two-hour classes per week with lectures on Mondays and Wednesdays, lab/lecture on Tuesdays and Thursdays, and discussions/exams on Fridays. Lecture and laboratory participation will comprise a large portion of the final grade. In

addition, there will be one mid-term exam, a final exam, and a group project. For the project students will be expected to propose a relevant study addressing the genetic effects of radiation in a model organism. The study must make use of genetic assays discussed in class and incorporate a detailed experimental design and discussion of how their potential results could be extrapolated to human genetic risk assessment.

Prerequisites:
Introductory Genetics

Genotoxicology Course Innovation:

This course will make use of two facilities present at SREL on the SRS: the Low-Dose Irradiation Facility (LoDIF) and the DNA laboratory. During the first lab session students will tour the LoDIF and learn about the medaka fish as a model organism. The LoDIF is a one-of-a kind facility consisting of 40 outdoor mesocosms equipped with 137Cs irradiation sources designed to provide three different biologically relevant exposure levels for use in evaluating the long-term impact of chronic low-level radiation exposure. Medaka fish have been studied at the Lo-Dif for 7 years and previous studies at SREL demonstrated that offspring from irradiated male medaka parents have elevated mutation frequencies relative to unirradiated controls. At present the medaka colony is being used to examine the transgenerational effects of radiation exposure and the colony is on its 6th generation of exposure. Students in this class will be directly involved in measuring mutation rates in medaka from the ongoing study. Students will spend two days per week working in the SREL DNA laboratory where they will learn how to extract DNA, genotype microsatellite loci, and measure mutation rates. Students will use high throughput
DNA technologies including ABI 96-well thermocyclers and an ABI 3130 automated sequencer, and GeneMapper software to analyze microsatellites.

Genotoxicology Course Schedule:

Week 1:
Monday Introduction/review of DNA structure & biochemistry
Tuesday Trip to LoDIF facility/ Introduction to Medaka as a model organism
Wednesday DNA damage & repair; DNA adducts & mutations
Thursday DNA extraction of Medaka samples/Intro to biomarkers
Friday Discussion

Week 2:
Monday Radiation and mutagenesis
Tuesday PCR of microsatellite loci in Medaka/Biomonitoring
Wednesday Epigenetics, carcinogenesis & cell cycle
Thursday Computer analysis of PCR genotyping results/identification of mutations
Friday Exam/Discussion

Week 3:
Monday Transgenerational effects, susceptibility & polymorphisms
Tuesday Data analysis: measuring mutation rates, experimental design, and extrapolation of data from genetic assays to human genotoxicological risk
Wednesday Genomics & the future of assessing molecular effects of environmental mutagens
Thursday Implications of mutations to population genetics, adaptation, & evolution
Friday Final Exam

5.2.6 Genotoxicology References:
This class will rely upon primary literature. Literature references used in developing class materials are listed in the Cited References at the end of the Project Description (Section C).

Environmental Geochemistry of Radionuclides (3 hrs)
UGA Course Listing: CRSS 4###, ECOL 4###, EHSC 4###
USC Course Listing: ENVR
USC-Aiken Course Listing: APHY
Instructor(s): G. Geidel1 and J.C. Seaman2 (Section E: Abbreviated CVs)
Instructor Contact Information:
1Assistant Dir. School of the Environment
Department of Geological Sciences
University of South Carolina
Columbia, SC 29208
803-777-5340
Email: geidel@environ.sc.edu
2SREL Acting Associate Director
The University of Georgia
Drawer E, Aiken, SC 29802
803-725-0977
Email: seaman@srel.edu

Course Description:
Participants will develop a fundamental understanding of environmental speciation and mass transport of radioactive elements relevant to energy and nuclear weapons production; the disposition of waste derived from nuclear materials processing; the environmental impact of current and future generation nuclear reactor designs; nuclear fuel reprocessing techniques (open vs. closed fuel cycles); and the design and development of both short- and long-term radioactive waste treatment/containment strategies (extraction, vitrification, etc.). Class discussion and computer problem sets will focus both on longstanding empirical methods of estimating exposure hazard and predicting radionuclide behavior in the environment, and more recent mechanistic approaches as applied to remedial action design and the responsible protection of the environment and public health. In addition to the transuranics (Pu, Np, etc.), significant lecture time will be reserved for radionuclides of particular academic and environmental importance, e.g., 3H, 137Cs, 90Sr, 99Tc, and 222Rn.

Class Schedule and Grading:
The geochemistry class will consist of 12-13 two-hour lecture periods, with 2-3 lecture periods reserved for class tours. A series of problem sets, generally computer modeling exercises illustrating concepts discussed in lecture or introduced during the class field trips, will be assigned periodically with some time at the end of each lecture period devoted to the modeling exercises sets. Students will be encouraged to work together on the problem assignments. Computers and the required public domain software (i.e., MINTEQA2, STANMOD, PHREEQC, HYDRUS1D, RESRAD, etc.) or proprietary software (i.e., HP1, Geochemists Workbench, etc.) will be available. Modeling exercises will focus on the impact of variable chemical conditions on radionuclide speciation and partitioning rather than becoming proficient with a specific hydro-geochemical software package. Given the complexity of the subject matter, the last lecture period of the week will be dedicated to a review of introduced concepts and problem assignments for the week. A half-hour exam will be given at the end of each class week. Each exam will be worth approximately 25% of the grade, with class

participation and problem assignments accounting for the final 25%.

Prerequisites:
Chem I and II, Calculus I and II, Biol I, Introductory Soil Science or Geochemistry, or approval from instructor

Course Innovation:
In addition to class lectures and computer modeling exercises, a minimum of two SRSbased field trips will be included in the curriculum. A trip to the SRS General Separations Area will be used to illustrate various aspects associated with low-level nuclear waste disposal and the fate and transport of various waste-derived radionuclides in the environment. The tour will include the Old-Rad Waste Burial Grounds, the capped F- & H-Area seepage basins, the deactivated pump-and-treat remediation system, the in situ pH adjustment remediation system, and the contaminated seepage outcrops (i.e., F- and H-area tree kill zones) along a tributary to the Savannah River. The second field trip will be a tour of the SRS Mixed Oxide (MOX) Fuel Fabrication Facility currently under construction. Field trip manuals will be developed to document each destination and augment class discussion.

Preliminary Course Schedule:
Week 1:
Monday Introduction to Radiochemistry: Sources and Types of Radioactivity (α, β, γ decay and fission); Thermodynamics and Chemical Equilibria

Tuesday Thermodynamics and Chemical Equilibria (contd.); Chemical Kinetics; Redox Reactions

Wednesday Tour: SRS Mixed Oxide (MOX) Fuel Fabrication Facility
Thursday Uranium Geochemistry and Decay Series (238U: 230Th, 226Ra, 222Rn), U Mining and Extraction; U Mine Tailings; Co-contaminant
Problem Set 1: Aqueous-Phase U Speciation: pe, pH and pCO2

Friday Weekly Lecture Review; Exam 1

Week 2:
Monday Reactive Surfaces (clays, oxides, zeolites, NOM, etc.)
Tuesday Solute Partitioning: Empirical (e.g., Langmuir, Freundlich, *Kd*, etc.) vs Mechanistic Descriptions (e.g., SCM)
Problem Set 2: Solute Partitioning
Wednesday Tour: SRS General Separations Area: Old Rad Waste Burial Ground, Capped F- & H-Area Seepage Basins and down-gradient tree-kill areas, Mixed-Waste Management Facility (MWMF) (Tour references Greenwood et al., 1990; Hitchcock et al., 2005; Seaman et al., 2007)
Thursday Flow and Transport Processes: Dispersion, Partitioning, and Decay
Problem Set 3: Conservative and Reactive Solute Transport-Distinguishing Chemical and Physical Transport Processes
Friday Weekly Lecture Review; Exam 2

Week 3:
Monday Flow and Transport Processes (Contd.)
Problem Set 4: Multi-Component Transport Simulation

Tuesday Closed (239Pu and 235U recovery) vs Open Nuclear Fuel Cycle; Purex Recovery Technology
Wednesday Tour: Virgil C. Summer Nuclear Station, SCE&G
Thursday Short- and Long-Term Nuclear Waste Issues
Friday Class Review; Comprehensive Final Exam

Class References:
Literature references used in developing class materials are listed in the Cited References at the end of the Project Description (Section C).

Radiation Protection and Safety Training (3 hrs)
UGA Course Listing: CRSS 4###, ECOL 4###, EHSC 4###
USC Course Listing: ENVR
USC-Aiken Course Listing: APHY
Instructor(s): N. Miller1 and D. Mosser2 (Section E: Abbreviated CVs)
Instructor Contact Information:
1Physics and Chem Dept. USC-Aiken
2Environmental Health and Safety
Manager
Savannah River Ecology Laboratory
The University of Georgia
Drawer E, Aiken, SC 29802
803-725-0063, Email: mosser@srel.edu

Course Description:
The objective of this course is to provide students with an introduction to the fundamentals of ionizing radiation protection and safety. The course curriculum combines radiation safety and protection topics derived from the International Atomic Energy Agency (IAEA) Standard Syllabus, and radiological protection and control programs as administered by the NRC and the DOE. Topics to be covered include: basic nuclear physics; radiological units, quantities, and measurements; the biological effects of ionizing radiation; detection of radiation; ALARA principles; protective measures and controls; exposure monitoring; regulatory controls and requirements for radiological work. The understanding of these principles will be reinforced through hands-on laboratory exercises. Additionally, students will be provided with tours of radiation protection training, detection, monitoring, and calibration facilities located on DOE's SRS.

Class Schedule and Grading:
The Radiation Protection class will consist of 15 two-hour class periods divided among 11 lecture periods, 3 hands-on lab exercises, and 2 class tours. A half-hour exam will be given each week. Each exam will be worth approximately 25% of the grade, with class participation and lab assignments accounting for the final 25%.

Prerequisites:
Chem I and II, or approval from instructor

Preliminary Course Schedule:
Week 1:
Monday Radiological Fundamentals
Tuesday Radiological Fundamentals (cont.)
Wednesday Radiological Quantities and Measurements
Thursday Tour: SRS Radiological Calibration and Monitoring Facilities
Friday Lab Exercise: Radiation Detection

Week 2:
Monday Biological Effects of Ionizing Radiation
Tuesday Radiation Exposure Limits and Control Levels
Wednesday ALARA Principles
Thursday Lab Exercise: Time, Distance, Shielding
Friday Exposure Monitoring Programs and Occupational Exposure Protection

Week 3:
Monday Regulatory Control of Radiological Work
Tuesday Radioactive Contamination Control
Wednesday Tour: SRS Radiological Worker Training and Certification Facilities
Thursday Lab Exercise: Simulated hands-on radiological work in a laboratory setting
Friday Comprehensive Final Exam

Class References:
Literature references used in developing class materials are listed in the Cited References at the end of the Project Description (Section C).

Environmental Radiation Protection: Career Development Seminar (1 hr)
UGA Course Listing: CRSS 4###, ECOL 4###, EHSC 4###
USC Course Listing: ENVR
USC-Aiken Course Listing: APHY
Instructor(s): J.C. Seaman1 and J. Singer2, and A.M. Zimeri3 (Section E: Abbreviated CVs)
Instructor Contact Information:
1Assistant Director
Savannah River Ecology Laboratory
The University of Georgia
Drawer E, Aiken, SC 29802
803-725-0977, Email: seaman@srel.edu
2Savannah River Ecology Laboratory
The University of Georgia
Drawer E, Aiken, SC 29802
Email: jsinger@srel.edu
3Environmental Health Sciences Dept.
College of Public Health
The University of Georgia

Course Description:
The ERP Seminar will consist of a series of one-hour interactive presentations related to professional development, most of which will include presentations from SRNL researchers, visiting scientists from other academic institutions, federal and state regulators, and SRS site

contractors with "real world" experience relevant to the nuclear industry.

Class Schedule and Grading:
This class will consist of 15 one-hour seminar periods. Grades will be based on attendance and participation in class discussions.

Prerequisites:
None

Course Innovation:
Eventually, the ERP seminar will be tied in with student intern recruiting efforts through participants from SRNS and the nuclear industry. A two-page CV (Section E) and letter of support (Section G) are provided for each of the speakers scheduled to date.

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 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 this URL to the Office of Management and Budget Cost Circulars is included for reference to:
A-21 (now 2 CFR 220)
A-87 (now 2 CFR 225)
A-122 (now 2 CFR 230
A-102:

http://www.whitehouse.gov/omb/circulars_index-ffm

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.

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 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

§ 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 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 VI 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 VI, 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's 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 should 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, 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. § 215.40-48
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 must be in accordance with the Grantee's Travel Regulations or the US Government Travel Policy and Regulations at: www.gsa.gov/federaltravelregulation and the per diem rates set forth at: www.gsa.gov/perdiem, absent Grantee's travel regulation. Travel costs for the grant must be consistent with provisions as established in Appendix A to 2 CFR 220 (J.53). All other travel, domestic or international, must not increase the total estimated award amount.

Domestic Travel:
Domestic travel is an appropriate charge to this award and prior authorization for specific trips are not required, if the trip is identified in the Grantee's approved program description and approved budget. Domestic trips not stated in the approved budget require the written prior approval of the Grants Officer, and must not increase the total estimated award amount.

All common carrier travel reimbursable hereunder shall be via the least expensive class rates consistent with achieving the objective of the travel and in accordance with the Grantee's policies and practices. Travel by first-class travel is not authorized unless prior approval is obtained from the Grants Officer.

International Travel:
International travel requires PRIOR written approval by the Project Officer and the Grants Officer, even if the international travel is stated in the approved program description and the approved budget.

The Grantee shall comply with the provisions of the Fly American Act (49 USC 40118) as implemented through 41 CFR 301-10.131 through 301-10.143.

Property and Equipment Management Standards
Property and equipment standards of this award shall follow provisions as established in 2 CFR 215.30-37.

Procurement Standards
Procurement standards of this award shall follow provisions as established in 2 CFR 215.40-48

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 and retain title 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 for this award shall follow OCOI requirements set forth in Section 170A of the Atomic Energy Act of 1954, as amended, and provisions set forth at 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 an intra-agency Appeal Board to review a grantee appeal of an agency action, if required, which will consist of the program office director, the Deputy Director of Office of Administration, and the Office of General Counsel.

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 215.60-62,

Monitoring and Reporting § 215.50-53

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 or deducted from the total project cost allowable cost as directed by the Grants Officer or the terms and conditions of award.
- Budget Revision – 2 CFR 215.25
    - The Grantee is required to report deviations from the approved budget and program descriptions in accordance with 2 CFR 215.25,and request prior written approval from the Program Officer and the Grants Officer.
    - The Grantee is not authorized to rebudget between direct costs and indirect costs without written approval of the Grants Officer.
    - The Grantee is authorized to transfer funds among direct cost categories up to a cumulative 10 percent of the total approved budget. The Grantee is not allowed to transfer funds if the transfer would cause any Federal appropriation to be used for purposes other than those consistent with the original intent of the appropriation.
    - Allowable Costs – 2 CFR 215.27

b. **Federal Financial Reports**

The Grantee shall submit a "Federal Financial Report" (SF-425) on a quarterly basis for the periods ending March 31, June 30, September 30, and December 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 is due within 90 days after expiration of the award. The report should be submitted electronically to: Grants_FFR@NRC.GOV. ***(NOTE: There is an underscore between Grants and FFR).***

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 should 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 may 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 on a semi-annual basis unless otherwise authorized by the Grants Officer. Performance reports should be sent to the Program Officer at the email address indicated in Block 12 of the Notice of Award, and to Grants Officer at: Grants_PPR.Resource@NRC.GOV. ***(NOTE: There is an underscore between Grants and PPR).***

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.

c. The Office of Human Resources requires the submission of the semi-annual progress report on the SF-PPR, SF-PPR-B, and the SF-PPR-E forms. The submission for the six month period ending March 31st is due by April 30th, or any portion thereof. The submission for the six month period ending September 30th is due by October 31st or any portion thereof.

d. Grant Performance Metrics:

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

As part of the FY 2010 HR 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:

Curriculum Development Awards

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.

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 Leadership of Reducing Text Messaging While Driving

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

Federal Employee Expenses

Federal agencies are 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."

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

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

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

Award Term

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

Reporting Subawards and Executive Compensation.

a. *Reporting of first-tier subawards.*

1. *Applicability.* Unless you are exempt as provided in paragraph d. of this award term, you must report each action that obligates $25,000 or more in Federal funds that does not include Recovery funds (as defined in section 1512(a)(2) of the American Recovery and Reinvestment Act of 2009, Pub. L. 111–5) for a subaward to an entity (see definitions in paragraph e. of this award term).

2. *Where and when to report.*

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

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

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

b. *Reporting Total Compensation of Recipient Executives.*

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

i. the total Federal funding authorized to date under this award is $25,000 or more;

ii. in the preceding fiscal year, you received—

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

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

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

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

i. As part of your registration profile at *http://www.ccr.gov.*

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

c. *Reporting of Total Compensation of Subrecipient Executives.*

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

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

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

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

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

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

i. To the recipient.

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

d. *Exemptions*

If, in the previous tax year, you had gross income, from all sources, under $300,000, you are exempt from the requirements to report:

i. Subawards,

and

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

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

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

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

ii. A foreign public entity;

iii. A domestic or foreign nonprofit organization;

iv. A domestic or foreign for-profit organization;

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

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

3. *Subaward:*

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

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

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

4. *Subrecipient* means an entity that:

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

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

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

i. *Salary and bonus.*

ii. *Awards of stock, stock options, and stock appreciation rights.* Use the dollar amount recognized for financial statement reporting purposes with respect to the fiscal year in

accordance with the Statement of Financial Accounting Standards No. 123 (Revised 2004) (FAS 123R), Shared Based Payments.

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

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

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

vi. Other compensation, if the aggregate value of all such other compensation (e.g. severance, termination payments, value of life insurance paid on behalf of the employee, perquisites or property) for the executive exceeds $10,000.