Grant and Cooperative Agreement

CHOOSE ONE:
- ☐ COOPERATIVE AGREEMENT
- ☒ GRANT

CHOOSE ONE: ☒ EDUCATION ☐ FACILITIES ☐ RESEARCH ☐ SDCR ☐ TRAINING

1. GRANT/COOPERATIVE AGREEMENT NUMBER	2. SUPPLEMENT NUMBER	3. EFFECTIVE DATE	4. COMPLETION DATE
NRC-HQ-84-14-G-0034	M0003	07/01/2016	

5. ISSUED TO
NAME/ADDRESS OF RECIPIENT (No., Street, City/County, State, Zip)
COLORADO STATE UNIVERSITY
601 S HOWES ST
FORT COLLINS CO 805212807

6. ISSUED BY U.S. NRC - HQ
Mailing Address: Acquisition Management Division
Mail Stop: 3WFN-05-C64MP
Washington DC 20555-0001

7. TAXPAYER IDENTIFICATION NO. (TIN)

8. COMMERCIAL & GOVERNMENT ENTITY (CAGE) NO.

9. PRINCIPAL INVESTIGATOR/ORGANIZATION'S PROJECT OR PROGRAM MGR. (*Name & Phone*)
Program A: Dr. Alexander Brandl; 970-491-2292
Program B: Dr. Thomas Johnson; 970-491-0563

10. RESEARCH, PROJECT OR PROGRAM TITLE
SEE SCHEDULE

11. PURPOSE
SEE SCHEDULE

12. PERIOD OF PERFORMANCE (*Approximately*)
08/01/2014 through 06/30/2020

13A.	AWARD HISTORY	13B.	FUNDING HISTORY
PREVIOUS	$387,844.00	PREVIOUS	$387,844.00
THIS ACTION	$400,000.00	THIS ACTION	$400,000.00
CASH SHARE	$0.00	TOTAL	$787,844.00
NON-CASH SHARE	$0.00		
RECIPIENT SHARE	$21,800.00		
TOTAL	$787,844.00		

14. ACCOUNTING AND APPROPRIATION DATA
See Schedule

PURCHASE REQUEST NO.	JOB ORDER NO.	AMOUNT	STATUS
See Schedule			

15. POINTS OF CONTACT

	NAME	MAIL STOP	TELEPHONE	E-MAIL ADDRESS
TECHNICAL OFFICER	NANCY V. HEBRON-ISREAL	3WFN/3A12	301-287-0718	Nancy.Hebron-Isreal@nrc.gov
NEGOTIATOR				
ADMINISTRATOR	M'LITA R. CARR		(301) 415-6869	MLITA.CARR@nrc.gov
PAYMENTS				

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

17. APPLICABLE STATEMENT(S), IF CHECKED:
- ☐ NO CHANGE IS MADE TO EXISTING PROVISIONS
- ☐ FDP TERMS AND CONDITIONS AND THE AGENCY-SPECIFIC REQUIREMENTS APPLY TO THIS GRANT

18. APPLICABLE ENCLOSURE(S), IF CHECKED:
- ☐ PROVISIONS ☐ SPECIAL CONDITIONS
- ☐ REQUIRED PUBLICATIONS AND REPORTS

UNITED STATES OF AMERICA		COOPERATIVE AGREEMENT RECIPIENT	
CONTRACTING/GRANT OFFICER: ERIKA EAM	DATE: 6/29/2016	AUTHORIZED REPRESENTATIVE: David B. Doty, Associate Director, Sponsored Programs	DATE: 7/19/16

TEMPLATE - ADM001

SUNSI REVIEW COMPLETE

JUL 25 2016

ADM002

ATTACHMENT A - SCHEDULE

A.1 PURPOSE OF GRANT

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

1. Program A: Colorado State University Health Physics Fellowship Program
2. Program B: Colorado State University Radiochemistry Fellowship

A.2 PERIOD OF GRANT

The effective date of the grant programs is:

Program A: Colorado State University Health Physics Fellowship Program. The effective date of this program is August 1, 2014. The estimated completion date of this program is July 31, 2018. Funds obligated hereunder are available for program expenditures for the estimated period: August 1, 2014 through July 31, 2018.

Program B: Colorado State University Radiochemistry Fellowship. The effective date of this program is July 1, 2016. The estimated completion date of this program is June 30, 2020. Funds obligated hereunder are available for program expenditures for the estimated period: July 1, 2016 through June 30, 2020.

A.3 BUDGET

Revisions to the budget shall be made in accordance with revisions of Grant Budget in accordance with 2 CFR § 200.308. All travel must be in accordance with Colorado State University travel regulations or the U.S. Government Travel Policy absent Recipient's travel regulations.

Program A:

1. Total Estimated NRC Amount:	$387,844.00
2. Total Obligated Amount:	$387,844.00
3. Cost-Sharing Amount:	$ 21,800.00
4. Activity Title:	Colorado State University Health Physics Fellowship Program
5. NRC Project Officer:	Nancy Hebron-Isreal
6. DUNS No.:	785979618
7. Principal Investigator:	Dr. Alexander Brandl

	Year 1	Year 2	Year 3	Year 4
Personnel	$ 5,709.00	$ 5,937.00	$ 6,176.00	$ 6,423.00
Fringe	$ 1,320.00	$ 1,392.00	$ 1,468.00	$ 1,548.00
Travel	$ 6,000.00	$ 6,000.00	$ 6,000.00	$ 6,000.00
Supplies	$ 8,500.00	$ 6,500.00	$ 8,500.00	$ 6,500.00
Tuition	$ 67,350.00	$ 69,244.00	$ 71,212.00	$ 73,262.00
Total Direct Cost	$ 88,879.00	$ 89,073.00	$ 93,356.00	$ 93,733.00
Indirect Cost	$ 5,510.00	$ 5,526.00	$ 5,868.00	$ 5,889.00
Total	$ 94,389.00	$ 94,599.00	$ 99,224.00	$ 99,623.00

educational experience. This will include teleconferences with NRC program administrators and resource staff as necessary and ensuring all program requirements are met. Colorado State University (CSU) will provide fellowship support to recipients who successfully compete in a selection process satisfying NRC-developed guidelines. Recipients must be United States citizens maintaining full-time graduate student status at CSU. This fellowship program will allow us to attract excellent students that might not otherwise attend CSU.

Describe the proposed program including the number and size of the fellowships.

NRC
Fellowship
Goals

During the next four years, the goals of the fellowship program in Health Physics will be to:

1. Provide tuition support for four graduate students over the duration of the grant period.
2. Enhance the current ABET-accredited curriculum to meet the challenges and changing responsibilities of health physicists in the 21st Century, such as renewed uranium mining in the western United States, new enrichment facilities, and construction of new reactors.
3. Extend current collaborations for practicum studies and summer internships to include the NRC, commercial nuclear power plants, and other fuel cycle facilities currently active in the region and throughout the USA (see Table 1).

Table 1. Sites that have hosted internship students in cooperation with CSU

Facility	Company	HP Activity	Supervisor
ISL Uranium Mine	Uranium One	Uranium Mining	Donna Wichers
Palo Verde Nuclear Station	Arizona Public Service Company	Power Reactor	Thomas Gray
TRIGA Reactor	USGS	Nuclear Reactor	Timothy Debey
Catawba Nuclear Station	Duke Energy	Power Reactor	Timothy Wright
Consulting	SENES Consulting	Consulting Fuel Cycle	Stephen Brown
Los Alamos National Laboratory	LANL	National Security	Joseph Bianconi

The NRC fellowship program at CSU will be used to support four Masters of Science (M.S.) students in Health Physics over the next four years. Since our health physics masters program is designed to be completed in two years, we will start two students in the program during Year 01. They will graduate at the conclusion of Year 02 of the program. Two more students will start in Year 03 with an expected graduation date at the end of the project duration.

CSU has previously been awarded similar fellowship grants (NRC-38-07-701 and NRC-38-10-951). In the course of the previous program period from 2010 to 2014, the CSU Radiation Protection and Measurement (Health Physics) Section and the CSU Department of Environmental and Radiological Health Sciences were able to leverage NRC funding to fully support one and partially support two students

in addition to the students budgeted in the grant. All supported students successfully graduated within the CSU recommended M.S. degree program duration and have all been successfully employed as health physicists in regulatory and industry positions.

Previous NRC fellowship program grants at CSU fully or partially supported a total of nine students. All previous graduates or current graduating students supported by an NRC fellowship have entered or have accepted positions in the health physics field. David Adams is currently working for SENES, a uranium mining consulting company, and Matthew Kaspar is with the National Nuclear Security Administration. Nicole Martinez will join the Health Physics faculty at Clemson University this spring, Jessica Gillis has accepted a position at Los Alamos National Laboratory, Derek Bailey with the Colorado Department of Public Health and Environment, and Dayton McMillan will start at the National Institutes of Health Radiation Epidemiology Branch.

CSU is recognized as one of the premier, ABET-accredited health physics/radiation protection graduate training programs in the country. The CSU Health Physics program has been in place for over 40 years, with our graduates holding leadership positions in the NRC (including alumni George Kuzo, Audrey Hays, and Margaret Cervera) as well as in other regulatory agencies.

The CSU health physics program was fully accredited by ABET in 2007 and has recently been re-accredited through 2020. As a result of the ABET accreditation process, the entire program is critically examined on a continuous basis and has focused on practical applications of health physics. The technical content of the CSU health physics program is exceptional. Our ABET External Advisory Board represents nuclear reactors, mining and milling operations, consulting experts, and the federal government and national laboratories. They review the content of our program annually, and provide suggestions for potential improvement and guidance on the direction of the entire health physics curriculum.

The CSU Health Physics M.S. program requirements include classes such as Radiological Physics and Dosimetry, Radiobiology, and laboratory classes. The program is unique in also offering classes in Radiochemistry and Radioecology in addition to the required curriculum. Recently developed electives in statistical methods in Health Physics and Monte Carlo modeling provide valuable additional training in relevant health physics disciplines.

One of the desired outcomes of our program is to have graduates successfully complete the Certified Health Physicist (CHP) exam. Certification represents a significant milestone in a health physicist's career, and demonstrates a level of expertise important to the commercial and academic marketplace. Our program has been tremendously successful in recent years in preparing our students for this comprehensive professional examination. Of our 35 recent graduates and current students, 23 have passed Part I or Part II (or both) of the CHP exam in the last four years, a passing percentage well above the national average.

A unique opportunity for our students is that they assist in developing and teaching an on-line CHP review class every spring semester. This affords them experience in teaching, as well as developing on-line instructional and informational materials.

The students also benefit from those interactions with professionals enrolled in the CHP review class, building valuable government and industry contacts while re-enforcing the practical aspects of the M.S. program.

Describe the recruitment activities and specific marketing strategies designed to attract a large and diverse pool of applicants.

The Health Physics recruiting program is not static. We are constantly evaluating our current practices and seeking new means of attracting superior students that are representative of the population of the United States. We have undertaken specific recruiting activities in addition to the university and college activities, including but are not limited to:

1. Health physics faculty and graduate students visit and give presentations at local high schools (e.g., Fort Collins High School, Poudre High School, Loveland Classical School, and Resurrection Christian School) and undergraduate programs in other area colleges (e.g., University of Northern Colorado, Air Force Academy) to increase awareness of our program and discuss graduate school opportunities in health physics. Additional outreach activities involved regional youth associations, such as Colorado Boy Scout Troops.

2. CSU has been reserving a booth at the Health Physics Society Annual Meeting for several years and also hosts an alumni reception at this meeting. We have been able to solicit valuable referrals for our program through our extensive alumni network.

3. CSU has initiated the first on-line CHP review class in the country. This class has served to increase awareness of our health physics program, resulting in referrals, and disseminating information about the outstanding opportunities that are available for graduate studies in health physics at CSU.

4. CSU and the College have provided a new and innovative internet environment to support external relations and recruiting. The health physics program website (http://csu-cvmbs.colostate.edu/academics/erhs/Pages/Health-Physics.aspx) has also benefitted from these developments and has received significant attention from the faculty sponsors to maintain an attractive and current status. Our website has been the single most important factor in attracting new applicants to our program.

5. Several years ago, CSU implemented a "Track III" program to identify outstanding students as undergraduates, and to provide a means for these students to obtain both their B.S. and M.S. degrees in five years. Several highly qualified undergraduate students have taken this opportunity and received their M.S. degree in Health Physics through this program. Three of these students received funding through the previous NRC fellowship grant.

CSU is a part of the Colorado Louis Stokes Alliance for Minority Participation (CO-AMP). The purpose of this program is to attract and prepare minority population students for careers in Science, Technology, Engineering, and Mathematics (STEM).

Within the College of Veterinary Medicine and Biomedical Sciences (the home college for our department), the RADAR program (Recruitment, Advising, Diversity, and Retention) also seeks to increase student population diversity and the number of under-represented students in the departments.

Describe the selection process that will ensure the most qualified applicants are selected based on academic merit, with consideration given to financial need and the goal of promoting the participation of minorities and women and persons with disabilities.

CSU's entrance criterion for graduate study is a 3.0/4.0 cumulative GPA from an accredited 4- year undergraduate institution. After this minimum requirement is met, the health physics faculty charged with student admission (Drs. Brandl, Johnson, and Steinhauser) carefully review all completed applications to ensure that pre-requisite classes, including calculus, general physics, biology, and chemistry, have been taken. We also examine the three letters of recommendation and the students' statements of purpose. The entire candidates' packages are evaluated, considering academic skills, work experience, financial need, and the overall qualifications of the candidate. Those who do not meet the pre-requisites, but are otherwise outstanding candidates, may take courses they lack concurrently with graduate coursework. Only the highest qualified candidates are selected for fellowships and support.

Recipients of fellowships are selected through a competitive process primarily on the basis of academic merit, with consideration given to financial need and the goal of promoting the participation of individuals identified in Sections 33 or 34 of the Science and Engineering Equal Opportunities Act (42 U.S.C. 1885a, 1885b).

CSU provides minority tracking for the health physics program. Currently, we have one minority student in the program (Hispanic); however, our program, over the years, has supported and trained several more minority students. More than 20% of the students supported on previous NRC fellowship program grants were minority students. Female enrollment in the program varies slightly on an annual basis; however, the average admission and graduation rates for female students in Health Physics at CSU are approximately 50%.

As a part of our ABET accreditation in health physics, we already have a method for monitoring and ensuring that adequate academic progress is made by each student in the program. Compliance monitoring in accordance with NRC guidelines is already in place based on our 2007 and 2010 NRC awards. Each advisor is required to meet with students at least once per semester to discuss their progress and GPA; this is documented in the student's portfolio. At this time, the faculty member ensures that the grade requirements of the NRC fellowship program have been met. The additional requirement for a 3.3/4.0 GPA has been easily accommodated within our already existing academic assessment system and was administratively added to the students who were awarded fellowships. The average GPA for students in the CSU health physics program is > 3.5/4.0. Semiannual progress reports will be submitted electronically to the NRC Project Manager, beginning six months after the project start date and coinciding with the end of each semester. Progress reports will detail activities that have occurred during the reporting period and that correspond with the fellowship goals and

objectives, and will provide specific research project-related information. During the final semester, the advisor will ensure that the student completes any appropriate NRC employment application paperwork.

Besides our documented and formal review of student progress, students typically meet weekly to informally discuss their progress with their advisor. Students are required to maintain a minimum course load of nine credit hours per semester to be considered full time students.

State the management structure and the capability for administering the program.

Dr. Alexander Brandl, CHP, will serve as director of the training program in Health Physics. He will be assisted by other Health Physics core faculty. These are experienced professionals with national and international reputations in their respective fields. A search for a new faculty member in Medical Physics is currently under way, and an enhancement of the radioecology specialization by a faculty member closely associated with Fukushima University in Japan is being discussed at the CSU administrative level. In addition to those directly associated with the core curriculum, there are numerous other members of the faculty that provide special lectures and serve on committees for graduate students in health physics. The breadth of knowledge and experience is unparalleled in radiological health sciences at peer institutions.

Identify an evaluation plan that will provide information on the effectiveness of the project in attracting, preparing and retaining individuals in nuclear careers.

Student tracking during graduate school is achieved as part of our existing ABET process, which requires a minimum of one meeting per semester. Our existing program also requires tracking students at two years and five years post-graduation using surveys. This process provides feedback to improve the program and to measure its impact in attracting, preparing, and retaining students in the health physics profession. It will also provide feedback into how well the fellowship program is meeting the needs of the NRC and how many students pursue a career in the field. The fellowship program will be considered successful if those students that are selected by the NRC for employment continue working for the NRC or NRC/Agreement State licensed or related facility beyond their obligatory years.

Provide a schedule of tuition fees and other pertinent costs for students.

All costs for students are detailed in the budget narrative and the attached fee schedule.

State whether or not these fellowships are contemplated as an integrated element of a State or regional strategic plan.

This fellowship program will be integrated with the Mountain and Plains Education and Research Center (MAP ERC). The MAP ERC is one of 17 regional Education and Research Centers funded by the Centers for Disease Control/National Institute for Occupational Safety & Health. As a Center within the Colorado School of Public Health Initiative, we share an established track record of commitment to training, research, and continuing education. The MAP ERC helps to

meet the occupational health education needs in the region, encompassing Colorado, New Mexico, Arizona, Montana, Wyoming, North Dakota, and Sound Dakota.

Health physics is an integral part of the MAP ERC long term strategic plan, with Drs. Johnson and Brandl serving in key positions in the MAP ERC. Five institutions – University of Colorado Denver, Colorado State University, National Jewish Medical and Research Center, Denver Health and Hospital Authority, and the University of New Mexico Health Sciences Center — have come together to provide graduate training, continuing education and outreach in the seven-state region in the area of occupational and environmental health and safety.

The MAP ERC has already demonstrated the strength of this collaboration by hosting numerous professional health physics meetings, including a Uranium Technical Symposium, aimed at educating the public on the health and environmental aspects of uranium mining and milling operations, and a National Nuclear Security Symposium on emerging threats to national security requiring health physics instrumentation research and dose assessment expertise. Additionally, the MAP ERC serves to expand the knowledge base of students. One of the major activities sponsored by the MAP ERC is to arrange for students from the health physics, industrial hygiene, epidemiology, occupational psychology, and occupational medicine programs to tour a uranium mill. We have visited an ISL uranium mine on several occasions (Smith Ranch). We have also featured female speakers in seminars that are open to the public, to provide scientific information on the nuclear fuel cycle to all. Notable speakers over the period of the current NRC fellowship grant included Ms. Kathryn Pryor, President of the Health Physics Society, Dr. John Boice, President of the National Council on Radiation Protection and Measurements, and Ms. Renate Czarwinski, formerly with the International Atomic Energy Agency and current President of the International Radiation Protection Association.

Long term, we expect the health physics portion of the regional alliance to contribute to the professional and public knowledge of radiation, uranium operations, and the nuclear fuel cycle.

State any arrangements with other non-Federal entities (State, local government or private), that provide additional support.

Institutions must require individual scholarship students to accept the NRC service agreement terms.

CSU and the Health Physics faculty are fully committed to ensuring the students' success in obtaining their graduate degree in health physics and providing our country with the well- qualified health physicists necessary to meet the demands of the 21st Century. All students will be obligated as delineated in the announcement regarding NRC employment. Suitable pre- fellowship contracts have been developed for previous fellowship programs at CSU and will be signed by student fellows prior to their entry into the program.

Program B: Colorado State University Radiochemistry Fellowship
Principal Investigator: Dr. Thomas Johnson

PROGRAM DESCRIPTION

The Environmental Radiochemistry Program is a concentration within the Radiation Protection and Measurement section and the ABET-accredited Health Physics program at Colorado State University (CSU). The Principal Investigator (PI) has overall responsibility for the administration of the institutional award, the management of the project, and interactions with the Nuclear Regulatory Commission (NRC). The PI and Dr. Sudowe, who will be joining the CSU faculty in May 2016, will directly advise the Environmental Radiochemistry fellowship recipients to ensure that the program achieves the desired goals and the students receive their degrees and above all a superior educational experience in environmental radiochemistry that CSU has been long known to deliver.

CSU will provide fellowship support to four recipients who successfully compete in a selection process satisfying NRC-developed guidelines. Recipients must be United States citizens maintaining full-time graduate student status at CSU. This fellowship program will allow us to attract excellent students that might not otherwise attend CSU and to combat the national shortage of qualified students with training in radiochemistry.

A CSU Environmental Radiochemistry student was invited to work with the University of Tokyo (Dr. Katsumi Shozugawa) in 2014 taking samples from the Fukushima exclusion zone, and performing radiochemical analysis of the various samples. Through creative one time only funding, the student was supported in the project for a two month stay in Tokyo. The student has continued his research in the field of environmental radiochemistry with focus on the understudied radionuclides emitted from Fukushima Daiichi nuclear power station, again using one time only "creative" funding from various sources. Since most students at CSU concentrate in health physics, there is little funding available for opportunities of this type, even though the opportunity for research and learning is unprecedented. Lack of funding for students concentrating in environmental radiochemistry research is a major shortfall of the CSU Radiation Protection and Measurements program, although multiple opportunities to perform environmental radiochemistry research exist.

History of Radiochemistry at CSU

The first class in Radiochemistry at CSU was initiated by Dr. Robert Thompson, from the Department of Chemistry, in 1964. In 1965, Dr. Robert Waters was hired to teach Radiochemistry and Radiation Chemistry, two separate classes. The laboratory portion of the classes was taught by Dr. Janet Johnson. Dr. Ed Powers taught the Radiochemistry class for 1974 and Dr. Janet Johnson taught the Radiation Chemistry class that year, while continuing to teach both associated lab classes. In 1975 Dr. James Johnson took over the teaching of both classes, until 1979, with Dr. Janet Johnson continuing to teach the labs. Dr. Shawki Ibrahim was hired in 1980 to teach radiochemistry classes and labs, which he did until his retirement in 2012. Dr. Georg Steinhauser taught both classroom and laboratory radiochemistry classes until his departure in fall of 2015. Dr. Ralf Sudowe was rapidly recruited to assume radiochemistry responsibilities starting in May 2016. Dr. Ibrahim had established Radiochemistry as its own formal specialty in the Radiation Protection and Measurements section in 2002, and it has remained a specialty since that time. CSU's

radiochemistry faculty and students have participated in the following projects: Monitoring of fallout from nuclear weapons testing from 1964 until present; Radioanalytical measurements for Rocky Flats (1965-1974, and during litigation from approximately 1992 to 2010); Responsible for all effluent monitoring of Saint Vrain nuclear power plant from pre-operational to cessation of critical operations; Uranium mill and mill tailings monitoring from 1968 to present.

Additionally, CSU has been a participant in the Radiochemistry Education Award Program (Department of Energy) from 2002 to 2006. Detection of radioactivity in soil, water, plants and animals from fallout in the environment was the initial focus of the program. Radiochemical analysis of effluents of uranium mines and tailings were then added to the research portfolio, with multiple student supported through this funding. Monitoring of the Fort Saint Vrain reactor effluent became a source of research and funding for students through the 1980's and early 1990's. One of the largest and most interesting radiochemistry projects initiated by CSU was the determination of off-site plutonium concentrations in soils from the Rocky Flats site. Multiple students utilized this opportunity to focus their studies on radiochemistry, and have gone on to have careers in environmental radiochemistry with the DOE, EPA, and USGS, such as Dr. David McCurdy.

The environmental radiochemistry program at CSU is now known both nationally and internationally for its holistic research, teaching and work on the Fukushima nuclear accident. The PI has strong, established contacts with Japan, in particular the University of Tokyo and Fukushima University. Dr. Sudowe has strong ties to the national laboratory complex as well as the EPA. The environmental radiochemisty program is *strongly supported* by the CSU administration and faculty as evidenced by their recent (January 2016) hire of Dr. Ralf Sudowe as a tenured associate professor to administer the program.

Describe the proposed program including the number and size of the fellowships.

NRC Fellowship Goals

During the next four years, the goals of the fellowship program in Environmental Radiochemistry will be to address this problem by the following actions:

1. Provide tuition support and stipend to two graduate students per year.
2. Enhance the current curriculum to meet the challenges and changing responsibilities of environmental radiochemistry in the 21st century, in particular emergency response to nuclear accidents, nuclear forensics and Fukushima-related research.
3. Extend current collaborations for practicum studies, research visits and summer internships to include collaborations in the USA and with our partner, Fukushima University, in Japan.

The NRC Environmental Radiochemistry fellowship program at CSU will be used to support four Masters of Science (MS) students and/or PhD students concentrating in Environmental Radiochemistry over the next four years. We will start two MS or PhD students in the program during Year 01. The MS students will graduate at the conclusion of Year 02 of the program and two additional MS students will be started for year 03. PhD students will be funded until graduation, which is typically 3 years, whereupon additional graduate students will be started.

CSU has previously been awarded similar fellowship grants (NRC-38-07-701, NRC-38-10- 951, and NRC-HQ-84-14-G-0034). In the course of the previous program period from 2010 to 2014, the CSU Radiation Protection and Measurement (Health Physics) Section and the CSU Department of Environmental and Radiological Health Sciences were able to leverage NRC funding to fully support 6 and partially support 8 students, and had only anticipated supporting 4 students. All supported students graduated and are successfully employed in their field.

National agencies have identified the problem that the USA is facing a crisis due to the aging of radiochemists and a lack of young academics in the nuclear field. The U.S. National Council on Radiation Protection and Measurements (NCRP) recently published an alarming statement, asking, "Where are the Radiation Professionals?" In their investigation of this "potential national crisis", the NCRP found evidence that the United States are on the verge of a severe – current and projected – shortfall of radiation professionals, which will "adversely affect the public health, radiation occupations, emergency preparedness and the environment." A previous study by the National Academy of Sciences came to the same conclusion and urged to train additional students in radiochemistry to make up for the ageing work force and the associated loss in institutional capabilities and knowledge.

Dr. Sudowe has a strong background in radiochemical method development for environmental monitoring, remediation, emergency response and nuclear forensics & safeguards and will work closely with students (upon his starting at CSU in May 2016). He has been associated with the Nuclear Science & Security Consortium that was established by the National Nuclear Security

Administration to develop a pipeline to replenish the workforce at the national laboratory. He also routinely gives guest lectures at the ACS Nuclear Chemistry Summer School, the Nuclear Forensics Undergraduate Summer School and the Fuel Cycle Chemistry Undergraduate Summer School. In addition Dr. Sudowe has also taught webinars on a variety of topics in radioanalytical chemistry through the National Analytical Monitoring Program.

Recruitment activities and specific marketing strategies designed to attract a large and diverse pool of applicants.

The Environmental Radiochemistry recruiting program is not static. We are constantly evaluating our current practices and seeking new means of attracting superior students that are representative of the population of the United States. We have undertaken specific recruiting activities in addition to the university and college activities, including but are not limited to:

1. Working directly with the faculty at Alcorn State University (an HBCU) to identify candidates to apply for CSU's graduate programs. We have had two students attend CSU in the past year from our efforts.
2. Environmental Radiochemistry/Radiation Protection and Management faculty and graduate students visit and give presentations at local high schools (e.g., Fort Collins High School, Poudre High School, Loveland Classical School, German School Fort Collins, and Resurrection Christian School) and undergraduate programs in other area colleges (e.g., University of Northern Colorado, Air Force Academy) to increase awareness of our program and discuss graduate school opportunities in environmental radiochemistry. Additional outreach activities involved regional youth associations, such as Colorado Boy Scout Troops.

3. We have been able to solicit valuable referrals for our program through our extensive alumni network.
4. CSU and the College have provided a new and innovative internet environment to support external relations and recruiting. Our website has been the single most important factor in attracting new applicants to our program.
5. Several years ago, CSU implemented a "Track III" program to identify outstanding students as undergraduates, and to provide a means for these students to obtain both their B.S. and
   M.S. degrees in five years. Several highly qualified undergraduate students have taken this opportunity and received their M.S. degree in Health Physics with a concentration in Environmental Radiochemistry through this program.

CSU is a part of the Colorado Louis Stokes Alliance for Minority Participation (CO-AMP). The purpose of this program is to attract and prepare minority population students for careers in Science, Technology, Engineering, and Mathematics (STEM). Within the College of Veterinary Medicine and Biomedical Sciences (the home college for our department), the RADAR program (Recruitment, Advising, Diversity, and Retention) also seeks to increase student population diversity and the number of under-represented students in the departments.

Describe the selection process that will ensure the most qualified applicants are selected based on academic merit, with consideration given to financial need and the goal of promoting the participation of minorities and women and persons with disabilities.

CSU's entrance criterion for graduate study is a 3.0/4.0 cumulative GPA from an accredited 4- year undergraduate institution. After this minimum requirement is met, the Radiation Protection and Measurements Section faculty charged with student admission (Drs. Sudowe, Brandl, and Johnson) carefully review all completed applications to ensure that pre-requisite classes, including calculus, general physics, biology, and chemistry, have been taken. We also examine the students' statements of purpose, as well as the three letters of recommendation, and occasionally contact the references personally. The entire candidates' packages are evaluated, considering academic skills, work experience, financial need, and the overall qualifications of the candidate. Those who do not meet the pre-requisites, but are otherwise outstanding candidates, may take courses they lack concurrently with graduate coursework. Only the highest qualified candidates are selected for fellowships and support.

Recipients of fellowships are selected through a competitive process primarily on the basis of academic merit, with consideration given to financial need and the goal of promoting the participation of individuals identified in Sections 33 or 34 of the Science and Engineering Equal Opportunities Act (42 U.S.C. 1885a, 1885b).

CSU provides minority tracking for the Radiation Protection and Measurement section, but we have been able to attract so few students to specialize in Environmental Radiochemistry (due to a lack of funding for this specialty) that no tracking is currently available in this area. Currently, we have three minority students in the Radiation Protection and Measurement section (African American and Pacific Islander); however, our program, over the years, has supported and trained several minority students.

As a part of our ABET accreditation in health physics, we already have a method for monitoring and ensuring that adequate academic progress is made by each student in the program. Compliance monitoring in accordance with NRC guidelines is already in place based on our 2007 and 2010 NRC awards for Health Physics Students. Each advisor is required to meet with students at least once per semester to discuss their progress and GPA; this is documented in the student's ABET portfolio. At this time, the faculty member ensures that the grade requirements of the NRC fellowship program have been met. The additional requirement for a 3.3/4.0 GPA has been easily accommodated within our already existing academic assessment system and was administratively added to the students who were awarded fellowships. The average GPA for students in the CSU Radiation Protection and Measurement section is > 3.5/4.0. Semiannual progress reports will be submitted electronically to the NRC Project Manager, beginning six months after the project start date and coinciding with the end of each semester. Progress reports will detail activities that have occurred during the reporting period and that correspond with the fellowship goals and objectives, and will provide specific research project- related information. During the final semester, the advisor will ensure that the student completes any appropriate NRC employment application paperwork.

Besides our documented and formal review of student progress, students typically meet weekly to informally discuss their progress with their advisor. Students are required to maintain a minimum course load of nine credit hours per semester to be considered full time students.

State the management structure and the capability for administering the program.

Dr. Johnson is currently the head of the Radiation Protection and Measurements Section that contains the Environmental Radiochemistry training program. Dr. Ralf Sudowe will serve as director of the training program in Environmental Radiochemistry as of his start date of May 2016. He will be assisted by other Radiation Protection and Measurement section core faculty. These are experienced professionals with national and international reputations in their respective fields. including Dr. Thomas Hinton, a radioecology specialist who joined the CSU faculty in 2015 and has a joint appointment with Fukushima University. In addition to those directly associated with the core curriculum, there are numerous other members of the faculty that provide special lectures and serve on committees for graduate students in Environmental Radiochemistry. The breadth of knowledge and experience is unparalleled in radiological health sciences at peer institutions.

Identify an evaluation plan that will provide information on the effectiveness of the project in attracting, preparing and retaining individuals in nuclear careers.

Student tracking during graduate school is achieved as part of our existing ABET process, which requires a minimum of one student meeting per semester. Our existing program also requires tracking students at two years and five years post-graduation using surveys. This process provides feedback to improve the program and to measure its impact in attracting, preparing, and retaining students in the radiochemistry profession. It will also provide feedback into how well the fellowship program is meeting the needs of the NRC and how many students pursue a career in the field. The fellowship program will be considered successful if students are hired and retained in health physics positions that support NRC or agreement state licensed activities beyond the obligatory years.

Provide a schedule of tuition fees and other pertinent costs for students.

Please find the costs for students in the budget narrative and the attached fee schedule.

State whether or not these fellowships are contemplated as an integrated element of a State or regional strategic plan.

This fellowship program will be integrated with the Mountain and Plains Education and Research Center (MAP ERC), which has been renewed recently. As a Center within the Colorado School of Public Health Initiative, we share an established track record of commitment to training, research, and continuing education.

The MAP ERC has already demonstrated the strength of this collaboration by hosting numerous professional radiochemistry/health physics meetings, including a Uranium Technical Symposium, aimed at educating the public on the health and environmental aspects of uranium mining and milling operations, and a National Nuclear Security Symposium on emerging threats to national security requiring radiochemistry expertise. Additionally, the MAP ERC serves to expand the knowledge base of students. One of the major activities sponsored by the MAP ERC is to arrange for students to tour a uranium mill and learn the radiochemical processes that occur on an industrial scale. We have visited an ISL uranium mine on several occasions (Smith Ranch) where again, we see radiochemistry applications. We have also featured multiple female speakers in seminars that are open to the public, to provide scientific information on the nuclear fuel cycle to all. Notable speakers over the past 3 years include Ms. Kathryn Pryor, President of the Health Physics Society, Dr. John Boice, President of the National Council on Radiation Protection and Measurements, and Ms. Renate Czarwinski, formerly with the International Atomic Energy Agency and current President of the International Radiation Protection Association.

Long term, we expect the environmental radiochemistry portion of the regional alliance to contribute to the professional and public knowledge of radiation, accident response, environmental fate and transport, uranium operations, and the nuclear fuel cycle.

State any arrangements with other non-Federal entities (State, local government or private), that provide additional support.

No additional support is available at this time, but we anticipate utilizing funds from this grant to assist in soliciting additional support from other institutions.

Institutions must require individual fellowship students to accept the NRC service agreement terms.

CSU and the Radiation Protection and Measurement section faculty are fully committed to ensuring the students' success in obtaining their graduate degree in Radiochemistry and providing our country with the well-qualified Environmental Radiochemists necessary to meet the demands of the 21st Century. All students will be obligated as delineated in the announcement regarding NRC employment. Suitable pre-fellowship contracts have been developed for previous fellowship programs at CSU and will be signed by student fellows prior to their entry into the program.

Attachment C - Standard Terms and Conditions

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

Preface

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

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

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

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

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

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

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

2. Award Package
The Recipient is obligated to conduct project oversight as may be appropriate, to manage the funds with prudence, and to comply with the provisions outlined in 2 CFR Part 200. Within this framework, the Principal Investigator (PI) named on the award face page, is responsible for the scientific or technical direction of the project and for preparation of the project performance reports. This award is funded on a cost-reimbursement basis, not to exceed the amount awarded as indicated on the face page, and is subject to a refund of unexpended grant funds to the NRC.
The non-Federal entity alone must be responsible, in accordance with good administrative practice and sound business judgment, for the settlement of all contractual and administrative issues arising out of procurements related to its grant

award. These issues include, but are not limited to, source evaluation, protests, disputes, and claims. These standards do not relieve the non-Federal entity of any financial or fiduciary responsibilities or obligations arising under its grant, including sub-contracts and sub-awards, or any other contractual or financial obligation. The Federal awarding agency will not substitute its judgment for that of the non-Federal entity unless the matter is primarily a Federal concern. Violations of law will be referred to the local, State, or Federal authority having proper jurisdiction. See 2 CFR § 200.318(k), General Procurement Standards.

Subawards

Appendix II to Part 200 Contract Provisions for Non-Federal Entity Contracts Under Federal Awards

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

Nondiscrimination

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

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

- Title VI of the Civil Rights Act of 1964 (42 U.S.C. §§ 2000d et seq.), which prohibits discrimination on the grounds of race, color, or national origin in any program or activity receiving federal financial assistance.
- Title IX of the Education Amendments of 1972 (20 U.S.C. §§ 1681 et seq.), which prohibits discrimination on the basis of sex in any education program or activity receiving federal financial assistance.
- Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. § 794), which prohibits discrimination on the basis of disability in any program or activity receiving federal financial assistance.
- The Age Discrimination Act of 1975, as amended (42 U.S.C. §§ 6101 et seq.), which prohibits discrimination on the basis of age in any program receiving federal financial assistance.
- The Americans with Disabilities Act of 1990 (42 U.S.C. §§ 12101 et seq.), which prohibits recipients from discriminating on the basis of disability in employment (Title I); State and local government services (Title II); and places of public accommodation and commercial facilities (Title III).
- Parts II and III of E.O. 11246, as amended by E.O.11375, 11478, 12086, 12107, 13279, 13665, and 13672, which prohibits federal contractors and federally assisted construction contractors and subcontractors, who do over $10,000 in Government business in one year, from discriminating in employment decisions on the basis of race, color, religion, sex, or national origin and requires that government contractors take affirmative action to ensure that equal opportunity is provided in all aspects of their employment.
- E.O.13166, "Improving Access to Services for Persons with Limited English Proficiency," which clarifies that national origin discrimination under Title VI includes discrimination on the basis of limited English proficiency (LEP) and requires that the recipient take reasonable steps to ensure that LEP persons have meaningful access to programs and activities.

- Any other applicable non-discrimination law(s).

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

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

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

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

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

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

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

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

(1) Are presently excluded or disqualified from covered transactions by any Federal department or agency;

(2) Have been convicted within the preceding three-year period preceding this proposal 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 the recipient's present responsibility;

(3) Are presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (1)(b); or

(4) Have had one or more public transactions (Federal, State, or local) terminated for cause or default within the preceding three years.

(5) The Recipient agrees that, unless authorized by the Grants Officer, it will not knowingly enter into any subaward or contracts under this grant/cooperative agreement with a person or entity that is not included on the System for Award Management (SAM) (https://www.sam.gov).

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

Debarment, Suspension, Ineligibility, and Voluntary Exclusion

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

Drug-Free Workplace

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

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

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

The Recipient must comply with E.O. 13224, Blocking Property and Prohibiting Transactions with Persons who Commit, Threaten to Commit, or Support Terrorism. Information about this Executive Order can be found at: Implementation of Executive Order 13224 Blocking Property and Prohibiting Transactions With Persons Who Commit, Threaten To Commit, or Support Terrorism amended by E.O. 13268, 13284, and 13372.

Procurement Standards - 2 CFR §§ 200.318-200.326
Sections 200.318 - 200.326 set forth standards for use by Recipients in establishing procedures for the procurement of supplies and other expendable property, equipment, real property and other services with Federal funds. These standards are furnished to ensure that such materials and services are obtained in an effective manner and in compliance with the provisions of applicable Federal statutes and executive orders. No additional procurement standards or requirements will be imposed by the Federal awarding agencies upon Recipients, unless specifically required by Federal statute, executive order, or approved by OMB.

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

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

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 Recipient'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 for the grant.

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 Recipient's policies and practices. Travel by first-class travel is not authorized unless prior approval is obtained, in writing, 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 Recipient will comply with the provisions of the Fly America Act (49 U.S.C 40118), as implemented at 41 CFR §§ 301-10.131 through 301-10.143.

Property Standards
Property standards of this award shall follow provisions as established 2 CFR §§ 200.310-200.316.

Intangible Property
Intangible and intellectual property of this award shall generally follow provisions established in 2 CFR § 200.315.

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

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

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

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

Record Retention and Access
Recipient shall follow established provisions in 2 CFR §§ 200.333-337.

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

Dispute Review Procedures

a. Any request for review of a notice of termination or other adverse decision should be addressed to the Grants Officer. It must be postmarked or transmitted electronically no later than 30 days after the postmarked date of such termination or adverse decision from the Grants Officer.

b. The request for review must contain a full statement of the Recipient's position and the pertinent facts and reasons in support of such position.

c. The Grants Officer will promptly acknowledge receipt of the request for review and shall forward it to the Director, Office of Acquisition Management Division, unless otherwise delegated, who shall appoint an intra-agency Appeal Board to review a recipient appeal of an agency action, if required, which will consist of the program office director, the Deputy Director of Office of Administration, and the Office of General Counsel.

d. Pending resolution of the request for review, the NRC may withhold or defer payments under the award during the review proceedings.

e. The review committee will request the Grants Officer who issued the notice of termination or adverse action to provide copies of all relevant background materials and documents. The committee may, at its discretion, invite representatives of the Recipient and the NRC program office to discuss pertinent issues and to submit such additional information as it deems appropriate. The chairman of the review committee will insure that all review activities or proceedings are adequately documented.

f. Based on its review, the committee will prepare its recommendation to the Director, Office of Administration, who will advise the parties concerned of his/her decision.

Remedies for Noncompliance
Termination of this award will follow provisions as established and described above in "Dispute Review Process" in 2 CFR §§ 200.338-342.

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

Recipient Financial Management systems must comply with the provisions in 2 CFR § 200.302.

- Payment – 2 CFR § 200.305
- Cost Share or Matching – 2 CFR § 200.306
  - Recipients are to be careful with providing excessive cost share or match since at the end of the grant, if the identified match has not been provided, then a portion of the federal share may be required to be returned to the Government.
- Program Income – 2 CFR § 200.307
  - Earned program income, if any, will be added to funds committed to the project by the NRC and Recipient and used to further eligible project or program objectives or be deducted from the total project cost for the grant, as directed by the Grants Officer or indicated in the terms and conditions of the award.

- Revision of Budget and Program Plans – 2 CFR § 200.308

- The Recipient is required to report deviations from the approved budget and program descriptions in accordance with – 2 CFR § 200.308(b) and request prior written approval from the Project Officer and the Grants Officer.
- The Recipient is not authorized to re-budget between direct costs and indirect costs without written prior approval of the Grants Officer.
- The Recipient is authorized to transfer funds among direct cost categories up to a cumulative 10 percent of the total approved budget. The Recipient is not allowed to transfer funds if the transfer would cause any Federal appropriation to be used for purposes other than those consistent with the original intent of the appropriation.
- Allowable Costs – 2 CFR §§ 200.403

- See section 2 CFR §§ 200.330-332 for Subrecipient Monitoring and Management.

FEDERAL FINANCIAL REPORTS

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

PERFORMANCE PROGRESS REPORTS

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

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

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

Period of Performance – 2 CFR § 200.309

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

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

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

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

II. Audit Requirements

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

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

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

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

III. Programmatic Requirements

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

Grant Performance Metrics

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

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

Fellowship Metrics:

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

2. How many students, supported by NRC funding, have received M.S. or equivalent degrees?
    a. Response is the number of students, for this reporting period and cumulative to the grant.

3. How many students, supported by NRC funding, have received Ph.D. or equivalent degrees?
    a. Response is the number of students, for this reporting period and cumulative to the grant.

4. How many students, supported by NRC funding, have accepted a job and are employed in the nuclear industry?
    a. Response is the number of students, for this reporting period and cumulative to the grant.

5. How many items have students produced, for example, Professional Journal articles, publications, patents, or conference reports?
    a. Response is the type and number of items, for this reporting period and cumulative to the grant.

As part of the PPR, include the following information for each student support under this award:

1. Student Name

2. Years of Support
3. Cumulative Support in Dollars
4. Estimated Graduation Date
5. Status
6. Up to date student contact information (mailing address, telephone/cell phone, email address) for students no longer participating in the program, i.e. transferred programs, graduated, withdrew, etc.
7. Up to date student contract information, for all students at time of grant expiration, i.e. Final PPR.

Examples of status could be:
"Employed in Nuclear Industry", if so, where;
"Looking for employment", if so, how long;
"Deferred due to continuing education", if so, what degree;
"Employed by Non-Nuclear", if so, where; and
"Dropped out of program"

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

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

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

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

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

IV. Additional Requirements

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

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

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

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

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

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

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

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

Minority Serving Institutions (MSIs) Initiative
Pursuant to E.O.s 13230 and 13270, amended by E.O. 13316 and 13385, 13532, 13592, 13555, 13515, and 13621, NRC is strongly committed to broadening the participation of MSIs in its financial assistance program. NRC's goals include achieving full participation of MSIs in order to advance the development of human potential, strengthen the Nation's capacity to provide high-quality education, and increase

opportunities for MSIs to participate in and benefit from Federal financial assistance programs. NRC encourages all applicants and Recipients to include meaningful participations of MSIs. Institutions eligible to be considered MSIs are listed on the Department of Education website: http://www.ed.gov/about/offices/list/ocr/edlite-minorityinst.html

Research Misconduct

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

Publications, Videos, and Acknowledgment of Sponsorship

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

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

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

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

> "...any grant, contract, or cooperative agreement provided or entered into by a Federal department or agency under which funds are to be provided to a private entity, in whole or in part, shall include a condition that authorizes the department or agency to terminate the grant, contract, or cooperative agreement, without penalty, if the recipient or any subrecipient, or the contractor or any subcontractor

(i) engages in severe forms of trafficking in persons or has procured a commercial sex act during the period of time that the grant, contract, or cooperative agreement is in effect, or (ii) uses forced labor in the performance of the grant, contract, or cooperative agreement." (See 22 U.S.C. §7104(g).)

EXECUTIVE COMPENSATION REPORTING

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

Reporting Subawards and Executive Compensation.

a. *Reporting of first-tier subawards.*

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

2. *Where and when to report.*

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

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

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

b. *Reporting Total Compensation of Recipient Executives.*

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

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

ii. in the preceding fiscal year, you received—

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

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

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

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

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

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

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

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

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

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

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

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

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

i. To the recipient.

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

d. *Exemptions*

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

i. Subawards,

and

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

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

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

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

ii. A foreign public entity;

iii. A domestic or foreign nonprofit organization;

iv. A domestic or foreign for-profit organization;

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

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

3. *Subaward:*

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

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

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

4. *Subrecipient* means an entity that:

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

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

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

i. *Salary and bonus.*

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

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

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

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

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