PROJECT ANNEX I

TO THE IMPLEMENTING AGREEMENT BETWEEN THE DEPARTMENT OF ENERGY OF THE UNITED STATES OF AMERICA AND THE DEPARTMENT OF ATOMIC ENERGY OF THE REPUBLIC OF INDIA FOR COOPERATION IN THE AREA OF ACCELERATOR AND PARTICLE DETECTOR RESEARCH AND DEVELOPMENT FOR DISCOVERY SCIENCE FOR HIGH INTENSITY PROTON ACCELERATORS

The Department of Atomic Energy of the Republic of India (DAE) and the Department of Energy of the United States of America (DOE), hereinafter referred to as the "Parties":

ACTING pursuant to Article 3 of the Implementing Agreement between the Department of Atomic Energy of the Republic of India and the Department of Energy of the United States of America for Cooperation in the Area of Accelerator and Particle Detector Research and Development for Discovery Science of July 19, 2011, hereinafter referred to as the "Implementing Agreement";

DESIRING to establish a framework for cooperation between DOE and DAE institutions in the United States and in India for High Intensity Superconducting Radio Frequency Linear Proton Accelerators, referred to as "HISPA", and collaboration among the researchers supported by DOE and DAE, respectively; and

EXPECTING that development of HISPA will support basic particle physics experiments and will offer opportunities for utilization of these accelerators in other basic research disciplines and applied areas such as medical and materials science for the advancement of science and technology in the Parties' countries,

Have agreed as follows:

Section 1 – Objective

A. The objective of this Project Annex is to establish the framework for specific collaboration, including research, design, development, and construction of HISPA in the Parties' respective countries. The expected participants in the collaboration are DOE and the DAE, national laboratories and universities in both countries, and other United States and Indian government and private industry organizations involved in HISPA and related technology development.

1. The DAE has proposed to build a HISPA as part of the Indian research and development program. In advance of this undertaking, the DAE would like to build two accelerators based on superconducting radio frequency technologies: a spallation neutron source and an injector linac for medical and industrial applications.

The objective of the DAE is to develop the technology for HISPA either independently or jointly with DOE.

2. DOE has proposed to build a multi-MW HISPA as part of a possible advanced accelerator project. Such a project would provide next generation accelerator capabilities to support DOE's High Energy Physics mission.

The objective of DOE would be to integrate the DAE in-kind contribution (Section 4.F., below) into a DOE HISPA project.

B. This Project Annex is subject to the terms and conditions of the Implementing Agreement, which is itself subject to the Agreement on Science and Technology Cooperation between the Government of the Republic of India and the Government of the United States of America of October 17, 2005 (the "S&T Agreement"). In the event of any conflict between the provisions of the S&T Agreement or the Implementing Agreement on the one hand and this Project Annex on the other hand, the provisions of the S&T Agreement and the Implementing Agreement shall govern.

Section 2 – Areas for Cooperation

Cooperation under this Project Annex may include, but is not limited to, the following areas:

A. Technical Cooperation

1. HISPA Design
2. High Intensity Particle Source
3. Radio Frequency Quadrupole
4. Superconducting Radio Frequency Cavities

5. Cavity Helium Vessel and Tuner
6. Radio Frequency Power
7. High Power Radio Frequency Coupler
8. Distribution, monitoring and control of High Power Radio Frequency
9. Normal and Superconducting Solenoid, Dipole and Quadrupole magnets
10. Beam Instrumentation
11. HISPA Control
12. Cryogenic Plant, distribution and control
13. HISPA utilities including electricity, water, vacuum
14. HISPA integration
15. Cryo-modules
16. Superconducting Radio Frequency Cavity Processing Facilities and Test Stands

B. Development of Technical Information

1. The Parties plan to develop, either independently or jointly, HISPA accelerator design and parameters, specifications and design tolerances of accelerator components, beam requirements, and HISPA infrastructure requirements, in conformance with applicable safety and building code standards.

2. The development of technical information is planned to be done within the framework of the Collaboration Governance Plan to be jointly developed by the Parties' Technical Coordinators and agreed by the Parties' Principal Coordinators.

C. Conditions on the Areas of Cooperation

1. Jointly-owned technical information, technologies and hardware can be shared between the Parties. The Parties shall exclude from their cooperation technologies or hardware whose transfer is restricted by the export control requirements of either the United States or India.

2. If either Party believes it is desirable to share export-controlled information associated with an activity listed in Section 2.A or 2.B above, the Parties shall consult with each other to ensure that their collaborative activities comply with the export control requirements of the exporting Party's country.

Section 3 – Participating Organizations

Each Party may invite other government agencies and organizations and private organizations in its country to participate in cooperative activities under this Project

Annex, at the participating organizations' own expense and subject to such terms and conditions as the Parties may specify.

Section 4 – Forms of Cooperation

Cooperative activities undertaken pursuant to this Project Annex may include, but are not limited to, the following:

A. Development and Exchange of Technical Information and Experiences, and Collaborative Visits

The Parties plan to develop, jointly or independently, technical design of the items listed in Section 2. Design and experience developed by the Parties under this Project Annex are to be exchanged. Parties are to arrange collaborative visits. These visits may address research and development programs for the items listed in Section 2.

B. HISPA Technology Development

The Parties plan to explore the need for demonstrations in order to show the technical and economic feasibility of the technologies in areas of cooperation set out in Section 2 of this Project Annex.

C. Ownership of Assets

1. All equipment purchased by the DAE for use in the Indian accelerator program shall be the property of the Government of India.

2. The Parties intend that all equipment sent to DAE by DOE as a part of their collaboration under this Project Annex shall become the property of the Government of India once it has been installed as a functional component of a DAE facility.

3. The Parties intend that all equipment sent to DOE by the DAE as a part of their collaboration under this Project Annex shall become the property of the United States Government once it has been installed as a functional component of a DOE facility.

D. Intellectual Property

1. Except as provided in paragraph D.2, the protection and allocation of intellectual property, and the treatment of business-confidential information, shall be governed by Annex I to the S&T Agreement.

2. The Parties may share or transfer jointly-owned intellectual property outside the territories of their respective countries only if, and to the extent, authorized by the export control restrictions of the exporting Party's country.

E. Professional Training

The Parties plan to explore the need to train their respective professionals in HISPA and supporting technologies.

F. Contributions from the Parties

1. The Parties intend to make in-kind contributions to each other's accelerator programs.

2. The HISPA design, technology, and supporting infrastructure knowledge transfers from DOE to the DAE are the planned in-kind contribution from the United States.

3. The engineering resources, design, manufacturing, and supply of HISPA accelerator hardware from the DAE to DOE, amounting to a maximum total of $200 million (direct cost in U.S. accounting in terms of 2012 US Dollars), are the planned in-kind contribution from India over the years 2013-2022.

    a. The maximum in-kind contribution from the DAE during the current Indian 12th plan (2012-2017) would be $US60 million allocated for HISPA research and development.

    b. After the joint (DAE-DOE) review of the progress made under India's 12th plan period, and if future HISPA projects receive the requisite approvals in both the United States and India, the DAE would make a maximum contribution from India's 13th plan of $US140 million in-kind to the DOE program under this Project Annex.

4. The itemized list and schedule of deliverables from both sides would be decided and agreed to by the Principal Coordinators.

Section 5 – Management

A. The Technical Coordinators designated pursuant to Article 4 of the Implementing Agreement shall jointly plan the technical approach for accomplishing the objective of this Project Annex, and shall be responsible for the collaborative program, schedule, and coordination. The Technical Coordinators shall also

make progress reports at the Principals' Coordination Meetings to be held at mutually agreed sites, preferably annually.

B. Each Party shall exercise due care of budget, schedule, safety and other applicable requirements in carrying out all the work under this Project Annex.

Section 6 – Entry into Force, Amendment, and Termination

A. This Project Annex shall enter into force upon signature by the Parties and remain in force so long as the Implementing Agreement remains in force.

B. This Project Annex may be amended by written agreement of the Parties, so long as the Implementing Agreement remains in force.

C. The Parties may terminate this Project Annex at any time by mutual consent in writing. Alternatively, a Party may terminate this Project Annex upon six (6) months advance notice in writing to the other Party.

DONE at Mumbai, in duplicate, this 6th day of Nov. 2014.

FOR THE DEPARTMENT OF ENERGY OF THE UNITED STATES OF AMERICA:

FOR THE DEPARTMENT OF ATOMIC ENERGY OF THE REPUBLIC OF INDIA:

make progress reports at the Principals' Coordination Meetings to be held at mutually agreed sites, preferably annually.

B. Each Party shall exercise due care of budget, schedule, safety and other applicable requirements in carrying out all the work under this Project Annex.

Section 6 – Entry into Force, Amendment, and Termination

A. This Project Annex shall enter into force upon signature by the Parties and remain in force so long as the Implementing Agreement remains in force.

B. This Project Annex may be amended by written agreement of the Parties, so long as the Implementing Agreement remains in force.

C. The Parties may terminate this Project Annex at any time by mutual consent in writing. Alternatively, a Party may terminate this Project Annex upon six (6) months advance notice in writing to the other Party.

DONE at Mumbai, in duplicate, this 6th day of Nov, 2014.

FOR THE DEPARTMENT OF ATOMIC ENERGY OF THE REPUBLIC OF INDIA:

FOR THE DEPARTMENT OF ENERGY OF THE UNITED STATES OF AMERICA: