SAFETY RESEARCH PROGRAMME

GOVERNMENT OF INDIA

ATOMIC ENERGY REGULATORY BOARD

MUMBAI

(2004)

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NIYAMAK BHAVAN
ANUSHAKTI NAGAR
MUMBAI-400 094
website : www.aerb.gov.in

(November 2004)

SAFETY RESEARCH PROGRAMME

The Atomic Energy Regulatory Board (AERB) was set up in November 1983 to carry out certain regulatory and safety functions in the field of radiation safety on a countrywide basis and industrial safety in all operations of the Department of Atomic Energy. One of the functions of AERB is to promote and fund research on reactor safety, radiation safety, front end and back end fuel cycle problems and industrial safety as part of its programme. AERB has also set-up Safety Research Institute (SRI) in February 1999 at Kalpakkam to carry out and promote safety related research and analysis in selected areas of relevance to regulatory decision making.

AERB AND ITS ADVISORY COMMITTEE

AERB has constituted a Committee for Safety Research Programme (CSRP) to frame rules, regulations and guidelines and to recommend, evaluate and monitor the research projects. The Committee also recommends financial assistance to universities, research organisations and professional associations for holding symposia and conferences of interest to AERB after scrutinising the applications from the organisations. The present membership of the committee is given in Annexure-I. The Committee normally meets thrice in a year.

Organisations seeking the support of AERB are expected to have the basic infrastructure needed to carry out such research projects. The facilities available may be suitably augmented to a limited extent with the help of research grants made by AERB. The organisations involved in such research projects could, on their own initiative, make special arrangements with other organisations for the use of any special research facilities that may be needed to supplement their own efforts. AERB does not get involved in making these arrangements.

RESEARCH PROJECTS

Eligibility

AERB funds for appropriate research projects will be made available to members of faculties of universities and other research organisations. Proposals from persons who apply in their individual capacity and not through organisations will not be considered. All applications for grants should be made through the Head of the Organisation in which the project is proposed to be carried out.

Tenure

The normal duration of a research scheme would be two to three years from the date of the issue of sanction. However, financial grants will be made on annual basis. The progress of the projects will be reviewed while renewal applications are considered. Approval for extensions upto six months can be given in consultation with the Chairman of the Committee. The tenure of the fellows attached to the project can be extended by three months after the terminal date of the project at the discretion of the Committee, for preparing the consolidated report.

Procedure for Applying

Ten copies of the application for research proposals for the year should be submitted to Member Secretary, Committee for Safety Research Programmes, Atomic Energy Regulatory Board, Niyamak Bhavan, Anushakti Nagar, Mumbai-400 094 in the format that is enclosed in Annexure-II on or before November 30. This is for funding in the ensuing financial year. At least one copy of the proposal sent to AERB should be endorsed by the Head of the Organisation in which the proposed work is to be carried out. The proposer and

the organisation in which the work will be carried out, will be required to accept the terms and conditions stated separately in Annexure-III. A statement to this effect as shown in Annexure-II has to be included when the request is made for an AERB grant. Applications for annual renewal of grants have to be submitted as per Annexure-IV.

The decision on proposed projects may be communicated to the concerned organisations by the first week of April.

Scrutiny of Applications

The proposals will be studied by the CSRP. The Committee may consult other experts as considered necessary and make recommendations to the Chairman, AERB.

Topics of Interest

A detailed list of the general topics of interest to AERB is given in Annexure-V. Investigations on topics related to (a) safety aspects of nuclear technology including civil and structural engineering (b) front end and back end fuel cycle problems (c) industrial safety in nuclear and allied installations and (d) safety aspects of radiation applications in agriculture, industry, medicine and research, will be considered for support.

Renewal of Projects

The investigator is expected to apply to the Board for renewal of the grant every year. Renewal is subject to satisfactory progress. The application for renewal in the prescribed format should be sent to the Member-Secretary, CSRP by November 30, for obtaining the grant for the next financial year.

The progress during the first year is likely to be modest in view of the time taken to recruit fellows and to procure equipment. However, the investigator must send the renewal application promptly to ensure continuation of support to the project.

Consolidated Terminal Reports

Every investigator must submit five copies of a consolidated terminal report within three months of the terminal date of the project to the Member Secretary of CSRP. The consolidated report should be a self-contained complete document and not a compilation of papers published. The report must contain information as shown in Annexure-VI. Two copies of all the papers published/submitted for publication based on work done under the AERB project should also be sent along with this report.

Components of Research Grants

Basically, AERB will fund the research project for items such as equipment, consumables, stipends for staff exclusively employed for the project, and computation charges and other contingencies that may be required to complete the project successfully. Only those items including equipment, which are essential for carrying out the project effectively and expeditiously are granted by AERB. Travel grants may also be provided from contingencies in cases where there is a well-defined requirement. Grants for foreign travel will not be provided. No part of the project funds can be diverted for this purpose. No payments are made to the Principal Investigator and additional members of the faculty who may be working as co-investigators. The categories of staff granted under the project are separately indicated in the sanction. The mode of their selection is explained in Annexure-III under terms and conditions.

CONFERENCES, SYMPOSIA AND WORKSHOPS

The investigator should present and discuss the results of all research and development work in conferences. This is essential to promote science and technology. AERB extends financial support to organisations and institutes to organise seminars, workshops, conferences or symposia on safety-related topics. These meetings encourage interaction among scientists and promote interdisciplinary contacts; an essential factor in promoting radiological, industrial and nuclear safety. Publication from these meetings is easily available all over the country to a wider section of professionals.

AERB Form 'A' in Annexure-VII should be submitted by the conveners of national/international meetings, conferences, seminars, symposia and workshops to get AERB funding. Support is generally extended in the form of co-sponsorship with other agencies. The requests for support should reach the Member Secretary, CSRP by December 31 for anticipatory support for the subsequent financial year.

AERB funding is subject to the following conditions:

1. Two representatives from AERB, as communicated by Member-Secretary, CSRP will be allowed to attend the meeting free of charge.

2. A copy of the proceedings of the meeting must be supplied free of charge to AERB Library.

3. Utilisation certificate / audited statement of accounts should be submitted to Accounts Section of AERB with a copy to Member-Secretary, CSRP AERB, shortly after completion of the project.

Annexure-I

MEMBERSHIP OF THE AERB COMMITTEE ON SAFETY RESEARCH PROGRAMME (CSRP)

1.	Shri S.L. Kati Formerly Member, Atomic Energy Commission G-104. Hrushikesh, Apna Ghar Unit no.1, Co-op. Housing Society Swami Samarth Nagar, Andheri (W) Mumbai-400 052	…	Chairman
2.	Shri S.K. Chande Vice Chairman Atomic Energy Regulatory Board Mumbai-400 094	…	Member
3.	Shri H.S. Kushwaha Director, Health, Safety & Environment Group Bhabha Atomic Research Centre, Trombay, Mumbai-400 085	…	Member
4.	Shri S.G. Ghadge Associate Director (TH&PL) Nuclear Power Corporation of India Limited Mumbai-400 094	…	Member
5.	Prof. Tarun Kant Department of Civil Engineering Indian Institute of Technology, Mumbai-400 076.	…	Member
6.	Shri P.K. Wattal Back End Technology Development Division Bhabha Atomic Research Centre Mumbai-400 085	…	Member
7.	Dr. Om Pal Singh Secretary, AERB and Director, Information & Technical Services Division Atomic Energy Regulatory Board Mumbai-400 094	…	Member
8.	Dr. A.N. Nandakumar Head, Radiological Safety Division Atomic Energy Regulatory Board Mumbai-400 094	…	Member
9.	Shri A. Ramakrishna Safety Analysis & Documentation Division Atomic Energy Regulatory Board Mumbai-400 094	…	Member Secretary

Annexure-II

Government of India
Atomic Energy Regulatory Board
Safety Research Programme

Date:

FORMAT FOR APPLICATION FOR GRANT-IN-AID FOR NEW RESEARCH PROJECT

(Please send 10 copies to Member-Secretary, Committee for Safety Research Programmes, Atomic Energy Regulatory Board, Niyamak Bhavan, Anushakti Nagar, Mumbai-400 094)

1. (a) Title of the Project :

(b) Duration of the Project :

2. Project Personnel

(a) Principal Investigator

(Name) : (Designation) :

Academic Qualifications :

Date of Birth :

Previous Research Experience :

Percentage of Time to be Spent on the Project :

Recent Publications
(Within the last 5 years. Include earlier publications only if relevant to present proposal)

(i) In refereed journals (Journals in which original articles are published) :

(ii) Others :

(b) Co-investigators

Name, Designation and Affiliation	Academic Qualifications	Date of Birth

Previous Research Experience :

Percentage of Time to be Spent on the Project :

Recent Publications

(Within the last 5 years. Include earlier publications only if relevant to present proposal)

(i) In refereed journals :

(ii) Others :

(c) Details of Research Fellows/Associates, if any, supported by agencies such as DAE, CSIR etc. who are not recruited under this project but will participate in the project work :

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3. Is the Principal Investigator/Co-investigator likely to go abroad? If yes, what is the duration ? :

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4. (a) Name and Address of the Organisation :

(b) Department where Research is to be performed :

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5. (a) Name, Designation and Address of the Person with whom formal correspondence in respect of this Research Scheme is to be conducted :

(b) Telephone No. :

(c) Fax No. :

(d) E-mail Address :

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6. Scientific Background of the Project

(a) Importance of the Problem :

(b) Related Work already Performed or in Progress at your Organisation :

(c) Similar/Related Work in Progress or already Performed at other places in India or Abroad :

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7. (a) Scientific Scope of the Research Scheme

(b) Detailed Work Plan for First year, indicating Proposed Methods/Techniques to be used.

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8. List facilities available in your Organisation (equipment, material, etc.) presently available, which would be used for the Project.

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9. Details of Projects already negotiated by the Principal Investigator and Co-investigator with any Funding Agency, including AERB.

(a) All projects submitted in last 3 years, indicating agency to which submitted.

(b) Projects currently under negotiation by Principal Investigator/Co-investigator with agencies for which decision is awaited.

(c) Projects currently being conducted by the Principal Investigator/Co-investigator.

10. Budget Estimate for the First Year of the Project

(a) Staff Salary

Project Personnel Recruited for the Project

Personnel	Estimated Cost (Rs.)

(b) Equipment

(c) Consumables

(Give a list of items)

(d) Contingencies

(e) Computer Charges (if any)

(f) Overheads

Total:

11. Project funding (indicate as a %)

(a) Amount to be contributed by the Organisation ..... %

(b) Amount expected from Other Sources (Name of the Sources and Items) ..... %

(c) Amount requested from AERB for this Project ..... %

l2. If the Project requires more than one year to complete, please give estimate of funds required for each year.

Year	Salaries	Equipment Rs.	Consumables Rs.	Contingencies Rs.	Computer Charges Rs.	Total Rs.	Requested from AERB Rs.
1st							
2nd							
3rd							

Certificate

The terms and conditions of the grant-in-aid are acceptable to us and all facilities of the organisation will be available for conducting this research scheme.

Signature of the
Principal Investigator

Name

Designation

Date

Seal of the Principal Investigator

Signature of the
Head of the Organisation

Name

Designation

Date

Seal of the Organisation

Annexure - III

Government of India
Atomic Energy Regulatory Board
Safety Research Programme

TERMS AND CONDITIONS OF GRANT-IN-AID FOR AERB SPONSORED RESEARCH PROJECTS

1. Sanctioning of Project

The Atomic Energy Regulatory Board (AERB) will issue a formal sanction for the entire period of the Project indicating, inter alia, the details of the amount of grant-in-aid for the first year and approximate anticipated amounts for subsequent years. The terms and conditions under which the grant-in-aid would be paid, will be communicated as soon as the recommendations of the Committee for Safety Research Programmes (CSRP) are accepted.

2. Payment of Grant-in-Aid

2.1 While the Project is generally expected to receive support for about two to three years, the amount will be sanctioned and released only for one year at a time. Grant for the first year will be paid in full to the principal investigator directly on receipt of the bill in duplicate in relevant Claim Form enclosed with the terms and conditions. The investigator must ensure that this reaches the Member-Secretary, CSRP, Atomic Energy Regulatory Board, Niyamak Bhavan, Anushakti Nagar, Mumbai-400 094.

2.2 If the duration of the project is more than two years, the grant from the second year onwards (but not for the last year) will be released after evaluating the renewal application and only after receipt of the bill in duplicate in the prescribed Claim Form along with the statement of accounts signed by the Accountant of the Institute.

2.3 For the final year of the Project, the grant will be released in two instalments. First instalment to the extent of 50 % of the grant sanctioned for the year will be released on receipt of the bill in duplicate in relevant Claim Form along with the statement of accounts signed by the Accountant of the Institute. The remaining 50 % of grant for the final year will be paid on submission of the final statement of accounts audited by a Chartered Accountant/Statutory Auditor. The final report can be submitted within three months after completion of the project. It may be noted that it will not be possible for the Board to release funds for the project unless the claims in the prescribed form duly supported by the appropriate documents mentioned above are submitted to the Board.

2.4 Final claim supported by the audited statement of accounts may be submitted along with the consolidated report of the project within three months from the date of termination of the project. If the claims are not received within the stipulated period, it is presumed that the investigator has no further claim. An inventory of equipment referred to in para 6.3 below should also be enclosed.

3. Appointment of Staff

3.1 The staff sanctioned for AERB Research Project should be appointed on the basis of personal interviews. Selection should be in accordance with the recruitment procedure of the institute concerned. An appropriate selection committee should be constituted locally for the purpose by the Institute/University. A representative of the Board should be included in the Selection Committee for recruitment of Research Fellow(s) and Research

Associate(s). The Member-Secretary, CSRP should be contacted for the nomination of a representative of the Board in the Selection Committee and the Committee meeting should be arranged in consultation with this representative.

3.2 To ensure continuity of work, staff appointed in the project should be required to serve for a minimum period of one year. A copy of the appointment order and joining report of the staff should be sent to the Member-Secretary, CSRP.

3.3 Details about the Research Fellowships

3.3.1 The value of Research Fellowship of the Board is as given below:

Sl. No.	Type of Fellowship	Qualifications	Rate (per month)
1.	Junior Research Fellow (JRF)	M.Sc./BE/B.Tech./B.VSc/B.Pharm.	Rs. 8,000 for 1st and 2nd years. Rs. 9,000 for subsequent years.
2.	Senior Research Fellow (SRF)	M.Tech/M.E./M.VSc./M.Pharm/M.B.B.S./BDS M.Sc./B.Tech with two years research experience	Rs. 9,500 for 1st and 2nd years. Rs.10,000 for subsequent years.
3.	Research Associate (RA)	**Category-I (RA-I)** Ph.D in Science / MD **or** M.Tech/M.E./M.VSc/M.Pharm/M.B.B.S./BDS with 2 years experience.	Rs. 10,000
		Category-II (RA-II) Ph.D in Science / MD **or** M.Tech/M.E./M.VSc/M.Pharm/M.B.B.S./BDS with 2 years experience and possessing exceptional academic record.	Rs. 11,500
		Category-III (RA-III) Ph.D in Engineering **or** As in RA-II and selected through interviews under specific DAE Schemes such as KSKRA, etc	Rs. 12,000
4.	Research Scientists (RS)	RS: M.Sc. qualification with sufficient number of years of experience in the relevant field.	Rs. 8000-275-13500
		Ph.D. with three years experience in the grade of SO/SC level.	Rs. 10000-325-15200
		Minimum of four years service in the grade of SO/SD level.	Rs. 12000-375-16500
Note: (1) The Associateship will depend upon the assessment of their academic achievements and research capability. (2) Upward revision of Fellowships and Associateships is undertaken from time to time.			

3.3.2 The local institute will review after two years whether JRF/SRF should continue for the third year and a certificate may be sent to AERB to this effect. Similarly, at the end of the third year, the institute should review the cases to decide whether the extension for another year should be given.

3.3.3 **House Rent Allowance (HRA), Medical Allowances (MA):** HRA & MA may be allowed to all the categories of Fellowships, i.e, JRF/SRF/RA/RS, as per the rules of the institute in which they are working. For this purpose, the Fellowship amount for JRF/SRF/RA/RS may be taken as Basic Pay. However, House Rent Allowance will not be admissible if hostel accommodation is provided. HRA & MA, as admissible, may be claimed separately by furnishing a copy of the order regulating these allowances as per the rules of the respective organisation along with such claims.

3.3.4 **Leave:** Under this, JRF/SRF are eligible only for Casual Leave while Research Associates / Scientists are entitled to leave facilities as per rules of the institutes. However, participation by any of these categories in any scientific event in India or abroad will be treated as on duty. Maternity leave as per Government of India instructions would be available in all categories.

3.3.5. **DA and CCA:** JRF, SRF and RA will not be entitled to these allowances. RS will get DA as per Central Government and CCA as per rules of the local institute where they are working.

3.3.6 **Encouragement for pursuing higher degrees:** SRF/JRF may be encouraged to register for higher degrees and the tuition fees to undertake such studies may be reimbursed to them from the contingency grant sanctioned under the project grant.

3.3.7 **Benefits to Host Organisation:** Towards meeting their costs for overhead expenses including infrastructural facilities, an amount of,

(i) 15%, if the total cost with an upper limit of Rs. 6 lakh for educational institutes and Rs. 2 lakh for laboratories and institute under Science & Technology agencies / departments, will be provided as part of the project; and

(ii) on projects costing more than Rs. 50 lakh, the quantum will be decided on a case to case basis.

3.3.8 Bonus and Leave Travel Concession (LTC) are not admissible to any category.

3.4 The members of the staff appointed on the research projects are, for all practical purpose, to be treated as employees of and subject to the administrative control of the Organisation where the project is carried out.

3.5 The staff employed on the Research Project financed by AERB may be encouraged to give lectures and/or courses restricted to not more than two hours duration per week in the Institute where the project is located. Such permission may be granted by the Principal Investigator of the project in consultation with the Head of the Organisation.

3.6 Staff appointed for AERB research project may be allowed to utilise the contingency grant to meet travel expenses in connection with the work of the projects or for attending symposia, etc. at the rates admissible to regular employees of the Organisation concerned, subject to the following conditions.

(i) The journey should have the approval of the Principal Investigator.

(ii) The grant for contingencies could be utilised only for payment of Travelling Allowance and Dearness Allowance to the staff employed on the research project.

(iii) The expenditure involved will not result in any excess over the amount provided under sub-head “contingencies” and no additional funds will be provided on this account.

3.7 (i) The JRF and SRF appointed for the project will not be eligible for next higher scale of pay unless they complete 2 years in the project.

(ii) Persons doing course work may not be appointed in the project as JRF or SRF, except where the course work is mandatory for obtaining a degree by research.

4. Contingency

The Contingency Grant could also be utilised for the following.

(i) To buy any urgently required laboratory items for the project.

(ii) To meet the travel expenditure of the investigator(s) and staff engaged on the project for attending symposia relevant to the project. This is at the discretion of the Principal Investigator.

(iii) Towards payment of honorarium for visiting scientists to give lectures which have direct bearing on the project work and tuition fees and registration fees for Ph.D.

(iv) Towards purchase of apparatus, reprints connected with the work, purchase of stationery and fees for the audit of project accounts upto a maximum of Rs. 500/- per year.

(v) The Principal Investigator can utilise the Contingency Grant per annum for any purpose indicated in this para without getting the prior approval of the Board subject to the condition that a consolidated account is rendered at the end of the year. The Investigator should inform the Board if he intends to go abroad. He should also indicate the name of the person who will carry on the research programme in his absence.

5. Overheads

This amount is meant for partly meeting the cost of administering the Project. This will be the amount claimed by Principal Investigator subject to a maximum of 15 % of the Project Cost excluding Contingency.

6. Equipment and Stores

6.1 All the major items of equipment are indicated in the sanction letter. Only such items of equipment, as have been sanctioned by the Board should be purchased by the Institute out of the grant sanctioned as Equipment Grant. In case any change in the equipment (item or cost) is considered essential, prior approval is required. This should be obtained before the purchase of such equipment by writing to the Member Secretary of CSRP. The Board does not assume financial responsibility for any equipment purchased without their prior approval. In no case should the organisation purchase items like air conditioners, refrigerators, exhaust fans, furniture, typewriters, etc., out of the grant sanctioned for the project.

6.2 All the major equipments purchased against AERB projects will be the property of the Board and is subject to verification.

6.3 The University/Institute should maintain a proper and separate stock register of all items of equipment and stores, both capital and consumables purchased out of AERB grant. Equipment purchase should be marked either with a metal disc or painted boldly with the letters AERB. All equipment should be serially numbered. An inventory of equipment and consumables purchased out of AERB grants, should be sent to the Board immediately after the close of the financial year in the following proforma to the Member Secretary, CSRP.

AERB Inventory No.	Date of Purchase	Description of the Equipment	Name of the Supplier	Price Paid (Including Taxes)	Remarks, if any

A. Capital Equipment

. . . . . .

B. Consumables

. . . . . .

6.4 All equipment purchased by the Institute/University for work on the Research Project remains the property of the Board and is required to be returned to Board after the termination of the Project. The Board may however consider the question of allowing the Institute/University to retain the same on payment of suitable price to be mutually agreed upon. The Board has also the right to transfer the equipment to another Project after the termination of the Project or in case of unsatisfactory performance of the Project.

7. Audited Reports by Comptroller and Auditor General of India

The accounts of the Institute in receipt of grant-in-aid in excess of Rs. 1.00 lakh per annum will be subject to a test check by the Comptroller and Auditor General of India at his discretion.

8. Renewal Application

The Principal Investigator of the Project should submit renewal application on the Project each year. Ten copies of the Report are required to be submitted not later than November 30 to the Member-Secretary of CSRP. Application received late is not likely to be considered and this will adversely affect the renewal of the Grant-in-Aid.

9. Publication of Papers

The following procedure has been laid down for the publication of papers on the work done under AERB Research Programmes.

The researchers are free to publish their findings in journals of their choice. They must send copies of the manuscripts to AERB. AERB's financial support to the project must be acknowledged in the publication. The responsibilities for the contents of the publication is exclusively that of the author/authors.

10. Patent Rights

All patent rights on design and inventions derived from the research work financed or aided by AERB shall belong to the Government of India or its nominees. The Board may, at its discretion, allow any benefit thereof to be retained by the Inventor or may direct that some benefit thereof be given to the inventor.

Annexure - III

REQUEST FOR RELEASE OF GRANT-IN-AID

(First Instalment)

CLAIM FORM I

(YEAR : 20 - 20)

(To be filled and submitted in duplicate)

To
The Member-Secretary
Committee for Safety Research Programmes
Atomic Energy Regulatory Board,
Niyamak Bhavan, Anushakti Nagar,
Mumbai 400 094.

Title of the Research Project :

Sanction letter No. and date :

Name of the Institute/University :

Particulars	Staff Salary	Equipment	Consumables	Computer charges	Contingencies	Overheads	Total
1. Amount (Rs.) Sanctioned in Current Year (20 - 20)							
2. Net Amount Claimed Now							

Authority in the Organisation in whose favour the Demand Draft is to be drawn should be indicated.

ACCEPTANCE FORM

The terms and conditions of Grant-in-Aid communicated by the Board are accepted:

Signature of the Principal Investigator	Counter Signature of the Head of the Institute
Name :	Name :
Designation :	Designation :
Date :	Date :
Seal of the Principal Investigator :	Seal of the Institute :

Annexure - III

REQUEST FOR RELEASE OF GRANT-IN-AID

(Second and Subsequent Including Final Year)

CLAIM FORM II

(YEAR : 20 - 20)

(To be filled and submitted in duplicate within one month of receiving the sanction letter)

To
The Member-Secretary
Committee for Safety Research Programmes
Atomic Energy Regulatory Board
Niyamak Bhavan
Anushakti Nagar, Mumbai 400 094

Title of the Research Project :

Sanction-letter No. and Date :

Name of the Institute/University :

Particulars	Staff Salary	Equipment	Consumables	Computer charges	Contingencies	Overheads	Total
1. Amount (Rs.) Sanctioned in Current Year (20 - 20)							
2. Amount Received so far							
3. Total Balance Admissible under the Project							
4. Unutilised Balance if any, from Previous Years/ Instalment							
5. Net Amount Claimed Now							

Authority at the institute in whose favour the Demand Draft is to be drawn, should be indicated.

Signature of the Principal Investigator

Counter Signature of the Head of the Institute
(Seal)

Annexure - III

Utilisation Certificate

(if the Grant is fully utilised)

Rupees ……..……sanctioned by the Atomic Energy Regulatory Board, Niyamak Bhavan, Anushakti Nagar, Mumbai 400 094 vide their letter No ……..…… dated……and already paid in the month of ……..…… for the years has been fully utilised during the financial year to meet the expenditure on ……..……

Principal Investigator
(Seal)

Audit Officer/Chartered Accountant
(Seal)

Utilisation Certificate

(if the Grant is partly utilised)

Rupees ……..……. sanctioned by the Atomic Energy Regulatory Board, Niyamak Bhavan, Anushakti Nagar, Mumbai 400 094 vide their letter No. ……..…… dated…….. and already paid in the month of ……..…… for the years has been partly utilised during the financial year to meet the expenditure on ……..…… and there is an unutilised balance of Rs. …… of the Grant as on ……..……

Principal Investigator
(Seal)

Audit Officer/Chartered Accountant
(Seal)

Annexure - III

CLAIM FORM III

(To be submitted after the termination of the Project)

CONSOLIDATED STATEMENT

	Amount Received							Amount Spent						
Year	Staff salary	Equip-ment	Consum-ables	Computer charges	Contin-gencies	Over-head	Total	Staff salary	Equip-ment	Consum-ables	Computer charges	Contin-gencies	Over-head	Total
I Year (20 -20)														
II Year (20 -20)														
III Year (20 -20)														
IV/Final Year (20 -20)														
Total														

Note: III and IV year to be included only if the payment is sanctioned for more than two years.

Principal Investigator
(Seal)

Audit Officer/Chartered Accountant
(Seal)

Remarks :

Annexure - IV

Government of India
Atomic Energy Regulatory Board
Safety Research Programme

APPLICATION FOR RENEWAL OF GRANT-IN-AID FOR RESEARCH PROJECT

(Please indicate whether it is the lst, 2nd etc. renewal)

(Please send 10 copies to the Member-Secretary, CSRP, AERB, Niyamak Bhavan, Anushakti Nagar, Mumbai 400 094.)

1 . Title of the Research Project :

2. (a) Principal Investigator

Name :

Position held :

(b) Co-investigator(s)

Name :

Position held :

(c) Research Fellow(s) Recruited for the Project and their Date(s) of Joining.

Name :

Date of joining :

3. (a) Number and Date of First Sanction of Scheme:

(b) Date of Actual Commencement of Work :

4. Department where Research is being Performed.

5. Name and Address of the organisation.

6. Is the Principal Investigator/Co-investigator likely to go abroad? If yes, what is the duration?

7. (a) Name, Designation and Address of the Person to whom all Letters are to be Addressed.
(b) Telephone No.
(c) Fax No.
(d) E-mail Address

8. List of Major Equipment already Procured/Fabricated.

9. Detailed technical report prefaced by a summary highlighting major achievements is to be enclosed with each copy. The summary should include all work done to date.

10. (a) Deviations, if any, from the programme of work and expenditure originally approved.

    (b) Reasons for above.

11. List of papers and copies of papers published/communicated is to be included with each copy.

12. Details of Grant:

Item	Yearwise Received (I)	(II)	Yearwise Actually Spent (I)	(II)	Commitments Pending Payments upto 31st March of the Current Year	Grants requested for the Next Year
(a) Staff Salary (Research Fellows and Associates)						
(b) Equipment (Give list of major items and their individual cost)						
(c) Consumables (indicate type of Consumables and their individual cost. Indicate Radiochemicals separately).						
(d) Contingencies						
(e) Computer charges (if any)						
(f) Travel (including travel for computer work. The purpose and justification must be recorded)						
(g) Overheads						
Total:						

13. Project Personnel and Estimated Percentage of Total Working Time Devoted to the Project.

Personnel	Time (%)	Estimated cost (Rs.)

14. Highlights of Detailed Programme Report of work completed covering procurement of equipment, its utilisation, experiments conducted, literature survey, theoretical work, papers published/presented in conferences, etc.

15. Detailed Plan for the Next Year.

Signature of the
Principal Investigator

Name:

Designation:

Date:

Seal of the Principal Investigator :

Signature of the
Head of the Organisation

Name:

Designation:

Date:

Seal of the Organisation:

ANNEXURE V

Government of India
Atomic Energy Regulatory Board
Safety Research Programme

AREAS OF INTEREST TO AERB

Studies in some areas are of special interest to AERB. Some of these areas and the preferred topics under these areas are indicated in the following list.

1. Effective Use of Information Technology for Regulatory Activities

- Survey of minimum and maximum data collection required for effective regulatory control for different applications of radiation.
- Development of a system of integrated management of data relating to different applications of radiation.
- Allotment of passwords to authorised licensees and online handling of applications for certain types of approvals (e.g., movement of radiography source from one site to another).
- Development of software for enabling authenticated online of submission of periodic safety reports.
- Development of automatic updating of data submitted on-line and a system of identifying discrepancies in the submitted data.

2. Medical Applications of Radiation

- Techniques of reduction of medical exposure in diagnostic radiology, particularly in Computed Tomography (CT) scanning, Interventional Radiology and Nuclear Medicine.
- Techniques of reduction of occupational exposure in Interventional Radiology and use of Positron Emission Tomography (PET) scanning.
- Methods of Quality Assurance (QA) and development of acceptance criteria for software used in treatment planning systems.
- Development of tamper-proof instrumentation for detection of removal of sources from teletherapy and brachytherapy installations with an alarm system, a real time logging unit and Uninterrupted Power Supply (UPS) so that unauthorised removal of sources can be detected and effectively prevented.

3. Industrial Applications of Radiation

- QA in industrial radiography with gamma sources as well as X ray units and LINAC (Linear Accelerator).
- Study into the causes of individual occupational exposures being relatively high in industrial radiography and methods of reducing the exposure levels to ensure that workers always wear the individual monitors.
- Development of tamper-proof instrumentation for detection of removal of radio-active sources from industrial radiography installations / source storage areas with an alarm system, a real time logging

unit and UPS so that unauthorised removal of sources can be detected and effectively prevented.

- Reduction in the activity of radiation sources used in nucleonic gauging systems with more sensitive instrumentation.

- Study of alternate sources of radiation to replace long-lived sources used in nucleonic gauging, particularly, ^{241} Am and ^{137} Cs.

- Nuclear techniques in pollution monitoring.

4. Radiobiology/Radiation Dosimetry/Radiation Protection

- Investigations on low dose and dose rate effects and dosimetry.

- Population surveys on levels and effects of natural radiation environments.

- Studies on/surveys for assessment of exposure levels due to radiation and radionuclides in the environment, studies to determine transfer coefficients for radioactive iodine from pasture to cow to milk and for caesium from pasture to meat.

- Anthropometric surveys for compilation of data on Indian Standard Man and its application to internal dosimetry.

- Development of radiation monitoring/measuring equipment and radiation protection accessories.

- Development and standardisation of protective apparel such as ventilated frog suits.

- Development of battery operated air samplers.

5. Use of Radiation Sources for Research Purposes

- The type of research studies carried out with radiation sources from the standpoint of justification of practice.

- Development of criteria for application of radiation for research purposes from the standpoint of dose constraint.

6. Transport of Radioactive Material

- Development of a software package for assessment of the response of a package to the regulatory tests.

- Survey of accident data in different modes of transport and severity categorization using regulatory tests as benchmarks.

- Development of a software package for determining the Criticality Safety Index (CSI) of a package containing fissile material.

7. Applied Chemistry in Nuclear Industry

- Development of instrumentation for monitoring conventional pollutants such as H_2S.

- Development of iodine filter system with provisions for cooling and life extension of existing design of

charcoal filters from about 2 years to at least 6-9 years.

- Studies relating to determination of source term in severe accident situations, namely chemical speciation, release from fuel, aerosol formation and transport behaviour of fission products (in particular iodine) and associated aerosols in containment atmosphere, transport, distribution and reactions of hydrogen in containment atmosphere and development of catalytic methods for controlling the reaction rate.

- Studies relating to obtaining early warning about fires through methods based on detection on vapour released during combustion of table sheaths, paints and other substances.

- Studies on development of more effective detection and environment-friendly extinguishers in case of fires in general and with special reference to fires involving liquid sodium.

- Development of techniques for chemical removal of radioactive contamination on exposed surfaces of reactor components/primary heat transport system.

- Development of technique for on-line high temperature pH monitoring in primary and secondary systems of Nuclear Power Plant.

- Development of methodology/instrumentation for on-line tritium monitoring.

- Development of methods of chemical decontamination of different nuclear reactor systems.

- Development of suitable leak proof and fire resistance coating (paints) for reactor containments.

8. Techniques for Radioactive Waste Management

- Laboratory and field investigations on chemical behaviour of radioactive wastes in ground water, determination of the rates of movement and development of models to allow prediction of waste dispersion/movement.

- Development of ultra filtration techniques for treatment of alpha wastes containing colloidal particles.

- Development of methods for treatment and immobilisation of liquid wastes in suitable solid matrices, determination of leaching rates for wastes so fixed.

- Development of methods for control of spread of deposits of radioactive substances through quick drying polymer films.

9. Applied Metallurgy/Radiometallurgy

- Studies on causes of failure of reactor components such as pressure tubes and calandria tubes in pressurised water reactors; crack in core shrink in BWR, cavities/cracks in reactor vessel in PHWR, Moderator/Bleed Cooler Heat Exchanger tubes, etc., application of methods based on fracture mechanics for failure prediction.

- Studies on the long term influence of neutron radiation on properties of structural materials with particular reference to fast reactors.

- Corrosion behaviour of steam generator materials.

- Studies on life extension measures for safety related components of Nuclear Power Plants.

- Studies on long-term operational integrity of containment vessel.
- Studies on cracks/corrosion in liners of Reactor Vault, fuel pool inspection/storage bay.

10. Reactor Physics, Thermal Hydraulics/Fluid Structure Interactions in Pressurized Heavy Water Reactors, Light Water Reactors and Fast Breeder Reactors under Accident Conditions

- Development of mathematical models for space-time kinetics.
- Numerical techniques for Efficient Solutions of Neutron Transport Equations.
- Neutron transport through low density Neutron Guides in FBR neutron detector locations.
- Monte Carlo Solutions for Radiation Streaming.
- Design Basis Event Analysis of large secondary sodium leak in FBR.
- Development of numerical methods for diffusion of radioactive material through ground over long time period.
- Analysis of events involving failure in the primary coolant system.
- Sub channel analysis in two phase situations under critical break Loss of Coolant Accident.
- Analysis of events involving steam line / feedline break in the secondary coolant system.
- Analysis of the effectiveness of the suppression pool in a loss of coolant accident scenario in PHWR.
- Heat transfer analysis applicable to post dry-out period.
- Heat transfer analysis under Station Black Out situation.
- Behaviour of PHWR core under severe accident conditions.
- Modelling of underground mine ventilation system.
- Pump behaviour under two phase flow conditions.
- Studies on vortex formation in emergency core cooling system accumulators.
- Evaluation of necessary and sufficient conditions for explosive thermal interactions between molten fuel materials and liquids.
- Theoretical model studies on propagation of pressure waves through fluid media and determination of effect on structures.
- Molten Fuel and Clad Relocation Models in nuclear reactors.
- Post Accident Heat Removal Studies.
- Air thermo-hydraulics in Multiple Compartments of a Building.

- Core catcher modeling studies in Light Water and Fast Reactors.
- Studies on incidents in different type of heat exchanger.
- To establish the basis for the strike zone and distance up to which its effect is to be considered for safety in layout depending upon potential for generation of primary and secondary missiles.
- Core-catcher modeling and analysis for VVER and FBR type reactors.
- Methods to find residual stress in components which have undergone physical and thermal stresses during operation of Nuclear Power Plant.
- Development of Algorithm and computer codes for computational fluid dynamics.

11. Civil and Structural Engineering

- Safety assessment of containment structure against aircraft crash, internal pressure loading, and impact of internal missiles generated by turbine failure.
- Soil-structure interaction in seismic response analysis of nuclear island connected building.
- Assessment of seismic potential of capable faults.
- Probabilistic seismic hazard analysis.
- Establishment of constitutive laws of concrete with mineral and mixtures.
- Study of heat hydration, shrinkage and creep of concrete with mineral admixtures.
- Bacterial concrete.
- Development of liquid metal resistant concrete.

12. Safety Evaluation Methodology

- Generation of failure data for mechanical, electrical, electronic, computer based system including softwares and process system components for the purpose of reliability assessment.
- Model development for applications to Probabilistic Safety Assessment (PSA), like analysis of aircraft impact on the reactor and its potential for affecting the safety released systems and structures.
- Development of models for Human Reliability Analysis (HRA) for integration with Probabilistic Assessment, characterisation of operator errors of commission and omission arising from misdiagnosis and other relevant factors for the purpose of HRA, supporting data based on accidents that have occurred in large facilities. Studies on common cause failures.
- Development of Common Cause Failure (CCF) with specific model applications for some reference plants.
- Risk monitor at plant site with regulators interface.
- Fire Hazard Analysis for fuel cycle plant.

13. Applications of Computers and Appliances

- Development of expert systems as operator aids in safety surveillance and operation of reactors and nuclear plants.
- Development of robotic techniques for a variety of unmanned operations such as inspection of structures, material welding, radiation survey, application of protective coatings, chemical decontamination, etc.

14. High Energy Particle Accelerator

- Radiation Source Term calculations (Neutron Yields).
- Attenuation characteristics of High Energy Neutron through shields (>20Mev).

15. Linear (<25 Accelerator MeV Accelerator)

- Brehmstraheung Source Term detailed calculations and Emperical Fits in LINAC.
- Beam Flattening Designs and Development of suitable Algorithms.
- High Energy Standard Photon Dose Rate Estimations for medical dosimetry

16. Environmental Impact Assessment

- Theoretical and field studies on atmosphereic dispersion and ground deposition of aerosols under different weather conditions, in diverse terrain, development of models for prediction of atmospheric concentrations and extent of ground deposition.
- Hydrological investigations.
- Marine dispersion studies.

17. Fire and Industrial Safety

- Development of suitable models for assessment of fire hazards in nuclear fuel cycle facilities.
- Formulation of fire protection methodologies.
- Qualification of fire resistant materials.
- Risk assessment for operations involving hazardous materials like beryllium.

Annexure VI

Government of India
Atomic Energy Regulatory Board
Safety Research Programme

INFORMATION TO BE INCLUDED IN THE CONSOLIDATED REPORT

1. Name and Address of the Institute.
2. Title of the project, Reference Number and Date of first Sanction.
3. Name, Designation and full Address including e-mail address, phone number and fax number of the Principal Investigator of the Project.
4. Date of Commencement of Actual work on the Project.
5. Detailed Technical Report of the Entire Work done on the Project.
6. Publications in Refereed Journals (Copies of Reprints to be Attached).
7. Other Publications including Papers Presented in Symposia/Conferences.
8. Whether any of the staff was awarded research degree on the basis of work carried out on the Project. If so, degrees, title of the thesis and the years of submission/award.
9. Details of Grant (name and designation of staff, name and cost of equipment, consumables (give heads) received during the tenure of the scheme).
10. Particulars such as the title of the Project, funding agency, duration of any other Project under your charge in similar areas.
11. Details of all the previous DAE/AERB and other project under your charge (scheme title, total funds, duration).
12. Brief Summary of Achievements in not more than 300 words.
13. Other Specific Remarks/Suggestions.

Annexure VII

Government of India
Atomic Energy Regulatory Board
Safety Research Programme

AERB FORM A

APPLICATION FOR THE GRANT OF FINANCIAL ASSISTANCE FOR ORGANISING SYMPOSIA/ SEMINARS BY OTHER AGENCIES

1. Topic of Symposium/Seminar :

2. Name of the Convener/Organising Secretary :

3. Full Postal Address of the Convener/Organising Secretary including Telephone No., Fax No. and e-mail Address :

4. Name of the scientific society/specialist association organising the meeting :

5. Whether it is main society or branch of the main society and status of the organisation :

6. Dates of holding the seminar/symposium etc. :

7. Venue of holding the seminar/symposium etc. :

8. (a) Topics being covered (name technical sessions) :

   (b) Relevance and importance of the topic in the context of national needs :

9. (a) How many delegates are expected to participate? Indicate the number of national & foreign delegates separately :

   (b) How many of the delegates are expected to present papers? :

   (c) For how many delegates TA/DA is offered and at what rate? :

10. What is the total expenditure anticipated?
    Please give details under the following heads.
    (a) Publication of abstracts, proceedings etc. :

    (b) Boarding and Lodging expenses of delegates :

    (c) Entertainment :

    (d) Others: transport, conference hall arrangements, etc. :

11. Amount requested from AERB : Rs .....

12. Details of grants requested/received from other agencies

Name of Agency	Grant requested	Grant Received	Items for which Grant asked for
(1)			
(2)			
(3)			
(4)			

13. Details of the grant obtained from AERB in the past

Grant Requested :

Grant Sanctioned :

Year :

14. Name of the authority who will be responsible for submitting the audited statement of accounts/ utilisation certificate and other reports

15. Name, designation and address including e-mail, phone and fax number of the authority in whose favour payment of grant is desired

16. Any other information

Place: Signature of the Convenor :

Date: Name:

Seal of the Organisation :