No.W.11017/24/2012-WQ
Government of India
Ministry of Drinking Water & Sanitation

9th Floor, Paryavaran Bhawan
CGO Complex, Lodhi Road
New Delhi – 110 003.

Dated the 13th January, 2013

To

All Members of the Research and Development Advisory Committee
(As per list attached)

Subject:- Meeting of the Research & Development Advisory Committee (R & DAC) for R & D Projects on Rural Drinking Water & Sanitation -- forwarding of agenda - regarding.

Sir,

I am directed to refer to this Ministry's letter of even number dated the 11th January, 2013 on the above subject and to enclose herewith the agenda papers for the above meeting. It is however informed that **due to unforeseen circumstances the venue of the aforesaid meeting has been changed to Secretary(DWS)'s Conference Room No. 247, A – Wing, Nirman Bhawan, New Delhi.**

Kindly confirm your participation through E-mail at pp_nagrath@yahoo.co.in and pnashtamoorthy@gmail.com

Yours faithfully,

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Encl : As above.

Copy to:-

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Agenda items for discussion in the 26th Research & Development Advisory Committee Meeting to be held on Tuesday, the 15th January, 2013 at 12.15 p.m. in Room No. 247, Conference Room, A-Wing, Nirman Bhawan, New Delhi.

New R & D Projects which were technically found suitable and put up for discussion at the RDAC Meeting.

1. Research Proposal of Dr. V. Jothiprakash, Associate Professor, Department of Civil Engineering, IIT, Bombay on "A Study on Estimation of Water Leakages/ Pilferages and Unaccounted Water Losses in Comprehensive Piped Water Supply".

Shri Jothiprakash of IIT, Bombay forwarded the project proposal on this subject costing Rs.34.06,116/- with duration of 3 years in response to Ministry's letter dated 21.2.2011 to the Director, IIT, Bombay.

The objective of the research proposal is to estimate water losses, the causes for water losses, e.g. frictional losses, leakages and also suggest measures to reduce losses. SCADA systems can only estimate losses and causes. Moreover SCADA systems are very few in rural water supply schemes. This study can help in identifying causes and suggest measures that can be applied to schemes where SCADA is not in place.

. This was examined in the Ministry and he was asked to revise the project as per observation given below.

i.) Three schemes are to be selected for study viz. single village, multi village (up to 10 villages) and comprehensive PWS Scheme (about 10 villages).
ii.) Verification of frictional losses using EPANOT could be useful for theoretical calculations.
iii.) Water & Energy audit is required at the WTP (if available)
iv.) Bulk meters should be available in the selected W/S schemes.
v.) Portable leakage detectors may be hired if possible. Otherwise these will be necessary.
vi.) Project can be completed in 1- 1 ½ years.
vii.) The outcome shall have clear-cut recommendations for controlling wastage of water, recovery of water wherever feasible and reduce ufw.

Subsequently, Shri Jothiprakash submitted the revised project. Total cost of the project now comes to Rs.29,90,152/-

Details of the cost of the project are as given below.

S. No.	Budget given by PI Details of items/ service	Amount requested in Rupees	Suggested budget as per norms in Rupees	Remarks
1	**Equipment Cost.** (Metallic Pipe Locators, Manual Listening Sticks, Electronic Leak Detector, Portable Water Pressure Recorder, Pipe quality and left over life measuring equipment (non-destructive type)	17,22,000	2,49,733	Guidelines provide for 25% of the cost of the project
2	Cost of checking the results of manual measurement with automatic instrument at Rs.15,000 for five days	75,000	75,000	
2	Salary of JRF at Rs.16,000 + HRA for one person) per month	4,99,200*	4,99,200	
3	Travel Expenses for data collection and attending conferences	1,75,000	1,75,000	
4	Cost of stationery, printing/ chemicals/ glassware/ fabrication, etc.	-	-	
5	**Total cost of the project**	**24,71,200**	**9,98,933**	
6	Contingency expenditure	2,47,120	99,893	
7	10% over-head charges	2,71,832	99,893	10% only is permissible
8	**Grand Total**	**29,90,152**	**11,98,719**	
9	Duration of the project	Two years		

* HRA calculated at 30%.

2. Research proposal submitted by Dr. P.K. Ghosh, Department of Civil Engineering, IIT, Guwahati on Development of Bioreactor system for simultaneous removal of multi-pollutants such as iron , nitrate, arsenic and fluoride from ground water.

Dr. P.K. Ghosh, of Department of Civil Engineering, IIT, Guwahati had submitted a research proposal on the above subject costing Rs.26.62 lakh with project duration of 3 years.

The objectives of the proposals are:

i.) Design, build & operate a laboratory scale bioreactor system and study the mechanism responsible for contaminant removal in detail.
ii) Optimize the system for different and sustained removal of iron, nitrate, arsenic to below detectable limit and fluoride to acceptable level, and
iii) Evaluation of post treatment effluent.

This was examined in the Ministry and the Principal Investigator was asked to clarify/ provide information/ comments on the following:

i) The project budget is on a very high side.
ii) The project did not mention anything about reject management.
iii) Information about similar study carried out in any rural areas of the country.
iv) Period of study be reduced to two years.
v) Salary of research teas is not as per DST guidelines. Break up of Rs.9 lakh provided under salary and qualification of the research team to be provided.

Subsequently, the PI has forwarded the revised proposal. The cost of the project has been reduced to Rs.18.6184 lakh and the duration of the project is still 3 years.

Details of the cost of the project are as given below.

(Rupees in lakh)

S. No.	**Budget given by PI Details of items/ service**	**Amount requested**	**Suggested budget as per norms**	**Remarks**
1	**Equipment Cost** Syringe pump (2 Nos.), Dissolved Oxygen meter (1 No.), Hollow Cathode Lamp (HCL), Reactor fabrication	4.7000	3.4247	Guidelines provide for 25% of the cost of the project
2.	Salary of research team* (Fellowship of an SRF)	8.4240	8.4240	
3	Travel Expenses	1.0500	1.0500	
4	Cost of stationery, printing/ computer processing etc.	0.8000	0.8000	
5	**Total cost of the project**	**14.9740**	**13.6987**	
6	Contingency expenditure	1.9500	1.3699	10% is only permissible
7	10% over-head charges	1.6924	1.3699	-do-
8	**Grand Total**	**18.6164**	**16.4385**	
9	Duration of the project	Three years.		

* HRA @ 20% + Rs.1,000/- Medical include in the salary component.

3. Research proposal submitted by Shri A. Shahul Hameed, Head, Isotope Hydrology Division, Centre for Water Resources Development and Management, Kerala on "Study of Micro Pollutants with Special Reference to Detergents and Fertilizers in Drinking Water Sources in a Highland Region of Kerala".

Shri A. Shahul Hameed, Head, Isotope Hydrology Division of Centre for Water Resources Development and Management, Kerala has submitted the proposal on this subject in response to Ministry's letter dated 13.5.2011. The cost of the proposal is Rs.28 lakh with project duration three years.

The Objectives of the study are:

i.) To assess the level of detergents and fertilizer contamination by domestic and agricultural effluents in drinking water sources fin an agro-urban area.

ii) To have a better knowledge of the spatial and temporal pollutant loadings in runoff and relationship to land use and other environmental factors.

iii.) To characterize the micro-pollutants and to identify specific organic tracer compound to ascertain sewage contamination in drinking water sources.

iv.) To discriminate pollutant sources using stable isotopes of carbon and oxygen and

v) To suggest possible mitigation measures to contain specific pollution problem in the region.

This was considered in this Ministry. It was felt that effect of leaching of contaminants due to fertilizer and detergents is an emerging water quality issue and the Ministry has no data in this regard. It was also felt that the project could be completed in 15 months. However, the Principal Investigator has maintained that it required 2 years time for completion of the project. However the project cost has been reduced to 19.8132 lakh.

Details of the cost of the project are as given below.

(Rupees in lakh)

S. No.	Budget given by PI Details of items/ service	Amount requested	Suggested budget as per norms	Remarks
1	**Equipment Cost** (Fluorescence Spectrophotometer)	7.0000	2.5707	Guidelines provide for 25% of the cost of the project
2	Salary of research team* (JRF 2 Nos.)	6.9120	6.9120	
3	Travel Expenses	0.6000	0.6000	
4	Cost of stationery, printing/ copying etc.	0.2000	0.2000	
5	**Total cost of the project**	**14.7120**	**10.2827**	

6	Contingency expenditure	3.3000	1.0283	10% is only permissible
7	10% over-head charges	1.8012	1.0283	-do-
8	**Grand Total**	**19.8132**	**12.3393**	
9	Duration of the project	Two years.		

* Rs.12,000/- pm + 20% HRA

4. Research proposal submitted by Dr. Biswajit Ruj, Principal Scientist, Central Mechanical Engineering Research Institute (CSIR), Durgapur on Microwave assisted Stabilization of Arsenic-Iron Contaminated Water Treatment Plant Sludge.

Dr. Biswajit Ruj, Principal Scientist, Central Mechanical Engineering Research Institute (CSIR), Durgapur has submitted the research proposal under sectoral innovation in response to this Ministry's letter dated 20.9.2012.

The objective of the project is to treat arsenic sludge in microwave reactor/ muffle furnace to stabilize the arsenic by using stabilizing agents for its safe disposal to the landfill.

This was examined in the Ministry and recommended for inclusion for consideration by the RDAC.

Details of the cost of the project are as given below.

(Rupees in lakh)

S. No.	Budget given by PI Details of items/ service	Amount requested	Suggested budget as per norms	Remarks
1	**Equipment Cost** (Microwave Reactor, Muffle Furnace, etc.)	1.00	1.00	Eligible amount comes to Rs.2.70 lakh but claimed Rs.1 lakh.
2	Salary of research team Project Fellow	5.04	5.04	
3	Travel Expenses	1.00	1.00	
4	Cost of stationery, printing/ computer processing) etc.	0.75	0.75	
5	Consumables	1.30	1.30	
5	**Total cost of the project**	**9.09**	**9.09**	
6	Contingency expenditure	0.909	0.909	
7	10% over-head charges	0.909	0.909	
8	**Grand Total**	**10.908**	**10.908**	
9	Duration of the project	Three years.		

In the budget break up given by the PI, the PI has included Rs.5.00 lakh towards salary of the CMERI Research team. However, that is not included in the project cost. Hence the R & D expenditure to be borne by the Ministry is Rs.10.908 lakh only.

5 Research project on process for removal of arsenic from polluted water using micro-organisms

The project proposal is submitted by Dr. Sanjukta Patra, Assistant Professor, Department of Biotechnology, IIT, Guwahati, Assam with an original cost of Rs.43.3632 lakh. The objective of the project is to have arsenic free water and a feasible process for the same. This was examined in the Ministry and the PI was asked to revise the cost along with some other clarification like applicability of the technique to the rural areas, O && M details, management of sludge generated, whether any similar study using miro-organism for arsenic removal has been carried out especially for the rural areas. The PI in response to the same has revised the projected and submitted to the Ministry again in which the cost was reduced to Rs.34.3632 lakh.

This was examined in the Ministry and recommended for inclusion for consideration by the RDAC.

Details of the cost of the project are as given below.

(Rupees in lakh)

S. No.	Budget given by PI Details of items/ service	Amount requested	Suggested budget as per norms	Remarks
1	**Equipment Cost** (Incubator, Shaker, Bioreactor, Separator, Recycle unit and Detection unit)	9.000	6.212	Guidelines provide for 25% of the cost of the project
2.	Salary of JRF/SRF*	8.136	8.136	
3	Travel Expenses	2.500	2.500	
4	Cost of stationery, printing/ computer processing) etc.	1.000	1.000	
5	Consumables	6.000	6.000	
6	Sample (Sample analysis and processing charges	1.000	1.000	
5	**Total cost of the project**	**27.636**	**24.848**	
6	Contingency expenditure	1.000	1.000	PI claimed Rs.1.00 lakh. Hence this amount is recommended.
7	10% over-head charges	5.7272	2.485	10% is only permissible
8	**Grand Total**	**34.3632**	**28.333**	

9	Duration of the project	Three years.

* @ Rs.18000/- + HRA 20% + Rs.1000/- Medical Allowance.

6. Development of new nano-filtration membranes for desalination and brackish water

Dr. Geetha Balakrishna, Professor and Shri Mahesh S. Padaki, Post Doctoral Fellow, Centre for Nano and Material Sciences, Jain University has submitted the proposal through NEERI, Nagpur.

The objectives of the study are chemical modification of polymers to change the properties like hydrophilicity, solubility and charge, Synthesis of metal oxide nano-particles, preparation of nano-filtration composite membranes, Surface modification of some nano-filtration composite membranes by UV-Light, Surface Morphology studies, Determination of membrane surface charge by measurement of ion exchange capacity (IEC) and diffusion potential, Performance of the membrane in terms of Hydraulic permeability coefficient, Molecular weight cut-off (MWCO) and % rejection of salt and brackish water, the rejection experiments are extended to water samples.

The proposal was considered and it was felt that this technology has already been tried earlier and the NEERI was requested to clarify. NEERI has clarified that nano-filtration has been considered as a viable and low-cost solution to solve the problem of water scarcity and lack of potable water in developing countries for the past few decades. A lot of attention has been focused on the potential benefits of water-treatment devices that incorporate nano-filtration. The UN has referred nano-filtration as an effective solution to achieving its MDG in developing countries and still focuses on development. In recent years there has been increased focus on optimizing the performance of a nano-filtration membrane in terms of improving slat rejection rate, decreasing humic acid fowling, increasing clean water flux and testing these membranes for cost-effectiveness through the technology was developed in 1970s.

It has therefore been decided to add this project in the RDAC Meeting for consideration.

Details of the cost of the project are as given below.

(Rupees in lakh)

S. No.	Budget given by PI Details of items/ service	Amount requested	Suggested budget as per norms	Remarks
1	**Equipment Cost**	12.50	10.90	Guidelines provide for 25% of the cost of the project

2	Salary of Research Team 2 + 2 Nos (JRF and SRF) @ Rs.16,000/- and Rs.18,000/- per month + staff salary @ Rs.30,000/- p.m.	22.80	22.32	
3	Travel Expenses	0.90	0.90	
5	Consumables	9.0	9.0	
5	**Total cost of the project**	**45.20**	**43.12**	
6	Contingency expenditure	6.00	4.31	10% is only permissible
7	10% over-head charges	4.67	4.31	10% is only permissible
8	**Grand Total**	**55.87**	**51.74**	
9	Duration of the project	Three years.		

7. Application of phage encoded lysins as a formulation for bactericidal activity in water

Dr. Krishna Khairnar, Scientist NEERI through NEERI has submitted the proposal.

The objectives of the study are isolation of different bacteria and bacteriophages found in water bodies, isolation and purification of different phage encoded lytic enzymes for treatment of bacteria, cloning and expression of selected phage lytic genes can be isolated and quantified for desired applications, product in the form of a formulation of phage encoded lytic enzymes for bactericidal treatment of water, suggestion of pre and post treatment method required if any.

The proposal was considered and it was found that similar study was done in NEERI. However, no explanation was given that how the proposed study is different from the earlier study and thus outcome of the project. NEERI was requested to give clarification.

In its reply NEERI has submitted that other assignments carried out at NEERI were for studying bactericidal activity by using UV/VUV excimer source. This previous/ ongoing assignments mentioned are similar from the point of bactericidal activity, but totally different from application point of view. In the proposal application of phage-encoded lysins formulation for bactericidal activity in water and for controlling membrane biofouling has been proposed. This application is a groundbreaking research with a novelty in the field at world stage.

It has therefore been decided to add this project in the RDAC Meeting for consideration.

Details of the cost of the project are as given below.

(Rupees in lakh)

S. No.	Budget given by PI Details of items/ service	Amount requested	Suggested budget as per norms	Remarks
1	**Equipment Cost**	58.00	46.83	Guidelines provide for 25% of the cost of the project
2.	Salary of Research Team Staff salary and project staff salary	47.50	47.50	
3	Travel Expenses	22.00	22.00	
5	Consumables (including chemicals)	71.00	71.00	
5	**Total cost of the project**	**198.50**	**187.33**	
6	Contingency expenditure	15.00	1.87	10% is only permissible
7	10% over-head charges	21.35	1.87	- do -
8	**Grand Total**	**234.85**	**191.07**	
9	Duration of the project	Five years.		

8. Application of phage encoded products to control membrane biofouling caused by bacterial biofilms.

Dr. Krishna Khairnar, Scientist NEERI through NEERI has submitted the proposal.

The objectives of the study are identification and characterization of different biofilm forming bacterium, isolation of different bacteriophages against biofilm forming bacteria, development and formulation of phage encoded enzyme based product for treatment of membrane biofouling, Suggestion of pre and post method required if any.

The proposal was considered and it was found that similar research was done earlier. This needed to be clarified by the PI that how this study is differtent than earlier study of similar nature and thus out of the project. NEERI was requested to give clarification.

In its reply NEERI has submitted that other assignments carried out at NEERI were for studying bactericidal activity by using UV/VUV excimer source. This previous/ ongoing assignments mentioned are similar from the point of bactericidal activity, but totally different from application point of view. In the proposal application of phage-encoded lysins formulation for bactericidal activity in water and for controlling membrane biofouling has been proposed. This application is a groundbreaking research with a novelty in the field at world stage.

It has therefore been decided to add this project in the RDAC Meeting for consideration.

Details of the cost of the project are as given below.

(Rupees in lakh)

S. No.	Budget given by PI Details of items/ service	Amount requested	Suggested budget as per norms	Remarks
1	**Equipment Cost**	58.00	38.17	Guidelines provide for 25% of the cost of the project
2	Salary of Research Team Staff salary and project staff salary	47.50	47.50	
3	Travel Expenses	22.00	22.00	
5	Consumables (including chemicals)	45.00	45.00	
5	**Total cost of the project**	**172.50**	**152.67**	
6	Contingency expenditure	15.00	1.53	10% is only permissible
7	10% over-head charges	18.75	1.53	- do -
8	**Grand Total**	**205.25**	**155.73**	
9	Duration of the project	Five years.		

9. Development of a water purification system using botanicals.

Dr. Satyawati Sharma, Professor, Centre for Rural Development & Technology, IIT Delhi with Co-PIs Prof. S.N. Naik and Dr. Anushree Malik has submitted the proposal on the above subject costing Rs.45,25,248/- with project duration of 2 years.

The primary objectives of project are to study different plant species (moringa, maize and cactus) and common filtration techniques (solar Disinfection(SODIS), slow sand filtration, NEERI filters, copper utensils, bleaching powder, chlorine tables) for purification (with respect turbidity, hardness and bacterial contamination) of drinking water from different sources. The Secondary objectives are; pre and post analysis of water samples collected from selected sources sites; extraction and evaluation of efficacy or raw and active components from selected botanicals; to evaluate low cost household level water treatment technologies; to study the efficacy of selected botanicals separately and alternated with filtration techniques in water purification; and to conduct demonstration cum training programme on the technology to the beneficiaries at the selected site (Mubarikpur, Shaidpur and Farukhnagar) with the involvement of NGO

The proposal was considered and PI was requested to submit the revised R&D project considering the following aspects:-

Development of community based filters for capacity of 3KL a& 5KL; project duration may be reduced to 18 months with development of technology and conducting laboratory trials through community based filters (12 months) and field trials in two villages & analyzing the product water quality (six months); one JRF and one attendant are adequate, Salary for them should be as per latest DST norms: since turbidity, bactenological contamination and hardness are only targeted for removal, the instrumentation proposed should be only for these parameters. BOD/COD analyzer, digital water analyzen etc are not necessary; travel cost to be restricted to maximum of Rs. One lakh; contingency and overheads should be restricted to 10% each of the net project cost; etc.

In its reply IIT Delhi has submitted that the project is mainly R&D project. Under this proposal is is envisaged that a prototype will be developed using selected botanicals (Moringa, cactus and maize: raw / active components). These botanicals will be tested alone as well as in combination. The use of these will also be alternated with low cost technologies. Based on the results the technological model will be scaled up for testing at pilot level testing in the villages. It has stated that work is to be conducted at lab as well as field level with the field trials in two villages, project cannot be completed in one and half year. Minimum two years are required to achieve the objectives. To achieve the objectives authentically, fruitfully and successfully, the project staff proposed in the project is equally important. As turbidity, bacteriological contamination and hardness are to be tested, to determine the bacterial contamination, one of the important parameter i.e. BOD (Biological Oxygen Demand) is required and hence BOD analyzer is required for this purpose. Further, turbidity and hardness are to be determined; the digital water analyzer is required for the same. To restrict the travel cost upto maximum one lakh, it has been stated as okay. With regard to Contingency and overheads charges, it has been stated that since it is R&D project, the budget proposed in the proposal is required to accomplish the work authentically and successfully, the overhead as per IIT norms is 20% of the total budget.

In view above clarifications submitted by the P.I., It has therefore been decided to add this project in the RDAC Meeting for consideration.

Details of the cost of the project are as given below.

(Rupees in lakh)

S. No.	Budget given by PI Details of items/ service	Amount requested	Suggested budget as per norms	Remarks
1	**Equipment Cost**	7.00	7.00	Eligible amount comes to Rs.11.57 lakh. But PI claimed Rs.7.00 lakh.

				Hence this amount recommended.
2.	Salary of Research Team Staff salary and project staff salary (Project Associate, Project Assistant and Project Attendant)	19.7104	19.7104	
3	Travel Expenses	3.00	1.00	
5	Consumables (including chemicals)	5.00	5.00	
5	**Total cost of the project**	**34.7104**	**32.7104**	
6	Contingency expenditure	3.00	3.00	10% is permissible. Amount claimed is less than 10%.
7	(20%)10% over-head charges	7.54208	3.271	As per norms 10% is eligible.
8	**Grand Total**	**45.25248**	**38.9814**	
9	Duration of the project	2 years.		