RFP for entities to implement the subsidy "Verification of technologies for contaminated water management (Demonstration Project for Verification Tests of Tritium Separation Technologies)" project in the FY2013 Supplementary Budget

2-1

Requirements for Project Implementation, Application and Adoption

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MITSUBISHI RESEARCH INSTITUTE, INC.

Management Office for the "Project of Decommissioning and Contaminated Water Management"

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Contents

Requirements for project implementation and point rating	3
1. Requirements for Project Implementation	
2. Point Rating	
3. Reference Information	
Application procedures	13
1. Application Form	
2. Submission of Application	
Method and criteria of evaluation	22
1. Method of Evaluation	
2. Evaluation Criteria	

Requirements for project implementation and point rating

- 1. Requirements for Project Implementation
- 2. Point Rating
- 3. Reference Information

Purpose of the project

- \checkmark Verifying the performance of tritium separation technology
- Assessing construction and operating costs needed for installing the system in the Fukushima Daiichi Nuclear Power Station and for treating water remaining after treatment through the multi-nuclide removal equipment (hereinafter called <u>"treated water"</u>)

(However, the decision whether or not to conduct tritium separation treatment has not yet been made.)

- Details of Demonstration Implementation
 - ✓ With regard to contaminated water arising in the Fukushima Daiichi Nuclear Power Station, efforts to remove 62 kinds of nuclides are ongoing, but it is not possible to remove tritium. In this situation, entities to conduct verification tests of tritium separation technologies are being solicited. More precisely, in order to verify the separation technology, it is required to construct and use system, the scale of which is left to the implementing entity's discretion, and to conduct verification tests that will enable evaluation of separation performance of the "treated water" arising in the Fukushima Daiichi Nuclear Power Station, construction costs, and operating costs.

Prerequisites

- Tokyo Electric Power Company would offer a minimum quantity of "treated water" needed for implementation of the verification tests.
 - → The implementing entities are required to obtain the necessary permission.

Composition of the "treated water"			
Tritium concentration	6.3×10^{5} Bq/L~ 4.2×10^{6} Bq/L (varies according to the sampling date)		
Other radionuclides	⁶⁰ Co ¹⁰⁶ Ru ¹²⁵ Sb ¹²⁹ I	7.0×10^{-1} Bq/L 3.0×10^{1} Bq/L 9.8×10^{-1} Bq/L 4.6×10^{1} Bq/L	
lons	Ca ²⁺ Mg ²⁺ Cl ⁻	a few ppm a few ppm to a few ten ppm approx. 2,000~11,000ppm	

- The verification tests will be conducted outside of the site of the Fukushima Daiichi NPS.
 - Implementing entities are responsible to take the necessary procedures for;
 - (1) transportation of the "treated water" to the laboratory
 - (2) transportation of the water and containers after tritium separation to the Power Station, in compliance with regulations of concerned countries.
 - PMO will support the procedures for bringing the water out of the Power Station.

Basic requirement

- Separation performance of tritium and its system
 - It must be shown that the technology is capable of realizing a separation factor* higher than 100 of the "treated water" generated in the Fukushima Daiichi Nuclear Power Station.
 - > The mechanism of tritium separation must be described.
 - The description must also contain generation volume, composition and storage method of tritium concentration liquid which contains enriched tritium and effluent (It means the water which will be generated by the process of conditioning before tritium separation etc., if it is generated) which would be produced through separation of 400 m³ of "treated water" per day.
 - > The volume of needed "treated water" for implementing the demonstration tests must be described.

Separation Factor =

Tritium concentration (Bq/L) in the "treated water" before the treatment / Tritium concentration (Bq/L) in the "treated water" after the treatment

② Treatment capacity

- It must be shown that the treatment capacity of the technology can be expanded to more than 400 m³/ day.
- The description must also contain possible verification steps needed for the expansion, such as additional demonstration tests, implementation scheme, costs, etc. as detailed as possible.
- The proposal must also include both the treatment capacity in the verification tests and the one which can be achieved through the said expansion (unit: m³ / day).

Basic requirement (cont.)

- ③ Construction and operating costs in the expansion and construction time period
 - The proposal must specifically show the proposed separation factor, construction costs and operating costs, including the method of their estimations and the conditions, needed for the system which can realize the treatment capacity of the expansion shown in (2), including maintenance costs for the system and the parts, as well as costs for operation of the system.
 - The proposal must also show construction time period for the system which can realize the treatment capacity of the expansion, as detailed as possible.
- ④ Necessary site area and height of the system per treatment volume
 - The proposal must specifically show the necessary site area for treatment per 400 m³ of the "treated water", including the method of its estimation and the conditions, with consideration to expandability of the treatment capacity of the technology up to more than 400 m³ per day.
 - the proposal must specifically show the necessary height of the system (using meter as the unit).

Items for additional points

1 Tritium separation performance

Points will be added in accordance with the separation performance.

2 Quantity of effluent (liquid waste)

In separation, the less effluent (If it is generated. In the case that it is not generated, please write "0".) is generated, the more points will be added.

Items for additional points (cont.)

③ Necessary site area per treatment volume

With consideration to expandability of the treatment capacity of the technology up to more than 400 m³ per day, the narrower the necessary site area for treatment per 400m³ of the "treated water" is, the more points will be added.

④ Time needed for treatment of 800,000 m³ of "treated water"

The shorter needed days for treatment of 800,000 m³ of the "treated water" is, the more points will be added, in the case the proposed technology will be expanded at a future date. In the description, please describe the supposed utilization factor, which should be realistic.

5 Presentation of the experimental data

Points will be added to proposals that are able to demonstrate their feasibility with experimental data regarding the basic requirements or points to be additionally added. Extra points will be added for the data presented if they have already been published in a peer-reviewed form, such as in an academic conference or journal, etc. Furthermore, points to be additionally added will be gained by proposals which are expected to shorten the time period necessary for verification based on the presentation of experimental data.

6 Necessary scheme for expansion of the technology

In transition to development and demonstration phase, if the proposed technology is applied to expand the treatment capacity, if expected time is short, the process is specific, and the scheme for consideration is sufficiently arranged in expansion of the proposed technology at a future date, the more points will be added.

Goals to be achieved

The goals to be achieved for the following items during the project period:

- I) Construction of full-scale equipment for verification tests based on the proposal
- II) Verification of separation performance using the system
- III) Confirmation of the validity of construction costs, operating costs, site area and height (m) of the system which can achieve the proposed treatment capacity
- IV) Confirmation of technical feasibility and validity of the items of the basic requirements and of the items for points to be additionally added.

2. Point Rating Method

(Basic conditions)

Total 20 points

(5)

(5)

(5)

- (1) Tritium separation performance and its
 - ✓ The technology which can achieve a separation factor more than 100 of the tritiated water arising in the Fukushima Daiichi Nuclear Power Station is described.
 - \checkmark The separation mechanism is described in detail.
 - ✓ Generation volume, composition and storage method of tritium concentration liquid containing enriched tritium and effluent (if generated) are described in detail.
 - ✓ The volume of needed "treated water" for implementing the demonstration tests is described.

(2) Treatment capacity

- \checkmark It is described that the treatment capacity of the technology can be expanded to more than 400 m³ per day .
- \checkmark Possible verification steps are described in detail.
- ✓ Both the treatment capacity in the verification tests and the one which can be achieved in the said expansion (unit: m³ per day) are described.
- \checkmark The system for achieving the treatment capacity is described in detail.
- (3) Construction costs and operating costs in expansion and construction time period(5)
 - Construction costs and operating costs, including the method of their estimations and the conditions, are described in detail.
 - Construction time period, including the method of its estimation and the conditions, is described in detail.
- (4) Necessary site area and height of the system per treatment volume
 - ✓ The necessary site area for treatment per 400m³ of "treated water", including the method of its estimation and the conditions, is described in detail.
 - \checkmark The necessary height of the system is described in detail (using meter as the unit).

2. Point Rating Method (cont.)

(Items for Additional Points)	Total technical points=40 points	
(1) Tritium separation performance		(10)
✓ The separation efficiency of the proposed te	echnology is high.	
(2) Effluent		(3)
✓Generated effluent is small.		
(3) Necessary site area per treatment		(9)
✓The necessary site area for treatment of 400	Om ³ of "treated water" per day is narrow	.The
amounts of secondary wastes are small.		
(4) Time needed for treatment of 800,000	0 m ³ of "treated water"	(3)
✓ Days needed for treatment of 800,000 m^3	of "treated water" is short.	
(5) Presentation of experimental data		(11)
 The experimental data are with control sam evaluated. (3) 	ples and with data statistically processed	d and
\checkmark The data are already published as peer revi	iewed in an academic conference, journa	al, etc. (3)
 The experiment is conducted and the data a the effect.(2) 	are analyzed from various points of view	to confirm
\checkmark Based on the presented data, it is expected	to shorten the time period for demonstr	ation.(3)
(6) Necessary scheme for expansion of t	he	(4)
✓ Whether or not expected time needed for the process is specific. (2)	or development and demonstration is s	hort, and
Mhothar ar not the scheme for consideration	n is sufficiently arranged (2)	

 \checkmark Whether or not the scheme for consideration is sufficiently arranged. (2)

3. Reference Information

① Information on the "treated water"

Please refer to the following information concerning the basic information.

(original in Japanese)

http://www.meti.go.jp/earthquake/nuclear/pdf/140115/140115_01c.pdf http://www.meti.go.jp/earthquake/nuclear/pdf/140424/140424_02_003.pd

(translation to English)

http://www.meti.go.jp/earthquake/nuclear/pdf/140424/140424_02_008.pdf

2 Status of consideration by the government

(original in Japanese)

http://www.meti.go.jp/earthquake/nuclear/pdf/140428/140428_01f.pdf

(tentative translation to English)

http://www.meti.go.jp/earthquake/nuclear/pdf/140428/140428_01n.pdf

	Status of Contaminated Water Treatment and Tritium at Fukushima Daiichi Nuclear Power Station
	Tokyo Electric Power Company, Inc.
THE	東京電力 ————————————————————————————————————

Application Procedures

- 1. Application Form
- 2. Submission of Application
- 3. Points to be noted in writing and submitting the application

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1. Application Form

- An Application of the RFP consists of the following three forms:
 - Form 1 Information of Applicant
 - Form 2 Proposal
 - Form 3 Conformity to Evaluation Criteria
- You can download Microsoft Word files of the forms from the home page of the project.
- The application must be written in Japanese or in English.

Form 1 Information of Applicant

- Applicant
 - ✓ Name of (Prime) Company or Organization
 - Name and Title of Representative (of the company or organization)
 - ✓ Address
- Contact
 - ✓ Name of contact person
 - Section / Department*
 - ✓ Title
 - ✓ Telephone Number
 - ✓ E-mail address
 - * If the contact person belongs to a company or an organization other than the applicant, please write the company / organization name of the contact person.
 - Sign or seal of the representative is required.

(For	m 1)			
			Entry No. * Not to be filled in by the applicant	
Man Man	agement Office for t agement	ne Project of I	Decommissioning and Co	ontaminated Wate
Appl man (De	ication for subsidies f agement project" in the f imonstration Project for N Company/Organizati	or the "Verificati FY2013 Suppleme /erification Tests o	ion of technologies for c entary Budget of Tritium Separation Techno	ontaminated wate
Applicant	Representative (Full Name and Title)			Seal o Signature
	Address			
	Contact Person (Full Name)			
Contac	Section/Department			
	Title			
	Telephone (Extension, if any)			

Form 2 Proposal

- 1. Project purpose, details and implementation method
 - ✓ The background and purpose of the project
 - Your concrete proposal for enhancing the performance of the project.
 - This item is evaluated by the conformity to the basic conditions and to the items with additional points described in Exhibit 1.
- 2. Project Implementation Plan
 - Implementation schedule
 - ✓ Concrete implementation procedure
 - ✓ Concrete milestone targets
 - ✓ Quasi-quarterly progress meetings
- 3. Project Implementation Scheme
 - ✓ Diagram of the scheme
 - ✓ Number of persons engaged in the project
 - \checkmark Roles of the persons
 - Brief CV, expertise and experience in similar fields of Project manager and leader
 - ✓ Description of outsourcing



Form 2 Proposal (cont.)

- 4. Track Record of Other Projects
 - Organization's track record of similar projects
 - Expertise and experience in similar fields of major full-time personnel
- 5. Financial Basis and Management System
 - Your fiscal condition
 - ✓ System for financial management
- 6. Total Project Cost
 - Labor cost
 - ✓ Operating cost
 - [1] Design, manufacturing and processing
 - [2] Consumables
 - [3] Travel
 - [4] Reward
 - [5] Outsourcing
 - You may not include general administrative expenses.
 - Re-entrustment (outsourcing major part of the project) is prohibited.

4. Track Record of Other Projects State your organization's track record of similar projects. Include the following items: · Project name, project overview, fiscal year(s) of the project, project owner (if it is your own project, state so). * List major full-time personnel solely committed to this project including their specialized field and track record of similar projects (those listed in item 3 above to be excluded). 5. Financial Basis and Management System * State your fiscal condition as a necessary financial basis for smoothly implementing this project, and your adequate system (persons in charge of and their role) for financial management (filing and storing of written evidences for expenditures). 6. Total Project Cost (in units of thousand yen) *State necessary expenses according to 10. (1) "Expenditure Classification" of the subsidy application procedure. Note that the expense items listed below are only provided as examples. I. Labor cost II. Operating cost [1] Design, manufacturing and processing [2] Consumables [3] Travel [4] Reward [5] Outsourcing thousand yen (% The total amount must not exceed the upper limit of the subsidy).

Form 3 Conformity to Evaluation Criteria

 Conformity of the proposal details to "Basic Requirements" and "Additional points"

Example for [Basic Requirements]

(1) Tritium separation performance and its mechanism The separation factor of the proposed equipment to "treated water" is 200 – 2,000 (see p. 12 of Form 2).

(The technology which can achieve a separation factor more than 100 of the tritiated water arising in the Fukushima Daiichi Nuclear Power Station is described. \rightarrow Yes)

The mechanism and the theory of the equipment are written in p.15 of Form 2.

(The separation mechanism is described in detail. \rightarrow Yes)

- Applications that do not meet all the "basic requirements" shall not be adopted.
- The additional technical points shall be calculated only for the applications that meet all the "basic requirements". The project with higher additional points shall be advantageous in adoption.

Details of the proposal	Allocation of marks (Basic points)
) Tritium separation performance and its mechanism	0
 The technology which can achieve a separation factor more than 100 of the tritiated water arising in the Fukushima Daiichi Nuclear Power Station is described. The separation mechanism is described in detail. Generation volume, composition and storage method of tritium concentration liquid containing enriched tritium and effluent (if generated) are described in detail. The volume of needed "treated water" for implementing the demonstration 	5
tests is described.	0
 i) Treatment capacity It is described that the treatment capacity of the technology can be 	
expanded to more than 400 m ³ per day.	
 Possible verification steps are described in detail. Both the treatment canacity in the verification tests and the one which 	5

[Points to be additionally added]

	Details of the proposal	Allocation of marks (Technical points)
i) Tritiu	m separation performance	
٨	The separation efficiency of the proposed technology is high.	10
ii) Efflu	ent	2
>	Generated effluent is small.	3
iii) Nec	essary site area per treatment volume	
>	The necessary site area for treatment of 400m ³ of "treated water" per	9
	day is narrow.	
iv) Tim	e needed for treatment of 800,000 m ³ of "treated water"	2
A	Days needed for treatment of 800,000 m ³ of "treated water" is short.	3
v) Pres	sentation of the experimental data	11
A	The experimental data are with control samples and with data statistically processed and evaluated.	(3)

2. Submission of Application

Application period

Thursday, July 17, 2014 (by noon, Japan time)

- Documents to be submitted
 - Form 1 Information of Applicant
 - Form 2 Proposal
 - Form 3 Conformity to Evaluation Criteria (*)

and the following:

- Corporate and organization data (i.e. the name, address, foundation date, major business areas, organization chart and number of employees)
- The financial results, and statement of revenues and expenses (for the past one year)
- The articles of association or the act of endowment

(*) Form 3 is not a requirement, but during the evaluation it would be extremely helpful for confirming the conformity with the basic requirements and scoring the additional points if you were to record using Form 3 of Exhibit 1 where the descriptions corresponding to the basic conditions and items for additional points can be found in your proposal.

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2. Submission of Application (cont.)

- Acceptable format of application
 - PDF file attached to e-mail, or on CD-ROM or other media brought or sent by postal mail. (recommended)

or

- 10 copies of the application documents brought or sent by postal mail.
- Place of submission
 - 6-9-5, Shinbashi, Minato-ku, Tokyo, 105-0004 Japan
 - Responsible personnel: Dr. Sato and Mr. Kondo
 - Management Office for the Project of Decommissioning and Contaminated Water Management
 - Mitsubishi Research Institute, Inc.
 - E-mail: tr-apply@mri.co.jp

Please do not use the above e-mail address for any purpose other than sending applications, such as sending questions.

3. Points to be noted in writing and submitting the application

Please be aware of the following when you write and submit the application form. If there is an inadequacy in the following, the proposal will be immediately rejected without being evaluated for additional points.

[In writing the application form]

- The proposal shall meet all the basic requirements for project implementation. The conformity to the basic requirements is judged by the presence of the descriptions required in the basic requirements. Please confirm that the proposal includes the answers to all the basic requirements written in Form 3 of Exhibit 1. (If you attach Form 3 filled with the locations of the required descriptions in the proposal, we can easily judge that the proposal meets the basic requirements.)
- Please confirm that the total project costs shall not exceed the upper limit of the subsidy (one billion yen), and that the project will be completed by March 2016.
- The proposed project shall be implemented completely with your financial bases and technical competence.
- Please confirm that the proposal meets the purpose and the prerequisites of the project by fully understanding the contents of the guidelines.

[In submitting of the application]

- Please comply with the deadline and the methods for the submission of the applications written in the guidelines.
- We recommend sending the application forms and documents via e-mail.

Method and criteria of evaluation

- 1. Method of Evaluation
- 2. Evaluation Criteria

1. Method of Evaluation

- The evaluation procedure is as follows.
 - 1. The applicants shall be evaluated based on the application documents by the Management Office of the Project.
 - 2. "The Review Committee for the Project of Decommissioning and Contaminated Water Management" shall confirm the evaluations for the proposals for which the application documents were complete and met all the "basic requirements" and shall determine the evaluations.
 - 3. The applicants who made remarkable proposals may be requested to make a presentation to "the Review Committee for the Project of Decommissioning and Contaminated Water Management". (The schedule shall be announced after the proposal deadline.)
 - 4. Also, hearings and on-site inspections shall be conducted as required, and submission of additional documents may be requested.
 - 5. The adopted applicants shall be determined considering the results of the evaluation of the application documents, presentations (if implemented), hearings and field research (if implemented).

2. Evaluation Criteria

The descriptions in the applications shall be evaluated based on the following criteria. [1] Adequacy and Efficiency of Project Plan

• The plan shall be evaluated as to whether it is appropriately viable in accordance with the requirements for the Subsidy. The descriptions in the application shall be evaluated on "Basic conditions" and "Items for Additional Points" in Form 3. Applications that do not meet all the "basic requirements" shall not be adopted.

[2] Adequacy of Subsidy Amount

•Accounting of the costs (quote details) shall be evaluated as to whether it is reasonable and precise, and whether it is sufficiently economical. The applicants shall be evaluated based on "1. Project purpose, details and implementation method", "2. Project Implementation Plan" and "6. Total Project Cost". in Form 2.

[3] Technical Competence (Knowledge and Skill) (Prerequisite)

• The applicants shall be evaluated as to whether they have the skills, knowledge and experience required to implement the subsidized project, for instance if they have been proven successful in the field concerned. The applicants shall be evaluated based on "1. Project purpose, details and implementation method", "2. Project Implementation Plan", "3. Project Implementation Scheme" and "4. Track Record of Other Projects" in Form 2.

[4] Financial Basis and Management System

(Prerequisite)

• Subsidized project operating entities shall be evaluated as to whether they have the sufficient financial basis and management to implement the subsidy project smoothly. The applicants shall be evaluated based on "3. Project Implementation Scheme" and "5. Financial Basis and Management System" in Form 2.

Contact

Mitsubishi Research Institute, Inc.

Management Office for the "Project of Decommissioning and Contaminated Water Management"

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