

Evaluation of Operating Results for  
Institute of Physical and Chemical Research (RIKEN)  
in the 3rd Mid to Long-Term Objective Period

August 2018

Minister of Education, Culture, Sports, Science and Technology

1. Items related to the evaluation		
Agency	Institute of Physical and Chemical Research (RIKEN)	
FY for evaluation	Period evaluation	the 3 <sup>rd</sup> mid to long-term objective period
	Mid to long-term objective period	FY 2013-FY2017

2. Items related to the assessor			
The Competent Minister	Minister of Education, Culture, Sports, Science and Technology		
Incorporated jurisdiction dept.	Research Promotion Bureau	Dept. and person in charge	Basic Research Promotion Division, Tetsuya Kishimoto
Evaluation and inspection dept.	Science and Technology Policy Bureau	Dept. and person in charge	Planning and Evaluation Division, Keiji Inoue

3. Items regarding implementation of the evaluation	
July 11, 2018:	13 <sup>th</sup> Sub-Committee for RIKEN, National Research and Development Agency Council of MEXT (1 <sup>st</sup> hearing from RIKEN)
July 13, 2018:	14 <sup>th</sup> Sub-Committee for RIKEN, National Research and Development Agency Council of MEXT (2 <sup>nd</sup> hearing from RIKEN)
August 10, 2018:	15 <sup>th</sup> Sub-Committee for RIKEN, National Research and Development Agency Council of MEXT (hearing opinions)
August 22, 2018:	12 <sup>th</sup> National Research and Development Agency Council, MEXT (hearing opinions)

4. Important items and others relating to the evaluation	
March 17, 2014	Amended 3 <sup>rd</sup> mid to long-term objectives
March 19, 2014	Changed 3 <sup>rd</sup> medium-term plan
March 3, 2015	Amended 3 <sup>rd</sup> mid to long-term objectives
March 31, 2015	Changed 3 <sup>rd</sup> medium-term plan
November 26, 2015	Amended 3 <sup>rd</sup> mid to long-term objectives
February 22, 2016	Changed 3 <sup>rd</sup> medium-term plan
March 1, 2016	Amended 3 <sup>rd</sup> mid to long-term objectives
March 31, 2016	Changed 3 <sup>rd</sup> mid to long-term plan
October 1, 2016	Became the designated National Research and Development Agency
October 1, 2016	Amended 3 <sup>rd</sup> mid to long-term objectives
October 3, 2016	Changed 3 <sup>rd</sup> mid to long-term plan
March 23, 2017	Changed 3 <sup>rd</sup> mid to long-term plan

1. Overall evaluation		
Rating*1 (S, A, B, C, D)	A	(Reference) Estimated evaluation
		A
Reasons for rating	As shown in the overall evaluation of the agency as a whole, the creation of considerable achievements and anticipated creation of achievements in the future and so on are recognized as a result of comprehensive consideration based on some circumstances regarding the agency's business achievements, efforts and so on through its activities and with the National Research and Development Agency's mid to long-term objectives taken into account.	

2. Evaluation of the whole agency	
<p>○ In its activities in the 3<sup>rd</sup> mid to long-term objective period, RIKEN created considerable research and development achievements that lead the world in each research field, and these are expected to be widely applied to industry, including emergent physical science research, brain science research, photonics engineering research and accelerator science research, and therefore it is evaluated that the agency is proceeding with plans for maximization of the R&amp;D achievements.</p> <p>(Examples of remarkable research and development achievements created during the 3<sup>rd</sup> mid to long-term objective period)</p> <ul style="list-style-type: none"> <li>• Emergent matter science research: It is extremely highly evaluated that the agency discovered the world's first skyrmion room temperature operating substance, and developed skyrmion research toward the realization of ultra low power magnetic memory, such as generation in metastable state and established a unique molecular framework and material design guide for organic thin film photovoltaic cells, which produced a high incident photon-to-current conversion efficiency exceeding 10%, and contributed to substantial progress toward practical use.</li> <li>• Brain science research: It is extremely highly evaluated that memory operation, the first breakthrough achievement in the world, suggests the possibility of development of new therapeutic methods, such as for depression, Alzheimer's disease and memory disorder, and that the agency also developed a model mouse for the next generation type Alzheimer's disease as a world standard model mouse and so on.</li> <li>• Advanced photonics research: It is highly evaluated that the agency has contributed greatly to elucidation of an ultra-high-speed physical phenomena, such as movement of electrons which could not be observed up to now, using high power laser, the world's highest output isolated attosecond pulse that the agency developed by using an original method, and the agency also developed a new method to visualize the inside by reflection from the object using a fast neutron beam using an advanced neutron imaging method toward realization of nondestructive testing of infrastructure to mitigate any concern about aging.</li> <li>• Accelerator science research: It is highly evaluated that the agency achieved the mid-to-long term goal of triple beam intensity of heavy element about RI beams two years ahead of schedule and created an achievement to acquire the right to name the element 113 and add the Japan-born element named “nihonium” labeled with the symbol “Nh” in the periodic table of elements as the first country in Asia, and successfully verified the synthesis of the element 116 as a preliminary experiment for synthesis of elements 119 and beyond.</li> <li>• Promotion of collaboration in biomass engineering: Success of the biosynthesis of isoprene used as a raw material for synthetic rubber in a joint research with a private company by developing technologies to create artificial enzymes using the artificial metabolic pathway design tool developed, and success of the development of element technology, which largely increases the technological property of thermoforming, to put polyhydroxyalkanoic acid in bioplastic into practical use, as well as technological transfer for commercialization can be evaluated.</li> </ul> <p>○ In addition, during the mid to long-term objective period, Japan's Basic Science and Technology Plan was revised, and RIKEN Center for Advanced Intelligence Project was established amid increasing importance of research and development toward realizing Society 5.0, whereby efforts for starting artificial intelligence research were made steadily. In the next mid to long-term objective period, further efforts for promotion of research and development activities with high national and social needs are expected in accordance with the current state and environment.</p> <p>○ Regarding items related to management, such as streamlining business operations, it can be evaluated that steady efforts are underway generally as planned. Furthermore, it can be evaluated that the agency introduced a new mechanism to realize efficient allocation of research resources under the leadership of the president. The agency also formulated a science power development plan as management policy, for instance, beginning new work for creation of innovation, personnel system reform and etc. Further enhancement and progress of these efforts are expected as a designated national research and development agency.</p> <p>○ Note that research misconduct related to the article on the STAP phenomenon occurred during this mid to long-term objective period, as pointed out as issues to improve in the Evaluation on Operating Performance, and that it was recognized that RIKEN carried out reform efforts to prevent the recurrence of research misconduct, while receiving the points and being evaluated by external experts, including receiving advice on resolving these issues. It is important to take a serious view that trust in society has been greatly impaired due to a series of problems and it is imperative to continue implementing effective measures based on reform efforts for researching and developing activities in accordance with strict standards.</p>	

3. Issues to be solved and /or improved for each subject	
<ul style="list-style-type: none"> <li>○ The research misconduct related to the article on the STAP phenomenon occurred during this mid to long-term objective period, as pointed out as issues to improve in the Evaluation on Operating Performance, and that it was recognized that RIKEN carried out reform efforts to prevent the recurrence of research misconduct, while receiving the points and being evaluated by external experts, including receiving advice on resolving these issues. It is important to take a serious view that trust in society has been greatly impaired due to a series of problems and it is imperative to continue implementing effective measures based on reform efforts for researching and developing activities in accordance with strict standards. (See, p.175)</li> </ul>	

4. Other items	
Main opinions of the council on research and development	<ul style="list-style-type: none"> <li>○ Many outstanding achievements and obvious progress in social implementation are recognized. Besides efforts of researchers, managerial endeavors and support of researchers could also contribute to these results.</li> <li>○ Start of innovation design as a mechanism to understand social needs, and not general but prioritized budget allocation using expenses at president's discretion are good examples for other national research and development agencies.</li> <li>○ How to prioritize research fields and take the initiative are important for research. RIKEN produced achievements with highly flexible and strategic efforts with a good combination of bottom-up and top-down approaches.</li> <li>○ As the layer of young researchers is generally thin in Japan, proactive recruitment of foreign researchers is thought to be important. RIKEN already took this tactic and expected to continue.</li> <li>○ Although the high level of research activities at the RIKEN Center for Developmental Biology has been returned now, the misconduct in STAP cell research, developed to a very serious social problem, and failure to verify and withdraw the paper in an early stage were regrettable. The whole agency should never forget that the incident occurred in this mid to long-term objective period, and continuous inquest including review of communication between science and society is critical.</li> </ul>
Auditor's special comments	<ul style="list-style-type: none"> <li>○ It is admitted that the work is properly implemented in compliance with laws and regulations, and effective and efficient operation is being conducted in line with the mid to long-term plan and the FY plan.</li> </ul>

- \*1 S: Based on the National Research and Development Agency's aims, businesses, mid to long-term objectives and so on, as a result of comprehensive consideration based on some circumstances regarding the agency's business achievements, efforts and so on through its activities, especially the creation of considerable achievements, anticipated creation of special achievements in the future and so on toward "maximization of R&D achievements" under the conditions of appropriate, effective and efficient operations are recognized.
- A: Based on the National Research and Development Agency's aims, businesses, mid to long-term objectives and so on, as a result of comprehensive consideration based on some circumstances regarding the agency's business achievements, efforts and so on through its activities, the creation of considerable achievements, anticipated creation of achievements in the future and so on toward "maximization of R&D achievements" under the conditions of appropriate, effective and efficient operations are recognized.
- B: Based on the National Research and Development Agency's aims, business, mid to long-term objectives and so on, as a result of comprehensive consideration based on some circumstances regarding the agency's business achievement, efforts and so on through its activities, a certain degree of expectation for the creation of achievement and creation of achievement in the future toward "maximization of R&D achievements" were recognized, and steady business operations have been also recognized.
- C: Based on the National Research and Development Agency's aims, businesses, mid to long-term objectives and so on, as a result of comprehensive consideration based on some circumstances regarding the agency's business achievements, efforts and so on through its activities, the creation of achievements, further drastic efforts and improvements toward "maximization of R&D achievements" or "the appropriate, effective and efficient operations" are anticipated.
- D: Based on the National Research and Development Agency's aims, businesses, mid to long-term objectives and so on, as a result of comprehensive consideration based on some circumstances regarding the agency's business achievements, efforts and so on through its activities, special efforts and improvements including a fundamental drastic review, toward "maximization of R&D achievements" or "the appropriate, effective and efficient operations" are required.

Mid to long-term objectives (Mid to long-term plan)	FY Ratings					Mid to long-term objective period evaluation		Itemized evaluation document No	Remarks
	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	Estimated evaluation	Period evaluation		
<b>I. Items concerning the improvement of the service to the nation and the quality of the operations</b>									
<b>1. Promoting strategic/focused research development on a basis of national/social needs</b>									
(1) Emergent matter science	S	S	S	S	S	S	S	I-1-(1)	
(2) Sustainable resource science	S	A	A	A	A	A	A	I-1-(2)	
(3) Brain science	S	S	S	A	S	S	S	I-1-(3)	
(4) Developmental biology	C	B	A	A	A	B	B	I-1-(4)	
(5) Life system research	A	S	S	A	A	A	A	I-1-(5)	
(6) Integration of life and medical sciences	S	A	A	A	S	A	A	I-1-(6)	
(7) Advanced photonics research	S	S	S	A	S	S	S	I-1-(7)	
(8) Information science and technology research	-	-	-	B	B	B	B	I-1-(8)	
<b>2. Promotion of development and share-use study of the world's top level research base</b>									
(1) Accelerator science research	A	A	S	A	A	S	S	I-2-(1)	
(2) Synchrotron radiation science research	A	A	A	A	A	A	A	I-2-(2)	
(3) Bio resource project	B	B	A	A	S	A	A	I-2-(3)	

Mid to long-term objectives (Mid to long-term plan)	FY Ratings					Mid to long-term objective period evaluation		Itemized evaluation document No	Remarks
	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	Estimated evaluation	Period evaluation		
<b>II. Measures to be taken for achieving the objectives concerning the efficiency of the administration of the operations</b>	A	B	B	B	B	B	B	II	
<b>1. Efficiency of research resource allocation</b>	A	B	A	B	A	A	A	II-1	
<b>2. Efficiency of research resource</b>									
(1) Promotion of information disclosure	A	B	B	B	B	B	B	II-2	
(2) Efforts for cost management	A	B	B	B	B	B	B	II-2	
(3) Improvement of the quality of staff	B	B	B	B	B	B	B	II-2	
(4) Energy-saving measures, facility utilization measures	A	B	B	B	B	B	B	II-2	
3. Regulation of salary levels	A	B	B	B	B	B	B	II-3	
4. Appropriateness of contract business	A	B	B	B	B	B	B	II-4	
5. Securing external funds	A	B	B	B	B	B	B	II-5	
6. Ensuring business safety	A	B	B	B	B	B	B	II-6	
<b>III. Budget (Including personnel expenses)/ income and expenditure plan, and funding plan</b>	A	B	B	B	B	B	B	III	
<b>IV. Limit amount of short-term borrowing</b>	-	-	-	-	-	-	-	IV	
<b>V. If the agency has any unnecessary property or any property that is expected to be unnecessary property, a plan for disposal of such property</b>	A	B	B	B	B	B	B	V	

(4) Life sciences technology platform research	A	A	A	A	A	A	A	I-2-(4)	
(5) Computational science and technology research	A	B	A	A	A	A	A	I-2-(5)	
3. Promotion of tip fusion research by establishing a system for exhibiting the comprehensive strength of RIKEN									
(1) Creative research proposal system	A	A	B	B	A	B	A	I-3-(1)	
(2) The creation of a system to appoint a researcher as the core	A	B	B	B	B	B	B	I-3-(2)	
4. Infrastructure construction and the promotion of industry-academia-government collaboration to create the results with the impact leading to innovation									
(1) Interdisciplinary cooperation with industry	A	B	A	A	A	A	A	I-4-(1)	
(2) Cross-promotion cooperation ①Promotion of cooperation on biomass engineering	A	A	A	A	A	A	A	I-4-(2)-①	
(2) Cross-promotion cooperation ②Promotion of cooperation on drug discovery related research	A	A	S	A	A	S	A	I-4-(2)-②	
(3) Promotion of effective intellectual property strategy leading to practical use	A	B	A	A	A	A	A	I-4-(3)	
5. Development of research environment, nurturing and producing excellent researchers and so on									
(1) Development of vibrant open research environment	B	B	B	B	B	B	B	I-5-(1)	
(2) Development of human resources with internationally superior ability (entitled, “Development of excellent researchers, etc.” until September 2016)	B	B	B	B	A	B	B	I-5-(2)	
(3) Increase understanding R&D activities and announcing easy-to-understand R&D achievements									
①Papers and the results announced at the symposium and so on	A	B	A	A	A	A	A	I-5-(3)	

VI. If the agency intends to transfer or provide as collateral any important property other than the property provided for in the preceding item, a plan therefor	C	B	B	B	B	B	B	VI	
VII. Purpose of using accumulated profit	-	-	B	B	B	B	B	VII	
VIII. Other matters concerning the administration of the operations specified by ordinance of the competent ministry									
1. Plans for equipment and facilities	A	B	B	B	B	B	B	VIII-1	
2. Plans for personnel	B	B	B	B	B	B	B	VIII-2	
3. Debt burden over the mid to long-term objective period	-	-	-	-	-	-	-	VIII-3	
4. Use of a reserve fund	A	B	-	-	-	B	B	VIII-4	

②Understanding the promotion of RD activities	B	B	B	B	A	B	B	I-5-(3)	
(4) Coordination and cooperation with research institutes at home and abroad	A	B	B	B	A	B	B	I-5-(4)	
(5) Strengthening the strong support function for R&D from an administrative and technical perspective	B	B	B	B	B	B	B	I-5-(5)	
6. Promotion towards the appropriate business operations efforts									
(1) Responding to national policies, and social needs	A	B	B	B	A	B	B	I-6-(1)	
(2) Legal compliance, maintain ethics	C	B	B	B	B	B	B	I-6-(2)	
(3) Implementation and reflection of appropriate research evaluation, and so on	B	B	B	B	B	B	B	I-6-(3)	
(4) Promoting information disclosure	A	B	B	B	B	B	B	I-6-(4)	
(5) Efforts for auditor enhancement	—	B	B	B	B	B	B	I-6-(5)	

\* For items that are set to “high” level of importance, a “circle” shall be marked next to each comment.  
For items that are set to “high” level of difficulty, each comment shall be underlined.

\* Ratings up to FY2013 were made based on the “Basic Guidelines for Evaluation of Operational Results for Incorporated Administrative Agencies under the Jurisdiction of the Ministry of Education, Culture, Sports, Science and Technology” (decided by the Evaluation Committee for Incorporated Administrative Agencies, Minister of MEXT on March 22, 2002).

Ratings after FY2014 are made based on the “Standards for Evaluation of Incorporated Administrative Agencies under the Jurisdiction of the Ministry of Education, Culture, Sports, Science and Technology” (decided by the Minister of MEXT on June 30, 2015). The details are as follows:

Ratings up to FY2013	Ratings after FY2014
<p>S: Outstanding achievements are fulfilled. (Without providing a cross-cutting objective standard for the agency in advance, S is rated according to the characteristics of the agency's business operations.)</p> <p>A: Achievements are in line with the medium-term plan, or beyond, or are steadily being implemented toward a medium-term objective, or beyond (achievement rate for a medium-term plan should be over 100% in a given FY).</p> <p>B: In some ways the plan is not being implemented in line with medium-term plan, however, a medium-term objective may be achieved by means of ideas and efforts (achievement rate for the medium-term plan should be 70% to 100%).</p> <p>C: The implementation of the plan is behind the medium-term objective, therefore, improvement of business is necessary in order to realize the achievement of the medium-term objective (achievement rate for the medium-term plan in a given FY is less than 70%).</p> <p>F: The Evaluation Committee needs to warn an agency concerning the improvement of its business management and others (Without providing an objective standard in advance, F is rated as a result of judgement that a warning concerning business improvement is necessary.)</p>	<p>[Administrative and projects related to research and development (I)]</p> <p>S: Based on the National Research and Development Agency’s aims, businesses, mid to long-term objectives and so on, and as a result of comprehensive consideration based on some circumstances regarding the agency’s business achievements, efforts and so on through its activities, especially the creation of considerable achievements, anticipated creation of special achievements in the future and so on toward “maximization of R&amp;D achievements” under the conditions of appropriate, effective, and efficient operations are recognized.</p> <p>A: Based on the National Research and Development Agency’s aims, businesses, mid to long-term objectives and so on, and as a result of comprehensive consideration based on some circumstances regarding the agency’s business achievements, efforts and so on through its activities, the creation of considerable achievements, anticipated creation of achievements in the future and so on toward “maximization of R&amp;D achievements” under the conditions of appropriate, effective, and efficient operations are recognized.</p> <p>B: Based on the National Research and Development Agency’s aims, businesses, mid to long-term objectives and so on, and as a result of comprehensive consideration based on some circumstances regarding the agency’s business achievement, efforts and so on through its activities, a certain degree of expectation for the creation of achievement and creation of achievement in the future toward “maximization of R&amp;D achievements” were recognized, and steady business operations have been also recognized.</p> <p>C: Based on the National Research and Development Agency’s aims, businesses, mid to long-term objectives and so on, and as a result of comprehensive consideration based on some circumstances regarding the agency’s business</p>

achievements, efforts and so on through its activities, the creation of achievements, further drastic efforts and improvements toward “maximization of R&D achievements” or the “appropriate, effective, and efficient operations” are anticipated.

D: Based on the National Research and Development Agency's aims, businesses, mid to long-term objectives and so on, and as a result of comprehensive consideration based on some circumstances regarding the agency's business achievements, efforts through its activities, special efforts and improvements including a fundamental drastic review, toward “maximization of R&D achievements” or the “appropriate, effective, and efficient operations” are required.

[Other than administrative work and projects regarding research and development (After II)]

S: Through the activities of a corporation, remarkable performance exceeding the intended objectives is recognized quantitatively and qualitatively in the medium-term plan (in terms of quantitative indicators, 120% or more vis-à-vis planned medium-term value (or planned FY value), and remarkable performance is also recognized qualitatively)

A: Through the activities of a corporation, remarkable performance exceeding the intended objectives is recognized in the medium-term plan (in terms of quantitative indicators, 120% or more vis-à-vis planned medium-term value (or planned FY value).

B: Performance exceeding the intended objectives is recognized in the medium-term plan (in terms of quantitative indicators, 100% or more but less than 120% vis-à-vis planned medium-term value (or planned FY value).

C: Performance falls below the intended objectives in the medium-term plan, requiring improved performance (in terms of quantitative indicators, 80% or more but less than 100% vis-à-vis planned medium-term value (or planned FY value).

D: Performance falls below the intended objectives in the medium-term plan, requiring drastic improvement of business including its abolition (in terms of quantitative indicators, less than 80% vis-à-vis planned medium-term values (or planned FY value), or it is recognized that the competent Minister is required to ask for improving business operations or taking other necessary measures).