付　属　資　料

1．ミニッツ

2．合同評価報告書

3．同付属書（APPENDIX)、PDM　ver. 1、ver. 2、ver. 2.1、評価グリッドを含む）

1．ミニッツ

PM/GE - 023 J号 3/3

MINUTES OF MEETING OF THE JOINT COORDINATION COMMITTEE BETWEEN JAPAN INTERNATIONAL COPERATION AGENCY AND THE AUTHORITIES CONCERNED OF THE REPUBLIC OF PANAMA ON JAPANESE TECHNICAL COOPERATION FOR THE WATER QUALITY MONITORING TECHNIQUES PROJECT

The Resident Representative of Japan International Cooperation Agency (hereinafter referred to as "JICA") in the Republic of Panama had a series of discussions with the Panamanian authorities concerned, on the achievements of the Water Quality Monitoring Techniques Project (hereinafter referred to as "the Project") to date and desirable measures to be taken by Panamanian side after the Project, for strengthening the sustainability of the ANAM's laboratory.

As a result of the discussions, both sides agreed to recommend to the respective Governments the matters referred to in the document attached hereto.

Done in duplicate in Spanish and English languages, each text being equally authentic. In case of any divergence of interpretation, the English version shall prevail.

Panama City, August 31, 2006

Mr. KAI Naoki
Resident Representative
Panama Office
Japan International Cooperation Agency
Japan

Dra. Ligia Castro de Doens
General Administrator
National Environmental Authority
Republic of Panama

witness by;

Mr. TANAKA Kenichi
Senior Advisor
Japan International Cooperation Agency
Japan

Ms. Natalia Young
National Director for
Environmental Quality Protection
National Environmental Authority
Republic of Panama

ATTACHED DOCUMENT

At the Joint Coordination Committee (hereinafter referred to as "the committee") on the 31st of August, 2006, the findings and recommendations of the Terminal Joint Evaluation, which was conducted from 21st to 30th of August, 2006, were presented and agreed upon between both sides. The essential matters discussed during the Committee are noted as follows;

1. Results of the Joint Terminal Evaluation

   According to the results of the Joint Terminal Evaluation, it can be concluded that the original target of the Project has been practically accomplished and the Project shall be terminated on October 7th, 2006 as planned in the Record of Discussions singed on October 8th, 2003.

   The JICA side recognizes and respects all the efforts made by ANAM during the Project term.

2. Activity of ANAM's Laboratory needed after the end of the Project

   The C/Ps have acquired basic knowledge and skills for the water quality monitoring and now they are capable to handle the routine work. However, enhancement of the precision of the water quality monitoring will be needed for more effective achievement on ANAM Lab's mission. Both sides agreed that, hereafter, based on the results of the Project, it will be necessary to enhance the precision of the water quality monitoring.

3. Provisions for the next project requested to Japanese Government

   The Panamanian side has submitted the official request form for Japanese technical cooperation to the Japanese side. In order to reach the next step, both sides must take into consideration the following matters:

   (1) Sufficient and smoothly disbursed budget for the operation of the Laboratory.

   (2) Adequate counterpart technicians who will be engaged especially in the activities of analysis in the Laboratory, based on an operational plan to be established with verifiable indicators.

   (3) The equipments and machineries should be given the proper maintenance to continue all the activities in the Lab.

4. Documents that will be required for the consideration of the requested project

Following documents shall be submitted to the JICA headquarters via JICA Panama office soon after they are acquired by ANAM officially.

(1) A copy of the approved budget sheet for FY 2007

(2) Job description of personnel related to activities of ANAM's Laboratory

(3) Equipments status report

ANNEX 1 Minutes of Meeting of the Terminal Joint Evaluation

MINUTES OF MEETING
BETWEEN
THE JAPANESE TERMINAL EVALUATION TEAM
AND
THE PANAMANIAN TERMINAL EVALUATION TEAM
ON
JAPANESE TECHNICAL COOPERATION
FOR
THE WATER QUALITY MONITORING TECHNIQUES PROJECT

The Japanese Terminal Evaluation Team (hereinafter referred to as "the Team"), organized by Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. TANAKA Kenichi, visited the Republic of Panama from August 20 to September 2, 2006, for the purpose of conducting the joint terminal evaluation on Japanese technical cooperation for the Water Quality Monitoring Techniques Project (hereinafter referred to as "the Project") on the basis of the Record of Discussions signed on October 8, 2003 (hereinafter referred to as "the R/D").

During its stay in the Republic of Panama, the Team had a series of discussions and exchanged views with the Panamanian Terminal Evaluation Team (hereinafter referred to as "the Panamanian side") headed by Ms. Natalia Young.

As a result of the discussions, the terminal joint evaluation team mutually agreed upon the matters referred to the document attached as ANNEX I.

Done in duplicate in Spanish and English languages, each text being equally authentic. In case of any divergence of interpretation, the English version shall prevail.

Panama City, August 30, 2006

Mr. TANAKA Kenichi
Leader
Japanese Terminal Evaluation Team
Senior Advisor
Japan International Cooperation Agency
Japan

Ms. Natalia Young
Leader
Panamanian Terminal Evaluation Team
National Director for
Environmental Quality Protection
National Environmental Authority
Republic of Panama

ANNEX I JOINT EVALUATION REPORT

ANNEX- I

JOINT EVALUATION REPORT
OF
THE TERMINAL EVALUATION STUDY

ON

THE WATER QUALITY MONITORING TECHNIQUES PROJECT

IN

THE REPUBLIC OF PANAMA

Panama City

August 31, 2006

FISCAL YEAR

Fiscal year of the Government of Japan (JFY): April 1 – March 31

Fiscal year of the Panamanian Government (PFY): January 1 – December 31

CURRENCY EQUIVALENTS

1 Panamanian Balboa = 1.000 US Dollar

1 US Dollar (US$) = 115.772 Japanese Yen (JPY)

ABBREVIATIONS AND ACRONYMS

LIST OF ABBREVIATION AND ACRONYMS USED

AMP	Panama Maritime Authority (Autoridad Marítima de Panamá)
ANAM	National Environment Authority (Autoridad Nacinal del Ambiente)
APO	Annual Plan of Operation
CENMA	Centro Nacional de Medio Ambiente
C/P	Counterpart Personnel
DIPROCA	Direction for Protection of Environmental Quality (Dirección de Protección de la Calidad Ambiental)
EIA	Environmental Impact Aceessment (Evaluación de Impacto Ambiental)
EOJ	Embassy of Japan
IDB	Inter-American Development Bank
JCPP	Japan-Chile Partnership Programme
JICA	Japan International Cooperation Agency
JFY	Fiscal Year of the Government of Japan
JPY	Japanese Yen
PAMA	Adequate Program for the Environmental Management (Programa de Adecuación y Manejo Ambiental)
PROTEMOCA	Technical Project for the Water Quality Monitoring (Proyecto deTécnicas De Monitoreo De La Calidad Del Agua, Misión De Estudio)
M/M	Minutes of Meetings
OJT	On-the-Job Training
PAN	National Environmental Program (Programa Ambiental Nacional)
PCM	Project Cycle Management
PDM	Project Design Matrix
PFY	Panamanian Fiscal Year
PMA	PLAN DE MANEJO AMBIENTAL
PO	Plan of Operation
R/D	Record of Discussions
DAC/OECD	Development Assistance Committee in the Organization for Economic Co-operation and Development

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1. Introduction

(1) Objectives of the Evaluation Study

The terminal evaluation of the Project was conducted with the following objectives.

- To confirm process on the implementation of the Project.
- To confirm the achievement of the Project and put forward effective recommendations for sustainability of the Project.
- To clarify in the logical framework how to achieve the Overall Goal, "The management for the observance and accomplishment of the wastewater standards in the Republic of Panama is strengthened".
- To confirm the current status of the issues that were cited in the mid-term evaluation.

(2) Joint Evaluation Team Members

The evaluation and the recommendations on the Project were made by the following members of the Joint Evaluation Team (hereafter referred to as "the Team").

Name	Assignment	Title/Organization
Panamanian Side		
Ms. Natalia Young	Leader of the Panamanian evaluation members	National Director of Environmental Quality Protection, ANAM, Project Director on PROTEMOCA
Ms. Elba Cortés	Panamanian evaluation member	Technical Assistant of International Cooperation office, ANAM
Mr. Antonio Armas		Economist in the National Directorate of Planning and Environmental Policy, ANAM
Mr. José Rincón		Biologist in the National Directorate of Integrated Watershed Management, ANAM
Japanese Side		
Mr. TANAKA Kenichi	Leader of the Japanese Study Team	Senior Advisor, Environmental Impact Assessment , Institute for International Cooperation in JICA
Mr. OSADA Hiromi	Evaluation Analysis	Senior Consultant, Public Administration, IC-Net Limited
Mr. HAMAGUCHI Katsumasa	Cooperation Planning	Environmental Management Team-1, Group-2, Global Environment Department in JICA

(3) Study Schedule

The Team conducted documentary reviews, interviews and site visits between August 20 and September 2, 2006. Based on these activities, the Joint Coordination Committee held a meeting on August 31, 2006. During the evaluation process, the Team members discussed issues relevant to the execution of the Project with the governmental authorities and institutions. The following table shows the detailed schedule.

Study Schedule

Date				Leader/Cooperation Plan	Evaluation Analysis
	1	Aug. 19	Sat		Departure from Japan
	2	Aug. 20	Sun		Arrival at Panama, Internal meeting
	3	Aug. 21	Mon		Meeting for study plan
	4	Aug. 22	Tue		The 1st Workshop
	5	Aug. 23	Wed		The 2nd Workshop
	6	Aug. 24	Thu		Investigation for the evaluation
	7	Aug. 25	Fri		Investigation for the evaluation
1	8	Aug. 26	Sat	Arrival at Panama	Analysis of collected materials
2	9	Aug. 27	Sun	Internal meeting of the mission	
3	10	Aug. 28	Mon	Meeting at JICA office, visit to ANAM and Laboratory, meeting with the Administrator of ANAM and joint evaluation members.	
4	11	Aug. 29	Tue	Joint evaluation	
5	12	Aug. 30	Wed	Joint evaluation , Preparation of the Minutes of Meeting	
6	13	Aug. 31	Thu	Meeting of Joint Coordination Committee and Signature on the M/M	
7	14	Sep. 1	Fri	Meeting at JICA Office, Report to the Embassy of Japan	
8	15	Sep. 2	Sat	Departure at Panama	
9	16	Sep. 3	Sun	On the flight to Japan	
10	17	Sep. 4	Mon	Arrival at Japan	

2. Project Outline

(1) Background

The majority of Panama's population of approximately 2.8 million is concentrated in Panama prefecture, where Panama City, the national capital, is located. The river water running through Panama City's streets is severely polluted. The pollution is now so serious that shellfish and other benthonic organisms are unable to survive.

This water pollution can be primarily attributed to the fact that domestic wastewater and water discharged from factories and offices are flushed directly into the river without treatment. This, in turn, is because of a lack of sewer pipes and water purification facilities, failure to maintain and repair existing facilities so that they cannot be operated, and inadequate legal restrictions and monitoring systems governing industrial waste.

In February 2000, the Panamanian government established the Regulations for Wastewater, a law setting standard values for wastewater in order to improve the severe water pollution. In addition, the government formulated the Plan to Purify the Panama Bay and Urban Water, a Project to build sewage and treatment systems. The government then requested about US$ 400 million in aid for this Project from the Japanese government and the Inter-American Development Bank (IDB).

However, Panama lacks the analysts, laboratories for analysis and systems for administrative monitoring needed to accurately ensure accomplishment of water quality standards are being followed. As a result, the National Environmental Authority of Panama currently plays the central role, and required establishment of a water quality monitoring system and to strengthen the role for verification of compliance with wastewater regulations.

Thus the Panama government requested the Japanese government to carry out a technical cooperation Project to rebuild the current water quality analysis laboratory, train analysts and promote and reinforce water quality monitoring. In response to this request, the Japanese government began a three-year technical cooperation Project in October 2003.

(2) Project Summary

The objective of the Project is that accurate monitoring information about wastewater (industrial, residential) and natural water (rivers, lakes, and seas) in the Province of Panama is provided by the ANAM's analytical laboratory. The Outputs are divided into the three fields of sampling, analysis and information and education. Currently, two long-term experts, i.e., a chief adviser and a coordinator, have been dispatched.

Here is an outline of basic information of the Project.

Project name	Technical Project for the Water Quality Monitoring (PROTEMOCA)
Related organizations	National Environment Authority (ANAM)
	Direction for Protection of Environmental Quality (DIPROCA), in ANAM
Administrative system	Project Manager: Administrator of ANAM
	Project Director: Director of DIPROCA in ANAM
Date of signing (R/D)	October 8th, 2003
Cooperation period	From October 8th, 2003 to October 7th, 2006
Cooperation scheme	Technical cooperation Project
Related cooperation by JICA	• An individual short-term expert for Water Quality Monitoring Technology • A Japan Overseas Cooperation Volunteer for "Chemical Analysis" • A Senior Overseas Cooperation Volunteer dispatched to the Advanced Technical Research Center • Training course by Japan-Chile Partnership Program
Other donors and related cooperation	• IDB: National Environmental Program (PN0122) • IDB: National Environmental Program 2 (in preparation) • Co-financing by JBIC and IDB: Project for Purification of the Panama Bay (in preparation)

(3) Project Design Matrix (PDM)

PDM 2.1, which is used for analysis on this evaluation study, indicates the current framework of the Project.

Three versions of PDMs have been formulated since the beginning of the Project. Major contents of PDM1.0 had been approved by both the Panamanian and Japanese sides in discussions on October 8th, 2003. Then PDM 1.0 was modified into PDM 2.0 on January 1st, 2005. Moreover, PDM 2.1 was approved in the mid-term evaluation study on January 21st, 2006 with some amendments to the Indicators and Activities. All the versions of the PDMs are attached in "APPENDIX II: Project Design Matrix (PDM 1.0, PDM 2.0 and PDM 2.1)"

3. Methods of Evaluation

The entire evaluation was conducted based on the Project Cycle Management (PCM) method. The Evaluation Team (hereinafter referred to as the "Team") examined all the versions of PDM, process of project preparation and implementation, and achievement of the Outputs through analysis of related documents. Then the Team visited the Project site and had a series of interviews with the Japanese experts, counterparts and other relevant stakeholders. Subsequently, the Team confirmed the status of the Project's achievement in terms of Inputs, Activities, Outputs, Project Purpose and Overall Goal stated in PDM. The Team also evaluated the Project in the light of the five criteria by DAC/OECD: Efficiency, Effectiveness, Impact, Relevance and Sustainability. These criteria are defined as follows.

Five criteria for evaluation

Evaluation criteria	Descriptions
Relevance	Relevance refers to the validity of the Project purpose and the overall goal in connection with the development policy of the recipient governments as well as the needs of beneficiaries.
Effectiveness	Effectiveness refers to the extent to which the expected benefits of the Project have been achieved as planned, and examines if the benefit was brought about as a result of the Project (not of external factors).
Efficiency	Efficiency refers to the productivity of the implementation process, examining if the input of the Project was efficiently converted into the Output.
Impact	Impact refers to direct and indirect, positive and negative impacts caused by implementing the Project, including the extent to which the overall goal has been attained.
Sustainability	Sustainability refers to the extent to which the recipient country can further develop the Project, and the benefits generated by the Project can be sustained under the recipient country's policies, technology, systems, and financial state.

4. Inputs

All the Inputs by the Both Panamanian and Japanese side are shown in "APPENDIX V Project Inputs".

5. Implementation Process

The process of the Project based on Activity is shown in "APPENDIX I Table of Process on PDM 2.1".

6. Project Achievements

(1) Overall Goal

<table>
<tr><th>Narrative Summary</th><th>Indicator</th><th>Summary of Achievement</th></tr>
<tr><td rowspan="2">Overall Goal
The management for the observance and accomplishment of the wastewater standards in the Republic of Panama is strengthened</td><td>1. The number of supervised factories that fulfill the Wastewater standards in Panama is increased by more than 30%</td><td>● Accomplishment on verification for compliance with wastewater standard is being steadily implemented, and the number of activities being checked and evaluated has increased from 169 in 2003 to 715 in July 2006. The rate of increase shows 323% within the term. The number of acceptance of characterization has also been counted at 500 in 2006.
<table>
<tr><th>Fiscal Year</th><th>Number of supervised factories (accumulation)</th><th>Number of acceptance (accumulation)</th></tr>
<tr><td>2002*</td><td>N.A</td><td>1</td></tr>
<tr><td>2003</td><td>169</td><td>52</td></tr>
<tr><td>2004</td><td>N.A</td><td>344</td></tr>
<tr><td>2005</td><td>N.A</td><td>424</td></tr>
<tr><td>2006</td><td>715</td><td>500</td></tr>
</table>
*2002:Year before the Project
● The verification mentioned above is being provided through the Project, and the results are being organized in reports and a database.
● Capacity for evaluating wastewater characterization has been brought up through the Project activity.</td></tr>
<tr><td>2. More factories (at least 50) fulfill the wastewater standards.</td><td>● The number activities that complied with BOD levels established in the wastewater standards reached a 57 % of 500 industries from in 2002 until in 2006.
<table>
<tr><th>Fiscal Year</th><th>Number of complied activities (for BOD5)</th><th>Share</th></tr>
<tr><td>2002*</td><td>0</td><td>0%</td></tr>
<tr><td>2003</td><td>40</td><td>77%</td></tr>
<tr><td>2004</td><td>182</td><td>53%</td></tr>
<tr><td>2005</td><td>230</td><td>54%</td></tr>
<tr><td>2006</td><td>285</td><td>57%</td></tr>
</table>
*2002:Year before the Project</td></tr>
</table>

	3. The number of corrected Wastewater standards and ordinances by ANAM (DIPROCA) based on the monitoring information from the analytical Lab	● The wastewater standards is underway to be revised and a new one (coffee sector) is being created. **Fiscal Year** / **Number of corrected standards using data by the Project** 2002* : 0 2003 : 0 2004 : 0 2005 : 0(4 in the process) 2006 : 0(5 in the process) *2002:Year before the Project

Outlook for fulfillment of the Important Assumptions in the level of the Project Purpose	
The government of Panama maintains and promotes the national policy of the environment in order to comply with regulations.	.The verification of the compliance with the wastewater standards is being implemented based on Resolution AG-0026-2002 and the National Environmental Policy for Supervision, Control and Verification is in process of being approved by the executive.
【Appearance of Overall Goal】	The capacity for data evaluation, have been improved by the project because it contributed partly to the achievement of the Indicator 1. The achievement of the Indicator 2 is not caused by the direct impact of the Project, because the supervision of the discharges is a response to the establishment of the legal framework for wastewater and an increase in people's pressure to control water polution.

(2) Project Purpos

Narrative Summary	Indicators	Summary of Achievement
Project Purpose The accurate monitoring information about waste water (industrial, residential) and natural water (rivers, lakes, and seas) in the Province of Panama is provided by the ANAM analytical Lab.	1. The number of monitored rivers in Panama province increases (from 10 to 16).	● The number of rivers being monitored increased from 10 to 16.. **Fiscal Year** / **Number of monitored rivers** 2002* : 7 2003 : 11 2004 : 10 2005 : 16 2006 : 16 *2002:Year before the Project

	2.The number of physicochemical analysis is increased (up to 21, the required number by the water quality standards).	● The cumulative number of parameters under observation has increased from 12 in 2002, 15 in 2003 to 27 in 2004 and 33 in 2005. **Fiscal Year** / **Number of the items y parameters** 2002* : 12 2003 : 15 2004 : 27 2005 : 33 2006 : 33 *2002:Year before the Project ● Parameters such as pesticides and heavy metals have been increased, and the reliability of the analysis system has been improved due to the introduction of equipments in the Project. **Fiscal Year** / **Number of the parameters** 2002* : 0 2003 : 0 2004 : 12 2005 : 17 2006 : 17 *2002: Year before the Project
	3. The number of monitored lakes and seas in the national parks is increased (from 0 to 1 for lakes, and 0 to 2 for seas).	● The monitoring for lakes and seas has been conducted since May 2006. **Fiscal Year** / **Number of monitored points in Las Cumbres Lake** / **Number of monitored sea points in Panama Bay** 2002* : 0 : 0 2003 : 0 : 0 2004 : 0 : 0 2005 : 0 : 0 2006 : 5 : 4 *2002:Year before the Project
	4. The water quality data is published on ANAM's website and in its Environmental White Paper (in Official	

	Publications)	● Data for 2002,2003, 2004 and 2005 have been already disclosed on ANAM's website and a written publication. ● The elaboration period for the GEO Report does not coincide with the Project implementation cycle.

【General Achievement of Project Purpose】
The above-mentioned quantitative indicators have been almost achieved. Therefore the Project Purpose has been achieved. Consequently, activity on the wastewater monitoring by ANAM Lab is expected to increase by the end of the last date of compliance of the national wastewater standards. On the other hand, further efforts are necessary to improve the qualitative aspect of laboratory management, such as quality assurance and quality control on the analytical process and appropriate evaluation of data. For this aspect, some efforts have already been started by ANAM e.g. agreement based on the JCPP between ANAM, CENMA in Chile and JICA on the management, implementation and quality assurance system based on the ISO 17025.

Fulfillment of the Important Assumptions in the Level of the Outputs	
No changes for the role and the function of the ANAM Lab in the national policy of environment	The roles and functions of ANAM's Lab have been defined through the establishment of the legal framework with such elements as decree and annual operation plan. The importance of the Lab has been increasing under the current national environmental policy.

(3) Outputs

Method to evaluate achievement of Outputs

A. Verification by Joint Evaluation Committee members
The members inspected the Project site and carried out the activities from 1) to 4).
1) Confirmation of products of the Project, confirmation of the abilities acquired by C/Ps as regards transferred technology using a series of interviews, paper tests, demonstrations and other means.
2) A series of discussions on the achievements held between the members and C/P.
3) Formulation of a general agreement among the members.

B. A series of discussions on the general meeting of the committee.

Narrative Summary	Indicator	Summary of Achievement
1. Necessary equipment for water quality analysis and compliance monitoring can be supplied and operated definitely in the ANAM Lab.	1-1. The number of equipment and specifications	● 109 items of monitoring and analytical equipment were purchased in the project. ● Out of an estimated budget for equipment of 422,000 US$, almost 100% has already been provided.

Fiscal Year	Provided items	Disbursed budget (US$)
2003	0	0
2004	62	232,001.46
2005	33	178,908.32
2006	14	11,032.74
Total	109	421,942.52

* Above mentioned budget is listed for the items more than 200$ and items except reagent and glassware.

<table>
<tr><th>Narrative Summary</th><th>Indicator</th><th>Summary of Achievement</th></tr>
<tr><td></td><td>1-2.
The frequency with which supplied equipments is operated</td><td>● Analytical equipment introduced in the Project is being operated in accordance with requests for analysis.
● Proposed renovation of the second floor of the infrastructure for installation of the draft chamber has been contracted on December 6th, 2005, then it started at June 19th , 2006 after approval by the General Controller, and it will be finished on September 9, 2006.
● The only equipment being out of operation, the draft chamber will be under the operation at the end of September, 2006 by the completion of the renovation.</td></tr>
<tr><td colspan="3">【General Achievement of Output 1】 All the equipments for the Project have been procured and installed except the Draft Chamber. However its installation will be completed within the project term after renovation of the Lab's building. The frequency of operation of the equipment will be increased subject to the necessity of the analysis. Thus Output 1 was achieved and it means the establishment of the Labo's facility.</td></tr>
<tr><td>2. ANAM Lab scientists can make water quality monitoring and analysis by themselves for natural water and wastewater in accordance with environmental standards.</td><td>2-1.
The number of sampling (frequency) carried out</td><td>● Monitoring was carried out 7 times in 2002, 16 times in 2003, 29 times in 2004, 35 times in 2005 and more than 40 times in July 2006, showing a steady increase over time.
<table>
<tr><th>Fiscal Year</th><th>The number of sampling carried out</th></tr>
<tr><td>2002*</td><td>7 times</td></tr>
<tr><td>2003</td><td>16 times</td></tr>
<tr><td>2004</td><td>29 times</td></tr>
<tr><td>2005</td><td>35 times</td></tr>
<tr><td>2006</td><td>More than 40 times</td></tr>
</table>
2002*: Year before the Project
➢ In 2004, the target number, 2 times in each of dry and rainy season was not achieved at any sites. The main reason of this was the instability during the election period.
● In the second half of 2005 and in 2006, the target number of sampling and the addition of staff were carried out.</td></tr>
<tr><td></td><td>2-2.
The number of sampling site carried out</td><td>● The number of monitoring sites increased to 7 rivers in 2002, 11 in 2003, 11 in 2004 and 16 in both 2005 and 2006.
● Monitoring at 1 sites in the sea and 1 site in a lake has been started in May 2006.
<table>
<tr><th rowspan="2">Fiscal Year</th><th colspan="3">The number of monitoring sites</th></tr>
<tr><th>Rivers</th><th>Sea</th><th>Lake</th></tr>
<tr><td>2002*</td><td>7</td><td>0</td><td>0</td></tr>
<tr><td>2003</td><td>11</td><td>0</td><td>0</td></tr>
<tr><td>2004</td><td>11</td><td>0</td><td>0</td></tr>
<tr><td>2005</td><td>16</td><td>0</td><td>0</td></tr>
<tr><td>2006</td><td>16</td><td>1</td><td>1</td></tr>
</table>
2002*: Year before the Project</td></tr>
<tr><td></td><td>2-3.
The number of parameters carried out</td><td>● The number of parameters has increased steadily to 12 in 2002, to 15 in 2003, 27 in 2004 and 33 in 2005 and 2006.
<table>
<tr><th>Fiscal Year</th><th>The number of parameters</th></tr>
<tr><td>2002*</td><td>12</td></tr>
<tr><td>2003</td><td>15</td></tr>
<tr><td>2004</td><td>27</td></tr>
<tr><td>2005</td><td>33</td></tr>
<tr><td>2006</td><td>33</td></tr>
</table>
2002*: Year before the Project</td></tr>
<tr><td></td><td>2-4.
The number of analyses carried out</td><td>● The number of analytical data has increased steadily to 216 in 2002, to 1830 in 2003,to 1,786 in 2004, to 4,040 in 2005, and to 5057 until August 2006.
<table>
<tr><th>Fiscal Year</th><th>The number of analytical data</th></tr>
<tr><td>2002*</td><td>216</td></tr>
<tr><td>2003</td><td>1830</td></tr>
<tr><td>2004</td><td>1,786</td></tr>
<tr><td>2005</td><td>4,040</td></tr>
<tr><td>2006</td><td>5057(Until August)</td></tr>
</table>
2002*:Year before the Project</td></tr>
</table>

<table>
<tr><th>Narrative Summary</th><th>Indicator</th><th>Summary of Achievement</th></tr>
<tr><td></td><td>2-5.
The number of analytical procedures for each parameters</td><td>● The quality manual and procedures manual for the selected parameters : BOD, COD, Suspended Solids, Coli form bacillus, heavy metal (8 types), nitrate ion, and phosphate ion have been compiled.</td></tr>
<tr><td></td><td>2-6.
The number of trainings and seminars carried out</td><td>● Training in Japan: 6 people
● Technical seminar subjects;
① Bacterial analysis (seminar: 20 participants)
② Evaluation of chemical analysis (seminar: 22 participants)
③ Aquatic life (two seminars: 15 participants)
④ Aquatic life (two seminars: 22 participants)
⑤ Pesticide analysis (seminar: 17 participants)
⑥ Heavy metal analysis (seminar: 20 participants)
⑦ Monitoring of lake (seminar: 19 participants)
⑧ Measurement of Marine Water Pollution (seminar: 27 participants)
Affiliation of seminar participants: ANAM, Office of the President's Science and Technology Agency, Panama University, Panama Engineering College, Agency of Canals, Agency of Marine Transport, Ministry of Economy and Finance, others.
● JCPP (Japan and Chile Partnership Program)
① Dispatches to training at CENMA in Chile: four times, 6 people in total.
② Invitation of Chilean experts to Panama: two times, 4 people in total.
<u>Qualitative outcome</u>
● All the knowledge obtained in this training is necessary for actual water quality monitoring and analytical work and is used in Project activities.
● The laboratory tecnitians organized and presented the results obtained in the proyect.
● The human networks built up in the seminar could be used to resolve the technical problems confronted in daily situations.</td></tr>
<tr><td colspan="3">【General Achievement of Output 2】
All the indicators on Output 2 have been achieved. It means that ANAM's Lab and the scientists have acquired appropriate capacity for the water quality monitoring and analysis. However, technical capacity development on the wastewater monitoring needs to be strenghtened. Technical manuals for analysis on some major parameters have been prepared and they are expected to be base for SOPs including ISO 17025 process. The process is expected to continue even after the end of the Project.</td></tr>
<tr><td>3. Monitoring results provided by ANAM'S Lab scientists can be opened to the public through the publication and on the Web Site of ANAM.</td><td>3-1.
The contents of the ANAM website, and the number of data on the website</td><td>● The Laboratory web site was created from June 2005.
● The website's content consists of an overview of the Project, data of water monitoring in 2002 and 2003, and monitoring map data.
<table><tr><th>Completed contents</th><th>Contents to be completed at the time the Project ends</th></tr><tr><td>▪ Overview of the Project
▪ Data of water monitoring in 2002-2003 and 2004-2005,
▪ Monitoring map</td><td>▪ Project Memoirs for October 2006</td></tr></table></td></tr>
</table>

<table>
<tr><th>Narrative Summary</th><th>Indicator</th><th>Summary of Achievement</th></tr>
<tr><td></td><td>3-2.
The number of monitoring report on water quality monitoring assisted by ANAM laboratory.</td><td>

2003: 4 reports.
2004: 21 reports (20 on rivers and one on coastal water body)
2005 and 2006: More than 20 reports confirmed.

<table>
<tr><th>Fiscal year</th><th>Number of monitoring reports</th></tr>
<tr><td>2002*</td><td>N.A</td></tr>
<tr><td>2003</td><td>4</td></tr>
<tr><td>2004</td><td>21 (20 rivers, 1 coastal water)</td></tr>
<tr><td>2005</td><td>More than 20</td></tr>
<tr><td>2006</td><td>More than 20</td></tr>
</table>
2002*: Year before the Project
</td></tr>
<tr><td colspan="3">【General Achievement of Output 3】
Monitoring results have been provided in the publications and the Web site. Although the contents of the Web site are expected to be enriched, Output 3 shall be achieved by the time the Project ends.</td></tr>
<tr><th colspan="3">Fulfillment of the Important Assumptions in the level of the Activities</th></tr>
<tr><td colspan="2">1. Stable supply of budget to continue the water resources monitoring during the Project period.</td><td>Although operational cost for the Lab has not been enough, ANAM has been making a continuous effort to obtain a sufficient budget for 2006 and 2007, e.g., the budget for the Lab in 2006, for US$120,950 has been already approved.
<table>
<tr><th rowspan="2">Fiscal year</th><th colspan="2">Supply of budget by ANAM for the Project (US$)</th></tr>
<tr><th>Approved</th><th>Executed</th></tr>
<tr><td>2003</td><td>N.A</td><td>14,658.11</td></tr>
<tr><td>2004</td><td>N.A</td><td>29908.91</td></tr>
<tr><td>2005</td><td>N.A</td><td>78,530.24 (until Oct.)</td></tr>
<tr><td>2006</td><td>US$ 120,950.00</td><td>33600 (until July 2006)</td></tr>
</table>
</td></tr>
<tr><td colspan="2">2. Stable placement of the trained counterparts in ANAM'S Lab</td><td>Currently ten counterparts are assigned on the Project and nine of them have obtained permanent status. 3 technical staff have been newly assigned in 2005 and 2006 respectively and a new chief of the Lab has newly assigned on the Lab in February 2006. Thus the stable placement of the counterparts has been assured through the project term.</td></tr>
<tr><th colspan="3">Fulfillment of the Preconditions</th></tr>
<tr><td colspan="2">1. Fulfillment of Lab facilities such as the Internet, telecommunication, training room, septic tank etc. before execution of the Project</td><td>All the proposed items have been realized except renovation of the second floor of the infrastructure that will be completed at the end of September, 2006.</td></tr>
</table>

7. Evaluation Results

(1) Relevance

Conformity with residents' needs

In terms of environmental measures, the overall purpose and the Project purpose are consistent with the

needs of the residents, the final beneficiaries. In Panama's metropolitan region, the core of the Project's target area, the failure of construction of sewage systems to keep pace with the rapid urbanization has worsened the water pollution of urban rivers and the Bay of Panama, exerting a clearly negative effect on residents' hygiene and health.

Conformity with needs of Panama's governmental organizations
ANAM's capacity for environmental management must be developed in order to resolve the water pollution, as ANAM is responsible for ensuring that wastewater standards are observed. Water quality monitoring technology is a crucial element in this. As such, the Project is consistent with the needs of the Panamanian government—the direct target group—in terms of management capacity.

Conformity with Panama's policies
The administration of President Martin Torrijos Espino started in September 2004 and advocated environmental conservation as one of its policy goals. This Project helps to achieve this goal.

Conformity with Japan's aid policies
The discussions in February 2000 between the Project confirmation team and the Panamanian government agreed on the four areas, including environmental conservation, that represent Japan's priority aid areas for Panama. Education on and promulgation of conservation technology is an area requiring aid, and this Project is being implemented in accordance with this.

Relevance of approach taken in the Project
Technology transfer aiming to strengthen water quality monitoring capacity, including the analytical technology of ANAM's water quality laboratory, and monitoring carried out in Panama's metropolitan region—the target area—is a relevant strategy. This can be attributed to the fact that training water quality monitoring technicians with an emphasis on this particular technical capacity is expected to have the most spillover effect in enhancing the capacity to manage wastewater regulations. This, in turn, is because the selection of the Panama metropolitan region, which suffers the most severe water pollution, as the target area means that the transferred technology can be used directly and indirectly.

Process enhancing relevance of the Project
Since its establishment in 1998, ANAM have been trying to elaborate environmental laws, norms, and regulations. However, the legal and institutional framework and the role for ANAM's laboratory were not defined clearly at the beginning of the Project. The need for the framework and defined role was identified in the internal evaluation of the organizational needs of ANAM conducted in 2005 and confirmed by the mid-term evaluation study. . Thus it is fair to say that the establishment of the legal and institutional framework of the laboratory is steadily proceeding.

- The laboratory's legal base and role was defined in the draft of the decree with a change of the role and organization of ANAM in March 2006. The draft is waiting for the approval by the President.
- The laboratory's official plan is spelled out in a document, "Perspectivas Futuras y Sostenibilidad del Laboratorio de Calidad Ambiental" by DIPROCA in January 2006.
- Moreover, manuals for appropriate operation of the laboratory were elaborated in a document, "Manual de Calidad" by the staff of the laboratory in March 2006.

(2) Effectiveness

Outlook for achievement of the Project goals based on results of verifying performance
The four indicators measuring the Project goal of providing accurate monitoring information on wastewater (industrial and residential) and natural water (rivers, lakes, seas) have been mostly achieved by the time the Project ends. The number rivers being monitored (indicator 1) and the number of parameters being analyzed (indicator 2) is increasing and the reliability of the data has improved. Monitoring of lake water and sea water (related to indicator 3), and the disclosure of water quality data (indicator 4) have been achieved at the end of the project. The water quality data has been published on ANAM's website, in the First (2002 and 2003) and Second (2004 and 2005) Monitoring Report on the

Water Quality of Panama's Watershed. In terms of the technical capacity, water quality monitoring technology has improved markedly compared to when the Project started, thanks to the input of the requisite analytical equipment and the implementation of training programs (a key element of the activities). For example, the technology introduced through the Project has made it possible to analyze dangerous chemicals such as heavy metals and agricultural chemicals, as well as marine life. Further, the adoption of new analytical equipment has improved the accuracy of analysis in basic physical, chemical and micro-biological tests. In the future, the accuracy of analysis will be improved to provide accurate monitoring information, and also to leave records of the transferred technology.

Contributions of output achievement to achieving Project purpose

The number of sites being monitored (indicator 1) and the number of items being analyzed and observed (indicator 2) have increased due to the procurement and operation of equipment (related to output 1) and the acquisition of monitoring technology (related to output 2). Authorized laboratories for the monitoring analysis of wastewater regularly carry out water quality analysis for wastewater, and the laboratory scientists assess the results of the analysis to verify observance of the standards. In addition, the laboratory scientists would be able to carry out the inspections of water pollution incidents. This is the first time that natural water are being monitored in Panama (related to indicator 3), due to the Project. Monitoring of lake water and sea water (related to indicator 3), and the disclosure of water quality data (indicator 4) have been achieved by the end of the Project. The achievement of the Project purpose will be due to the achievement of the outputs.

(3) Efficiency

Relationship between extent to which output are achieved and input

Ten indicators for four outputs have been achieved by the time the Project is completed. This was due to the inputs and activity effects for which economic efficiency and effectiveness were taken into consideration. Standard operating procedures (SOPs) were elaborated for certain parameters as planned for indicators 2-5. The implementation of the system for management and quality assurance that is being realized to achieve the accreditation will allow the continuous improvement of the procedures, these would require the cooperation and coordination with other organizations other than ANAM.

Quantity and quality of input

So far a total of seven counterparts have been trained in the following areas: water quality analysis, quality control of the laboratory, and environment policy and management. This was the input needed to achieve Output 2. Efficiency in terms of cost and communication were taken into account here, in tandem with the training in Japan and training in Chile offered by JCPP. Seven of the short-term experts were provided to cover five types of water quality analysis, and JCPP's experts in Chile were utilized here as well. A chief adviser in charge of overall management and two long-term experts for water quality monitoring technology needed for continuous OJT were also provided. In this way, efforts were made to ensure that input was planned efficiently, coupled with the minimum number of requisite long-term experts and third-country input.

(4) Impact

Impact on achievement of overall goal through achievement of Project purpose

【Overall goal: The management for the observance and accomplishment of the wastewater standards in the Republic of Panama is strengthened】

【Project Purpose: The accurate monitoring information about waste water (industrial, residential) and natural water (rivers, lakes, and seas) in the Province of Panama is provided by ANAM'S analytical Lab】

The overall goal is already being realized as the impact from the Project purpose's achievement. The fact that ANAM, as responsible for enforcing wastewater regulations and carrying out monitoring, has a water quality analysis laboratory with technical capacity means that it can now use its technology to

respond to sudden water pollution incidents. Requests from actors, from various sectors to carry out surveys of water pollution problems have also increased, and this kind of network with similar organizations has become more active. Further, the Project's success in reinforcing the ANAM laboratory's capacity has encouraged affiliations with other similar analysis laboratories and in the future this laboratory is expected to play a leading role in the environmental monitoring field. In this way, achieving the Project purpose will reinforce environmental management functions for Panama society overall.

A remarkable legal impact

The information generated and the technical capacity has helped to create and to modify not only environmental but also public health and agricultural regulations, for example, the restriction of Endosulfan (pesticides) in the republic of Panama.

Discrepancy between overall goal and Project purpose

In projects assisted by JICA, the overall goal is set as an effect generated three to five years after the Project purpose is achieved. Currently, part of the Overall Goal is beginning to be realized due to the achievement of the Project purpose, and ultimately it will be achieved as an effect in tandem with implementation of other measures. As such, the Project purpose and the Overall Goal share a causal relationship and there is no discrepancy.

Unanticipated impact

Throughout the Project period, many students from Panama University and Panama Engineering University helped with analysis and monitoring. As a result, the Project made a considerable contribution to spreading environmental monitoring technology in Panama. Also, the training carried out through JCPP (Japan-Chile Partnership Program) has brought Panama's laboratories closer to acquiring ISO17025 accreditation for its quality management, and requests from other donors' Projects for water quality analysis have increased.

Issues for realizing impact

Sustainable and independent efforts will remain essential for improving technical capacity in the future. This is because environmental monitoring in Panama needs to reach a technical level equivalent to the global standard of developed nations, and the experiences of other beneficiary countries and Japan suggests that it will take a minimum of 5-10 years before it reaches the requisite level. This Project's desired objective is being achieved in the sense that monitoring technology has been improved to a certain level, but technical capacities must be improved even further and on a continuous basis in order for Panama to be able to accurately analyze all of the items in the water quality standards it has adopted. Medium and long-term attainment targets for the laboratory's analytical technology should be set, and efficient means of achieving these targets should be reviewed.

(5) Sustainability

Organizational and institutional aspects

Currently, the laboratory' s mission, functions and responsibilities are basically justified in the context of administrative law, e.g., the Law No.41 1998, National Environmental Strategy, Decree 207-2000 and AG-0036-2004. The new draft for a decree that defines the role and functions of ANAM' s Lab for the new administrative structure of ANAM has been submitted for official approval by the Ministry of the Presidency. Thus, the process for justification of ANAM' s Lab has been sustancially proceeding since 2005. It would also form a foundation for the Project goal' s sustainability.

Personnel aspects

All the analysis technicians were granted permanent contracts since January 2005, based on a policy of the current administration of ANAM that coincided with the suggestion from the Japanese side.

. On the other hand, the number of laboratory technicians is not sufficient given the volume of operations, so there is a need to increase this number. Furthermore, four out of the current seven

analytical employees are in their age 40s, so increasing the number of younger employees and training them is another issue to address in the future.

Organizational management issues
To make further improvement on management of the Lab, both sides of the Joint Evaluation Team agreed upon a recommendation that weekly meetings take place with participation of all the levels of the Lab personnel that includes Project manager, Project Coordinator and all the Lab staff.

Financial aspects
Although the operational budget for the Lab has not been enough, ANAM has been making a continuous effort to obtain a sufficient budget for 2006 and 2007. For instance, the budget for the Lab in FY 2006, US$120,950 has been already approved. In order to realize smooth and timely disbursement on the planned budget, it is necessary that the Lab submits applications for the disbursement to DIPROCA in advance based on its annual operation plan, at least 3 months before.

Technical aspects
Both sides recognized that some of the donated machineries, e.g. AAS, GC and Spectrometers, could need complicated repair works. So it is essential that a certain reparation system be established for the future through a partnership with related actors such as distributors and other laboratories in Panama.

While national technical standards of methodology of water quality analysis have been established, including the quality control criteria, the Panamanian government must establish a vision as to the way in which the technology transferred in this Project will be used, acknowledging that technical needs continue to increase.

8. Status of the follow-up at agreement on the mid-term evaluation

At the Joint Coordination Committee (hereinafter referred to as "the Committee") on 20th January 2006, findings and recommendations of the Mid-term Joint Evaluation, which was conducted from 9th to 20th January 2006, were presented and agreed upon between both sides. The following are summaries of Committee discussions and the current status of follow-up actions.

(1) Revision of PDM and PO

According to the recommendations of the mid-term joint evaluation report, the Committee agreed to revise the past Project Design Matrix (PDM 2.0) into PDM 2.1 with the following amendments.

1) With regard to the Indicator 2 of the Project Purpose ("The number of physicochemical parameters analysis is increased"): Taking into account wastewater standards and required number of parameters for wastewater inspection, the PDM should be revised as "The number of physicochemical analysis is increased (up to required No. 21 by the water quality standards)."
   - The cumulative number of physical and chemical analyzed parameters has increased from 12 in 2002, 15 in 2003 to 27 in 2004 and 33 in 2005. Thus this indicator has been achieved.

2) With regard to the Indicator 3 of the Project Purpose ("The number of monitored lakes and seas in the national parks is increased (from 0 to 2 each)": Since it will not be possible to monitor two lakes in the project area, the PDM should be revised as "The number of monitored lakes and seas in the national parks is increased (from 0 to 1 for lake, and 0 to 2 for seas)."
   - The target number has been accomplished and the monitoring for lakes and sea has been conducted since May 2006. Thus this indicator has been achieved.

3) With regard to the Indicator 4 of the Project Purpose ("The water quality data is published on ANAM's website and in their Environmental White Paper"): Since the water quality data has been printed as an official publication by ANAM in cooperation with JICA, this could be used instead of Environmental White Paper. Therefore, the PDM should be revised as "The water quality data is published on ANAM's web site and in their Environmental White Paper (in Official Publications)",
   - Data for 2002 and 2003 has been already disclosed on ANAM's website. Moreover, data for 2004 and 2005 will be disclosed by the end of August 2006. Thus this indicator is ha been achieved.

4) With regard to Activity 2-4 ("Water quality analysis laboratory scientists will prepare SOPs on analysis methods"): Preparing SOPs for analysis requires coordination with other organizations as well as ANAM, and judging from the content and technical level, it will not be possible to complete them within the Project period. Those in charge of analysis should describe the knowledge and experiences acquired in this Project's training program in writing, and use it in the laboratory. Accordingly, the PDM should be revised as "Water quality analysis laboratory scientists will create technology materials describing the analytical methods that they learned in this Project (10 selected parameters)."
   - Currently, methods of analysis concern the following: BOD, COD, Suspended Solids, Coli form bacillus, heavy metal (8 types), nitrate ion, and phosphate ion. Thus the amended activity has been appropriately carried out.

(2) Enhancement of the Administration of the Project

Both sides agreed to strengthen the communication between DIPROCA and ANAM's Lab. A weekly meeting shall be held at the Lab every week and the Project Coordinator, JICA Experts and all the Lab staff members are required to attend it. The Project Manager shall be present in the meetings at least every 2 weeks and shall take responsibility for memorandums of all the meetings.

According to the JICA Experts' report, the Project Coordinator has visited the Lab 7 times during

6 months after the mid-term evaluation. The Project Director has visited the Lab twice and several times of regular meetings were held. However, meetings between the Project Coordinator, the Lab's chief and the other staff were held 2-3 times a week in July and August at DIPROCA's office and there was daily communication by phone. However, regular communication at the Lab between administrative staff and Lab staff has to be promoted more frequently.

(3) Action Plan to Secure the Sustainability of the Project

ANAM shall start the activity to realize the matters mentioned below. These matters are all essential for the sustainable laboratory management. JICA Experts shall provide necessary advice for ANAM.

1) Approval of Resolution

A resolution for the Lab's role and function is now under preparation. ANAM shall implement the necessary procedure and make efforts so that the resolution will be approved in January 2006.

➢ The final draft of a decree that includes definition of the Lab's role and function has been already prepared and submitted to the ministry of the Presidency. A copy of the final draft of the decree has been submitted to JICA Panama office at August 28th 2006. The decree is now waiting for the approval of the president of the republic.

2) Budget Allocation

MEF has already approved the C/P budget until the end of the Project in October 2006. ANAM shall do its best to execute the budget as planned. The current Project Manager made a commitment, during an evaluation study meeting, for ANAM to keep doing its best to obtain the necessary budget through MEF for ANAM's Lab even after the end of the Project. The Project manager agreed to send a copy of a draft budget compilation plan for FY 2007 to the JICA Panama Office between April and June 2006.

➢ ANAM is preparing for the purchase of the necessary equipment in the Lab. Nevertheless, the budget execution rate on 2006 is still 28 % as of July 2006.
➢ On the other hand, a draft of the budget for the fiscal year 2007 with an amount similar to the fiscal year 2006 has been submitted to JICA Panama office at August 28th 2006, which had been submitted to MEF.

3) Development of various budget sources

There are several ways to obtain a budget for laboratory: national budget from MEF, project budget from MEF, project budget from Donors, and budget earned by provision of services. DIPROCA shall develop various ways to obtain funding for the laboratory thorough close coordination among other department in ANAM and related organizations. PAN-2 is one of the alternatives taking shape. PAN-2 is expected to support the laboratory's budget because the certification program for laboratories is going to be one of the components. The responsible person for laboratory management should attend the meeting. DIPROCA shall dispatch the responsible person for laboratory management to the meeting. Moreover, ANAM shall start making the strategy for cleaner production by FOMIN.

➢ According to the confirmation in April 2006 through the Department for Planning and Environmental Policy about the progress of the preparation for the PAN-2 program by IDB, a prospective financial resource for certification on ISO 17025 of the Lab, its budget is to be definitely incorporated as one of activities of the program. The framework of the program will be formulated through 4 months of the consultantcy work that will be contracted after the approval of the IDB. The Terms of Reference of the consultancy has been already prepared and is waiting for approval by IDB's confirmation mission that will visit to Panama early September.
➢ The entire budget for the Lab includes 3 items: national common budget, special budget for the Lab, and acquired budget by the other projects. The Department pledged to analyze

methodology for the procurement of the necessary budget for the Lab. Regarding the special budget, ANAM will analyze the procurement methodology based on the examination fee for wastewater analysis of the industries.

4) Procurement of human resources
It is essential for technical sustainability of the Lab to obtain and train its own human resources with the appropriate range in age and qualifications. ANAM through DIPROCA shall begin studying various means for the procurement and shall formulate an action plan.

➢ ANAM increased the number of staff members for the Lab and it will continue increasing it. Students of Panama University and Panama Institute of Technology are engaged in the graduation thesis work or project in the Lab as interns in coordination with the Universities. Providing a field for graduation study and internships helps train national human resources and strengthen the Lab's capacity. During the Project term, Japanese Experts have recommended to secure implementation body to be dedicated to activities for the technical transfer by the Project, especially in analysis activity in the Lab.

(4) Documents to be required
The following documents will be submitted to the JICA headquarters via the JICA Panama office immediately after they are acquired by ANAM officially.

1) A copy of the approved Resolution about ANAM's Lab: by the end of January 2006.
➢ A rough draft has been prepared and a related decree is awaiting a signature by the President. (Refer to "(3)-1), Approval of Resolution")

2) A draft of budget compilation plan for 2007: A preliminary draft of the document shall be submitted until the end of July, and then the second draft shall be submitted by the end of September 2006.
➢ A draft of the budget for the fiscal year 2007 to be requested to MEF has been already prepared with an amount similar to the fiscal year 2006. The second draft is expected to be prepared by the end of September.

3) A draft of the Terms of Reference for the Accreditation Program related with ISO 17025: by the end of January 2006.
➢ An action program for the accreditation of the ISO 17025 has been formulated and is currently under the implementation.

4) The 2006 Annual Operational Plan of ANAM's Lab: by the end of January 2006.
➢ The plan has been already prepared and is being implemented.

9. Conclusion

The inputs of the Project, such as the Experts, the counterpart technicians, equipments and machineries and the operational budget were arranged almost as planned by both the Panamanian and the Japanese sides. Consequently the Outputs and Project Purpose aimed at on the PDM 2.1 have been almost accomplished. Hereafter, based on the result of the Project and the new needs of the country, it will be necessary to enhance the precision, among other priorities, of the water quality monitoring.

It means that the primary basis of the water quality monitoring system has been established through the implementation of the Project in terms of human resources, facility, equipments and technology. Moreover the water quality data acquired by the monitoring activity has been released in several official reports.

Furthermore, the sustainability of ANAM's Lab on the primary stage has been strengthened by the Panamanian side's efforts in the aspects of human resources, budget allocation, and legal and institutional framework through the implementation of the Project.

Therefore, it can be concluded that the original target of the Project has been practically accomplished and then the Project shall be terminated in October 7th, 2006 as planned in the R/D.

10. Recommendations

<Short Term Recommendations>

(1) Continuous contact with JICA

After the Project, continuous contact with JICA Panama Office is recommended to inform the latest condition of ANAM's Lab and to request support if necessary.

(2) Beforehand application for the budget

The operational budget for the Lab has been already applied to the MEF. In order to realize a smooth and timely disbursement of the applied the budget, it is necessary for the Lab to submit applications for the disbursement to DIPROCA at least 3 months before.

(3) The condition needed for the technical capacity development

The C/Ps have acquired basic knowledge and skills for the water quality monitoring and now they are capable to handle the routine work. However, the enhancement of the precision of the water quality monitoring methodology will be needed for more effective achievement of ANAM Lab's mission defined on the related legal framework. To conduct the future activities smoothly, the following matters are recommended.

1) Continuous disbursement of sufficient budget for the operation of the Lab.
2) Adequate technicians who will be engaged especially in the activities on analysis in the Lab, based on operational plan to be established with verifiable indicators.
3) Continuous and appropriate preventive maintenance of the equipments and machineries in the Lab.

<Long and Mid Term Recommendations>

(1) Job descriptions

The role of the ANAM Lab has various aspects, e.g. supervision of the industries, technical advice to the committees related with the water quality control, etc. It is relevant for the Lab's staff to take action related with those aspects. However, in the aspect of the technical capacity development of the Lab, it is essential to secure and increase the appropriate staff who work especially for the analysis in the Lab. In this sense, the division of the duties in the Lab under the integrated institutional framework will be needed in the future.

(2) Accreditation on the ISO 17025

Since ANAM Lab is aiming to be a reference laboratory in Panama, it is essential to obtain the accreditation for the ISO 17025 for the future. An action program of the preparation for accreditation had been formulated and was already implemented under the cooperation with the JCPP program. Then the Lab is expected to proceed the next step for the preparation toward the accreditation. Therefore, it is recommended for JICA to provide appropriate advice when ANAM requests for it.

11. Lessons learned

(1) The Project term, 3 years was so short, that it should be essential to secure at least 5 years' term for more efficient implementation and further impact.

(2) It is important to promote synergy among the related programs in the same field e.g PAN by IDB, FOMIN, GEF and etc. in order to promote greater impact and to ensure sustainability after the project ends.

(3) Organizational structure of the project and internal and mutual communication is the key issue for efficient and effective implementation of the project.

(4) It is important to keep relationship between the government, civil society, academic and scientific fields and the private sectors in order to improve technical transfer inside the project.

(5) Though there are often obstacles on the implementation of the international cooperation project, e.g. language and culture, it is important for the both sides to make an effort through mutual understanding for overcoming the obstacles.