付　属　資　料

1．2006年1月20日に開催された合同調整委員会のM/M

2．合同中間評価報告書に対する合意M/M

3．調査団協議議事録等

4．水質モニタリング技術計画事前評価調査報告書

（2003年10月、パナマ事務所作成。R/D、M/M、TSI含む。作成当初は印刷、製本されていなかったため、本報告書の別添として収録することとした。）

1．2006年１月20日に開催された合同調整委員会のM/M

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 for the remaining period of the Project to be taken by both Japanese and Panamanian Sides, for the successful implementation of the Project.

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

This Minutes of Meeting is prepared in two versions. The main version is written in English and the other version is written in Spanish. In case of any divergence of interpretation, the English version shall prevail.

Panama City, January 20, 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 20th of January, 2006, findings and recommendations of the Mid-term Joint Evaluation, which was conducted from 9th to 20th of January, 2006, were presented and agreed upon between both sides. The essential matters discussed during the Committee are noted as follows;

1. Priority for Water Quality Monitoring

Both sides reconfirmed that water quality monitoring is very significant in environmental administration in Panama and that it is a matter of high priority in ANAM.

2. Revision of PDM and PO

According to the recommendation of the mid-term joint evaluation report, both sides reviewed the existing Project Design Matrix (PDM2.0) and Plan of Operation (PO2.0) and agreed to revise them as shown in Joint Mid-term Evaluation Report's Appendix VII (PDM Version 2.1 and Plan of Operation Version 2.1).

3. Enhancement of the Administration of the Project

Both sides agreed to strengthen the communication between DINAPROCA and ANAM Laboratory. Weekly meeting shall be held at the Laboratory and Project Coordinator, JICA Experts and all the Laboratory staffs are required to attend. Project Manager shall be present to the meetings at least every 2 weeks and shall take responsibility for all the memorandums of the meetings to be made at every meeting.

4. 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

Resolution for laboratory's role and function is now under preparation as shown in ANNEX I. ANAM shall implement necessary procedure and make effort so that the resolution will be approved within January 2006.

(2) Budget Allocation

MEF has already approved the C/P budget until the end of the Project, October 2006 as shown in ANNEX II. ANAM shall make an effort for the execution as planned. It was committed by the current Project Manager at the meeting on the Study that ANAM shall continuously make all effort to obtain necessary budget through MEF for ANAM Laboratory even after the time the Project ends. The Project manager accepted to send copy of draft of budget compilation plan for FY 2007 to JICA Panama Office, which will be made from April to June, 2006.

(3) Development of various budget source

There are several ways to obtain budget for laboratory; national budget from MEF, project budget from MEF, project budget from Donors, and self budget earned by provision of services. DINAPROCA shall develop various ways to obtain budget for the laboratory through close coordination among other department in ANAM and related organizations. PAN-2 is one of the alternatives which is taking shape. It is expected that PAN-2 support the laboratory's budget because the certification program of laboratories is going to be one of the components. DINAPROCA shall dispatch responsible person for laboratory management to the meeting, which is to formulate the framework of PAN-2. Moreover, ANAM shall start to make strategy in the program for environmental management and enterprise participation in cleaner production by FOMIN.

(4) Procurement of human resources

It is essential for technical sustainability of the laboratory to obtain and train up its own human resources with appropriate range in age and qualified capacity. ANAM through DINAPROCA shall begin to study various means of the procurement and to formulate an action plan.

5. Documents to be required

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

(1) A copy of the approved Resolution about ANAM's Laboratory, until the end of January, 2006.
(2) A draft of budget compilation plan for 2007: A preliminary draft of the document shall be submitted until the end of July, then the second draft shall be submitted until the end of September, 2006.
(3) A draft of the Terms of Reference on the Accreditation Program related with ISO 17025, until the end of January, 2006.
(4) The 2006 Annual Operational Plan of ANAM's Laboratory, until the end of January, 2006.

ANNEX I **Draft of the Resolution for ANAM's laboratory**
ANNEX II **Approved Budget for PROTEMOCA for FY 2006**
ANNEX III **Minutes of Meeting of the Mid-term Joint Evaluation**

BORRADOR

REPÚBLICA DE PANAMÁ
AUTORIDAD NACIONAL DEL AMBIENTE

RESOLUCIÓN No._____

LA SUSCRITA ADMINISTRADORA GENERAL DE LA AUTORIDAD NACIONAL DEL AMBIENTE (ANAM), EN EJERCICIO DE SUS FACULTADES LEGALES, Y

CONSIDERANDO:

Que a través de la Ley No.41 de 1 de julio de 1998, "General de Ambiente de la República de Panamá", dispone que la administración del ambiente es una obligación del Estado y ordena la gestión ambiental y la integra a los objetivos sociales y económicos, a efecto de lograr el desarrollo humano sostenible en el país.

Que el Artículo 5 de la citada Ley General de Ambiente de la República de Panamá, crea a la Autoridad Nacional del Ambiente como entidad autónoma rectora del Estado en materia de los recursos naturales y del medio ambiente para asegurar el cumplimiento y aplicaciones de la leyes, reglamentos y la política nacional del ambiente.

Que el Decreto Ejecutivo No.207, de 7 de septiembre de 2000, por el cual se adopta la estructura organizacional y funciones de la Autoridad Nacional del Ambiente (ANAM), establece a la Dirección de Nacional de Protección de la Calidad Ambiental en el nivel operativo para definir, elaborar e implementar políticas, planes y programas nacionales para promover regímenes normativos, mecanismos institucionales y acciones tendientes a conservar, proteger y mejorar la calidad ambiental; así como, la fijación y aplicación de instrumentos de gestión ambiental como mecanismos permanentes de concertación entre los diferentes sectores involucrados en el desarrollo de la gestión ambiental nacional.

Que la Dirección Nacional de la Protección de la Calidad Ambiental, con base al citado Decreto Ejecutivo No. 207, actualmente se encuentra conformada por dos (2) Departamentos con sus respectivas funciones, a saber: Departamento de Control de la Calidad Ambiental y Departamento de Adecuación y Manejo Ambiental.

Que para apoyar las acciones dirigidas al funcionamiento eficiente de la Autoridad Nacional del Ambiente, en el cumplimiento y adopción de medidas que conlleven a mejorar la calidad del ambiente, es necesario reorganizar la Dirección de Nacional de Protección de la Calidad Ambiental, a fin de poder desarrollar los programas establecidos en la materia.

Que mediante el Artículo 8 de la citada Ley General de Ambiente de la República de Panamá, se faculta a la Autoridad Nacional del Ambiente

(ANAM), para que cree y organice la estructura administrativa necesaria para el cumplimiento de los mandatos de dicha Ley.

RESUELVE:

ARTÍCULO 1: REORGANIZAR la Dirección Nacional de Protección de la Calidad Ambiental en los siguientes Departamentos: Departamento de Adecuación y Manejo Ambiental, el Departamento de Control de la Calidad Ambiental, el Departamento de Desastre Ambiental y el Laboratorio de Calidad Ambiental.

ARTÍCULO 2: La Dirección Nacional de Protección de la Calidad Ambiental, tendrá entre sus funciones:

a. Preparar y presentar para aprobación y ejecución políticas y normas de calidad ambiental y límites máximos permisibles que contribuyan al mejoramiento de las condiciones ambientales

b. Dirigir y coordinar el proceso de elaboración, revisión, modificación y adopción de normas de calidad ambiental y de límites máximos permisibles de emisión al aire, agua y suelos, con la participación de las autoridades competentes y la comunidad organizada.

c. Dirigir y dar seguimiento a las actividades que se requieren para mantener actualizado el inventario de normas de calidad ambiental vigentes, clasificadas para cada componente.

d. Coordinar con las Administraciones Regionales y autoridades competentes, la fiscalización del cumplimiento de los estudios de impacto ambiental, planes de manejo ambiental, programas de adecuación y manejo ambiental y resoluciones de aprobación de éstos.

e. Dirigir el desarrollo de los programas que se llevan a cabo con el Ministerio de Salud para controlar las sustancias sujetas al Convenio de Basilea, Protocolo de Montreal, Convenio de Estocolmo y otros.

f. Ejecutar todas las demás funciones que por Ley, reglamentación y regulaciones internas que se le asignen de acuerdo a los preciados objetivos y funciones.

ARTÍCULO 3: El Departamento de Adecuación y Manejo Ambiental, tendrá las siguientes funciones:

a. Promover conjuntamente con las Administraciones Regionales de la Autoridad Nacional del Ambiente y las autoridades competentes, el proceso de desarrollo y aplicación de instrumentos de Gestión Ambiental, tales como: Auditorias Ambientales, Programas de

Adecuación y Manejo Ambiental (PAMA's), Incentivos Ambientales y Tecnologías Limpias.

b. Orientar y apoyar la conformación de un mercado de reciclaje y reutilización de bienes, como medio para reducir los niveles de acumulación de desechos y contaminantes del ambiente.

c. Estimular y promover comportamientos ambientales sostenibles, a través de implementación de producción más limpia y el uso de tecnologías limpias en los diversos sectores económicos.

d. Participar en el diseño de estrategias para prevenir, eliminar o controlar fuentes existentes de contaminación que amenazan la calidad ambiental del medio físico.

e. Supervisar la implementación de mecanismos alternativos de control, tales como créditos canjeables, tasas de carga contaminante, y revisar periódicamente todos los instrumentos económicos y de regulación del ambiente.

f. Ejecutar todas las demás funciones que por ley, reglamentación u otras, le corresponda o se le asigne.

ARTÍCULO 4: El Departamento de Control de la Calidad Ambiental, tendrá las siguientes funciones:

a. Verificar el cumplimiento de los Planes de Manejo Ambiental (PMA), Programas de Adecuación y Manejo Ambiental (PAMA's), Resoluciones respectivas de aprobación y normas de calidad ambiental, en coordinación con las Administraciones Regionales y otras autoridades competentes.

b. Realizar inspecciones a las industrias y proyectos que se desarrollan dentro del territorio nacional, para la verificación de los controles que han establecido para prevenir, reducir o eliminar los niveles de contaminación del aire, suelo, agua y ruido.

c. Establecer estrategias dirigidas a la prevención, eliminación y/o control de las fuentes de contaminación existentes y que además, constituyan una amenaza para la calidad de los recursos naturales renovables y del ambiente.

d. Mantener inventarios de las fuentes generadoras de contaminantes y sus emisiones.

e. Colaborar en la implementación y evaluación de planes y programas de descontaminación y fiscalización de la calidad ambiental en todo el

país, así como en la elaboración de informes que señalen los resultados obtenidos a través de los mismos.

f. Ejecutar todas las demás funciones que por ley, reglamentación u otras, le corresponda o se le asigne.

ARTÍCULO 5: El Departamento de Desastre Ambiental, tendrá las siguientes funciones:

a. Promover acciones de prevención y mitigación de efectos negativos de origen natural y antrópico y los riesgos ambientales que se generan.

b. Coordinar las normas y procedimientos técnicos para el desarrollo de Programas y Actividades de Prevención de desastres ambientales.

c. Evaluar y llevar a cabo diagnósticos pormenorizados de la situación ambiental y socioeconómica de las áreas críticas ~~para las posteriores acciones nacionales en el tema~~. identificadas

d. Establecer los sistemas de coordinación en la vigilancia de los efectos al medio ambiente por factores protectores, físicos, químicos, biológicos, sociales, culturales que permitan identificar áreas críticas y propensas a desastres al medio ambiente.

e. Establecen los criterios y los procedimientos para definir las áreas propensas a desastres ambientales para sus respectivas acciones de colaboración y cooperación intrainstitucional que requiera.

f. Ejecutar todas las demás funciones que por ley, reglamentación u otras, le corresponda o se le asigne.

ARTÍCULO 6: El Laboratorio de Calidad Ambiental, tendrá las siguientes funciones:

a. Elaborar información analítica que sirva como evidencia técnica sobre el grado de cumplimiento de las normas ambientales.

b. Verificar la calidad del ambiente (agua, aire, ruido y suelo) ante situaciones de contaminación ambiental, así como el cumplimiento de las normas y límites máximos permisibles.

c. Proveer la información analítica necesaria para la implementación de planes de descontaminación y delimitación de zonas ambientales críticas.

d. Colaborar en los procesos de atención a denuncias ciudadanas sobre problemas de contaminación ambiental.

e. Mantener un sistema de aseguramiento y control de calidad para garantizar una confiabilidad en los resultados de los análisis ambientales realizados.

f. Ejecutar todas las demás funciones que por ley, reglamentación u otras, le corresponda o se le asigne.

ARTÍCULO 7: La presente Resolución entrará en vigencia a partir de su promulgación en la Gaceta Oficial.

FUNDAMENTO DE DERECHO: Constitución Política de la República de Panamá, Ley No. 41, General de Ambiente de 1998, Decreto Ejecutivo No. 207 de 2000 y demás normas concordantes y complementarias.

Panamá, _____ ( ) de _____de dos mil cinco (2005).

COMUNÍQUESE, PUBLÍQUESE Y CÚMPLASE.

LIGIA C. DE DOENS
Administradora General

12/21/2005
7:59:33 AM

MINISTERIO DE ECONOMICA Y FINANZAS
DIRECCION DE PRESUPUESTO DE LA NACION
ASIGNACION MENSUAL DEL PRESUPUESTO DE GASTOS 2006

Entidad . 108 AUTORIDAD NACIONAL DEL AMBIENTE

A.E T.P.F.SU.AC OBJ	Descripción	Recomendado	Total	Difer.	Enero	Febrero	Marzo	Abril	Mayo	Junio	Julio	Agosto	Septiembre	Octubre	Noviembre	Diciembre
108.1 3.404.00.05	Técnicas de Monitoreo de la Calidad del	50,000	50,000	0	12,500	0	0	12,500	0	0	12,500	0	0	12,500	0	0
108.1.3.404.00.08.930	IMPREVISTOS	50,000	50,000	0	12,500	0	0	12,500	0	0	12,500	0	0	12,500	0	0
108 1.3.501.00.08	Técnicas de Monitoreo de la Calidad del	120,950	120,950	0	4,555	2,300	29,250	40,555	4,900	0	4,555	29,200	850	4,765	0	0
108.1.3.501.00.08.140	VIATICOS	8,400	8,400	0	850	800	850	1,250	900	0	850	800	850	1,250	0	0
108 1.3.501.00.08 141	VIATICOS DENTRO DEL PAIS	8,400	8,400	0	850	800	850	1,250	900	0	850	800	850	1,250	0	0
108.1.3.501.00.08 180	MANTENIMIENTO Y REPARACION	10,300	10,300	0	0	1,500	1,900	0	4,000	0	0	2,900	0	0	0	0
108.1.3.501.00.08.182	MANT Y REP DE MAQUINARIAS Y OT	3,000	3,000	0	0	1,500	0	0	1,500	0	0	0	0	0	0	0
108.1.3.501.00.08.189	OTROS MANTENIMIENTOS Y REPARA	7,300	7,300	0	0	0	1,900	0	2,500	0	0	2,900	0	0	0	0
108.1.3.501.00.08.200	ALIMENTOS Y BEBIDAS	2,000	2,000	0	500	0	0	500	0	0	500	0	0	500	0	0
108.1.3.501.00.08.201	ALIMENTOS PARA CONSUMO HUMAN	2,000	2,000	0	500	0	0	500	0	0	500	0	0	500	0	0
108.1 3.501.00.08.220	COMBUSTIBLES Y LUBRICANTES	6,220	6,220	0	1,555	0	0	1,555	0	0	1,555	0	0	1,555	0	0
108.1.3.501.00.08.223	GASOLINA	6,220	6,220	0	1,555	0	0	1,555	0	0	1,555	0	0	1,555	0	0
108.1.3.501.00.08.240	PRODUCTO QUIMICOS Y CONEXOS	51,000	51,000	0	0	0	25,500	0	0	0	0	25,500	0	0	0	0
108.1.3.501.00.08.249	OTROS PRODUCTOS QUIMICOS	51,000	51,000	0	0	0	25,500	0	0	0	0	25,500	0	0	0	0
108.1 3.501.00.08.270	UTILES Y MATERIALES DIVERSOS	14,430	14,430	0	1,650	0	0	9,650	0	0	1,650	0	0	1,480	0	0
108.1.3.501.00.08.274	UTILES MEDICOS Y DE LABORATORIO	8,000	8,000	0	0	0	0	8,000	0	0	0	0	0	0	0	0
108.1 3.501.00.08.275	UTILES Y MATERIALES DE OFICINA	6,430	6,430	0	1,650	0	0	1,650	0	0	1,650	0	0	1,480	0	0
108 1 3.501.00.08.280	REPUESTOS	1,000	1,000	0	0	0	1,000	0	0	0	0	0	0	0	0	0
108 1 3.501.00.08.330	EQUIPO MEDICO, DE LABORATORIO	25,000	25,000	0	0	0	0	25,000	0	0	0	0	0	0	0	0
108.1.3.501.00.08.332	EQUIPO DE LABORATORIO	25,000	25,000	0	0	0	0	25,000	0	0	0	0	0	0	0	0
108.1.3.501.00 08.380	EQUIPO DE COMPUTACIÓN	2,600	2,600	0	0	0	0	2,600	0	0	0	0	0	0	0	0

2．合同中間評価報告書に対する合意M/M

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

The Japanese Mid-term 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 January 9 to 21, 2006, for the purpose of conducting the joint mid-term 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 Mid-term Evaluation Team (hereinafter referred to as "the Panamanian side") headed by Ms. Natalia Young.

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

This Minutes of Meeting is prepared in two versions. The main version is written in English and the other version is written in Spanish. In case of any divergence of interpretation, the English version shall prevail.

Panama City, January 19, 2006

Mr. TANAKA Kenichi Leader Japanese Mid-term Evaluation Team Senior Advisor Japan International Cooperation Agency Japan	Ms. Natalia Young Leader Panamanian Mid-term 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 MID-TERM EVALUATION STUDY

ON

THE WATER QUALITY MONITORING TECHNIQUES PROJECT

IN

THE REPUBLIC OF PANAMA

Panama City

January 20, 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$) = 120.712 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
DINAPROCA	National Direction for Protection of Environmental Quality (Dirección Nacional de Protección de la Calidad Ambiental)
EIA	Environmental Impact Aceessment (Evaluación de Impact 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	Appropriate Program for the Environmental Management (Programa Apropiado para 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 de Ambiente 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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APPENDIX I Table of Process on PDM 2.0

APPENDIX II Project Design Matrix (PDM 1.0 and PDM 2.0)

APPENDIX III Plan of Operation (PO for PDM 1.0 and for PDM 2.0)

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APPENDIX VII Recommended Draft of PDM 2.1 and Plan of Operation for PDM2.1

APPENDIX VIII Evaluation Grid

1. Introduction

(1) Objectives of the Evaluation Study

The mid-term evaluation of the Project was conducted with the following objectives.

- To confirm past process and progress of the Project and estimate the feasibility that the Project purpose will be achieved within the executing term of the Project.
- To identify obstacles to efficient implementation and sustainability of the Project, and to develop the solutions.
- To review the framework of the Project to enhance its relevance to the current situation.

(2) Joint Evaluation Team Members

The evaluation and the recommendations on the Project were done by the following members, which form 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
Ms. Zoila Aquino	Panamanian evaluation member	National Director of International Cooperation, 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 during the period between January 16 and January 21, 2006. Based on these studies, the Joint Coordination Committee held a meeting on January 20, 2006. During the evaluation process, the Team members discussed issues relevant to the execution of the Project with the governmental authorities and institutions. The detailed schedule is attached as following table.

Study Schedule

Date				Leader/Member for Cooperation Plan	Member for Evaluation Analysis
	1	Jan. 8	Sun		Departure at Japan
	2	Jan. 9	Mon		Arrival at Panama
	3	Jan. 10	Tue		Meeting for study plan
	4	Jan. 11	Wed		Investigation for the evaluation
	5	Jan. 12	Thu		Investigation for the evaluation
	6	Jan. 13	Fri		Investigation for the evaluation
1	7	Jan. 14	Sat	Departure at Japan	Analysis of collected materials
2	8	Jan. 15	Sun	Arrival at Panama, Internal meeting	Analysis of collected materials
3	9	Jan. 16	Mon	Meeting with Joint evaluation team in ANAM Lunch meeting with Administrator of ANAM	
4	10	Jan. 17	Tue	Joint evaluation	
5	11	Jan. 18	Wed	Joint evaluation, Preparation of the Minutes of Meeting	
6	12	Jan. 19	Thu	Joint evaluation, Preparation of the Minutes of Meeting Meeting with Administrator of ANAM	
7	13	Jan. 20	Fri	AM:Meeting of Joint Coordination Committee and Signature on the M/M	
8	14	Jan. 21	Sat	Deaprture at Panama	
9	15	Jan. 22	Sun		
10	16	Jan. 23	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 the capital Panama City 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 Panama 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 devised the Plan to Purify the Gulf of Panama and Urban Water, a Project to build sewage and treatment systems. They 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 that these water quality standards are being followed. As a result, the National Environmental Authority of Panama currently plays the central role, and only a water quality monitoring system has been set up and an environmental review conducted on step-by-step wastewater regulations.

Given this situation, the Panama government requested that the Japanese government 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 analytical Laboratory (hereinafter referred as the Lab). The Outputs are divided into the three fields of sampling, analysis and information and education. Currently, two long-term experts—a chief adviser and a coordinator have been dispatched.

The table below outlines basic information on the Project.

Project name	Technical Project for the Water Quality Monitoring (PROTEMOCA)
Related organizations	National Environment Authority (ANAM)
	National Direction for Protection of Environmental Quality (DINAPROCA), in ANAM
Administrative system	Project Manager: Administrator of ANAM
	Project Director: Director of DINAPROCA 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 entitled "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) • Co-finance by JBIC and IDB: Project for Purification of Gulf of Panama

(3) Project Design Matrix (PDM)

PDM2.0 indicates the current framework of the Project and it is used for analysis on this evaluation study.

Two versions of PDMs have been formulated since beginning of the Project. Major contents of PDM1.0 had been approved by both of Panamanian and Japanese side on Record of Discussions at October 8th in 2003. Then the PDM1.0 was modified into the current version, PDM2.0 at January 1st in 2005. The versions are attached under the title "APPENDIX II Project Design Matrix (PDM 1.0 and PDM 2.0)"

A draft of the third version, PDM2.1 is newly recommended by the Team with some parts of modification mentioned in "(1) PDM Revisions of " 5. Recommendations". The draft is attached in "APPENDIX VII".

3. Methods of Evaluation

Evaluation was conducted based on the Project Cycle Management (PCM) method. The Evaluation Team (the Team) examined the Project Design Matrix (PDM), which was attached to the Minutes of the Meeting signed on February 1, 1998. The Team visited the Project site and had a series of interviews with the Japanese experts, counterparts and other relevant organizations. Consequently, the Team confirmed the status of the Project's achievement in terms of inputs, activities, Outputs and Project purpose as stated in the PDM. The Team also conducted an evaluation of the Project in the light of 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. Project Achievements

(1) Overall Goal

Narrative Summary	Indicator	Summary of Achievement
Overall Goal The management for the observance and accomplishment of the wastewater standards in the Republic of Panama is strengthened	1. The number of supervised factories which have to fulfill the Wastewater standards in Panama, is increased by more than 30% 2. More numbers of factories (at least 50) fulfill the wastewater standards. 3. The number of corrected Wastewater standards and ordinances by ANAM (DINAPROCA) based on the monitoring information from the analytical Lab	• Administrative supervision of business wastewater is being steadily implemented, and the number of factories being supervised has increased from 169 in 2003 to 644 in 2005. • The administrative supervision is being provided through the IDP Project, and the results are being organized in reports and a database. • The number of factories meeting the wastewater standards is now under investigation. • The number of factories (aimed to at least 50) is expected to be increased as the result of the administrative guidance. • An investigation regarding revisions to the items to the right is underway. A report (draft) on the review of the establishment of marine water quality standards was completed by a consultant to whom the task had been assigned in summer 2005. The Project gave ANAM's managers technical comments on the draft in summer 2005. • The examination of wastewater standards is underway to be revised.

Outlook of achievement of the Project Purpose	Conditions at the level of the Project Purpose
The government of Panama in charge keeps and promotes the national policy of the environment in order to supervise the fulfillment of actual regulations.	The national environmental policy system is on the way to the complete establishment. The supervision and fulfillment of the regulation will be strengthened based on Resolution AG-0026-2002 and the National Environmental Policy for Supervision, Control and Inspection.

(2) Project Purpose

Narrative Summary	Indicator	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.
	2. The number of physicochemical analysis is increased (up to required No. 21 by the water quality standards).	• The cumulative number of physical and chemical items under observation has increased from 15 in 2003 to 27 in 2004 and 32 in 2005. • In particular, parameters such as pesticides and heavy metals have been increased, and the reliability of the analys system has been improved due to the introduction of equipments in the Project.
	3. The number of monitored lakes and seas in the national parks is increased (from 0 to 2 each)	• Although monitoring taking place in lakes and seas has not yet been started, the implementation of the monitoring will be finished within the project term.
	4. The water quality data is published on ANAM's web site and in their Environmental White Paper. (In Official Publications)	• Data on 2002 and 2003 has been already disclosed on the ANAM's Web site. Moreover, data on 2004 and 2005 will be disclosed by February 2006. • Time schedule of elaboration of the White Paper does not coincide with the Project implementation cycle. So the Project has supported ANAM to print the First Monitoring Report on the Water Quality of Panama's Watershed for 2002 and 2003. • The other types of information including the water quality data for each media are favorably being prepared toward the end of the Project.

【General Achievement of Project Purpose】
The above-mentioned quantitative indicators are considerably on the way to achievement toward the completion of the Project. However, 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.

Fulfilment of the Important Assumptions in the Level of the Output	
No changes for the role and the function of the ANAM'S Lab in the national policy of environment	The role and function of ANAM's Lab. has gradually become important under the context of 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 carrying out the activities mentioned below, from 1) to 5).
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) Confirmation of assignments to be achieved in the rest of the Project term.
4) 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'S Lab.	1-1. The number of equipment and specifications 1-2. The frequency with which supplied equipments is operated	• More than approximately 400 pieces of monitoring and analytical equipment were procured. Out of an estimated budget of 55 million yen, 52 million yen or about 90% has already been used. • The remaining equipment needed consists of boat engines, reagents for analytical use and miscellaneous materials and equipment; this can be provided by the end of the Project. • 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 should be implemented. The renovation work was already contracted on December 6th, 2005, and will be started after approval by the General Controller, and then will be finished within 75 days.
【General Achievement of Output 1】 Almost all the numbers and specifications of the proposed equipments will be satisfied until the Project completion. The frequency of operation of the equipment will be increased subject to the necessary allocation of the Lab staff and the proposed renovation of the infrastructure.		
2. ANAM'S Lab scientists can make water quality monitoring and analysis by themselves for natural water and wastewater in accordance with environmental standards.	2-1. The number of sampling (frequency) carried out	• Monitoring was carried out seven times in 2002, 16 times in 2003, 29 times in 2004 and 35 times in 2005, showing a steady increase over time. ➢ However, the targets for FY 2004 were not achieved at any of the sites during the rainy season and the dry season throughout the year. The main reason for this was the inability to carry out activities adequately because of insufficient staff. During the second semester in FY 2005, the required sampling number has been already fulfilled.
	2-2. The number of sampling site carried out	• The number of monitoring sites increased to seven rivers in 2002, 11 in 2003, 11 in 2004 and 16 in 2005. With the exception of rivers, sampling is not being carried out at two coastal water bodies and one lake, but there are plans to take samples in 2006.
	2-3. The number of parameters carried out	• The number of parameters has increased steadily, to 15 in 2003, 27 in 2004 and 32 in 2005.
	2-4. The number of analyses carried out	• The number of analytical data has increased steadily, to 1,040 in 2004 and to more than 3,000 in 2005 (currently being compiled).
	2-5. The number of analytical procedures for each parameters	➢ Initially, standardized operating procedures (SOPs) were to be prepared, but it has become apparent that it would be quite difficult to prepare SOPs at the ISO17025 level by the time the Project ends using the current implementing system and the remaining input amount. • However, the preparation process for SOPs including ISO 17025 has just started in several important parameters. The process is expected to be continued even after the end of the Project with a long-term vision. • Currently, didactic material comprised of knowledge acquired through the Project is being prepared in place of SOPs: pH, BOD, COD, hexavalent chromium, heavy metal (8 types), pesticides (2 types), nitrate ion, phosphate ion, aquatic life and fecal colon bacillus.

Narrative Summary	Indicator	Summary of Achievement
	2-6. The number of trainings and seminars carried out	• Training in Japan: five people • Technical seminar subjects ① Bacterial analysis (seminar: 20 participants) ② Evaluation of chemical analysis (seminar: 22 participants) ③ Aquatic life (two seminars: 38 participants) ④ Pesticide analysis (seminar: 17 participants) ⑤ Heavy metal analysis (seminar: 20 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, total of six people. □ Invitation of Chilean experts to Panama: two times, total of three people. • All he knowledge obtained in this training is necessary for actual water quality monitoring and analytical work and is used in Project activities. • Presenters organize their own knowledge to present at seminars, and were good opportunities for them to ascertain their own understanding and to study so that they could respond in question-and-answer sessions. • The human networks built up in the seminar could be used to resolve the technical problems confronted in daily situations.
【General Achievement of Output 2】 Progress for achievement of Output 2 is ahead of the establishment of the national environmental standards for natural waters, and ANAM's Lab and the scientists have acquired appropriate capacity for the water quality monitoring and analysis mentioned above. Therefore it is expected that the Lab staff will contribute to the application of the standards.		
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.	3-1. The contents of Web Site of ANAM, and the number of data on the Web Site	• A Project page was created on ANAM's web site from June 2005. • The web site's content consists of an overview of the Project, data of water monitoring in 2002 and 2003, and monitoring map data. • The other contents are expected to be achieved completely by the time the Project ends.
	3-2. The number of monitoring report on water quality monitoring assisted by ANAM laboratory.	• 2003: 4 reports. • 2004: 21 reports (20 for rivers and one for coastal water body) • 2005: More than 20 reports confirmed.
【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.		

Fulfillment of the Important Assumption at the Level of the Activities	
1. Stable supply of budget to continue the water resources monitoring during Project period.	Although operational cost for the Lab has not been enough, ANAM has been making a continuous effort to obtain sufficient budget for FY 2006 and FY2007 e.g. the budget for the Lab in FY 2006, for US$, 120,950 has been already approved.

Narrative Summary	Indicator	Summary of Achievement
2. Stable placement of the trained counterparts in ANAM'S Lab		All 8 counterparts obtained permanent status. All of them except former Project Coordinator remain in the Lab.
Fulfillment of the Preconditions		
1. Fulfillment of Lab facilities such as internet, telecommunication, training room, septic tank etc. before execution of the Project		All the proposed items have been realized except renovation of the second floor of the infrastructure.

5. 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 Gulf 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 aforementioned 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 Panama government—the direct target group—in terms of management capacity.

Conformity with Panama's policies

The administration of President Martin Torrijos Espino, which took power in September 2004, 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 Panama government confirmed 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.

(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) are expected to be achieved by the time the Project ends. The number of sites at which river water is being monitored (indicator 1) and the number of items being analyzed and items being observed (indicator 2) are increasing and the reliability of the data has improved. Although there have been delays in monitoring lake and sea water (indicator 3), according to APO these can be achieved by the time the Project ends. The water quality data has been published on ANAM's web site and in the First Monitoring Report on the Water Quality of Panama's Watershed for 2002 and 2003. 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 and chemical tests. In the future, attempts will be made to improve the accuracy of analysis to provide more 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 and the Adequacy Program. In addition, the laboratory scientists will directly provide immediate surveys of pollution incidents concerning wastewater and technical consulting in response to requests. This is the first time that natural water has been monitored in Panama (related to indicator 3), due to the Project. Monitoring of lake water (related to indicator 3) and the disclosure of water quality data (indicator 4) are also expected to be 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

A total of ten kinds of indicators for four outputs are expected to be achieved by the time the Project is completed, with the exception of indicator 2-5. As described below, these were produced by input and activity effects for which economic efficiency and effectiveness were taken into greater consideration. However, although a standard operating procedure (SOPs) was initially planned for indicator 2-5, it is clear that indicator 2-5 cannot be achieved by the time the Project ends using the current implementation system and the remaining input. Preparing this manual would require cooperation and coordination with other organizations besides ANAM.

Quantity and quality of input

So far a total of six counterparts have been trained in the three areas of monitoring technology, water quality analysis (four subjects) and water quality 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. Six 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 the ANAM'S analytical Lab】

The overall goal is already being realized as the impact from the Project purpose's achievement. Specifically, the fact that ANAM, which is 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, and as a result more requests for the laboratory have come in since the Project started. Requests from actors, from various sectors, for surveys of water pollution problems and analysis 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.

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. As described above, part of the overall goal is already 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 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 work and received instruction as interns. 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 aspects

Currently, the laboratory's mission, functions and responsibilities are basically justified in the context of administrative law, e.g. the Ley No.41 1998, National Environmental Strategy, Decree 207-2000 and AG-0036-2004. Now a draft for a Resolution that defines concrete functions of ANAM's Lab is underway for official approval. Thus, the process for justification of ANAM's Lab has been proceeding since FY 2005. It is essential that the resolution is approved immediately. It would also form a foundation for the Project goal's sustainability. Further, these would be decided based on the basic concept as to what role ANAM'S Lab plays in Panama's environmental management.

Personnel aspects

Since two out of the five analytical employees were short-term employees (annual contracts) when the Project started, ANAM through DINAPROCA had agreed with the suggestion from the Japanese side, and then realized the change of status to full-time employees.

As a result, all analytical employees became full-time employees from January 2005 and can continue in their employment after the Project is completed. On the other hand, the number of laboratory employees is not sufficient given the volume of operations. There is a particular need for full-time laboratory employees above the management and manager class. Also, three out of the current six analytical employees are in their 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 operational budget for the Lab has not been enough, ANAM has been making a continuous effort to obtain sufficient budget for FY 2006 and 2007. e.g. budget for the Lab in FY 2006, 120,950 US$ has been already approved. Furthermore, permanent disbursement of necessary budget should be provided in the future.

Technical aspects

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

While establishing national technical standards for water quality analysis, including accuracy management, the Panama 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.

6. Conclusion

(1) Relevance of the Project

1) Current status of the relationship between ANAM and PROTEMOCA
PROTEMOCA supports the strengthening of ANAM'S Lab, as the environmental reference center of the country, to play an important role in the environmental management of Panama. ANAM and related institutions will make joint efforts in order that the scientific and technical activities of PROTEMOCA contribute to the planning and implementation of the Panamanian environmental policies.

2) Area of water quality monitoring:
Regarding the analysis in ANAM's Lab, the activities continue in the same way as in the period of PROTEMOCA project. Additionally, a project for the elaboration of a reference procedure on analytical method is underway, with the support of the CENMA in Chile. On the other hand, this laboratory carries out activities to determine certain important parameters for wastewater and natural water prioritized by ANAM to contribute to the elaboration of the regulations on water quality, in which it participates with related institutions.

(2) Strengthening and Development of PROTEMOCA Activities
Panama is implementing the following national plans and programs:

- The National Environmental Strategy
- The Seven (7) National Environmental Policies
- A Reference Lab on water quality analysis
- An Accreditation Program with the National Accreditation Council

(3) Priority of the proposed activities
All the proposed PROTEMOCA's activities are following the most important national policies for the environment, and then are provided equally with the highest priority by the Panamanian government. It should be noticed that the expected outputs of each proposed project are given the priority order within the project as mentioned above.

ANAM's commitment is to continue making the maximum efforts to consolidate the budgetary base for the Lab for Environmental Quality in the future.

(4) Remarks
If the procedure for the project implementation has made progress based on the result of this intermediate evaluation study, both sides will discuss about the contents of the project to obtain maximum efficiency of the technical cooperation.

7. Recommendations

(1) Revision of PDM and PO

Both sides reviewed the existing Project Design Matrix (PDM2.0) and Plan of Operation (PO) and recommended to revise them as shown in Annex II (PDM Version 2.1) and Annex III (Plan of Operation for PDM 2.1).

1) In regards to "Indicator of Project Purpose, 2. The number of physicochemical analysis is increased," taking account of wastewater standard and required number of parameters for wastewater inspection, the PDM should be revised for "2. The number of physicochemical analysis is increased (up to required No. 21 by the water quality standards)."
2) In regards to "Indicator of Project Purpose, 3. 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 to "3. The number of monitored lake and seas in the national parks is increased (from 0 to 1 for lake, and 0 to 2 for seas)."
3) In regards to "Indicator of Project Purpose, 4. The water quality data is published on ANAM's web site 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 for "4. The water quality data is published on ANAM's web site and in their Environmental White Paper (in Official Publications)",
4) In regards to "Activity 2-4. Water quality analysis laboratory scientists will prepare an SOP on analysis methods," preparing an SOP 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 this 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 for "Activity 2.4 Water quality analysis laboratory scientists will create technology materials describing the analytical methods that they learned in this Project (10 selected parameters)."

(2) Enhancement of the Administration of the Project

Both sides agreed to strengthen the communication between DINAPROCA and ANAM's Lab. Weekly meeting shall be held at the Lab every week and the Project Coordinator, JICA Experts and all the Lab staffs are required to attend. The Project Manager shall be present at the meetings at least every 2 weeks and shall take responsibility for all the memorandums of the meetings to be made at every meeting.

(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

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

2) Budget Allocation

MEF has already approved the C/P budget until the end of the Project, October 2006. ANAM shall make an effort for the execution as planned. The current Project Manager made a commitment, during an evaluation study meeting, for ANAM to continuously make all effort to obtain the necessary budget through MEF for ANAM's Lab even after the time the Project ends. The Project manager accepted to send a copy of draft of budget compilation plan for FY 2007 to JICA Panama Office; this will be done from April to June, 2006.

3) Development of various budget sources

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

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 qualified capacity. ANAM through DINAPROCA shall begin to study various means for the procurement and shall formulate an action plan.

(4) Documents to be required

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

1) A copy of the approved Resolution about ANAM's Lab; until the end of January 2006.
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 until the end of September, 2006.
3) A draft of the Terms of Reference for the Accreditation Program related with ISO 17025; Until the end of January 2006.
4) The 2006 Annual Operational Plan of ANAM's Lab; until the end of January, 2006.

8. Lessons learned

(1) Definition of the Institutional Framework related with the Project

It is important for both sides to recognize and clarify the context related with the objective of the Project during the early stage of the project formulation.

(2) At least 5 years of execution period

The Panamanian side recommended that a longer duration, i.e. at least 5 years, is needed for this type of cooperation project from the technical point of view.

(3) Importance of language ability

Both sides recognized that language ability on both English and Spanish is an important issue for better understanding and operation of the project.

(4) Importance of political will for the Project

Only if we have political will, the results for the project can be guaranteed in the way achieved so far.

(5) To establish a weekly and daily activity plan

Counterpart personnel should elaborate a weekly and daily activity plan in joint coordination with the Japanese Experts.

SUMMARY of the APPENDIX

APPENDIX I Table of Process on PDM 2.0

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of activity	Targets of attainment	Progress of activities	Results	Achievements	Reasons if planned targets were not satisfied	Next plan of activity
Activities						
ANAM Lab. scientists prepare methodology of analysis for each parameter, necessary equipments and reagents by themselves through the instruction of experts.	1) Identify existing analytical methodology based on reviewing of legislation 2) Identify existing analytical methodology based on international legislation (EPA, JIS, etc) 3) Prepare the list of necessary equipments and reagents in order to do the water quality analysis according to the identified methodologies	•Identified existing analytical methodology and legislation as present bases, and 90% of necessary equipments in the laboratory were prepared at the moment.	•Inventory (register) of equipments including reagents	3 Prospect of completion	•Because a long delay of renovation work of 1st floor of the laboratory, lack of air exhauster (draft chamber) interferes with pretreatment work of analysis.	•Request starting work of renovation for 1st floor of the laboratory
ANAM Lab. scientists practice maintenance of equipments in order to carry out proper mangement of the laboratory. by themselves through the instruction of experts.	1) Prepare the inventory of equipment and reagents 2) Prepare the manual for maintenance of equipment 3) Execute maintenance of equipments	•Prepared the inventory of equipments including reagents •Manual for maintenance of equipment were prepared for AAS, GC, Spectrophotometer, management of gas consumption. •Maintenance has been executing through daily instruction and training by experts.	•Inventory (register) of equipments including reagents •Maintenance book for major equipments and gases	3 Prospect of completion	•Management system of the laboratory including maintenance of materials and reagents is under investigation. The proper work system of the laboratory should be established.	•Recommendation for proper management system of the laboratory
ANAM Laboratory scientists practice the basic knowledge of water sampling techniques (methods, places, timing, number of sampling site etc.) by themselves through the instruction of experts.	1) Prepare sampling manual through reviewing of existing sampling method and legislation	•Since sampling manual has not been created yet, sampling skill has enabled laboratory personnel to carry out properly through training and instruction of experts.	•Practice of sampling in daily work	3 Prospect of completion	•One of the reason why the sampling manual is not prepared yet, regulation of water quality monitoring for natural water is not established yet. •Procedures for sampling water such as quantity, storage, and pretreatment) are executed properly based on guideline of wastewater monitoring. •Sampling points, frequency of sampling and sampling time, those are determined according to capacity of the laboratory, shall be reconsidered after accumulation of data..	•Request creation of sampling manual
ANAM Lab. scientists experience the practical monitoring for natural water and effluents.	1) Prepare annual water quality monitoring and wastewater compliance monitoring program 2) Execute the water quality monitoring and wastewater compliance monitoring program	•Water quality monitoring for rivers has been executing as planned according to established semiannually program since 2005. •Water quality monitoring for lakes and sea has not been executed yet. •Since wastewater compliance monitoring program has been executing by P.U and P.T.U through other program, waste water monitoring are applied to sudden accident of pollution	•Program of monitoring for natural water and annual repots of water quality monitoring.	3 Prospect of completion	•Because motor engine of the boat purchased for sampling of the project was the victim of robbery, measurement is now under consideration. •Because regulation of natural water quality (River, Lake, Sea) has not been established yet, necessary parameter and its method of analysis are not determined yet. •Regarding waste water monitoring, it is necessary to define the role and proper work system between ANAM lab. and others, except accident of contamination from waste water.	•Prompt execution of water quality monitoring for lakes and sea.
ANAM Lab scientists learn theory, use of equipment, applications, etc., for metal analysis, pesticides and organic compounds analysis, analysis of basic water quality factors, bacteriology and aquatic biology through the instruction of experts.	1) Plan trainings 2) Execute trainings	•Analysis for heavy metals and pesticides has been executing based on training program. •Various training programs (in Japan, in Chili by JCPP, by experts) has been executing as scheduled.	•Reports of training	3 Prospect of completion	•Since voluntary training is not executing properly because of interruption of other task in the laboratory, concentration of the programmed training make up it. •Training for wastewater treatment and groundwater pollution are not necessary considering situation of the laboratory	•Recommend to execute continuous follow up and voluntary training after training program
ANAM Lab scientists make standardized operation procedures (SOPs) for each type of analysis	1) Prepare annual work plan and create SOP's for each type of analysis 2) Hold a evaluation meeting	•Creation of SOP's for each type of analysis that has not been made progress steady, is proceeding with a systematic way according to JCPP (CENMA in Chili). •Elaborated reports in accordance with knowledge and experience of analytical method through training.	•Reports based on JCPP •Reports based on training program	2 Problem to be solved	•Insufficient time for elaboration of SOPs by Laboratory personnel. •From the view point of necessity of strategic plan for acquisition of ISO17025, that takes an enormous amount of work, it may be difficult to execute this subject in the project.	•From the viewpoint of the necessity to collaborate with related institutes, not only ANAM but also other institutes, for elaboration of SOPs for environmental monitoring, it is necessary to proceed in cooperation with the related institutes considering from long term project. The level of manual (SOPs) will be elaborated some results of the training by laboratory personnel and utilized for the future.
ANAM Lab. scientists hold technical seminars for water quality monitoring to the related governmental institutes and laboratories in Panama.	1) Prepare annual work plan for technical seminar 2) Execute technical seminar	•Technical seminar has been held as planned in the period of training by Japanese experts and experts from Chile.	•Materials of presentation in each technical seminar.	3 Prospect of completion	•There is no delay of activities in this matter.	nothing special
ANAM Lab. scientists make annual report of water quality monitoring activities from the Lab.	1) Identify status of existing water quality monitoring maps and data 2) Obtain the x-y coordinates for monitoring points and point pollution sources 3) Create water quality monitoring maps for sampling sites and points pollution sources on GIS 4) Create water quality monitoring database 5) Prepare water quality annual reports	•The x-y coordinates of water quality monitoring points has been plotted in GIS map correctly. •The x-y coordinates of pollution sources has been created in the other project. •Water quality monitoring database has been created with excel file. •Since water quality annual report in 2002-2003 has been elaborated, successive reports in 2004 and 2005 has been in the process of elaboration.	•Water quality monitoring map with GIS •Water quality database (Excel file) •Water quality monitoring annual report in 2002-2003 with CD	3 Prospect of completion	•Original reports of the water quality monitoring, that have been elaborated in each case, should be edited as bookbinding in order to distribute to the public.	•Elaborate annual report in 2004 and 2005
ANAM Lab. scientists open the monitoring data of water quality and present activities and information of ANAM Lab. to the public through HP of ANAM	1) Create contents of HP based on database for opening to the public	The project has been introduced on HP from June of 2005, and contents of HP will has be created gradually.	http://www.anam.gob.pa/Protemoca/index.html	3 Prospect of completion	•Because of limited staff be in charged of HP construction, it takes a time for improvement of contents of the project. Necessity for opening of the data of water quality to the public.	•Recommend not only activity of the project but reporting of the state of water quality on HP.

vements" shall be divided into 4 grades such as " 4, Completion (already completed)", " 3, Prospect of completion (prospected completion by the end of project period)", " 2, Problem to be solved (not prospected completion by the end of project period)" and " 1, not be active". In the case except 4, the reason fill in the column asons if planned targets were not satisfied ", and prospect of completion fill in the column of "next activity plan" and necessary measurement for achievement. Note: Required information in this table is not to know the contents of the study but to verify actual and concrete activities of the project. Fill the progress of activities rts and counterpart personnel and result of activities such as reports in the column.

Project Design Matrics, PDM-1.0

Project Title: WATER QUALITY MONITORING TECHNIQUES PROJECT
Organization: National Authority of the Environment (Autoridad Nacional del Ambiente - ANAM)
Project Location Panama, Republic of Panama

Period:
Target Area: Panama Province
Date: Aug. 31, 2003

NARRATIVE SUMMARY	VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Overall Goal The management for the observance and fulfillment of the wastewater standards in the Republic of Panama is strengthened	1. The number of supervised factories which have to fulfill the Wastewater standards in Panama, is increased by more than 30% 2. More numbers of factories fulfill the wastewater standards. 3. The number of Wastwater standards are newly increased.	1. Annual Report of the environmental management of ANAM	1. The government of Panama keeps and promotes the national policy of the environment in order to supervise the fulfillment of actual regulations.
Project Purpose The accurate monitoring information about industrial wastewater, wastewater standards and natural water 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). 2. The number of physico-chemical analysis is increased(up to required No. 21 by the water quality standards). 3. The number of monitored lakes and seas in the national parks is increased.	1. Published water quality monitoring reports	1. The government of Panama in charge keeps and promotes the national policy of the environment in order to supervise the fulfillment of actual regulations.
Outputs 1. ANAM Lab scientists can make sampling by themseves. 2. ANAM Lab scientists can make water quality analysis by themseves. 3. More and trustable data base about the water resources and wastewater is built up. 4. Specialized courses about water quality and environment education for the related institutions are established.	1-1. The number of sampling carried out for wastewater 1-2. The number of sampling site carried out for wastewater 2-1. The number of passible factors carried out for analysis 2-2. Accuracy of analysis data carried out 3-1. The number of analysis made for each factor 3-2. The number of analytical data about water quality 4-1. The number of seminar carried out 4-2. The number of attendance for the seminar and of the attended institutions 4-3. A level of understanding of the atendance for the seminar	1. Water sampling rports 2. Final report of the trainees in Japan, and of third country experts indicating the results of the training work and evaluation for the trainees in Panama. 3. Water quality monitoring reports from ANAM Laboratory, and ANAM HP 4. Attendance list of seminars, and the result of questionnaires	1. No changes for the role and the function of the ANAM Lab in the national policy of environment

Project Title: WATER QUALITY MONITORING TECHNIQUES PROJECT

Organization: National Authority of the Environment (Autoridad Nacional del Ambiente - ANAM)

Project Location Panama, Republic of Panama

Period:

Target Area: Panama Province

Date: Aug 31, 2003

Activities	Inputs	
1-1. ANAM Laboratory scientists learn the basic knowledge of water-sampling technics (method, place, timing, number of sampling etc.) 1-2. Laboratory scientists experience the practical samplings. 2-1. Laboratory scientists learn Metal Analysis 2-2. Laboratory scientists learn Pesticides and organic compounds analysis 2-3. Laboratory scientists learn analysis of basic water quality factors 2-4. Laboratory scientists learn bacteriology 2-5. Laboratory scientists learn quality assurance in analytical chemistry 3-1. Maps of sampling sites for water quality monitoring are made. 3-2. Laboratory scientists learn the data analysis of water quality. 3-3. Laboratory scientists alalyze the water samples of rivers, lakes, seas, and industrial wastewater, for required water quality factors. 3-4. The database available to the public (for readjustment of water quality standards law etc.) and HP of ANAM are made. 4-1. Train the specialists from the ANAM education Dept. for methodology of environmental education seminars. 4-2. Drew up programs and curricula seminars about teaching methodology to ANAM scientists 4-3. Laboratory scientists learn the skills of methodology of seminars. 4-4. Laboratory scientists give seminars of environmental analysis and of environmental education to other related institutions, such as MINSA (Ministry of Health), IDAAN,Universities, SENACYT, etc.	**Japan side :** 1-1. Dispatch of Experts : 1 long term : 3years, and at least 4 short term (in the fields of water quality monitoring, chemical analysis, bacteriology, water biology, methodology of seminar from Japan). 1-2. Dispatch of 2 third country Experts, at least, for pesticides and metal analysis. 1-3. Training in Japan (2-3 persons per year), and in third countries (Chile, Mexico etc.) 1-4. Equipments: Necessary laboratory equipment and glassware Vehicle, boat, sampling equipments Acquisition of software and equipment for the database 1-5. Local business costs: general activity cost, local applied business cost, special local business cost **Panama side :** 2-1. Operational facilities (buildings, etc.) for the Lab with surveillance 2-2. Necessary operational costs for equipments and reagents 2-3. Technical counterparts for every expert 2-4. Coordination with computer and database section of ANAM 2-5. Administrative staffs(secretary and drivers etc.) and operational cost for water, electricity communications, fuel, etc.	1. Stable supply of budget to continue the water resources monitoring. 2. Stable placement of the trainded counterparts in ANAM Lab **PRECONDITIONS** 1-1. Fulfillment of Lab facilities such as internet, telecommunication, training room, septic tank etc.

APPENDIX II Project Design Matrics (PDM 1.0 and PDM 2.0) page 2/3

Project Design Matrics, PDM-2.0

Project Title: WATER QUALITY MONITORING TECHNIQUES PROJECT Organization: National Authority of the Environment (Autoridad Nacional del Ambiente - ANAM)

Project Location: Panama, Republic of Panama Project Period: Oct. 8. 2003 - Oct. 7. 2006 Revised on 1.Jan.2005

NARRATIVE SUMMARY	VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Overall Goal The management for the observance and accomplishment of the wastewater standards in the Republic of Panama is strengthened	1. The number of supervised factories which have to fulfill the Wastewater standards in Panama, is increased by more than 30% 2. More numbers of factories (at least 50) fulfill the wastewater standards. 3. The number of corrected Wastewater standards and ordinances by ANAM (DINAPROCA) based on the monitoring information from the analytical Lab	• Annual Report of the environmental management of ANAM	1. The government of Panama keeps and promotes the national policy of the environment in order to supervise the fulfillment of actual regulations.
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). 2. The number of physico-chemical analysis is increased (up to required No. 21 by the water quality standards). 3. The number of monitored lakes and seas in the national parks is increased (from 0 to 2 each) 4. The water quality data is published on the HP and the Environmental White Paper of ANAM	• Published water quality monitoring reports • ANAM Home Page • ANAM environmental white paper (environmental report)	1. The government of Panama in charge keeps and promotes the national policy of the environment in order to supervise the fulfillment of actual regulations.
New Outputs 1. Necessary equipments for water quality analysis and compliance monitoring can be supplied and operated definitely in the ANAM Lab. 2. ANAM Lab scientists can make water quality monitoring and analysis by themselves for natural water and wastewater in accordance with environmental standards. 3. Monitoring results provided by ANAM Lab scientists can be opened to the public through the publication and on the HP of ANAM.	1-1. The number of equipments and specifications 1-2. The frequency of operation of supplied equipments 2-1. The number of sampling carried out 2-2. The number of sampling site carried out 2-3. The number of parameters carried out 2-4. The number of analysis carried out 2-5. The number of analytical procedures for each parameters 2-6. The number of trainings and seminars carried out 3-1. The contents of HP of ANAM, and the number of data on HP 3-2. The number of monitoring report on water quality monitoring assisted by ANAM laboratory.	• Inventory of equipments • Water sampling reports • Final report of the C/P trainees in Japan, and of third country experts indicating the results of the training work and evaluation for the C/P trainees in Panama. • Water quality monitoring reports from ANAM Laboratory, and ANAM HP • Attendance list of trainings, and the result of questionnaires	1. No changes for the role and the function of the ANAM Lab in the national policy of environment
Activities 1-1. ANAM Lab. scientists prepare methodology of analysis for each parameter, necessary equipments and reagents by themselves through the instruction of experts. 1-2. ANAM Lab. scientists practice maintenance of equipments in order to carry out proper management of the laboratory. by themselves through the instruction of experts. 2-1. ANAM Laboratory scientists practice the basic knowledge of water sampling techniques (methods, places, timing, number of sampling site etc.) by themselves through the instruction of experts. 2-2. ANAM Lab. scientists experience the practical monitoring for natural water and effluents. 2-3. ANAM Lab scientists learn theory, use of equipment, applications, etc., for metal analysis, pesticides and organic compounds analysis, analysis of basic water quality factors, bacteriology and aquatic biology through the instruction of experts. 2-4. ANAM Lab scientists make standardized operation procedures (SOPs) for each type of analysis 2-5. ANAM Lab. scientists hold technical seminars for water quality monitoring to the related governmental institutes and laboratories in Panama. 3-1. ANAM Lab. scientists make annual report of water quality monitoring activities from the Lab. 3-2. ANAM Lab. scientists open the monitoring data of water quality and present activities and information of ANAM Lab. to the public through HP of ANAM	Inputs Japan side : 1-1. Dispatch of Experts : 1 long term : 3 years, and more than 4 short term (in the fields of chemical analysis, bacteriology, water biology, etc.) from Japan 1-2. Dispatch of 2 third country Experts, at least, for pesticides and metal analysis. 1-3. Training in Japan (2-3 persons per year), and in third countries (Chile, etc.) 1-4. Equipments: Necessary laboratory equipment and glassware Vehicle, boat, sampling equipments Acquisition of software and equipment for the database Panama side : 2-1. Operational facilities (buildings, etc.) for the Lab with surveillance 2-2. Necessary operational costs for equipments and reagents 2-3. Technical counterparts for every expert 2-4. Coordination with computer and database section of ANAM 2-5. Administrative staffs (secretary and drivers etc.) and operational cost for water, electricity communications, fuel, etc.		1. Stable supply of budget to continue the water resources monitoring during project period. 2. Stable placement of the trained counterparts in ANAM Lab Preconditions 1. Fulfillment of Lab facilities such as internet, telecommunication, training room, septic tank etc. before execution of the project

APPENDIX II Project Design Matrics (PDM 1.0 and PDM 2.0) page 3/3

Appendix III Plan of Operation (PO) for the Water Quality Monitoring Technique Project for PDM 1.0

8-Oct-03

Activities (Japanese Fiscal Year)	2003		2004				2005				2006	
	III	IV	I	II	III	IV	I	II	III	IV	I	II
Entire Period of the Project												
1. ANAM Lab scientists can make sampling by themselves for waste and natural water.												
1-1. The basic knowledge of water-sampling techniques (methods, places, timing, number of sampling etc.) are instructed to ANAM Laboratory scientists												
1-2. Laboratory scientists experience the practical samplings												
2. ANAM Lab scientists can make water quality analysis by themselves.												
2-1. ANAM Lab scientist are instructed in theory, use of equipment, applications, etc., for Metal Analysis, Pesticides and organic compounds analysis, analysis of basic water quality factors, Bacteriology												
2-2. ANAM Lab scientist make procedures manual for each type of analysis												
2-3. Laboratory scientists make a skill improvement program in analytical chemistry and carry it out by themselves in order to improve their analytical techniques												
3. More and trustable data base about the natural water and wastewater is built up.												
3-1. Maps of sampling sites for water quality monitoring are made												
3-2. Laboratory scientists are instructed in data analysis of water quality												
3-3. Laboratory scientists establish a system to analyze the water samples of rivers, lakes, seas, and industrial wastewater, for required water quality factors												
3-4. The database available to the public and published in the HP of ANAM, and then a suggestion is made for readjustment of water quality standards, the law etc.												
4. The training system about water quality,environmental education and water analysis techniques for the related Institutions are established in the												
4-1. Train the specialist from the ANAM Environmental Education Department to improve his/her skills for methodology of presentations												
4-2. Draw up programs and curricula of training about teaching methodology to ANAM scientists												
4-3. Laboratory scientists give training of environmental analysis and of environmental education to other related Institutions, such as MINSA (Ministry of Health), IDAAN,Universities, SENACYT, etc.												

Plan of Operation (PO) for the Water Quality Monitoring Technique Project (1 of 3) for PDM 2.0

Activities	Intended results	Calendar year 2003	2004	2005	2006	Persons in charge	Coordination	Input/Observations
0 Project management, consolidation, and discussion of the results								
(1)Scheduling						Manager/Chief advisor		
1)Prepare annual operational plans	3 annual operational plans					Manager/Chief advisor		
(2)Monitoring and evaluation						Manager/Chief advisor		
1)Monitoring	2 monitoring reports					Manager/Chief advisor		
2)Intermediate evaluation	Intermediate evaluation report					Manager/Chief advisor		
3)Final evaluation	Final evaluation report					Manager/Chief advisor		
(3)Joint Coordination Committee						Manager/Chief advisor		
1)Hold Joint Coordination Committee meetings	4 sets of meeting minutes from the Joint Coordination Committee					Manager/Chief advisor	DINEPA, DINEORA, FOMENTO, IDAAN, MINSA, MEF and other pertinent organizations	
(4)Consolidation and dissemination of the results						Manager/Chief advisor		
1)Hold workshops for governmental and non-governmental related to the promotion of the observance and accomplishment of the wastewater standards based on the Project achievements	2 workshops					Manager/Chief advisor	DINEPA, DINEORA, FOMENTO, IDAAN, MINSA, MEF and other pertinent organizations	
(5)Development of the necessary infrastructure for the Project activities						Manager/Chief advisor		
1)Prepare the Project base office	The Project base is operating in ANAM analytical Lab.					Manager/Chief advisor		
2)Improve necessary equipments and operational facilities	Provision of equipment and installation					Manager/Chief advisor		
1 Necessary equipments for water quality analysis and compliance monitoring can be supplied and operated definitely by ANAM Laboratory								
(1) ANAM Lab scientist prepare methodology of analysis of each parameter, necessary equipments and reagents by themselves through the instruction of experts						Manager/Chief advisor		
1) Identify existing analytical methodology based on reviewing of legislation	1 evaluation report					Lab. Staff/Expert		Mr. Sawaki
2) Identify existing analytical methodology based on international legislation (EPA, JIS, etc)	1 evaluation report					Lab. Staff/Expert		Mrs. Julia
3) Prepare the list of necessary equipments and reagents in order to do the water quality analysis according to the identified methodologies	1 document with the necessary equipments and reagents revised per year					Manager/Expert/ Chief advisor		Mrs. Julia
(2) ANAM Lab. scientist practice maintenance of equipments in order to carry out proper management of the laboratory by themselves through the instruction of experts						Manager/Chief advisor		
1) Prepare the inventory of equipment and reagents	1 equipment inventory revised per year					Lab. Staff/Expert		Mr. Yau
2) Prepare the manual for the maitenance of equipment	1 equipment maintenance manual revised per year					Lab. Staff/Expert		Mr. Yau
3) Execute the maintenance of equipments	3 maintenance reports					Manager/Expert/ Chief advisor		Mr. Yau

APPENDIX IIIPO 1/3

Plan of Operation (PO) for the Water Quality Monitoring Technique Project (2 of 3)

Activities	Intended results	Calendar year 2003	2004	2005	2006	Persons in charge	Coordination	Input/Observations
2 ANAM Lab scientist can make water quality monitoring and analysis by themselves for natural water and wastewater in accordance with environmental standards								
(1)ANAM Laboratory scientists practice the basic knowledge of water-sampling (monitoring) techniques (methods, places, timing, number of sampling site etc.) by themselves through the instruction of experts.						Manager/Chief advisor		
1)Prepare sampling manual through reviewing of existing sampling method and legislation	1 sampling manual					Lab. Staff/Expert		Mr. Sawaki
(2)ANAM Lab. scientists experience the practical monitoring for natural water and wastewater						Manager/Chief advisor		
1) Prepare annual water quality monitoring and wastewater compliance monitoring program	1 plan revised per year					Lab. Staff/Expert		Mr. Fabian
2) Execute the water quality monitoring and wastewater compliance monitoring program	4 annual water quality monitoring and compliance reports					Lab. Staff/Expert		All Lab staff
(3) ANAM Lab scientists learn theory, use of equipment, applications, etc., for metal analysis, pesticides and organic compounds analysis, analysis of basic water quality factors, bacteriology and aquatic biology through the instruction of experts						Manager/Chief advisor		
1) Plan trainings	1 plan per year					Manager/Chief advisor		
2) Execute trainings						Lab. Staff/Expert	• 8 of C/P trainings in Japan: J •5 of experts in short term from Japan: Jp • 6 of 3rd country experts from Chili (JCPP): Cp • 5 of 3rd country training to Chile(JCPP): Ct	
a. Water quality monitoring (sampling)	Training report for each					Lab. Staff/Expert		Mr. Yau
b. Chemical analysis with data processing	Training report for each					Lab. Staff/Expert		Mrs. Julia
c. Metal analysis (AAS)	Training report for each					Lab. Staff/Expert		Mr. Fabian
d. Pesticide analysis (GC-MS)	Training report for each					Lab. Staff/Expert		Mr.Tejada Mrs.Julia
e. Bacteriology and Aquatic biology	Training report for each					Lab. Staff/Expert		Mrs. Julia Ms.Yahaira
f. Industrial wastewater treatment	Training report for each					Lab. Staff/Expert		Mr. Guillermo
g. Marine pollution protection	Training report for each					Lab. Staff/Expert		
h. Groundwater pollution	Training report for each					Lab. Staff/Expert		
3) Hold an evaluation meeting	Evaluation report for each training					Manager/Chief advisor		
(4) ANAM Lab scientists make standardized operation procedures (SOPs) for each type of analysis						Manager/Chief advisor		
1) Prepare annual work plan and create SOP's for each type of analysis	1 plan per year					Manager/Chief advisor		
a. Water quality monitoring (sampling) techniques	1 SOPs revised per year					Lab. Staff/Expert		Mr. Yau Mrs. Julia
b. Chemical analysis with data processing	1 SOPs revised per year					Lab. Staff/Expert		Mr. Yau Mrs. Julia
c. Metal analysis (AAS)	1 SOPs revised per year					Lab. Staff/Expert		Mr. Fabian
d. Pesticide analysis (GC-MS)	1 SOPs revised per year					Lab. Staff/Expert		Mr. Tejada
e. Bacteriology and Aquatic biology	1 SOPs revised per year					Lab. Staff/Expert		Mrs. Julia
2) Hold a evaluation meeting	1 evaluation report per year					Manager/Chief advisor		
(5) ANAM Lab. scientists hold technical seminars for water quality monitoring to the related governmental institutes and laboratories in Panama						Manager/Chief advisor		
1) Prepare annual work plan for technical seminar	1plan per year					Manager/Chief advisor		
2) Execute technical seminar	Seminal will be held with traning by expet					Lab. Staff/Expert		
a. Water quality monitoring (sampling)	document about presentaion					Lab. Staff/Expert		Mr. Yau Mrs. Julia
b. Chemical analysis with data processing	document about presentaion					Lab. Staff/Expert		Mr. Yau Mrs. Julia
c. Metal analysis (AAS)	document about presentaion					Lab. Staff/Expert		Mr. Fabian
d. Pesticide analysis (GC-MS)	document about presentaion					Lab. Staff/Expert		Mr. Tejada
e. Bacteriology and Aquatic biology	document about presentaion					Lab. Staff/Expert		Mrs. Julia Ms. Yahaira
3) Hold a evaluation meeting	1 evaluation report per year					Manager/Chief advisor		

APPENDIX IIIPO 2/3

Plan of Operation (PO) for the Water Quality Monitoring Technique Project (3 of 3)

Activities	Intended results	Calendar year 2003	2004	2005	2006	Persons in charge	Coordination	Input/Observations
3 Monitoring results provided by ANAM Lab scientists can be opened to the public through the publication and on the HP of ANAM.								
(1) ANAM Lab scientist make annual report of water quality monitoring activities from the Laboratory						Manager/Chief advisor		
1) Identify status of existing water quality monitoring maps and data	1 evaluation report with work plan					Manager/Chief advisor	National Direction for Environmental Quality Protection (DINAPROCA), National Direction for Environmental Impact Assessment (DINEORA) and other pertinent organizations *Database will be subcontructed using MS-Access.	Following sampling points based on R/D will be included into created maps - 3 monitoring points for 16 rivers in Panama Province - 2 in Panama Bay - 2 in Lakes in Panama Province
2) Obtain the x-y coordinates for monitoring points and point pollution sources	Generated digital data					Manager/Chief advisor		
3) Create water quality monitoring maps for sampling sites and points pollution sources on GIS	Digital maps for sampling points and point pollution sources					Manager/Chief advisor		
4) Create water quality monitoring database	Digital database					Manager/Chief advisor		
5) Prepare water quality annual reports	1 annual report					Manager/Lab. Staff/Expert /Chief advisor		
(2) ANAM Lab scientist open the monitoring data of water quality and present activities and information of ANAM Lab. to the public through the HP of ANAM						Manager/Lab.Staff/ Chief advisor		
1) Create contents of HP based on database for opening to the public	Contents of HP					Manager/Chief advisor		

APPENDIX IV-1

Organization Chart of PROTEMOCA

anam

JICA

Directora del Proyecto / Administradora General de la ANAM

Dra. Ligia Castro de Doens

Comité Coordinador Adjunto

Presidente:

- Director(a) del Proyecto o su representante

Parte Panameña:

- Representante de la Oficina de Cooperación Internacional de ANAM
- Representante de la Dirección Nacional de Planificación y Política Ambiental
- Representante de la Dirección Nacional de Evaluación y Ordenamiento Territorial
- Representante de la Dirección de Fomento a la Cultura Ambiental
- Representante del IDAAN
- Representante del MINSA
- Representante del Departamento de Cooperación Técnica Internacional del Ministerio de Economía y Finanzas
- Gerente del Proyecto
- Coordinador del Proyecto
- Jefe del Laboratorio
- Otro personal que el Presidente del Comité considere necesario

Parte Japonesa:

- Asesor Jefe
- Experto(s) designado(s) por el Asesor Jefe
- Personal adicional que sea enviado por JICA, si es necesario
- Representante Permanente de la Oficina de JICA en Panamá

Nota: Funcionario(s) de la Embajada del Japón en la República de Panamá podrán asistir a las reuniones del Comité Conjunto, como observador(es).

Jefe Asesor Japonés

Ing. Kenji FUKUSHIMA

Gerente del Proyecto / Director de EDINAPROCA

Lic. Natalia Young

Experto Japonés

Ing. Natsuji SAWAKI

Coordinadora del Proyecto

Lic. ILeana Taylor

Expertos de Chile y Japón

Ing. FUJII | Ing. VERDUGO | Dr. KURATA | Ing. FUKAYA | Ing. KAMEGAI

Jefe del Laboratorio

Lic. Fabian Maregocio

Análisis de Metales

Sección de Administración

Sra. Telvys Guerra

Sección de Muestreo

Sr. Julio Adames

Lic. Genghis Kan Yau

Lic. Glaister Tejada

Sección de Análisis

Lic. Julia Pineda

Lic. Yajaira Serrano

Sección de Información y Educación

Ing. Eduviges Núñez

Análisis de Plaguicidas

Bacteriología y Agua Insecticida

Norma ISO/IEC 17025

Análisis Físico Químico

Muestreo de la Calidad del Agua

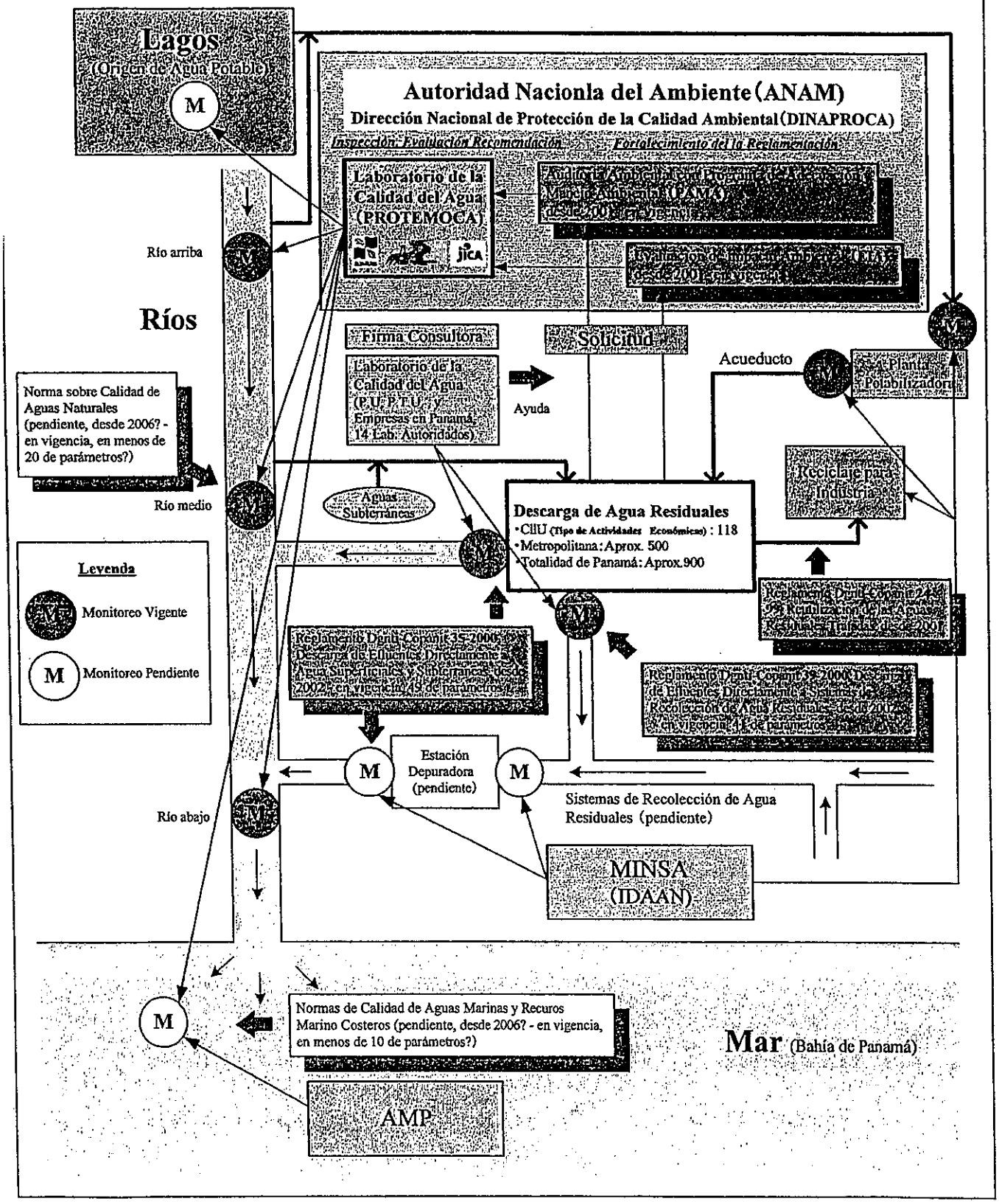
Sistema de Gestión y Aseguramiento de la Calidad del Laboratorio

Principales Funciones del Laboratorio

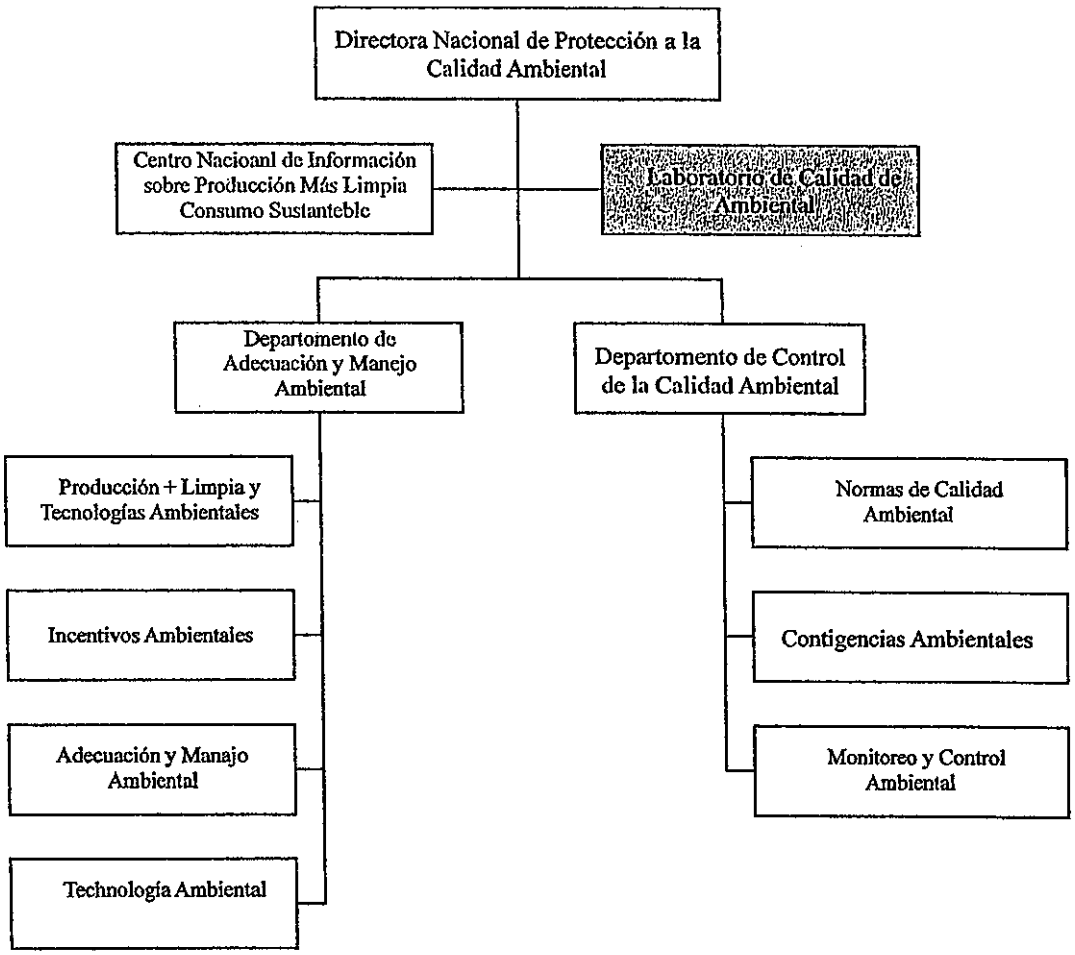
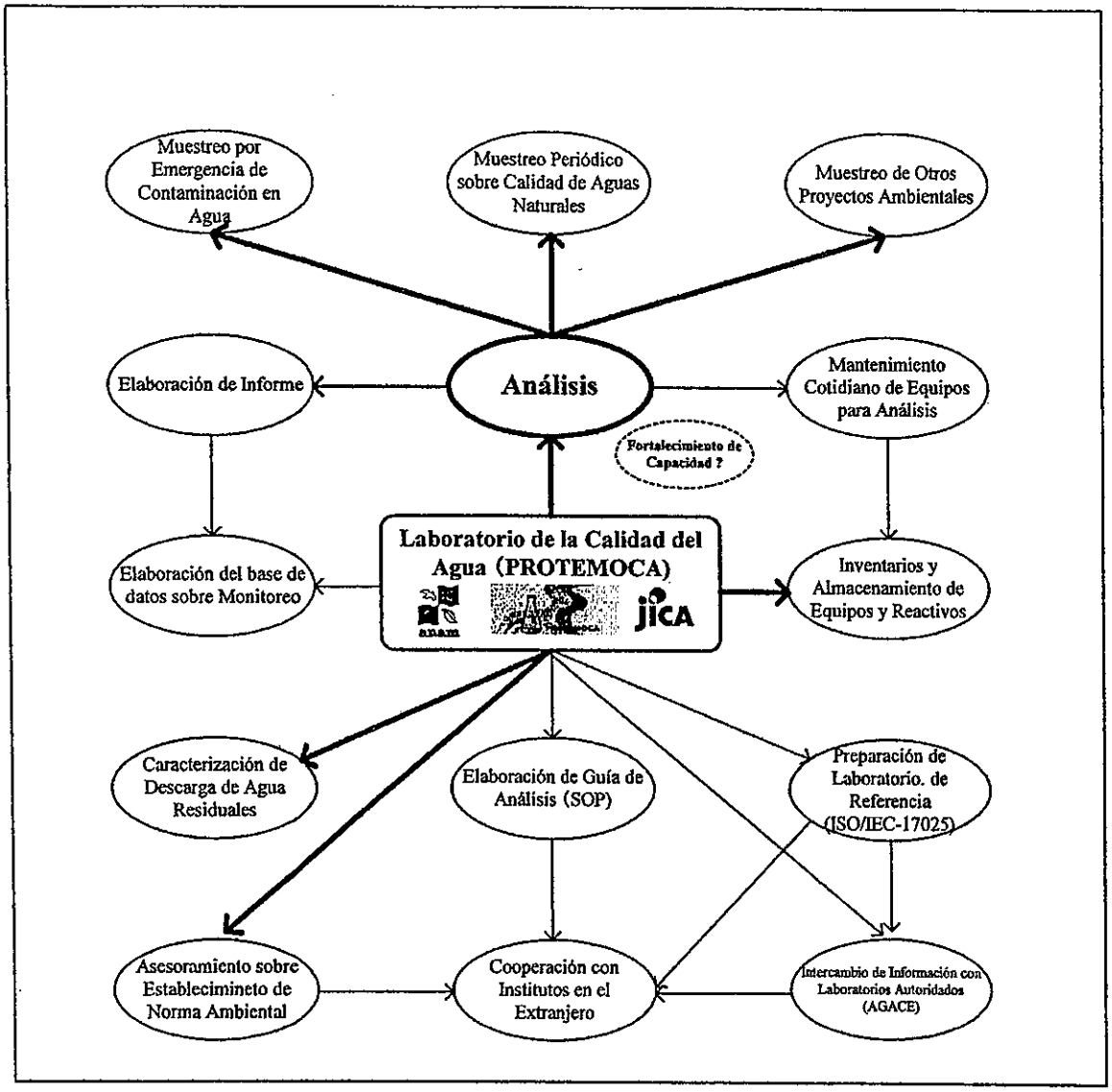
PROTEMOCA

APPENDIX Ⅳ-1 (2) Organization Chart for Implementation of the PROTEMOCA

Concept of Countermeasure for Water Contamoination in the Metropolitan Area of Panama



APPENDIX IV-1 (3) Organization Chart for Implementation of the PROTEMOCA



APPENDIX Ⅳ-1 (4) Mission and Technical Services for the Laboratory of Water Quality in ANAM