THE EX-POST EVALUATION STUDY ON PROJECT ON RISK MANAGEMENT OF HAZARDOUS CHEMICAL SUBSTANCES IN MALAYSIA

Evaluation Report

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March 2005

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Ex-Post Evaluation conducted by JICA Malaysia Office

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Mining/Industry / Chemical Industry Planning/Administration / Environment</td><td>Cooperation scheme: Project-type Technical Cooperation</td></tr>
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Along with the rapid development of the Malaysian economy, the quantity and variety of chemical substances consumed have also rapidly increased. This also applies to hazardous chemical substances. However, the preparation of regulatory measures and control lag behind this growth. Consequently, Malaysia needed to promptly implement control measures for the disposal of industrial waste. In response, JICA had implemented and completed the Project-type Technical Cooperation "Hazardous Chemical Substances Evaluation Analysis/Industrial Waste Disposal Technical Cooperation Project" from 1993 – 1997. However, this Project was aimed at developing basic technology and knowledge through technical transfer at the laboratory level. Therefore, Malaysia requested the cooperation in order to manage and control industrial pollution, applying the outputs gained from the former Project in actual industrial activities. SIRIM is a public corporation wholly owned by the Government of Malaysia. SIRIM plays the central role in the country as a research institution of industrial technology.

This ex-post evaluation is conducted two years after the completion of the project to gain an understanding of the impact and sustainability of the project.</td></tr>
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To provide the industrial sector with evaluation and management services for the safe use of chemical substances, the Project transferred the necessary techniques to SIRIM, such as techniques for assessment and treatment of wastewater.</td></tr>
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1) The equipment will be procured, operated and maintained properly
2) Technical expertise in chemical safety evaluation will be developed
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Before the Project termination, SIRIM created the study report on hazardous chemical substance, which means that the Verifiable Indicator of Overall Goal, i.e., SIRIM’s assessment of at least one hazardous chemical substance, was fulfilled. In addition, SIRIM’s ex-post self-assessment revealed that SIRIM has further developed its technical capability since the project termination. Therefore, it is concluded that the Overall Goal has been achieved.

b. Unintended Effects:
SIRIM’s capability has moved beyond modifications of methods and techniques to attain the level of innovation of new procedures and new products. SIRIM has managed to modify the techniques learnt in the Project to help solve clients’ problems, i.e. to test the chemical composition of unknown products, rather than verify the chemical purity of known products, the thrust of the Project’s technology transfer.
The counterparts with Project knowledge have better served in Government committees such as POPs (Persistent Organic Pollutants) and EHS (Environmentally hazardous substances).</td></tr>
</table>

(2) Sustainability

a. Institutional Aspect:

SIRIM was corporatised in 1996. The former Environment and Energy Technology Centre (EETC) was integrated with other SIRIM Centre, and reformed as the Environment and Bioprocess Technology Centre (EBTC) after the Project termination. 48 staff were assigned in whole EETC at the Project termination, while currently 55 staff in former EETC out of 90 staff in whole EBTC. It indicates that number of staff has increased. There were 25 counterparts (cumulative number) during the Project period, and 76% of counterparts including Project Leader and Project Coordinator are still assigned.

This Project was designed based on the understanding that the draft Industrial Chemical Act would be enacted, which is not yet enacted. However, SIRIM has provided the consultancy services on hazardous chemical substances based on the international standard, such as Globally Harmonised System (GHS) of classifying and labelling chemicals, and other domestic acts, such as Occupational Safety and Health Act (OSHA) and Environment Quality Act. Finally, it is concluded that the pending Industrial Chemicals Act (ICA) didn't affect the sustainability of the Project.

b. Financial Aspect:

SIRIM's corporatisation in 1996 has meant that they are required to match their revenue and funding with their cost of operations and maintenance. The income of EBTC for the year 2003 was RM 9.5 million (RM 2.7million was from commercial, and RM 6.8 million was from government strategic funding). This makes up 6.6% of SIRIM's total revenue (inclusive of commercial and governmental) of RM 143.5 million for 2003. However, SIRIM is not a purely commercial body. They still have to carry out some government responsibilities, such as maintaining essential but non-statutory services. However, beyond that, "non-economic" services will have to be financed by their own revenues. As such, SIRIM has to live within their means, i.e. their costs must be balanced against their revenue. And this has proved to be a risk to sustaining Project outcomes, especially since some of the costs are foreign-based (thus expensive), and some services or consumables are not available locally.

SIRIM has made investments since Project termination, i.e., RM0.6 million in capital expenditures and 5% annually of capital costs for maintenance and repairs for Project equipment and facilities.

c. Technical Aspect:

SIRIM obtained ISO/IEC 17025, which is the general requirements for the competence of testing and calibration laboratories, and has still maintained it. SIRIM management rated their capability above average, compared to average at the time of project termination. Clients generally rated SIRIM's capability in risk assessment as better than SIRIM's competitors. Users Survey indicated that more than 96% intend to give more business to SIRIM in the future indicating that SIRIM can have a sustainable level of business.

Based on the result of the Counterpart survey, on average, 75% of the counterparts have utilised JICA reports and reference materials after Project completion. This result indicates that most of the technical fields are still relevant. The counterparts except in mutagenicity areas indicated that Project skills gained in the Project are still relevant to current industrial needs. Project skills and equipment has been utilized in the ecotoxicity, risk assessment and wastewater treatment.

3-2 Factors that have promoted Project

(1) Impact
SIRIM's capability has moved beyond modifications of methods and techniques to attain the level of innovation of new procedures and new products.

(2) Sustainability
SIRIM has spent its budget to the training program for staff and the maintenance cost of the Project equipment.

3-3 Factors that have inhibited Project

(1) Impact
None

(2) Sustainability
- Though the Industrial Chemical Act is not yet enacted, SIRIM has provided the consultancy services on hazardous chemical substances based on the international standards and domestic acts. It is concluded that the pending ICA didn't affect the sustainability of the Project.

- Main issue that has affected sustainability is the status of equipment and suppliers, i.e., equipment outdated; unavailability of parts/accessories locally, no local maintenance/repair services etc. This pushes up the maintenance costs as well as upgrading costs which directly affects sustainability.

3-4 Conclusion

Given the results of the ex-post evaluation, it is concluded that the Overall Goal has been accomplished. Proposed Industrial Chemicals Act would have increased demand for SIRIM's risk assessment services. Although not implemented, the needs for risk assessment services are not diminished. This is evidenced by the active government participation in both international (Globalised Harmonised System) and domestic (USECHH Regulations 2000) arenas in terms of the management of hazardous chemicals. As the result of the Project, SIRIM has been one of the best testing institutes in Malaysia which can provide the risk assessment to industrial sector. It is expected that SIRIM will fulfill the industrial needs.

Although SIRIM was corporatised in 1996, SIRIM has continued to maintain "non-economic" services within their operations, which were transferred through the Project and are still necessary for Malaysia. In addition, the Project has enabled SIRIM to develop additional products and services for industry based on the transferred skill and technology. The sustainability of SIRIM has been secure.

3-5 Recommendations

(1) Recommendations for Malaysian Government
Budget must be provided for Project outcomes to be sustained as SIRIM cannot raise enough revenue to finance it. It is proposed that the Malaysian Government makes available maintenance budget for technologies that are consistent with achievement of national objectives. If sufficient funding cannot be raised, it is recommended that SIRIM donate the useable equipment to a government institution so that they can be maintained through government grants and funds.

(2) Recommendations for JICA
None

3-6 Lessons Learned

- For future projects, donor agencies should review with their partner agencies the financial implications of maintenance and replacements as the sustainability of projects are dependent on the technical equipment and facilities provided.
- It is important to appoint local suppliers to equipments and also to use local parts as much as possible in order to avoid the undesirable situation where maintenance and repairs are impossible because suppliers cannot be traced.
- Another area to consider is to train the counterpart agencies in the hardware so that they can maintain the equipment and thus having to avoid the problem of non-traceable suppliers.
- Technical cooperation projects to include management training components, e.g. marketing strategies, pricing and branding strategies, customer relations strategies, investment raising strategies and business development strategies to ensure that post project completion sustainability will be addressed earlier.

3-7 Follow-up Situation

None

Abbreviations

BOD	Biological Oxygen Demand
CAT	Chromosome Aberration Assay Test
CHRA	Chemical Health Risk Assessment
CSDS	Chemical Safety Data Sheet
DANIDA	Danish International Development Agency
DOE	Department of Environment
DOSH	Department of Safety and Health
DSM	Department of Standards Malaysia
EBTC	Environment and Bioprocess Technology Centre
EETC	Environmental and Energy Technology Centre
EHS	Environmentally Hazardous Substances
GHG	Green House Gas
HVAS	High Volume Air Sampler
IEC	International Electrotechnical Commission
IRPA	Intensification of Research in Priority Areas
ISO	International Organisation of Standard
JICA	Japan International Cooperation Agency
LCD	Liquid Crystal Display
MoHR	Ministry of Human Resource
MOSTI	Ministry of Science, Technology and Innovation
MSDS	Materials Safety Data Sheet
NIOSH	National Institute for Occupational Safety and Health
POPs	Persistent Organic Pollutants
QRA	Quantitative Risk Assessment
R&D	Research and Development
RO/UF	Reverse Osmosis/Ultra Filtration
SAMM	*Skim Akreditasi Makmal Malaysia* (National Laboratory Accreditation Scheme)
SIRIM	Standards and Industrial Research Institute of Malaysia
SOPs	Standard Operating Procedures
TCLP	Toxicity Characteristics Leaching Procedure
UKM	*Universiti Kebangsaan Malaysia*
UM	*Universiti Malaya*
UPM	*Universiti Putra Malaysia*

1. INTRODUCTION

1.1 Project Background

This Ex-Post Evaluation Report of the JICA technical assistance project in developing SIRIM's capacity in the area of risk assessment of hazardous chemical substances (hereafter known as the Project) from 1998 till 2002 was carried out from September – November 2004. The Terms of Reference of the project is attached as **Annex 1**.

A terminal evaluation report was produced about six months before the Project was officially terminated in 2002. That report outlined the progress/condition of the Project, the outcomes and achievements made at that time.

It is important to note that the impact of a project after its termination is different from the impact during the time of the project. There are no longer any "project" resources that can be directed to assist in reaching the goals. Institutional, organisational, political, market and economic factors are likely to influence the outcomes and directions of the project goals and purpose, as well as the institution's performance. Thus, the extent of the project's impact on and sustainability within the organisation and the counterparts is a function of its design and implementation, and its ability to demonstrate its relevance to the organisation's purpose and existence. In this regard, an Ex-Post evaluation helps in learning how to improve on the design and implementation of future projects. Such an exercise will help both donor and recipient evaluate the facts on whether project elements are still relevant to the core business, particularly the size of the impacts, and whether the outcomes could be sustained.

1.2 Study Objectives

In an Ex-Post evaluation, the most important objective is **to gain an understanding of the impact and sustainability of the project**. In this case, the evaluation is done two years after termination of the Project. In undertaking this exercise, JICA has determined that the evaluation should comprise mainly of interviews with key stakeholders, i.e. SIRIM Management, Project counterparts, and users of services that can be attributed to the Project. Other inputs, such as examination of records, were compiled to supplement this effort.

1.3 Key Evaluation Objectives

The objective of the evaluation is to verify important issues relating to the impact and sustainability of the Project. The main evaluation questions are listed as follows:

a) **Impact: Achievement of Project Goal since completion**

i) How much further has the Project Goal been attained?
ii) What factors have contributed to the impacts?
iii) Any unanticipated outcomes?
iv) Any external factors affecting the achievement of Project Goal?

b) **Sustainability: Continuation of Project activities and services**

v) How has sustainability been continued?
vi) Have Project outcomes been maintained? And how?
vii) What factors have affected its sustainability?

Specific Questions

In addition, certain specific questions were raised in the Ex-Post Evaluation. They were:

- Number of study reports on Hazardous Chemical Substances
- Unified Legal framework
- Consulting fees from private sector
- Condition of equipment

1.4 Evaluation Team

The Evaluation Team for this study was put together by PE Research Sdn Bhd and comprised Chang Yii Tan as Team Leader and Dr Tan Guat Lin as Researcher.

1.5 Structure of Report

The structure of this report is as follows. **Section 2** discusses the methodologies, particularly the tasks used in this evaluation in more detail. **Section 3** discusses the results of the evaluation, focussing on the two main issues of impact and sustainability. The discussions are focussed on aspects of policy, technology, environment, socio-cultural, institutional and management and economics and finance. **Section 4** is a conclusion of the evaluation result. **Section 5** provides the key lessons learnt with regards to impact and sustainability, and **Section 6** makes recommendations to resolve the issues that have surfaced during the discussions.

2. EVALUATION STUDY APPROACH

2.1 Methodology

The principal technique used is the logical framework (Logframe) approach. Specifically, the ex-post evaluation method uses the terminal evaluation report as its starting basis. The project objective/goal and purpose are defined as follows.

Project Goal: SIRIM's capability in risk assessment of hazardous chemicals will be upgraded.

Project Purpose: SIRIM will be able to provide evaluation and management services in chemical safety for the industrial sector.

It is important to make certain distinctions in this evaluation. Although SIRIM was the institution that received the technical assistance, the actual work was done at the premises of the Environment & Bioprocesses Technology Centre (EBTC). It is the only life-science related centre in SIRIM, which is very much an engineering enterprise. Although references are to SIRIM, the immediate focus of the evaluation is targeted at the EBTC, the counterpart staff that participated in the Project's activities, particularly training and postings in Japan.

2.2 Implementation

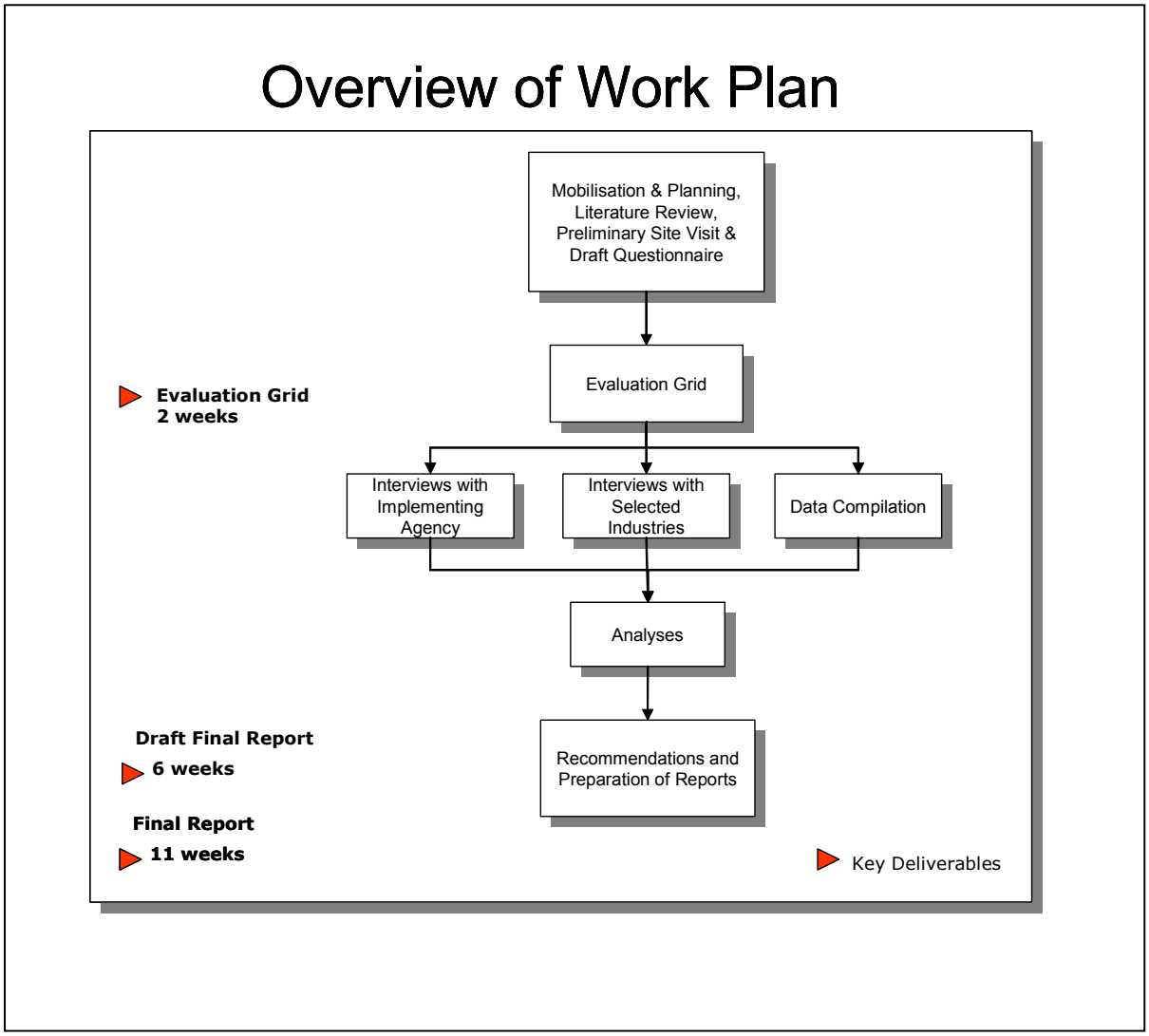
The following methodologies were used in this ex-post evaluation:

Table 2.1: Methodologies used in ex-post evaluation

Methodology	Implementation
Preparation of an evaluation grid (Annex 2)	An evaluation grid establishes the main questions of the evaluation. Sub-questions were developed alongside the key questions. Indicators were identified (e.g. quality), and their measures were defined (e.g. poor to excellent). Another key aspect was data requirements, sources of data and method of its collection. Hence, the evaluation grid provided the scope of work that was envisaged at the start of the Evaluation, and thus guided the evaluators in terms of answering the main and sub-questions. It is important to note that the grid was defined without detailed knowledge of the record keeping or documentary procedures or what was accessible to the study team. In this particular evaluation, the study team had the benefit of an initial meeting with SIRIM that provided information for many of the key issues that were eventually discussed. The study team also had the benefit of information in the terminal evaluation report and documents that were prepared during the Project and these were also used to prepare the final evaluation grid.
Surveys and interviews with SIRIM, counterparts and users (Annex 3)	Using the evaluation grid, the survey instruments were then developed based on the main and sub-questions. In this evaluation, three different questionnaires were designed, i.e. to the three levels of impacts indicated earlier. In addition to these questionnaires, it was important to note that the study team also developed guides for interviews with other organisations, such as the Department of Environment (DOE) and the Department of Safety and Health (DOSH). In this study, SIRIM management and all available counterparts were

Methodology	Implementation
	interviewed. A total of 33 firms (users) participated in the survey.
Checklist of status of equipments and facilities left behind (Annex 4 & 5)	In any donor project, the status of use of the equipment and facilities post-project form an important indication of the relevance of the technology that was delivered, especially after project resources are no longer sustaining their maintenance and upkeep. A checklist of equipment that was handed over/donated at the time of the terminal evaluation report was handed over to SIRIM, and their status is shown in Annex 4. An analysis of the state of the equipment has also been made, and this is discussed in Annex 5 of the report.
Organisational review of SIRIM and key changes since 2002 (Annex 6)	In order to better understand the results of the evaluation, it is important to have an appreciation of the organisational and institutional changes that occurred since the terminal evaluation report. An outline of the key changes is shown in Annex 6.

Figure 2.1:Overview of Work Plan



3. RESULTS

3.1 Evaluation Result

3.1.1 Impact

3.1.1.1. Achievement of the Overall Goal

Before termination of the project, SIRIM completed a study report on hazardous chemical substance, which is the Verifiable Indicator of Project Purpose in the Logical Framework Matrix.

An ex-post self-assessment of SIRIM's technical capability to undertake complex projects since 2002 is shown in **Table 3.1**. In this table, it is obvious that each of the five areas that the Project had contributed time, inputs and resources have progressed, albeit at different rates and performance levels. **All areas have shown improvement** while the area of risk assessment has been rated the best achievement, i.e. moved up 2 notches. The highest level has been given to the ecotoxicity section.

Table 3.1: Level of technical capability to undertake complex projects: at the time of project completion and now (post-project)

	Project Completion (2002)					Post-Project (2004)				
	Low				High	Low				High
	1	2	3	4	5	1	2	3	4	5
Mutagenecity	[ ]	[x]	[ ]	[ ]	[ ]	[ ]	[ ]	[x]	[ ]	[ ]
Ecotoxicity	[ ]	[ ]	[ ]	[x]	[ ]	[ ]	[ ]	[ ]	[ ]	[x]
Sampling and Analysis	[ ]	[ ]	[x]	[ ]	[ ]	[ ]	[ ]	[ ]	[x]	[ ]
Risk Assessment	[ ]	[x]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[x]	[ ]
Wastewater Treatment	[ ]	[ ]	[x]	[ ]	[ ]	[ ]	[ ]	[ ]	[x]	[ ]

Note: 1 = Very low capability (<10%)
2 = Slight capability (1%-20%)
3 = Moderate capability (21%-50%)
4 = Good capability (51%-75%)
5 = Very high capability (>75%)
Source: SIRIM Management Survey, Q1.4

In addition to these consultancy projects, SIRIM also engages in a significant amount of R&D. By their own assessment, SIRIM indicated that 40 per cent of their time is spent in R&D projects, another 40 per cent is spent on consultancies, while the balance time is spent on other SIRIM related functions and activities.

The impact on SIRIM can also be measured by a self-assessment process in relation to their competitors. SIRIM management was asked to name potential competitors in the technical fields and then to benchmark themselves against their competitors. **Table 3.2** shows their self-assessment vis-à-vis their competitors.

SIRIM views their competitors in technology, facilities, service levels to be the universities, and in two cases, they named government organisations, i.e. Department of Fisheries, and NIOSH (National Institute for Occupational Safety and Health). There was only one private firm named. In terms of technology and facilities, SIRIM ranked themselves equivalent or better than their competitors. They also fared well in terms of service levels. However, they consider that they lose out in terms of market share for sampling analysis and wastewater treatment. SIRIM's assessment is that the overall impact of the Project on SIRIM's capability is very important.

Table 3.2: SIRIM's self-rating of their competitiveness vis-à-vis their best competitor

	Technology	Facilities	Service Levels	Market Share	Competitor's Name
Mutagenecity	1	1	2	2	UKM
Ecotoxicity	2	1	1	1	Fisheries, UM
Sampling Analysis	2	2	2	3	Chemlab, Universities
Risk Assessment, CSDS, not QRA	1	2	1	1	NIOSH, UPM
Wastewater Treatment	3	1	2	3	UPM

Note: 1= better than best competitor; 2=equivalent; 3= worse than best competitor
Source: SIRIM Management Survey Q1.6

3.1.1.2. Unintended Effects

One of the examples is that the government has utilised the skills of SIRIM counterparts through their involvement in committees on POPs (Persistent Organic Pollutants) and GHS of categorising and labelling chemicals and other committees.

There appears to have been a considerable degree of innovation in the work that has been associated with the Project. SIRIM management informs that in all five areas, SIRIM's capability has **moved beyond modifications of methods and techniques**, but has even **attained the level of innovation of new procedures and new products**. **Table 3.3** shows the level of attainment since Project termination. As can be seen, in all the technical fields, SIRIM has not only modified the initial procedures but moved into new results, products or innovation. This is an interesting result because even in mutagenicity and sampling, where their contributions to jobs and usage of skills from the Project were low, they have achieved new products or innovation. Such a situation reflects on the nature of the consultancy tasks that SIRIM has to take on board, which are different from those for which they were trained.

Table 3.3: Level of Risk Assessment Capability, SIRIM

	Mutagenicity	Excotoxity	Sampling & Analysis	Risk Assessment	Waste Water Treatment
(1) Same as at Project Completion					
(2) Modifications made					
(3) New results, products, new innovation *Basically, pure chemical testing techniques have been used in R&D, i.e. applied techniques where different chemicals are in the samples or products of unknown chemical composition*.	***X*** *Artificial bone test*	***X*** *local fish in LC50 test*	***X*** *GHG sampling*	***X*** *ChemRA to process RA*	***X*** *Use of new substrate*

Source: SIRIM Management Survey, Q1.3

It appears that the SIRIM counterparts are asked by industry to solve problems that were different from the techniques and skills that the Project provided. One of the important issues raised is that there is no market for the pure testing of chemicals, which was the type of skill delivered by the Project. Typically, firms bring products or samples of unknown chemical origin for testing, rather than to test the purity of a particular known product.

However, SIRIM has managed to reverse-engineer the techniques to solve problems brought to them by their clients, industry. For instance, they have managed to use 3 local fish species (*keli, lampam jawa, sepat siam*) for LC50 testing. In the area of mutagenecity, artificial bone testing was developed.

In risk assessment, SIRIM's capability has moved beyond chemical risk assessment to process assessment, which is a much larger area of services. As such, they have given themselves high ratings for new products, new results and innovation in the level of capacity assessment.

It is obvious that without these innovations, SIRIM's risk assessment capability may have stagnated.

Dr. Zainal, the head of EBTC, identified **additional spin-offs from the Project**. In the area of certification, SIRIM has used the knowledge gained from the Project as a basis to launch certain certification schemes, such as for eco-labelling and biodegradation. However, he said that some of the methodologies required SIRIM to maintain certain procedures at a high cost (see economic-financial aspects).

3.1.2 Sustainability

3.1.2.1. Institutional and Management Aspects

SIRM was corporatised in 1996. The former Environmental and Energy Technology Centre (EETC) was integrated with another SIRIM Centre, and reformed as the Environmental and Bioprocess Technology Centre (EBTC) after the Project Termination. 48 staff were assigned to EETC at the Project Termination, while currently 55 staff in former EETC out of 90 staff in EBTC. It indicates that number of staff has increased. There were 25 counterparts (cumulative number) during the Project period, and 76% of counterparts including Project Leader and Project Coordinator are still assigned.

Counterpart staff trained in the Project is still working in SIRIM and **Table 3.4** shows the situation with the staff. Twelve counterpart staff were interviewed during the period of the evaluation study.

Table 3.4: Counterpart Staff trained, remaining in SIRIM

	No. Staff trained by Project	No. staff remaining 2004 (interviewed)	No. staff no longer with SIRIM
Mutagenecity	6	4 (3)	2
Ecotoxicity	6	4 (2)	2
Sampling/ Analysis	4	3 (2)	1
Risk Assessment	2	2 (2)	0
Wastewater Treatment	6	5 (3)	1
Total	24	18 (12)	6

Source: SIRIM Management Survey, Q.7.2

By virtue of being a corporation, SIRIM has had to develop a business and strategic plan for this aspect of their business. Their strategic plan is valid for 3 years, and their business plan is shaped annually.

The policy environment for a successful outcome of the Project was a unified legal framework for hazardous chemical substances. The assumption was that a unified legal framework would have increased the needs for industrial consultancy services and the Project would have prepared SIRIM to deliver those services.

The unified legal framework that SIRIM had in mind was a DOE proposal to integrate the chemicals issues into a **proposed Chemicals Act**. This proposed Act would have certain elements of the scheduled wastes, poisons and pesticides acts integrated into a holistic chemicals act[1]. If that were in place, then it would have provided a fillip to the risk assessment of hazardous chemicals. However, as things stand, this proposal has already been shelved. The current DOE considerations are to amend the Scheduled Waste Regulations to remove the source of the scheduled wastes but to adhere mainly to the chemical composition[2].

[1] Confirmed this with Dr Yeoh Bee Ghim, SIRIM, 8 November 2004
[2] Confirmed with Ir Lee Heng Keng, DOE, 8 November 2004

The study team has inquired about the unified legal framework with DOSH and also with the DOE, and the conclusions are similar to that provided by SIRIM, i.e. that **the plan to implement a unified legal framework for hazardous chemical substances has been abandoned**.

Even in such a situation, the Project had delivered services to SIRIM such that the level and quality of their services to industry had increased.

Although the proposed Chemicals Act is abandoned, this does not diminish the need for increased demand for risk assessment services. The government is active in the international arena, e.g. GHS (Globally Harmonised System) of classifying and labelling chemicals. Domestically, Malaysia has legislated the USECHH (Use & Standards of Exposure of Chemicals hazardous to Health) Regulations 2000, the Department of Occupational Safety and Health (DOSH) had observed visible changes in industry on the management of hazardous chemicals. Currently, hazardous wastes is regulated under the EQA (Scheduled Wastes) Regulations, and nation-wide services are available to collect, store, transport, treat and dispose such substances.

However, it is important to note that DANIDA is in the process of defining a project that would likely improve the management of environmentally hazardous substances (EHS). This Project, called a component in DANIDA terminology, is being developed with the DOE as the executing agency. Their terms of reference cover mainly chemical substances of which a significant portion would be pesticides. The project aims to provide a management system for the entire lifecycle of hazardous substances within the Malaysian environment.

3.1.2.2. Economic and Financial Aspects

The income of of EBTC for the year 2003 was RM 9.5 million (RM 2.7 million from commercial, and RM 6.8 million was from government strategic funding). This make up 6.6% of SIRIM's total revenue (inclusive of commercial and government) of RM 143.5 million for 2003.

Currently, the source of SIRIM's revenue is 50 per cent government and 50 per cent private sector. As far as EBTC is concerned, 60 per cent of its revenue is from the government and 40 per cent from the private sector (consultancies). MOSTI (previously MOSTE) provides grants for staff and operating costs in all government related projects but SIRIM has to earn the rest of the costs through consultancy services. IRPA research grants play a major role in SIRIM funding, i.e. development budget.

SIRIM is in the business of providing industrial consultancy, and in EBTC's case they provide consultancy services in all five Project-related areas of mutagenecity, ecotoxicity, wastewater treatment, risk management and sampling. **Table 3.5** shows the number of jobs and samples tested over the past six years. It is obvious that there has been growth of both jobs and samples tested between 2002 and 2004.

As of May 2003, EBTC has 90 staff and an annual budget of RM9.35 million. Between 1988 and 2000 (during Project period), 100 jobs/projects were completed. Between 2000 and 2004, 1,282 jobs/projects have been completed, i.e., an average of 256 jobs/projects per year between 2000 and 2004. From SIRIM's own records, the number of jobs has grown consistently.

Breakdown of jobs into technical fields was not possible because of the manual record keeping, and the format of which has also changed over the years. Hence, obtaining a consistent set of records will require a significant amount of work (1,282 jobs/projects from 2000 to August 2004), which is beyond the time available for this study. However, the total

number of jobs can be obtained from the latest job numbers given (serially given), which registers each project, and samples are based on the files that record the projects received.

Table 3.5: Number of Jobs and Samples Tested, 2000-2004

Type	1998-2001*	2000	2001	2002	2003	Up to August 2004
Mutagenecity	1					
Ecotoxicity	13					
Sampling Analysis/RA	69					
Wastewater Treatment	17					
Total Jobs/Projects	100	196	216	296	369	205
Samples				1,470	2,498	1,519

*Note: * based on Terminal Evaluation*
Source: SIRIM Management Survey, Q1.5; Jobs Done Template

In terms of market share, it appears that in overall terms, SIRIM's market share from these firms is declining, but the erosion may not be significant given the small number of cases. The average value of job reported going to SIRIM was valued at RM5,265 in 2001 but this has increased to RM8,099 in 2004 (15%). However, SIRIM's own data showed that they had a decline of 13% over the same period, from RM4,718 to RM3,176. It is important to note that outliers to the data reported had been excluded.

In terms of market share, SIRIM's share of 80 per cent in 2001 has declined slightly to 70 per cent in 2004. In ringgit terms, the decline is also not large, and the small sample size may have accounted for the difference.

However, it is important to note that while this may not be a matter of great concern if SIRIM were a government office, but as a corporation, they might wish to conduct more industry studies to find out about their position in the private market. The usual caution of interpreting from a small sample should also be made here. **Table 3.6** shows the key statistics in SIRIM's market share.

Table 3.6: SIRIM's Market Share in User's Demand

Year	Average value of jobs (RM)		Market Share	
	SIRIM	Others	RM	Jobs
2001	5,265	-	100%	80%
2002	13,481	-	100%	83%
2003	4,564	3,000	82%	75%
2004	8,099	3,733	84%	70%

Source: computed from User's Survey, Q.4 & Q.5 (removed outliers in the survey)

How did the users assess the Project's equipment and services in SIRIM? **Tables 6 and 7 in Annex 10** provide the respondents' assessment.

In risk assessment, their clients considered that both their equipments and service levels are way above the competition. In ecotoxicity, they are equal to their competitors. There is a slight variation when it comes to sampling and analysis work. As sampling and analysis is

also answered by more than one respondent, this is a slightly more robust answer than for risk assessment and ecotoxicity.

It appears that more than 96 per cent of their clients who were interviewed in the User's Survey will give SIRIM more business in the future, which corresponds to the sentiments expressed in Table 3.6 on businesses.

Due to the fact that SIRIM is a corporate entity, they regard this information as extremely sensitive. Hence, SIRIM has not disclosed full accounts information to the study team. However, they did comply with other financial and economic information.

One of the key issues that have affected the achievement of the overall Goal would have to be the institutional change that SIRIM is undergoing. The corporatisation of SIRIM in 1996 has far reaching consequences on SIRIM. Even though the government has given SIRIM a grace period to adjust to a corporate operating environment, such a change has tremendous effect on an organisation that has no history or experience in such an environment. One of the noticeable areas is the issue of "non-economic" services. In a strictly commercial environment, either one of two outcomes would already have happened: (a) a termination and write-off of those services, or (b) increased marketing and promotion of those services, i.e. investment, if they believed that those services had potential. The fact that SIRIM has continued to maintain "non-economic" services within their operations indicate that they are a corporate entity but still had to fulfil certain commitments to the government.

This is not to say that SIRIM is still operating as a public sector agency. It is evolving and changing. The mere fact that SIRIM has been an annual business/strategic planning cycle is clear evidence that it recognises its limits as well as having to plan its expenses carefully. SIRIM counterparts were extremely conscious of the cost of maintenance and upkeep as well as the capacity utilisation of their equipments. In our view, this is still an institution in transition.

Perhaps this was the intention of the government to have SIRIM operate in this way, but it introduces a risk to projects in terms of sustainability of their operations as well as the technology, standards and operating procedures left over.

Another example of this situation is that SIRIM has still been entrusted with certain responsibilities of government, such as membership of certain committees. Time spent by officers in these committees is time away from pursuing the corporate goal of financial sustainability, and contributing towards the nation's development objectives. Thus, this fine balance of national goals against institutional needs imposes on SIRIM a certain modus operandi which is public in character but in financial terms the price is paid solely by SIRIM.

SIRIM has invested an additional RM0.6 million and has maintained the equipments at 5 per cent of the operating and maintenance cost (SIRIM Management Survey, Q.8.2).

However, the main issue that has affected sustainability is the status of equipments and their suppliers. The study team was informed that in some cases the equipments were outdated that the original suppliers no longer carried the parts nor had even the knowledge of the equipment. In a particular case, the manufacturer's technician had to be flown out from Japan to examine the malfunctioned equipment. Hence, costs are higher and this will undermine the basis for sustainability. In any case, technology gets outdated rather quickly in industrial operations, and the issue of replacement versus maintenance will have to come into SIRIM's consideration at some point in time.

On the negative side, SIRIM did not realise that the high net cost of maintenance and operations of the Project equipments and operating procedures. Of course, this issue of high

cost is relative because if the utilisation of Projects equipments were correspondingly high or if industry paid fully for the cost of its use, then the net cost of equipment maintenance and repairs could be offset. Unfortunately the true situation is that the utilisation of the equipments is quite low (partly because industry demand is not up to the level of technical sophistication) then the net cost of maintenance is high.

Hence, the combined effect of corporatisation (that reduced their access to government funding) and the high cost of maintenance (eating into their operating budget) had created a situation of a double negative in terms of financial sustainability.

3.1.2.3. Technological Aspects

How does SIRIM view sustainability? The answer to this question can be seen in terms of their responses in the Management Survey. The first point that was conveyed is that SIRIM sees the Project skills are used in all the technical fields where consultancy services are provided to their clients. SIRIM's management further indicated that their capability has been either expanded or upgraded as a result of the Project. They are able to offer a wider range of services, technology and equipments to their clients.

SIRIM's clients were asked to rate SIRIM's equipments and service levels; their clients generally rated SIRIM's capability in risk assessment way above the competition. In ecotoxicity, they are equal to their competitors. There is a slight variation when it comes to sampling and analysis work. As sampling and analysis is also answered by more than one respondent, this is a slightly more robust answer than for risk assessment and ecotoxicity.

The Users' Survey found that more than 96 per cent of their clients who were interviewed for this Evaluation Study intend to give SIRIM more business in the future. **Table 3.7** shows their client's satisfaction ratings. Hence, with such an image of SIRIM, they stand a chance of a sustainable level of business.

Table 3.7: Satisfaction with SIRIM's services

Used SIRIM services, and satisfied …	N=26
Yes	96.2%
No	3.8%

In terms of the number of projects that each counterpart has worked and an estimate of usage of these skills acquired during the Project, the overall result was that skills have been upgraded, although there were variations between the different technical skills. There was significant usage of Project skills in the wastewater treatment (20 – 100%), risk assessment (40%) and possibly ecotoxicity projects.

Counterparts were then asked for their best estimate of how much time they spent using Project equipment or skills acquired as a proportion of their total working hours. To facilitate recall, the estimate was based on the average for the second half of 2004. As shown in **Table 2 of Annex 10**, counterparts reported up to 70 per cent of total time using Project Equipment. For instance, in the waste water and ecotoxicity areas, counterparts spent 40-70 per cent and 50 per cent respectively of their working hours using Project equipment. The proportion of time spent is a reflection of the importance of Project technical assistance after completion, and is function of its impact. Hence, it can be concluded that in both these areas, the impact is very significant.

Table 3.8 shows the utility of JICA Reports and literature that was accumulated during the Project period. It would appear that most of the technical fields are still relevant.

Table 3.8: Utilisation levels of JICA reports/literature reference

Technical Field	Utilised JICA reports/literature reference after project completion	N
Manager	100%	3
Mutagenecity	33%	3
Ecotoxicity	100%	2
Sampling & Analysis	50%	2
Risk Assessment	100%	2
Wastewater Treatment	100%	3
Average	75%	12

Source: Counterpart Survey, Q.4.4

The capacity of counterparts has been built during the Project through training of various forms. The key question is whether those skills have been sustained since the Project. Sustaining skills learnt is important in the industrial field because technology keeps improving all the time, and concomitantly skill upgrading is necessary if they are to be relevant to industry.

Table 3.9 shows the response to the question of skill upgrading since Project completion. Overall only one-third of Project staff (33 per cent) has received training since 2002. Tabulating the other counterparts by technical skill shows that skill upgrading has been rather uneven with all staff in the area of ecotoxicity being trained and two-thirds of staff in wastewater treatment. However, counterpart staff in the areas of mutagenecity, sampling and risk assessment has received no training since 2002.

Table 3.9: Counterpart Skill Upgrading since 2002

Technical Field	% upgrade skills	N
Manager	30%	3
Mutagenecity	0%	3
Ecotoxicity	100%	2
Sampling & Analysis	0%	2
Risk Assessment	0%	2
Wastewater treatment	67%	3
Average	33%	12

Source: Counterpart Survey, Q.3.1

Counterparts were then asked whether their current level of skills met the demand by industry, i.e. by their clients. **Table 3.10** shows the results. In both ecotoxicity and sampling, counterparts felt that project skills were adequate to meet the current needs of their clients. However, in mutagenecity, only one-third of the respondents felt that their skills are relevant to today's industrial needs.

Table 3.10: Does available skill meet current industrial demand by technical field

Technical Field	% project skill meets current industrial demand	N
Manager	67%	3
Mutagenecity	33%	3
Ecotoxicity	100%	2
Sampling & Analysis	100%	2
Risk Assessment	50%	2
Wastewater Treatment	67%	3
Average	67%	12

Source: Counterpart Survey, Q.3.4

3.2 Factors that have promoted Project

3.2.1 Impact

On the positive side, the outcomes were observed partly because of the nature of demand for industrial services. Industry in Malaysia does not require pure chemical testing, i.e. testing the purity of chemicals in products. Quite often, the sampling and analysis is done on products with unknown chemical composition. Such a switch requires a use of innovative techniques. Hence, SIRIM has indicated that they have actually moved beyond skills obtained in the Project, beyond modifications of techniques learned and developing new products and innovations. Such an outcome requires an attitude of innovative skill.

3.2.2 Sustainability

In terms of maintaining Project Outcomes, SIRIM has also made investments since Project termination. A total of RM0.6 million in capital expenditures has been invested, and SIRIM also undertakes maintenance and repairs (annually 5% of capital costs). Apart from facilities, SIRIM has also been investing in training and skills development, although the type of training has also been quite variable.

3.3 Factors that have inhibited Project

3.3.1 Impact

No significant factors are identified to inhibit Project.

3.3.2 Sustainability

SIRIM management attributed impediments to sustainability to the issue of financing and the availability of suppliers. **Table 3.11** shows their responses in the Management survey. The issue of cost is ultimately related to the pricing of services and that is in turn correlated to the

frequency of use and general market pricing conditions. Although the study team did not directly study these "external" issues, it is obvious that these would have serious consequences for a corporate entity. It therefore is vital that this issue should be addressed within the context of national development because these equipments and services, if required for national purposes, should be maintained within that context. Perhaps a more detailed cost-benefit analysis should be undertaken to decide on their fate. Leaving the situation as it is will mean that the life of these equipments will be determined by market forces.

Table 3.11: Impediments in maintaining project outcomes

Areas	Impediments
Staff	No high turnover (1-2 only)
Facility/Equipment	High maintenance & parts replacement cost
Financing	Sustainability is a major issue; especially with many equipment aging and requiring high maintenance; future projects, SIRIM will look into this issue more carefully

Source: SIRIM Management Survey, Q7.2

Any non-economic services that need to be maintained as a result of commitment made in the Project? Yes, for example in the case of the standard sludge, fish culture, and database software; obsolete equipment is a problem as models change and technology advances. Although they have coulometer, two other places outside of Japan has this (China and Korea).

In addition, SIRIM also identified the factors that affected the sustainability of outcomes. **Table 3.12** shows these factors.

Table 3.13: Factors Affecting Sustainability of Outcomes

	Yes	No	Reasons
Budget constraint	[x]	[ ]	Parts replacement & maintenance cost
Technology transfer	[ ]	[x]	
Skills requirement	[x]	[ ]	Instrumentation skills, training
Institutional Challenges	[x]	[ ]	Commercially oriented & financially viable
Industrial trend changes	[ ]	[x]	
Others	[ ]	[x]	

Source: SIRIM Management Survey, Q9.1

It is important to note that budgets, skills and institutional priorities are paramount to the Project. In this respect, it is vital that priorities be developed to provide long term financial support for those equipments that serve the national interest. SIRIM should not have to bear the full cost of maintaining these equipments and services on behalf of the country. At the same time, the issue of inability to locate Japanese suppliers has left SIRIM with equipment that cannot be repaired. Hence, it is important to think about either using local suppliers or giving training to SIRIM in equipment hardware.

The Chemical Health Risk Assessment or CHRA qualification was unanticipated. Two of SIRIM's staff have qualified for CHRA, indicating that the JICA Project training has been recognised.

The EBTC offers integrated risk assessment services (delisting and CSDS), maintains the standard sludge. Dr Yeoh mentioned that SIRIM had maintained certain activities at great cost to SIRIM, for instance, the “standard sludge”, using SAMM 17025. This process required SIRIM to collect 10 samples from all over the country on a quarterly basis. Spread over 8 years, a huge cost had been incurred (estimated RM10,000 per collection). SIRIM has been using standard testing procedures that were learned during the Project, maintaining standards of the Project. This exercise was not anticipated because SIRIM did not foresee having to support such an expensive facility. SIRIM’s corporatisation has exacerbated this problem because they were no longer entitled to apply for government grants to maintain such facilities. If SIRIM remained within the government, they could have appealed to the relevant authorities for support. This issue thus becomes a risk factor in terms of the sustainability of those “non-economic” services.

4. CONCLUSION

The overall goal of the JICA Project is that SIRIM's capacity in risk assessment will be upgraded. This is the intended overall impact of the Project.

SIRIM has completed a risk assessment of a particular chemical at the time of termination[3]. SIRIM has also achieved the (ISO/IEC 17025) standards in terms of the SAMM laboratory testing services, issued by the Department of Standards Malaysia (DSM). SIRIM's capacity in risk assessment of hazardous chemical substances has made an impact to the counterparts, to SIRIM the organisation that received the technical assistance, and also to industry at large. SIRIM management rated their capability above average, compared to average at the time of project termination.

It has made a difference in terms of SIRIM being able to develop additional products and services to industry, such as the biodegradability tests, provided only by SIRIM. The Project has delivered skills to analyse chemical purity of known products but SIRIM counterparts have reached the capability in testing the chemical composition of unknown products. With such skills, SIRIM's self-assessment is that they are better than their competitors technologically but in commercial considerations such as market share, they are behind the private sector.

The JICA Project has also made significant contribution towards improving SIRIM's institutional capacity in terms of staff members being able to undertake more complex problems in risk assessment, as well as in innovations developed directly from Project imparted skills. Nevertheless at the overall level, SIRIM has indicated that the Project has extended the range of services that they offer to industry. Certainly, SIRIM management has commented that they are able to offer a wider range of services using skills from the Project.

In terms of external factors affecting the Project's ability to achieve the overall Project Goal, it must be said that the proposed Chemicals Act would likely have increased the demand for SIRIM's risk assessment services. That it has not been implemented has not meant that the Project has not achieved its objectives. Both counterparts and industry agree that the Project's technologies are equal or higher than industrial needs.

Although SIRIM's risk assessment capability has not been assessed by any other party, their overall assessment of the impact of JICA Project has been very positive. In short, the overall goal of the Project has been achieved.

In terms of the unintended impacts, the positive impact has been the Chemical Health Risk Assessment or CHRA qualification. Two of SIRIM's staff have qualified for CHRA, indicating that the JICA Project training has been recognised. In so far as unintended negative effects of the Project, SIRIM did not foresee having to support expensive facilities and procedures (e.g. standard sludge). SIRIM's corporatisation had exacerbated this problem because they were no longer entitled to apply for government grants to maintain such facilities. If SIRIM had remained within the government, they could have appealed to the relevant authorities for support. This issue thus becomes a risk factor in terms of the sustainability of those "non-economic" services.

[3] The title of the report is "A Case Study on the Risk Assessment of Diphenyl Ether in the Malaysian Environment", The Project on Risk Assessment of Hazardous Chemical Substances, April 1998 – March 2002, case no. 101-84-8.

SIRIM management has stated that with the Project, risk assessment services to the industrial sector have been enhanced. They are able to offer a wider range of tests, analysis and consultancy in the five areas of the Project. The number of Projects completed has increased from 196 in 2000 to 296 in 2002 (end of Project) to 396 in 2003 (post-Project). However, the average value of projects has declined significantly over the past 4 years. SIRIM management attributed their current capability in the risk assessment area to be highly dependent on the JICA Project. Counterparts have indicated that their skills have been upgraded since Project completion. Concomitantly, counterpart staff has also provided training to both SIRIM staff and industry using skills from the Project. The User's Survey has shown that they are highly satisfied with SIRIM's services.

5. RECOMMENDATION

5.1 Recommendation for Malaysian Government

The most important recommendation with respect to sustainability is that budget must be found if the Project outcomes are to be sustained. As SIRIM cannot raise enough revenues to finance this, it is proposed that the Malaysian government make available maintenance budgets for technologies that support a national objective. In terms of budgets, RM0.3 million per year is a small sum by the national budget.

However, if sufficient funding cannot be raised within a reasonable period, it is recommended that SIRIM consider donating the useable equipments to a government institution so that they can be maintained through their maintenance grants and funds. A university is one institution that we have in mind. However, SIRIM has applied for funds under the Ninth Malaysia Plan process for strategically important maintenance.

5.2 Recommendation for JICA

Apart from funding, there is the issue of equipment maintenance. SIRIM has suggested that future technical cooperation projects should include both application and hardware training. SIRIM faces considerable problems in terms of hardware maintenance as they cannot trace the original suppliers, and therefore some equipment is falling into disuse because of non-traceability of suppliers. It is proposed that JICA provide the manufacturers and suppliers of the Project equipment for the future maintenance and repair.

6. LESSONS LEARNED

In future projects, donor agencies should be encouraged to review with their partner agencies the issue of financial implications of maintenance and replacements. In this case, the element of maintenance costs could be a killer assumption in terms of sustainability.

It is thus important to appoint local suppliers to equipments and also to use local parts as much as possible in order to avoid the situation where maintenance and repairs are impossible because suppliers cannot be traced. Alternatively is to train the counterpart agencies in the hardware so that they can maintain the equipment and thus having to avoid the problem of non-traceable suppliers.

Very often, in such projects, focus is given to the technical side of the technology transfer, and little or no attention is given to management of the organisation. Given the very significant influence of SIRIM's corporatisation on their financial bottomline, it will be necessary for technical projects to include management training components. The quality of management is important.

Among the key management issues (within the context of a corporate entity) that could be considered are:

(a) Marketing strategies for the risk assessment services and facilities in order to raise revenues and increase the utilization rates of equipments and facilities;

(b) Pricing and branding strategies to gain market share in order to establish market presence;

(c) Customer relations strategies to ensure that high value customers are retained;

(d) Investment raising strategies to ensure that the business is on track; and

(e) Business development strategies that can more effectively combine the engineering strengths with the life science capabilities.

Annex 1: Terms of Reference

Ex-Post Evaluation Study on Project on Risk Management of Hazardous Chemical Substances in Malaysia

1. Outline of the Targeted Project

(1) Title of the Targeted Project: The Project on Risk Management of Hazardous Chemical Substances in Malaysia (hereinafter referred to as "the Project")

(2) Malaysian Implementing Agency: SIRIM Berhad

(3) Technical Cooperation Period from JICA: 1 April 1998 – 31 March 2002 (four years)

(4) Project Site: Environmental and Energy Technology Centre, SIRIM Berhad

(5) Background

In 1990s, Malaysia's rapid industrialisation had resulted in the increased usage of chemical substances and the generation of industrial wastes. Hence an important area that needed emphasis along with industrial growth was minimizing the adverse effects caused by hazardous chemical substances and wastes menacing human health and the environment. Under such circumstances, JICA started the initial project, namely "Evaluation of Analysis of Hazardous Chemical Substances and Biological Treatment of Hazardous Wastes" with SIRIM in September 1993. This project achieved the fruitful results during its four-year period. However, the area of technical cooperation under this project had been confined to the laboratory experiments. SIRIM requested the further cooperation to apply these project achievements to the actual situation, and to control and prevent industrial pollution consistent with sustainable development. Based on this request, JICA carried out the Project in April 1998. The Project was successfully completed in March 2002 as scheduled.

(6) Master Plan of the Project

The Project was implemented in accordance with the Master Plan which was given in the Record of Discussion on the Project. The details were defined as follows;

- Overall Goal

SIRIM's capability in risk assessment of hazardous chemicals will be upgraded.

- Project Purpose

SIRIM will be able to provide evaluation and management services in chemical safety for the industrial sector.

- Output of the Project

1. The management system of the Project will be established.
2. The equipment will be procured, operated and maintained properly.
3. Technical expertise in chemical safety evaluation will be developed.
4. Technical expertise in the treatment of waste water containing colour and nitrogen will be developed.
5. The expertise developed will be disseminated to the industries.
6. Information on the evaluation and treatment of chemical substances will be disseminated

2. Purpose of the Study

(1) Title of the Study: The Ex-Post Evaluation Study on Project on Risk Management of Hazardous Chemical Substances in Malaysia (hereinafter referred to as "the Study")

(2) Purpose: The Study is expected to verify the important issues relating to the project impact and sustainability observed after three (3) years from the completion of the Project. The results of the Study contribute to the better-informed decision-making based on the lessons learned, and the promotion of the greater accountability. The results will also be shared by SIRIM.

3. Implementation of the Study

The Study will be carried out considering the following items;

(1) Main Evaluation Questions

The Study will seek answers to the following main evaluation questions:

a. Impact

- How far has the Overall Goal of the Project been achieved since the final evaluation?

- What kinds of factors have contributed to positive and negative impacts?

- Besides the Overall Goal of the Project, have the unexpected positive/ negative impacts observed?

- Are there any external factors that affected the achievement of the Overall Goal?

b. Sustainability

- How has the counterpart agency continued the Project activities and service?

- Have the Project outcomes been maintained since the termination of JICA's assistance?

- What kinds of the factors contribute to or inhibit the sustainability?

c. Specific questions

- When the Final Evaluation was conducted in October 2001, the Project didn't complete the risk evaluation and study reports of at least one hazardous chemical substance, which is stated in the Verifiable Indicator of Project Purpose. How many study reports on hazardous chemical substances have SIRIM prepared since the termination of JICA's cooperation?

- Joint Evaluation Report expected that the role of SIRIM would become important for the industrial sector for providing consulting service and useful information if a unified legal framework for hazardous chemical substances is enforced. Has such legal framework been enforced?

- Has SIRIM secured consulting fees from the industrial sector? Is it a sufficient amount of fees for SIRIM to continue the Project activities? Has SIRIM widened the scope of services or promote its consulting skills to secure more consulting fees?

- Has SIRIM maintained the equipment necessary for the implementation of the Project activities?

(2) Suggested/ Required Evaluation methods

The Consultant is responsible for identifying specific evaluation methods of data collection. It is suggested that actual inquiries use the methods, which can assess both quantitative and qualitative measurements of the changes. The Consultant is requested to come up with the objectively variable indicators to measure up these changes. In addition to that, it is important to investigate the factors that positively and negatively contributed to the changes. Data and information will be collected through the surveys including the followings;

a. Site visit to SIRIM and/or other authorities concerned.

b. Questionnaire surveys and Interviews with SIRIM counterpart/ex-counterpart who worked together with the JICA Experts, and also who were trained in Japan.

c. Qualitative investigations to measure the Project impacts, such as;

- numbers of trained counterparts in each field

- numbers of reports prepared by SIRIM

- budget allocation for the Project activities

JICA requires that all evaluation studies present the recommendations and the lessons learned in the Evaluation Report based on the qualitative and quantitative analysis. The recommendations should document practical and specific suggestions to improve the Project that is subject to evaluation. On the other hand, the lessons learned present specific suggestions for the formulation of future projects in a similar context.

4. Implementation Schedule

The Study is scheduled to commence from the end of September 2004, and complete by the end of March 2005. In advance of the Study commencement, JICA will organize the 5-day seminar on the ex-post evaluation study in the middle of September 2004. The Consultant is strongly requested to attend the seminar for the better understanding of JICA's methods for the project evaluation.

	Sep 2004	Oct 2004	Nov 2004	Dec 2004	Jan 2005	Feb 2005	Mar 2005	Apr 2005
Evaluation Seminar by JICA	▒							
Study Commencement		▒						
Evaluation Grid		▲						
Draft Evaluation Report				▲				
Comment from JICA & SIRIM				▒	▒	▒	▒	
Revision of Report							▒	
Evaluation Report + Summary							▲	

JICA estimates the total amount of man-month (M/M) required for the Study approximately as follows:

- Leader: 0.30M/M
- Researcher/ Evaluation Analysis: 1.00M/M

5. Deliverables

The Consultants shall submit the following deliverables to JICA.

(1) Evaluation Grid

The evaluation Grid is to be prepared within 5 days of the first meeting with JICA. The Consultants will be requested to modify their evaluation planning if JICA finds it inappropriate.

(2) Draft Evaluation Report

The Consultants shall submit the 5 copies of the Draft Evaluation Report to JICA Malaysia Office. The comments on the report will be given by JICA, SIRIM and the authorities concerned, and will be sent back to the Consultants for the revision of the report.

(3) Evaluation Report

The Consultants shall submit the Evaluation Report to JICA Malaysia Office by 31 March 2005.

- 5 copies in printed format

- 2 copies in CD-ROM (PDF format)

It should be concise and be no longer than 15 pages in A4 size form. The evaluation results and conclusions should be supported by the data gathered through the interviews and questionnaires and/or the additional information and data. The graphic presentation of data is recommended wherever applicable. The report should include the following issues;

- Scope of evaluation study
- Project overview
- Evaluation methods used
- Results of evaluation
- Conclusions
- Recommendations
- Lessons learned
- Annex (Logical Framework, Evaluation Grid and supporting data)

(4) Evaluation Summary Sheet

The Consultants shall submit the Evaluation Summary Sheet to JICA Malaysia Office by 31 March 2005. It should be prepared in accordance with the format which will be provided by JICA.

Annex 2: Evaluation Grid

Ex-Post Evaluation Study on Management of Hazardous Chemical Substances in Malaysia, 2004

Note: **(x.x)** see Management Questionnaire and *(x.x)* see Counterpart Questionnaire

	Evaluation Questions		Achievement Criteria/Measures	Data Needed	Data Sources	Data Collection Method
	Main Questions	**Sub-Questions**				
IMPACT	1. To what extent has the overall Project goal[4] been achieved since the terminal evaluation?	- Did SIRIM carry out a risk assessment of one hazardous chemical substance(s) as per project purpose? **(1.1)**	Compare new information with the terminal evaluation	- Documentary evidence of completed report	- SIRIM management	- Data compilation
		- Has ISO/IEC 17025 been maintained? For which area? **(1.2)**	Compare new information with the terminal evaluation	- ISO/IEC 17025 certification?	- SIRIM records or ISO certification	- Data compilation
		- What is the level of SIRIM's risk assessment capability since project completion? **(1.3)** *(1.1)*	1= as per project completion; 2 = modification 3 = new, innovation	- SIRIM's self assessment of their capabilities **(1.3)**	- EBTC, SIRIM records - interviews	- Interviews with SIRIM Management
				- Counterparts' assessment	- Counterparts *(1.1)*	- Counterpart survey
				- Users' assessment	- Industry/User	- Users' interview
		- What is the post and ex-post project situation in SIRIM re capacity and capability **(1.4) and (1.5)**	N = # Parameters or types **(1.4)**, Compare new information with terminal evaluation records	- Number, types, complexity of risk management projects, R&D, consultancies that SIRIM has completed **(1.5)**	- SIRIM records (compilation required)	- Matrix of Project parameters with pre and post-project by Project area

[4] Overall Goal: SIRIM's capacity in risk assessment of hazardous chemicals is upgraded (slightly modified).

Evaluation Questions		Achievement Criteria/Measures	Data Needed	Data Sources	Data Collection Method
Main Questions	**Sub-Questions**				
	- How does SIRIM compare with competitor firms in terms of technology, facilities, service levels, and market share? **(1.6)**	1 = better/higher 2 = equivalent/same 3 = below/lower	- SIRIM's self assessment of their capabilities - Users' assessment	- interview with SIRIM management - Industry/User - Federation of Malaysian Manufacturers (FMM)	- Matrix of Project area with parameters
	- What is SIRIM's overall assessment of the impact of the JICA project in developing its risk management capacity? **(1.7)**	1 = very important 2 = important 3 = not so important	- SIRIM's self assessment of their capabilities	- SIRIM management - Self assessment by SIRIM staff	- Interview with SIRIM Management
	- Has SIRIM's capacity in risk management been evaluated by others from 2002 to 2004? **(1.8)**	Compare new information with terminal evaluation records	- Self assessment	- SIRIM management - Industry User - FMM	- Interview with SIRIM management - Users Interview
2. What are the **unintended** positive and negative impacts from the Project since its completion?	- What are the positive unintended effects of the Project? Particularly benefits (individual or SIRIM wide) **(2.1)** *(2.1)*	Examine institutional and management, personal, and industry wide effects, and include cross-cutting issues **(2.1)** of technology, environment, economic and policy areas	- To be specified	- Industrial firms - Counterparts - SIRIM Management	- Literature & Document Search - Discussion, interviews with Counterparts & Management - Users survey
	- What are the negative unintended effects of the Project? Particularly issues and problems **(2.1)** *(2.2)*				

	Evaluation Questions		Achievement Criteria/Measures	Data Needed	Data Sources	Data Collection Method
	Main Questions	**Sub-Questions**				
	3. What has been the contribution of the Project to the development and management of risk assessment, consulting and R&D activities?	What is SIRIM's assessment of its delivery of risk assessment services (due directly or indirectly from the Project) to the industrial sector? **(3.1)**	1 = highly effective 2 = effective 3 = not very effective	- SIRIM's self assessment	- SIRIM management	- Interview with SIRIM Management
		- What are the types of projects undertaken (consultancy & R&D) since the terminal evaluation? **(3.2), (3.3), (3.4) and (3.5)**	Compare present SIRIM status with the Project Terminal Evaluation Report	- Number, types & value of projects/ R&D undertaken, using Project inputs as % total SIRIM industrial consultancy	- EBTC, SIRIM records	- Data compilation - Interviews with SIRIM management
		- To what extent has the project succeeded in enhancing your technological capability to handle current industrial demand? *(1.2), (1.5), (1.6) and (1.7)*	- Number of projects working on, using project skills, time spent, value of projects etc.	- Project skills utilisation	- Counterparts	- Counterpart survey - Interviews and analysis
		- Compare JICA training with other training, perception on areas that would have enhanced project impacts? *(1.3) and (1.4)*	Description and analysis of interview	- Counterparts' self assessment and perception	- Counterparts	- Counterpart survey - Compilation and analysis
		- Have you trained other SIRIM staff using skills from the project? *(1.8)*	Yes/No	- No. of training sessions, no. of staff trained		

Evaluation Questions		Achievement Criteria/Measures	Data Needed	Data Sources	Data Collection Method
Main Questions	**Sub-Questions**				
	- Have you conducted training for industry using skills acquired from the project? *(1.9)*	Yes/No	- No. of training sessions, no. of participants		
	- Are users satisfied with risk assessment and consulting services? **(3.6)**	Yes/No	- Measure of user satisfaction	- SIRIM management (self assessment) - Industry/User survey (secondary analysis, if data available)	- Interview with management - User survey or previous survey
4. What is the contribution of the Project towards improving the institutional capacity of SIRIM?	- Are trained staff members able to undertake more complex problems in risk management consultancy & R&D? **(1.4)**	Analyse the present information with the Project Terminal Evaluation Report	- Capability of trained staff	- EBTC, SIRIM records - SIRIM Management	- Data compilation - Interview with SIRIM Management
	- Has SIRIM been able to offer a wider and more comprehensive range of consultancy services? **(4.1)**	Analyse the present information with the Project Terminal Evaluation Report	- SIRIM's range of consultancy services	- SIRIM Management	- Interview with SIRIM management
5. Are there any external factors that influenced the achievement of the overall Project goal	- Are there changes in government policy that might affect/impact on Project goals? **(5.1)**	Description and analysis of discussion	- Government policies	- EBTC, SIRIM - DOSH, MoHR - DoE	- Literature review - Interview with SIRIM Management - Interview govt agencies

	Evaluation Questions		Achievement Criteria/Measures	Data Needed	Data Sources	Data Collection Method
	Main Questions	Sub-Questions				
		- Change in industrial trends, e.g. use of risk assessment & haz. chem. technologies? **(5.2)**	Use of such services	- Change in industrial technology needs	- Industrial firms	- Users Survey
SUSTAINABILITY	1. Has SIRIM maintained the benefits accrued from the Project?	- Are Project skills used widely in SIRIM's services to the industrial sector? **(6.1)**	Compare new information with the terminal evaluation	- Utilisation rate of Project skills	- EBTC, SIRIM records - SIRIM Management	- Literature review - Interviews with SIRIM Management
		- Have you upgraded or expanded your technical skills and knowledge acquired through the project? *(3.1)*	Yes/No	- Type of courses attended, place, year	- Counterpart	- Counterpart Survey
		- Has SIRIM conducted training to disseminate the skills? *(3.2)*	Analyse types of skill learning situations in SIRIM	- Skill learning		
		- Do you face any issues/problems in sustaining the technology and skills learned in the project? *(3.3)*	Yes/No	- Issues and problems		
		- Is Project facility/equipment utilised? **(6.2)**	Compare new information with the terminal evaluation	- Utilisation rate of Project equipment	- EBTC, SIRIM records	- Data compilation
		- Is Project facility/equipment adequately maintained? **(6.2)**	% equipment maintained	- Maintenance data of Project equipment	- EBTC, SIRIM records	- Data compilation

	Evaluation Questions		Achievement Criteria/Measures	Data Needed	Data Sources	Data Collection Method
	Main Questions	**Sub-Questions**				
		- Is the management system for risk assessment of hazardous chemicals still maintained in SIRIM? **(6.3)**	Compare new information with the terminal evaluation	- Procedures and standards, as in SOPs (Standard Operating Procedures)	- SIRIM Management	- Interview, document records
		- Has SIRIM's capability in consultancy and R&D services in risk assessment of hazardous chemicals been upgraded, expanded? **(6.4**)	Compare new information with terminal evaluation	- Investments, skills, training & staff strength,	- SIRIM Management	- Interview - SIRIM reports
		- Does SIRIM have a Business Plan for industry & risk assessment consultancy services? **(6.5)**	Resources allocated to promote services developed from the Project	- SIRIM's organisational study (if made available)	- SIRIM Management - Sample of plans	- Interview with SIRIM management
	2. How have Project outcomes been maintained?	- How does SIRIM keep up to date on technology changes in this area? **(7.1)** *(3.1)*	Evidence of post-Project training	- Number of skill training courses attended	- SIRIM Management - Counterparts	- Interview with SIRIM Management and Counterpart
		- How does SIRIM keep up to date on technology changes in this area? **(7.1)**	Evidence of post-Project training	- Number of skill training courses attended	- SIRIM Management	- Interview with SIRIM Management

Evaluation Questions		Achievement Criteria/Measures	Data Needed	Data Sources	Data Collection Method
Main Questions	Sub-Questions				
	- What are the impediments faced by SIRIM to maintain the project outcomes? **(7.2)**	Evidence of shortfall in budgets	- Operating and Development budget allocation	- SIRIM Management - EBTC, SIRIM records	- Interview with SIRIM Management
	- Has SIRIM promoted its enhanced risk assessment services to industries? **(7.3)**	Compare this information with terminal evaluation	- Budget for promotions and marketing - Number of post-project seminars and workshops	- SIRIM Management	- Interview with SIRIM Management
	- Does the Project technology transfer still meet the needs and demands of current industrial sector? *(3.4)*	Compare this information with terminal evaluation	- Industry needs vs SIRIM capability	- Counterparts	- Counterpart survey - Data Compilation
	- Has work been interrupted or stopped because project facilities and equipment no adequately maintained or repairs lacking? *(4.1)*	Yes/No	- Particular equipment, period of time, reason, impact on clients	- Counterpart	- Counterpart survey
	- Are project facilities and equipment relevant to your area of expertise fully utilised? *(4.2)*	Yes/No	- Type of expertise and equipment needed	- Counterpart	- Counterpart survey
	- Is SIRM investing sufficiently in skill development in your area of expertise? *(4.3)*	Yes/No	- Skill development of staff	- Counterpart	- Counterpart survey

Evaluation Questions		Achievement Criteria/Measures	Data Needed	Data Sources	Data Collection Method
Main Questions	**Sub-Questions**				
	- Have reports by JICA experts been utilised? *(4.4)*	Yes/No	- Usage of reports	- Counterparts	- Counterpart survey
3. What are the factors that contribute to the sustainability of the Project outcomes?	- Any change in SIRIM's budget allocations that might affect the sustainability of project outcomes? **(8.1)**	Describe the significant changes and analyse findings	- Revenues from risk consultancy as proportion of total financial requirement (8.1) - Budget allocation for EBTC (Devt & OM)	- EBTC, SIRIM records	- Interview with SIRIM Management - Data Compilation
	- Any additional personnel & equipment procured to sustain project outcomes? **(8.2)**	Describe the significant changes and analyse findings	- Additional staff recruited - Additional investments to Project-related areas	- EBTC, SIRIM records	- Interview with SIRIM Management - Data Compilation
	- Are there any other donors/ agencies involved after project completion? **(8.3)**	Describe the significant changes and analyse findings	- Donor support, post-project	- EBTC, SIRIM records	- Interview with SIRIM Management
	- If yes, who are the donor agencies and amount of budget etc? **(8.3)**	Describe the significant changes and analyse findings	- Current projects from other donor agencies (size & contribution as a proportion of SIRIM totals)	- EBTC, SIRIM records	- Interview with SIRIM Management - Data Compilation

	Evaluation Questions		Achievement Criteria/Measures	Data Needed	Data Sources	Data Collection Method
	Main Questions	**Sub-Questions**				
		- Has related project services contributed to SIRIM/EBTC financial status? **(8.4)**	% financial contribution to EBTC	- Financial revenue data	- EBTC, SIRIM records	- Interview with SIRIM Management - Data Compilation
	4. What are the factors that inhibit the sustainability of the Project outcomes	- Are there any budgetary constraints? **(9.1)**	% cost of equipment or technology maintenance not provided for	- Budget requests approved and rejected (separately for development and operating)	- EBTC, SIRIM Management	- Interviews with SIRIM
		- Is there any technology transfer or skills issues, <u>any gaps that need to be addressed</u>? **(9.1)**	Describe the significant changes and analyse findings	- Technology Transfer (with example)	- EBTC, SIRIM Management	- Interviews with SIRIM management
		- Are there any institutional challenges? **(9.1)**	Describe the significant changes and analyse findings	- Institutional changes made (organisational chart)	- EBTC, SIRIM Management	- Interviews with SIRIM management
		- Any non-economic services that need to be maintained as a result of commitment made during the Project? **(9.2)**	Describe the significant changes and analyse findings	- Non-specified	- EBTC, SIRIM Management	- Interviews with SIRIM management

Time Period of data requests: 2002-2005

Annex 3A: Management Survey

JICA-SIRIM

EX-POST EVALUATION STUDY ON MANAGEMENT OF HAZARDOUS CHEMICAL SUBSTANCES IN MALAYSIA 2004

QUESTIONNAIRE FOR IMPLEMENTING AGENCY (SIRIM)

Name of Respondent : Mr./Ms/Mrs./Dr._____

Designation : _____

Address & Contact : _____

_____

_____

Interviewer : Mr. _____

Date : _____2004

SECTION 1: IMPACT

1 Extent of achievement of overall Project Goal since the terminal evaluation

1.1 Did SIRIM carry out a risk assessment of one hazardous chemical substance(s) as per the project purpose?

Kindly provide details on the completed risk evaluation (if any): _____
_____
_____

1.2 Has ISO/IEC 17025 been maintained? [ ] Yes [ ] No

Provide details of the certification:

When: _____From whom: _____

Has it been maintained until now: [ ] Yes [ ] No

What is the contribution(s) of this project to this recognition:

_____

_____

1.3 What is the level of SIRIM's risk assessment capability since Project completion? (one tick per column)

	1M	2E	3W	4R	5S
(1) Same as at Project Completion					
(2) Modifications made					
(3) New results, products, new innovation					

Note: 1M = Mutagenicity; 2E = Ecotoxicity; 3W = Waste water treatment:
4R = Risk Assessment; 5S = Sampling and Analysis

1.4 Rank SIRIM in terms of technical capability to undertake complex projects: at the time of project completion and now (post-project).

	Project Completion (2002)					**Post-Project (2004)**				
	Low				**High**	**Low**				**High**
	1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Sampling and Analysis	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Risk Assessment	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Ecotoxicity	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Mutagenecity	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Wastewater Treatment	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

Note: 1 = Very low capability (<10%)
2 = Slight capability (1%-20%)
3 = Moderate capability (21%-50%)
4 = Good capability (51%-75%)
5 = Very high capability (>75%)

1.5 Detail the number and type of contract research and consultancy projects that SIRIM has undertaken since the terminal evaluation.

Type	**1998-2001***	**2002**	**2003**	**2004**
Sampling Analysis/Risk Assessment	69			
Ecotoxicity	13			
Mutagenecity	1			
Wastewater Treatment	17			
Total	100			

Note: * based on Terminal Evaluation

1.6 Compare SIRIM with the competitor firm of your choice who is/are offering similar services (SIRIM's self assessment on their capability)

Firm of your choice (can be more than 1)
_____
_____

	Technology	**Facilities**	**Service Levels**	**Market Share**	**Competitor's Name**
Sampling & Analysis					
Risk Assessment					
Ecotoxicity					
Mutagenecity					
Wastewater Treatment					

Note: 1= better than best private firm; 2=equivalent; 3= worse than best private firm

1.7 What is SIRIM's overall assessment of the impact of the JICA Project in developing its risk management capacity in hazardous industrial chemicals?

[ ] Very important [ ] Important [ ] Not so important

Comments:_____
_____
_____

1.8 Has SIRIM's capacity in risk management been evaluated by others from 2002 until 2004?
[ ] Yes [ ] No

If Yes,

What kind of award/recognition received: _____

Number of evaluation conducted: _____

Comments: _____

Number of Assessor (given by DOSH): _____

2. Unintended positive and negative impacts from the Project

2.1 What are the unintended consequences of the Project?

Issues	Unanticipated impacts (positive or negative)
Industrial Policy	
Technological innovation	
Environmental protection	
Social Aspects	
Economic/Financial benefits	
Institutional management	
Others	

3. Project contribution to development and management of risk assessment

3.1 What is SIRIM's assessment of its delivery of risk assessment services (due directly or indirectly from the Project) to the industrial sector?

[ ] highly effective [ ] effective [ ] Not very effective

Comments:_____
_____

3.2 Indicate the proportion of consultancy and R&D projects from EETC/EBTC as a percentage of total SIRIM industrial consultancy (revenue/earnings value)?

	EBTC Revenue (RM)	% of SIRIM revenue
2001		
2002		
2003		
2004		

(A detailed listing of all projects by type, value and time utilised is required for the years 2002, 2003 and 2004)

3.3 Basic information about SIRIM staff trained under JICA Project.

	No. Staff trained by Project	No. staff remaining 2004	No. staff no longer in service
Sampling/ Analysis			
Risk Assessment			
Ecotoxicity			
Mutagenecity			
Wastewater Treatment			
Total			

Note: No. of Staff trained can overlap across different Project activities (except total)

3.4 Basic information about Staff Time Utilisation for SIRIM activities (% of total daily working hours)

	Staff Time utilisation on R&D projects	Staff Time utilisation for Consultancy	Staff Time for other SIRIM functions
Sampling/ Analysis			
Risk Assessment			
Ecotoxicity			
Mutagenecity			
Wastewater Treatment			
Total			

Note: Staff trained can overlap across different Project activities (except total)

3.5 Basic information about value of R&D and Consultancy projects

	No. R&D projects, 2004	Value R&D, RM '000	No. Consultancy projects, 2004	Value of Consultancy RM'000
Sampling/ Analysis				
Risk Assessment				
Ecotoxicity				
Mutagenecity				
Wastewater Treatment				
Total				

Note: No. of projects can overlap across different Project activities (except total)

3.6 Are SIRIM's customers satisfied with SIRIM's risk assessment and consulting services?

[ ] Yes [ ] No

Reason(s): _____
_____

4. Project contribution to SIRIM's institutional capacity

4.1 Has SIRIM been able to offer a wider and more comprehensive range of consultancy services since Project completion?

[ ] Yes [ ] No

Reason: _____
_____

5. External factors influencing achievement of overall Project goal

5.1 Any change in government policy that has affected/impacted on SIRIM's technical capability in risk assessment of hazardous chemicals?

[ ] Yes [ ] No

If Yes, describe the changes: _____
_____
_____

5.2 Is SIRIM aware of any changes, particularly industrial trends with respect to use of risk assessment and hazardous chemical technology?

[ ] Yes [ ] No

If Yes, describe the changes: _____
_____
_____

SECTION 2: SUSTAINABILITY

6. Maintaining Project benefits

6.1 Are the skills learned in the Project widely used in SIRIM's services to the industrial sector?

	Yes	No	Reasons
Sampling/ Analysis	[ ]	[ ]	_____
Risk Assessment	[ ]	[ ]	_____
Ecotoxicity	[ ]	[ ]	_____
Mutagenecity	[ ]	[ ]	_____
Wastewater Treatment	[ ]	[ ]	_____

6.2 Are Project facilities and equipments provided adequately maintained? *(to do a checklist of items listed in Terminal Evaluation Rpt?)*

	Yes	No	**Reasons**
Sampling/ Analysis	[ ]	[ ]	_____
Risk Assessment	[ ]	[ ]	_____
Ecotoxicity	[ ]	[ ]	_____
Mutagenecity	[ ]	[ ]	_____
Wastewater Treatment	[ ]	[ ]	_____

6.3 Is the Project management system for risk assessment of hazardous chemicals still maintained in SIRIM?

[ ] Yes [ ] No

If Yes, describe the changes: _____
_____

6.4 Has SIRIM's capability in consultancy and R&D services been upgraded/ expanded?

	Yes	No	Reasons
Sampling/ Analysis	[ ]	[ ]	_____
Risk Assessment	[ ]	[ ]	_____
Ecotoxicity	[ ]	[ ]	_____
Mutagenecity	[ ]	[ ]	_____
Wastewater Treatment	[ ]	[ ]	_____

6.5 Does SIRIM have a business plan for risk assessment consultancy services?

[ ] Yes [ ] No

If Yes, describe briefly the Plan (strategies, time frame, method of operations etc):
_____
_____
_____

If No, state reason: _____
_____
_____

7. Maintaining the Project's outcomes

7.1 How does SIRIM keep up to date on technology changes in this area?
_____
_____

7.2 What are the impediments faced by SIRIM to maintain the Project outcomes?

Areas	Impediments
Staff	
Facility/Equipment	
Financing	
Others	

7.3 Has SIRIM promoted its enhanced risk assessment services to industries?

[ ] Yes [ ] No

Reason: _____
_____

8. Factors contributing to the sustainability of Project outcomes

8.1 What is the proportion of total revenue from risk assessment consultancy to the total cost of the EBTC?

	Revenue (RM)	% of total cost
2001		
2002		
2003		
2004		

8.2 Are there any additional facility/equipment procured since project terminal evaluation?

	Additional asset value of Equipment/Facility (RM)	Additional annual operating and maintenance expenditure (RM)	Additional Staff
2001			
2002			
2003			
2004			

8.3 Are there any other donors/agencies involved in this risk management project since Project completion?
[ ] Yes [ ] No

If Yes, indicate the name of the door/agencies, areas of cooperation, period of involvement and finance allocations.

Name of Donors/Agencies	Areas of Cooperation	Period of Involvement	Financial Allocation

8.4 Has the above mentioned co-operation projects and services contributed to SIRIM/EBTC financial status?
[ ] Yes [ ] No

Reason: _____
_____
_____

9. Factors inhibiting the sustainability of the project outcomes.

9.1 Are there any issues with regards to the following areas that inhibit the sustainability of Project outcomes?

	Yes	No	Reasons
Budget constraint	[ ]	[ ]	_____
Technology transfer	[ ]	[ ]	_____
Skills requirement	[ ]	[ ]	_____
Institutional Challenges	[ ]	[ ]	_____
Industrial trend changes	[ ]	[ ]	_____
Others	[ ]	[ ]	_____

9.2 Any non-economic services that need to be maintained as a result of commitment made in the Project?
[ ] Yes [ ] No

Reason: _____
_____
_____

Annex 3B: Counterpart Survey

JICA EX-POST EVALUATION STUDY PROJECT ON RISK MANAGEMENT OF HAZARDOUS CHEMICAL SUBSTANCES

ENVIRONMENT AND BIOPROCESS TECHNOLOGY CENTRE
SIRIM

SURVEY OF COUNTERPARTS

Introduction and Purpose of Survey

JICA Malaysia Office has appointed **PE Research Sdn Bhd** to conduct An Ex-Post Evaluation Study on the Project on Risk Management of Hazardous Chemicals. The Malaysian Implementing Agency was the Environmental and Energy Technology Centre (currently known as Environment and Bioprocess Technology Centre) in SIRIM.

The Project on Risk Management of Hazardous Chemical Substances in Malaysia was implemented based on an earlier Project Type Technical Cooperation, i.e., "Hazardous Chemical Substance Evaluation Analysis/Industrial Waste Disposal Technical Cooperation Project" from 1993 till 1997. This project was aimed at developing basic technology and knowledge through technical transfer at the laboratory level. In order to manage and control industrial pollution as well as applying the outputs gained from the earlier project in actual industrial activity, at the request of the Malaysian Government another Project Type Technical Cooperation titled "The Project on Risk Management of Hazardous Chemical Substances" was undertaken in April 1998. This second project was successfully completed in March 2002.

This evaluation study is expected to verify the important issues relating to the project impact and sustainability after 3 years from the completion of the project. The results of this study will contribute to decision making process based on the lessons learned as well as promotion of greater accountability. This study focuses on the main evaluation of **Impact** and **Sustainability** of the Project.

Information about yourself and your institution **(attach name card if any)**

Name : Mr./Ms/Mrs./Dr._____

Current Designation : _____

Educational Level : _____

Age / Sex : _____ years [ ] Male [ ] Female

Highest Prof Qualification Obtained : _____

Career Development in SIRIM : _____

_____

What kind of work do you do in SIRIM/your area of expertise?

_____

_____

Interviewer : Mr._____

Date : _____

Please tick (√) or circle the most appropriate answer or write down your comments.

Kindly indicate the technical fields that you have been trained in the Project.

	Trained in Japan	Trained internally in EBTC/SIRIM
Sampling/ Analysis	[ ]	[ ]
Risk Assessment	[ ]	[ ]
Ecotoxicity	[ ]	[ ]
Mutagenecity	[ ]	[ ]
Wastewater Treatment	[ ]	[ ]

SECTION 1: IMPACT

1. Projects contribution to development and management of risk assessment

1.1 To what extent did the Project raise the overall level of SIRIM's capability in risk assessment of hazardous chemical substances?

	No comment	Low				High
SIRIM's Risk Assessment Capability	[ ]	1	2	3	4	5

1.2 To what extent has SIRIM's Risk Management of Hazardous Chemical Substances Project succeeded in enhancing your technological capability in providing such services to industries in Malaysia?

	Not relevant	Low				High
Mutagenicity Test	[ ]	1	2	3	4	5
Ecotoxity Test	[ ]	1	2	3	4	5
Sampling and Analysis	[ ]	1	2	3	4	5
Risk Assessment	[ ]	1	2	3	4	5
Wastewater Treatment	[ ]	1	2	3	4	5

Please elaborate: _____
_____

1.3 What in your view was particularly distinctive about the JICA Project and the training that you received?

_____

_____

1.4 How would you compare that JICA training with other training that you had undertaken in SIRIM? [better/same/worse]

Explain: _____
_____

1.5 In your view, were there any areas that would have enhanced the impact of the Project even more than it has?

Explain: _____

_____

1.6 How many projects are you working on? And how many of these would use skills acquired during the JICA Project?

Total no of projects you're working on _____

No. of projects using Project skills _____

Total value of projects RM _____

Value of projects using Project skills RM _____

1.7 Your best estimate of how much time you spend using Project equipment or skills acquired as a proportion of your total working hours? (say average for second half of 2004)

_____% of time

1.8 Have you trained other SIRIM staff using skills that were acquired during the Project?
[ ] Yes [ ] No

Explain: (if yes, provide details, best estimate for training between 2002-2004)
Total No. of training sessions:
Total No. of SIRIM staff trained:

1.9 Have you conducted training for industry using the skills that were acquired during the Project?
[ ] Yes [ ] No

Explain: (if yes, provide details, best estimate for training between 2002-2004)
Total No. of training sessions:
Total No. of participants:

2. Unintended impacts from the Project

2.1 Any unintended benefit from the Project for you? (e.g. training accepted as waiver for a professional qualification, career improved, awards, etc.)

_____
_____
_____

2.2 Any unintended problems and issues of the Project that arose for you? (e.g. missed promotion, career stagnated, etc.)

_____
_____
_____

SECTION 2: SUSTAINABILITY

3. Maintaining Project benefits

3.1 Have you upgraded or expanded your technical skills and knowledge which you have acquired through the Project, through formal training since 2002?
[ ] Yes [ ] No

If Yes, provide details, e.g. type of course attended, place and year, duration.

_____
_____

3.2 Do these types of skill learning situations exist at SIRIM? Most prevalent.

[ ] knowledge sharing between colleagues
[ ] on-the-job training
[ ] learning from clients or subcontractors
[ ] collaboration across disciplines, e.g. other SIRIM centres)

Others: _____

3.3 Do you face any issues/problems in sustaining the technology and skills learned in the Project?
[ ] Yes [ ] No

If Yes, describe the issues: _____
_____
_____
_____

3.4 Do you think that the technology transfer and skills acquired by you through the Project meets current industrial needs and demand?
[ ] Yes [ ] No

Explain: _____
_____

4. Maintaining Project outcomes

4.1 Has your work been interrupted or stopped because Project facilities and equipment were not adequately maintained or repairs were lacking?
[ ] Yes [ ] No

Explain: (specify particular services, period of time, reason, impact on clients)
_____

4.2 Are the Project facilities and equipments relevant to your area of expertise fully utilised?
[ ] Yes [ ] No

Explain: _____
_____

4.3 In your view, is SIRIM investing sufficiently in skill development in your area of expertise?
[ ] Yes [ ] No

Explain: _____
_____

4.4 Have you utilised the reports produced by JICA's experts or other literature reference provided by JICA after the project completion?
[ ] Yes [ ] No

Reason(s): _____
_____

Annex 3C: User Survey Questionnaire

JICA EX-POST EVALUATION STUDY PROJECT ON RISK MANAGEMENT OF HAZARDOUS CHEMICAL SUBSTANCES

ENVIRONMENT AND BIOPROCESS TECHNOLOGY CENTRE SIRIM

SURVEY OF USERS/INDUSTRIES

Introduction and Purpose of Survey

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This evaluation study is to determine important issues relating to the project impact and sustainability 3 years from the completion of the Project. Since its completion, SIRIM has undertaken a number of consultancy projects for the private sector in this field. The purpose of this ex-post survey is to evaluate the services offered by SIRIM.

This survey will only take about 10 minutes. Your co-operation in answer the questionnaire is highly appreciated.

Information about yourself and your firm

Name : _____

Current Designation : _____

Firm/Establishment : _____

Address/Contact : _____

_____

Interviewer : _____

Date : _____

Please tick (√) the most appropriate answer &/or write down your comments.

1. What is the main business of your firm?

	Type	Details
[ ]	Manufacturing	_____
[ ]	Environmental Service Companies	_____
[ ]	Govt departments, Universities	_____
[ ]	Others	_____

2. Total number of employees in your firm: _____

3. Ownership :
   - [ ] 100% local
   - [ ] More than 50% local
   - [ ] More than 50% foreign (Specify: _____)
   - [ ] 100% foreign (Specify: _____)
   - [ ] Not Applicable (IF Govt. or Univ)

4. Have you used any of SIRIM's services?

   [ ] No (stop and fax back the questionnaire, see page 4 for details)

   [ ] Yes (continue until end of questionnaire)

   If Yes, describe the number of times you have used SIRIM's services (please provide best estimates, if actual figures are not available)

Year	Number of Times	Total Value (RM)
2001		
2002		
2003		
2004		

5. Have you used similar type of services through other providers
   [ ] Yes [ ] No

   If Yes, describe the number of times you have used other providers' services (please provide best estimates if actual figures are not available)

Year	Number of Times	Total Value (RM)
2001		
2002		
2003		
2004		

Name of other service providers: _____
_____

6. Compare SIRIM with the best private firm of your choice by fields who is also offering similar services as stated in the table below:

Kindly follow the example and rank by using the indicators below.
Note: 1= better than best private firm; 2=equivalent; 3= worse than best private firm

	Best Private Firm of your choice	**Used SIRIM's services, √ and state type**	**Equipment and Facilities**	**Service Levels**	**Why such service is needed?**
Example: ***Sampling & Analysis***	*ABC Berhad*	√ *soil sampling and analysis*	*2*	*2*	*To follow the requirement set by DOE according to the ***Act.*
Sampling & Analysis (e.g. for water, soil samples or gas, particulates effluents)					
Risk Assessment					
Ecotoxicity (e.g. for aquatic toxicity test –algae, daphnia toxicity tests, or fish chronic toxicity test; biodegradability test)					
Mutagenecity (e.g. AIMES test or (CAT Test – Chromosome Aberration Assay Test)					
Wastewater Treatment (e.g. Evaluation of product/system; on-site waste treatment monitoring; leachate studies;TCLP)					

7. Are you satisfied with the services provided by SIRIM?

[ ] Yes [ ] No

Please explain: _____

8. Has SIRIM been able to provide consultancy services that are not available locally in the private sector?

[ ] Yes [ ] No

If Yes, indicate the type of services: _____
_____

9. Would you go back to SIRIM for future services?

[ ] Yes [ ] No

Reason: _____
_____

Thank you for your cooperation in this short survey.

Annex 3D: Interview Guide with Agencies

SIRIM had indicated that DOSH was in the process of developing a comprehensive legal framework for hazardous chemicals in its justification for initiating the JICA Project. As such, the ex-post evaluation would like to seek discussion on the following issues:

- What is the progress of this legal framework?
- What kind of framework is being considered (policy, law, guideline, etc.)?
- What are the key issues or problems that need to be resolved to bring this framework into implementation (e.g. competitiveness of industries, health or safety aspects, regulating unknown chemicals, capability of public and private sectors to deal with the issues of implementation)?
- What effect would it likely have on government agencies (e.g. regulatory responsibility, skills required)?
- What effect would it likely have on the private sector (e.g. cost of implementation, more professional assessment)?
- Is there a wider consultation process that is taking place or going to take place before a legislative framework is brought into place?
- Is there a role for SIRIM (and other agencies, such as DOE) in this legal framework?

Annex 4: Equipment Checklist

MAJOR EQUIPMENT PROVIDED FOR THE PROJECT (MUTAGENICITY)

Please tick √ the relevant field

ITEM	DESCRIPTION	QUAN TITY	Still in use	Require repair (not in use)	Maintenance done in 2003	Maintenance done in 2004	Estimated cost of repair	Reason for breakdown	Average hours used per week	Remarks/ Comments
Provided by Japan										
Autoclave (High Pressure Steam Sterilizer)	Hirayama, Model HVE-50	2	√							
Biological Microscope	Nikon, Model E6F-21-1	2	√		√					
Biological Safety Fume Cabinet	Nuaire, Model NU-430-400E	1		√		√				External blower and digital controller breakdown, can't find local company to repair
CO2 Incubator	Sanyo, Model MTR-553	1	√							
Colony Counter	Ikemoto, Model N-056	4	√							
Colony Analyser	PROC-PC PROTOCOL	1	√							
Compact Table-Top Centrifuge	Kubota, Model 2010	2	√							
Constant Temperature Water Bath Shaker	Taitec, Monosin II	1	√			√				
Constant Temperature Water Bath Shaker	Taitec, Monosin II	1	√			√				
Cooled Incubator	Sanyo, Model MIR-553	1	√							
Cryo-Biological Container	MVE, 36L	1	√							

MAJOR EQUIPMENT PROVIDED FOR THE PROJECT (MUTAGENICITY)

Please tick √ the relevant field

ITEM	DESCRIPTION	QUAN TITY	Still in use	Require repair (not in use)	Maintenance done in 2003	Maintenance done in 2004	Estimated cost of repair	Reason for breakdown	Average hours used per week	Remarks/ Comments
Dry Block Heated Bath	Vision	1	√							
Electronic Balance	Mettler, Model TOLEDO AB204	1	√							
Laboratory Glassware Washer	Sanyo, Model MJW-8020	1	√							
Lenses for Microscope	Nikon, Model E6F-21-1	1	√		√		*			
Microbalance	Mettler, Model TOLEDO MT5	2	√							
Microcell counter	Sysmex, F-520	2								Can't be used since JICA project
Microscope	Olympus, Model CK40-32-PH	2	√							
PC Slide Maker	Polaroid, Digital Palette HR6000SE	1								Never been used
Personal Computer	IBM Thinkpad 380ED Notebook	2	√							1broken during JICA project, replace with Compaq
Personal Computer	HP BRIO 7113	2	√							1 broken and disposed, 1 OK
Personal Computer	Toshiba, Satelite 1710CDS	1	√							
Pharmaceutical Refrigerator	Sanyo, Model MPR-311H	2	√		√		*			
Photo Micro Graphic System	Nikon, Model H-III-35	1	√							
Shaker in Waterbath	Grant, Model OLS200	2	√							

MAJOR EQUIPMENT PROVIDED FOR THE PROJECT (MUTAGENICITY)

Please tick √ the relevant field

ITEM	DESCRIPTION	QUAN TITY	Still in use	Require repair (not in use)	Maintenance done in 2003	Maintenance done in 2004	Estimated cost of repair	Reason for breakdown	Average hours used per week	Remarks/ Comments
Software for Chromosome Aberration Test	GME, CAT Client Server 1.0	1								Software not complete even since JICA project
Teaching Head	Nikon	1	√							
Ultra Low Temperature Freezer	Revco, Model ULT 1490-5 Elite	1	√							
Ultra Sonic Generator	Misonix, Model XL2000	1	√							
Ultra Sonic Pipette Washer	Shibata, Model PU-100	1	√							
Ultra-Low Temperature Freezer	Sanyo, Model MDF-392AT	1	√							
Vis Spectrophotometer	Biotek, Novaspec II	2	√							
Malaysia										
Fumehood bench	Labraire, AURA 250E	1	√							
Dryer	MEMMERT, Germany, ULM600	1	√							
Dryer for Sterilation	MEMMERT, Germany, ULM600	1	√			√	*			
Utrasonicator	Selecta, Ulrasons-H	1	√							
Ice-maker	Scottman, AF10	1	√							
Microwave oven	Sanyo, EM-0953A	1		√						Heater doesn't work

MAJOR EQUIPMENT PROVIDED FOR THE PROJECT (MUTAGENICITY)

			Please tick √ the relevant field							
ITEM	**DESCRIPTION**	**QUAN TITY**	**Still in use**	**Require repair (not in use)**	**Maintenance done in 2003**	**Maintenance done in 2004**	**Estimated cost of repair**	**Reason for breakdown**	**Average hours used per week**	**Remarks/ Comments**
Deionizer	USF ELGA, MAXIMA HPLC	1	√			√	*			
Stereo microscope	Olympus, SZH10	1	√							
General Refrigerator	Sharp, SJ-D25J-GY	2	√							
Liquid nitrogen	MVE, SC 36/32Y	1	√							
Carbon dioxide cylinder	Nissan IOI	4	√							
Pressure regulator	Gas Arc	1	√							
LPG	Petronas	1	√							
Others	laboratory bench, rack and drawer		√							
Vacuum cleaner	National MC 4880	1	√							
Distiller and water tank	Barnstead, Fistream III	1	√		√		*			
Medical refrigerator	Sanyo, MPR 213F	1	√							
Sand Filter	EC 105	1	√							

Maintenance for this technical field are done in group so don't have breakdown cost for individual equipment

MAJOR EQUIPMENT PROVIDED FOR THE PROJECT (ECOTOXICITY)

Please tick √ the relevant field

ITEM	DESCRIPTION	QUANTITY	Still in use	Require repair (not in use)	Maintenance done in 2003	Maintenance done in 2004	Estimated cost of repair	Reason for breakdown	Average hours used per week	Remarks/ Comments
Provided by Japan										
Particle Analyser with Reagent	Coulter, PN9914557H	1								Never used, currently using microscope/ haemocytometer
Mini Pump	Shibata, Model MP-2N	2	√						24 hr/day	
Incubator with Bioshaker	TAITEK, Model BR-3000LF	1	√						24 hr/day	
NK System Biotron	Nippon, Model LH-100-RD	1	√							
Reflected Light Fluorescence Attachment	Olympus, Model BX-FLA-1	1								Not application so far by current work
Vortex Blower	Hitachi, VB-022-G	2	√		√	√			24 hr/day	Estimated RM 10k per year for service and repair for the whole system
Tube Well Submersible Pump	Groundfos, SPSA-10	1	√		√	√			24 hr/day	
Dura Glass II Pump with motor	Sta-Rite, 5P4 R6 G3	1	√		√	√			24 hr/day	
Centrifugal Pump with motor	Pentaz, CS 200	1	√		√	√			24 hr/day	
Horizontal Multi Stage Pump with motor	Groundfos, CH4-40	2	√		√	√			24 hr/day	
Pump to 2 Water Reservoir with motor	Onga Hi-Flo Centerifugal Pump, 413H	2							24 hr/day	Small modification made to the system design which does not required the pump, but are keep

MAJOR EQUIPMENT PROVIDED FOR THE PROJECT (ECOTOXICITY)

			Please tick √ the relevant field							
ITEM	**DESCRIPTION**	**QUANTITY**	**Still in use**	**Require repair (not in use)**	**Maintenance done in 2003**	**Maintenance done in 2004**	**Estimated cost of repair**	**Reason for breakdown**	**Average hours used per week**	**Remarks/ Comments**
										as spaes
Wastewater Treatment Pump with motor	Groundfos, CH12-40	2	√		√	√	*		24 hr/day	
Pump	Nihon, Model SP-D-2500(S)	3								Not known
Pump	Nihon, Model SP-D-3201	3								Not known
Malaysia										
Laminar Flow Biological Safety Cabinet	Nu-Aire-Labguard NU-425-400E	1	√							When there are request for algae test

MAJOR EQUIPMENT PROVIDED FOR THE PROJECT (SAMPLING AND ANALYSIS)

Please tick √ the relevant field

ITEM	DESCRIPTION	QUANTITY	Still in use	Require repair (not in use)	Maintenance done in 2003	Maintenance done in 2004	Estimated cost of repair	Reason for breakdown	Average hours used per week	Remarks/ Comments
Provided by Japan										
Current Meter System	Shibata, CM-2X	1								Never been used
BOD Tester	Shibata, 8053-01	1								Never been used
Bubble Film Flow Meter	Shibata, 8088-05	1		√						
Personal Organic Gas Sampler	Shibata, PG-5N	1	√							
Anemometer	Shibata, "windboy", ISA-811	1	√							
Personal Total and Dust Sampler	Shibata, PS-33	1	√						20 min	
Digital Dust Indicator	Shibata, P-5h2	2	√						20 min	
Low Volume Air Sampler	Shibata, SL-20	1	√							
High Volume Air Sampler	Shibata, HVS-500-5S	1	√							
Asbestos Dust Sampler	Shibata, AS-3	1	√							
Portable CL Ion Meter	Shibata, CLT-200	1		√						Chemical for calibration out of order
Potassium Permanganate Consumption checker	Shibata, HKC-101	1								Never been used
Wet Rotary Gas Meter	Shibata, 28311-11	1	√						1 hour	

MAJOR EQUIPMENT PROVIDED FOR THE PROJECT (SAMPLING AND ANALYSIS)

			Please tick √ the relevant field							
ITEM	**DESCRIPTION**	**QUANTITY**	**Still in use**	**Require repair (not in use)**	**Maintenance done in 2003**	**Maintenance done in 2004**	**Estimated cost of repair**	**Reason for breakdown**	**Average hours used per week**	**Remarks/ Comments**
Portable Turbidity Meter	Chemetrics, I-4300	1								Never been used
Ekman Grab	Stainless Steel, Standard, Wildlife Supply, 196-B12	1								Never been used
Water Depth Recorder	Alec Electronic, MDS-D	1								Never been used
Phase-Cont Bino Microscope	Fisher Scientific, MC 2255(12-561-2FAZ)	1								Never been used
Gravity Core Sampler	Forestry, USA, 77258	1	√							One a year
Universal Pump	Single Pump Kit, Deluxe, SKC, 224-PCXR8KDB	4	√ 3	√ 1						3 still In use and another required repair
Quick-FIX	Shibata	1								Never been used
Malaysia										
Pretreatment equipment	no details									
Water sampling unit	Hyroth									Never been used

*** Most of the equipment in this technical filed are for sampling purposes where seldom applied in SIRIM dairy job.*

MAJOR EQUIPMENT PROVIDED FOR THE PROJECT (RISK ASSESSMENT)

Please tick √ the relevant field

ITEM	DESCRIPTION	QUANTITY	Still in use	Require repair (not in use)	Maintenance done in 2003	Maintenance done in 2004	Estimated cost of repair	Reason for breakdown	Average hours used per week	Remarks/ Comments
Provided by Japan										
CD-ROM System	Toxline Plus, Silverplater, TOXP-QU-85	1								
CD-ROM System	Cheam-Bank, Silverplatter, CMBK-QU-12	1								
CD-ROM System	Tomes Plus, Micromedex	1								
Multimedia LCD Project	JVC, LX-D1000	1	√		√					
CD-ROM System	Chem Watch	1	√		√					Last license renewal 2002, CD ROM still available for use
CD-ROM System	Toxline Plus, Silverplater, TOXP-QU-85	1	√		√					
CD-ROM System	Tomes Plus, Micromedex	1	√		√					Last license renewal 2003, CD ROM still available for use
CD-ROM System	Chem Watch	1								
CD-ROM System	Tomes Plus, Micromedex	1								
Malaysia										
MSDS CD-ROMSubscription	CCINFO (Annual Subscription)		√		√					Last license renewal in 2003, CD ROM available for use

MAJOR EQUIPMENT PROVIDED FOR THE PROJECT (WASTE WATER TREATMENT)

Please tick √ the relevant field

ITEM	DESCRIPTION	QUANTITY	Still in use	Require repair (not in use)	Maintenance done in 2003	Maintenance done in 2004	Estimated cost of repair	Reason for breakdown	Average hours used per week	Remarks/ Comments
Provided by Japan										
Ion Chromatography system	Dionex, DX500	1	√		√	√	15000/yr	Bad power supply	24	Upgraded
Wet Oxidisation Reactor	Taiatsu Techno	1	√							Never been used
Activated Sludge Process Equipment	Shibata	1	√							Never been used
Coaguration Precipitation Equipment	Shibata	1	√							Never been used
Nitrification Denitrification Equipment	Shibata	1	√						24 hr/day	Use for colour removal project
Filteration Equipment	Shibata	1	√							Never been used
Test Unit for RO/UF Menbrane	Nitto Denko	1	√							Never been used
Filteration Unit	Vacuum Presure Pump Kit, Milipore, Cat XX5522050	1	√							Modified for FBC system
Water Quality Instruments	Minisonde Series 4A, Hydrolab, MS4A	1	√							For research project only
Water Quality Instruments	Surveyor 4A Data, Hydrolab, Surveyor 4A	1		√		√	In-house	Connect or spoil		
Pressure Vessel	Kasui, SUS304	1	√							Never been used
Compressor	Hitachi, bebicon	1	√							Never been used
Perisat Midipump with transformer	Atto, AC-2150	1	√							For research project
Induction Motor	Oriental, OM, 31K15GN-A, Gear Head, 3GN10XK,	2								Missing

MAJOR EQUIPMENT PROVIDED FOR THE PROJECT (WASTE WATER TREATMENT)

Please tick √ the relevant field

ITEM	DESCRIPTION	QUANTITY	Still in use	Require repair (not in use)	Maintenance done in 2003	Maintenance done in 2004	Estimated cost of repair	Reason for breakdown	Average hours used per week	Remarks/ Comments
	3GN75K									
Mixer with Tachometer	IKA, RM20DMn	2	√							Left 1, another 1 can't be traced
Pump	Iwaki, APN-215NV-1	2	√							
Ozone Generator	Triogen, TOG B2A	1	√							Just finish Dr. Rajes project
Laboratory Flocculator	J.P. Selecta, s.a., FLOCUMATIC, 3000914	1	√							
High Temperture Tube Furnaces	Carbolic, STF 15/75/1500/610/201D	1	√							
Automated Sampler with Starter Vial Kit	Dioner/USA, AS40	1	√						24	
Malaysia										
Hydrolab minisonde Multiprobe	Model4	1	√							Never been used

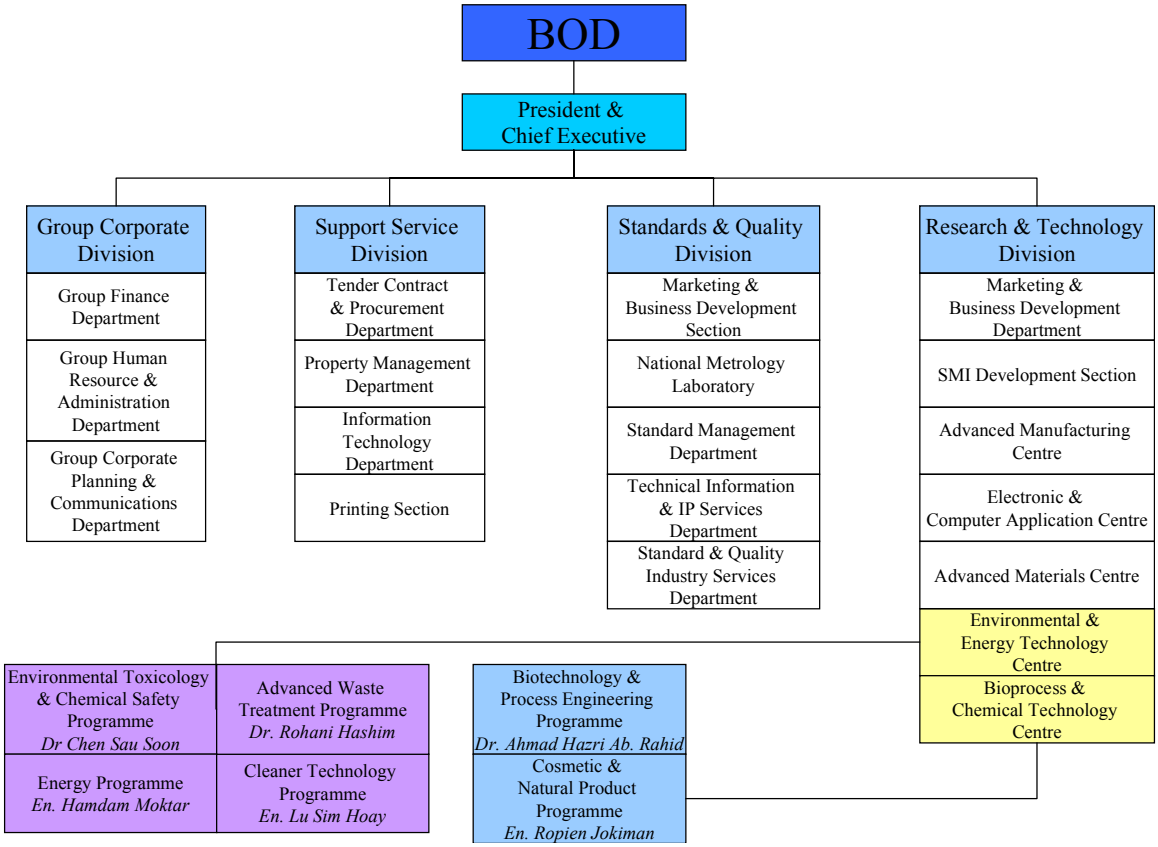
Annex 5: Summary of the Equipment Used and Maintained

Equipment	Details	
Mutagenicity	1	Out of total types of equipment items still in use =45/50 (90%)
	2	Of the 5 types not in use: 40% not working or need repair, 20% never used, 20% cannot be used, 20% incomplete
	a.	fume cabinet = requiring repair, but no local firm able to repair
	b.	microcounter – cannot be used since JICA project period
	c.	PC Slide maker – never used
	d.	Software (Chromosome Aberration test= software not complete since JICA Project period
	e.	Microwave heater does not work
	3	Of those which require maintenance
	a.	4/50 have been maintained in 2003, 5/50 maintained in 2004 (not the same equipment maintained in both years)
Ecotoxicity	1	Out of total types of equipment items still in use, 10/15 (67%)
	2	Of the 5 types not in use: 20% never, 20% no application, 40% not known, 20% small modification
	a.	particle analyser = never used
	b.	reflected light fluorescent attachment = no application
	c.	pump to eater reservoir=small modification
	d.	2 Nihon pumps= reason not known
	3	Of those which require maintenance
	a.	6/15 have been maintained in both 2003 & 2004, and same equipment maintained in both years
Sampling & Analysis	1	Out of total types of equipment items still in use =10/22 (45%)
	2	Of the 12 types not in use:83% never used, 8% no details, 8% calibration chemical out of order
	a.	Current meter system = never used
	b.	BOD Test = never used
	c.	Personal Organic gas sample r= never used
	d.	Potassium permanganate consumption checker = never used
	e.	Portable turbidity meter = never used
	f.	Ekman grab = never used
	g.	Water depth recorder=never used
	h.	Phase-cont bino microscope = never used
	i.	Quick fix = never used
	j.	Water sampling unit=never used
	k.	Portable CL ion meter = calibration chemical out of order
	l.	Pre-treatment equipment = no details
	3	None of equipment were maintained in 2003 or 2004
Risk assessment	1	Out of total types of items still in use = 5/10 (50%)
	2	Of the 5 types not in use:

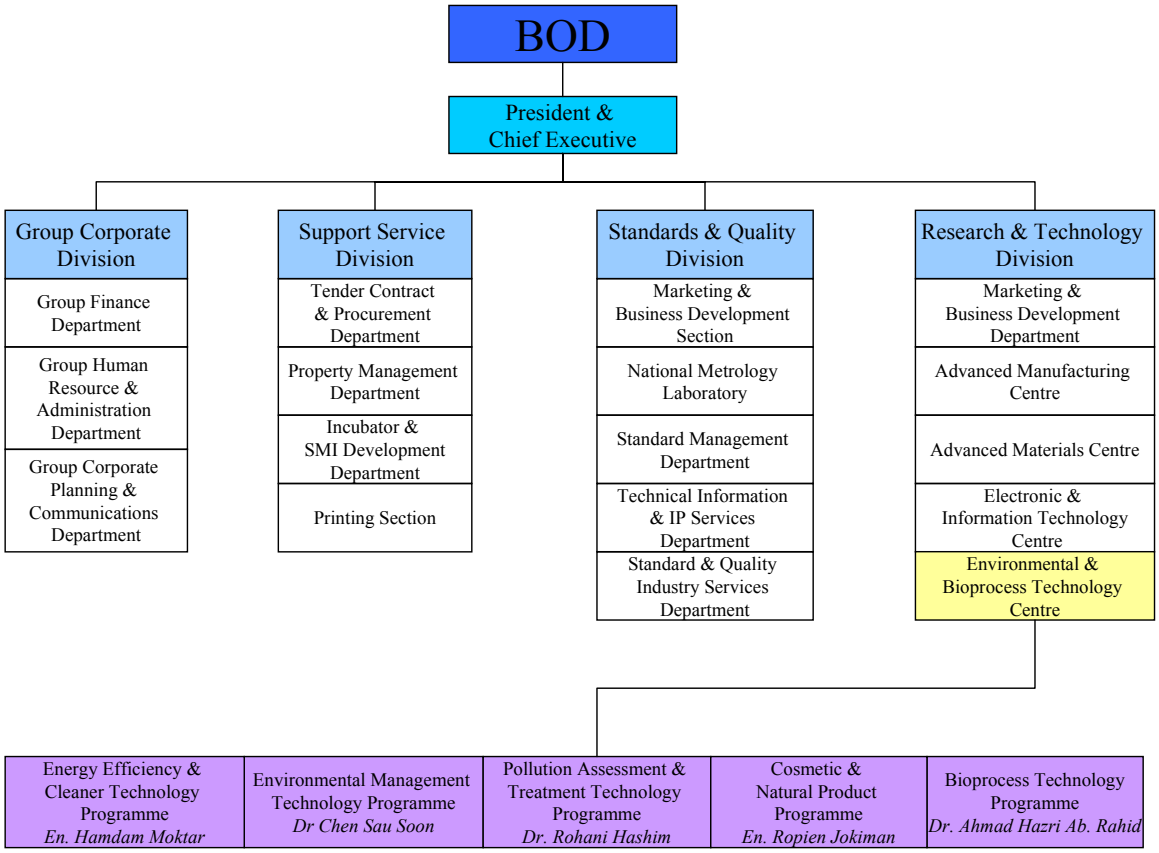
Equipment	Details
	a. 5 CD Rom systems=no details 3 Of those which require maintenance: a. Multimedia LCD projector maintained in 2003 b. Chem. Watch CD Rom, licence renewal 2003 c. Toxline plus CD Rom, licence renewal 2003 d. Tomes Plus CD Rom, licence renewal 2003 e. MSDS CD Rom, licence renewal 2003
Waste water treatment	1 Out of total types of items still in use=11/21 (52%) 2 Of the 10 types not in use: 80%never used, 10% repair required, 10% missing a. Wet oxidation reactor=never used b. Activated Sludge process equipment=never used c. Coagulation precipitation equipment=never used d. Filtration equip = never used e. Test unit for RO/UF membrane=never used f. Pressure vessel = never used g. Compressor = never used h. Hydrolab minisonde multiprobe =never used i. Water quality instruments = spoilt, repair required j. Induction motor = missing 3 Of those which require maintenance, only 1 was maintained in both 2003 & 2004

Annex 6: SIRIM Organisation Chart

SIRIM Organisation Chart in 2002



Latest SIRIM Organisation Chart



Annex 7: SIRIM Advertisement

ENVIRONMENT & BIOPROCESS TECHNOLOGY CENTRE
BUILDING 15, SIRIM BERHAD
NO. 1, PERSIARAN DATO' MENTERI
P.O. BOX 7035 40911 SHAH ALAM
SELANGOR, MALAYSIA

Contact: Mr Yeoh Bee Ghin
Tel : 603 5544 6564
Fax: 603 5544 6590
Email: web@sirim.my
Website: -

Client Served/Facilities: Public Testing

Field of Testing: Chemical

Scope of Accreditation:

Material/ Products Tested	**Type of Test/ Property Measured/ Range of Measurement**	**Standard Specifications/ Equipment/ Techniques Used**
Water, Wastewater Leachate, Aqueous Extract	Ammoniacal Nitrogen	APHA 4500-NH3 B & C (1992) Preliminary Distillation Step Nesslerization Method
	Anions: Fluoride, Bromide, Chloride, Nitrite, Nitrate, Sulphate, Phosphate	APHA 4110 B (1998) Anions by Ion Chromatography
	Biological Oxygen Demand (BOD_5)	APHA 5210 B (1998) 5 Day BOD Test APHA 4500-O G (1998) Membrane Electrode Method
	Chemical Oxygen Demand (COD)	APHA 5220 D (1998) Closed Reflux, Colorimetric Method
	Cyanide	APHA 4500-CN C & E (1998) Colorimetric Method
	Detergents, anionic	APHA 5540 C (1998) Anionic surfactant as MBAS
	Free Chlorine	APHA 4500-Cl G (1998) DPD Colorimetric Method
	Oil and Grease	APHA 5520 B (1998) Partition Gravimetric Method
	Oil and Grease	APHA 5520 C (1998) Partition-Infrared Method

Field of Testing: Chemical

Scope of Accreditation:

Material/ Products Tested	Type of Test/ Property Measured/ Range of Measurement	Standard Specifications/ Equipment/ Techniques Used
Water, Wastewater Leachate, Aqueous Extract	pH	APHA 4500-H+ (1998) pH value
	Phenol	APHA 5530 D (1998) Direct Photometric Method
	Phosphorus	HACH Method 8190 (1992) Total Phosphorus HACH Method 8114 (1992) Reactive Phosphorus
	Silica	APHA 4500-Si C (1995) Gravimetric Method
	Sulphide	APHA 4500 S^{2-}D (1998) Methylene Blue Method
	Total Kjeldahl Nitrogen	APHA 4500-N_{org} B (1998) Macro-Kjeldahl Method
	Total Suspended Solids	APHA 2540 D (1998) Total Suspended Solids, Dried at 103^{o}C-105^{o}C
	Volatile Fatty Acids	In-house Method EETC/SAMM/35

Field of Testing: Chemical

Scope of Accreditation:

Material/ Products Tested	**Type of Test/ Property Measured/ Range of Measurement**	**Standard Specifications/ Equipment/ Techniques Used**
Water, Wastewater Leachate, Aqueous Extract, Digestate	Hexavalent Chromium	APHA 3500 Cr-B (1998) Colorimetric Method
	Mercury	APHA 3112-Hg (1998) and Flow Injection Mercury System (Perkin Elmer)
	Metals: Arsenic, Boron, Selenium, Tin	APHA 3113 B (1998) Electrothermal Atomic Absorption Spectrometric Method
	Metals: Arsenic, Aluminium, Barium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silicon, Silver, Sodium, Tin, Vanadium, Zinc	SW 846 – Method 6010B (1996) Inductively Coupled Plasma-Atomic Emission Spectrometry

Field of Testing: Chemical

Scope of Accreditation:

Material/ Products Tested	Type of Test/ Property Measured/ Range of Measurement	Standard Specifications/ Equipment/ Techniques Used
Sludge, Sediment, Solid Wastes	Ash	BS:EN 12897:2000 Determination of the Loss of Ignition of Dry Mass
	Corrosivity	SW-846 Method 1110 (1986) Corrosivity Toward Steel
	Hexavalent Chromium	SW-846 Method 3060A (1996) Alkaline Digestion for Hexavalent Chromium
	Moisture	BS:EN 12880:2000 Determination of Dry Residue and Water Content
	Oil and Grease	APHA 5520 E (1998) Extraction Method for Sludge Samples
	Phosphorus	HACH Method 8181 (1992) Phosphorus in Soil HACH Method 8182 (1992) Soil Extraction for Phosphorus
	Polychlorinated biphenyls	SW-846 Method 3550 and 8080A (1986) Organochlorine Pesticides and PCBs
	Total Organic Carbon (TOC) CHNS-O	In-house method EETC/SAMM/12
	Toxicity Characteristics Leaching Procedure (TCLP)	SW-846 -Method 1311 (1992) Toxicity Characteristic Leaching Procedure

Field of Testing: Chemical

Scope of Accreditation:

Material/ Products Tested	**Type of Test/ Property Measured/ Range of Measurement**	**Standard Specifications/ Equipment/ Techniques Used**
Wastewater, Sludge, Chemical Substances	Aerobic Biodegradation	OECD Method 301 C (1998) Modified MITI Test (1)
	Biodegradability of Alkylbenzene Sulphonates	ASTM D2669-89 Biodegradability of Alkylbenzene Sulphonates
	Qualitative Organic Analysis	In-house Method EETC/SAMM/34

APHA – American Public Health Association
ASTM – American Standard Testing Methods
OECD – Organisation for Economic Cooperation and Development Guidelines for Testing of Chemicals
SW – Testy Methods for Evaluating Solid Waste SW-846, 3rd Edition
BS- British Standard
EN – European Standard
EETC/SAMM –In-house Coding System

Annex 8: Interview Reports

MEETING NOTES

Project : THE EX-POST EVALUATION STUDY ON PROJECT ON RISK MANAGEMENT OF HAZARDOUS CHEMICAL SUBSTANCES IN MALAYSIA

Date : 20 September 2004

Time : 9.30am to 11.45am

Venue : Environment and Bioprocess Technology Centre
SIRIM Berhad
1, Persiaran Dato' Menteri
Section 2, P.O.Box 7035,
40911 Shah Alam, Selangor
Tel: 03-55446000 / Fax: 03-55108095
Website: http://www.sirim.my

Participants : Environment and Bioprocess Technology Centre, SIRIM
1) Dr. Yeoh Bee Ghin (Senior Principal Consultant)
2) Wan Mazlina Wan Hussein (Researcher)
3) Tan Yong Nee (Researcher)
4) Izham Bin Bakar (Researcher)
5) Hasnah Mohd Zin (Researcher)

JICA Malaysia Office
6) Ueki Masahiro (Assistant Resident Representative)
7) Tan Siew Chan (Programme Manager)

PE Research Sdn Bhd
8) Chang Yii Tan (Senior Consultant)
9) T.Rajavijayan (Research Analyst)

Discussion brief

Dr. Yeoh Bee Ghin chaired the meeting. Mr. Ueki Masahiro opened the meeting with a brief on the project's terms of reference, i.e., the Ex-Post Evaluation Study and highlighted the reasons for the study. It will be carried out by a third party, PE Research Sdn Bhd, who have been selected by JICA.

Dr. Yeoh stated that as far as evaluation of the project was concerned:

- JICA experts together with SIRIM's project management team have undertaken evaluation throughout the project period, including a comprehensive assessment at the end of the project;
- The respective JICA experts and the Malaysian counterparts have had in-depth discussion, and agreed on the final evaluation; and
- An internal evaluation report based on the outcomes from the three activities above has been submitted to JICA at the completion of the project in 2001.

The evaluation done in 2001 highlighted two areas of concern because they are potential factors that will affect the achievement of the projects' goals and objectives:

- A unified legal framework for hazardous chemicals; and
- A comprehensive assessment of at least one hazardous chemical substance.

Dr Yeoh clarified that the prior to handover to SIRIM an assessment of a hazardous chemical had been undertaken. In the case of the legal framework, it is still KIV. The lead agency in the legal framework is the Department of Health and Safety (DOSH) under the Ministry of Human Resource. If the legal framework were enforced it would considerably enhance the need for SIRIM's services as SIRIM is the only agency in Malaysia having an Integrated Risk Assessment Facility.

Monitoring of the project results since completion of the project has not been specifically undertaken. However, the skills and technologies such as instrumentation skills, analytical skills and sampling skills acquired during the project have been used to provide consultancy services as well as R&D activities. Hence, project outcomes have been utilised for on-going activities. Dr. Yeoh reiterated that SIRIM would provide full cooperation for the successful completion of the evaluation study.

Since SIRIM's corporatisation in 1996, SIRIM has not been allocated any operating budget. Currently, overall SIRIM revenue is 50 per cent govt and 50 per cent private sector. As far as this division, Environmental and Bioprocesses Centre, is concerned it is 60 per cent govt and 40 per cent private sector. The Ministry of Science provides grants for staff and operating costs in all government related projects but SIRIM has to earn the rest of the costs through consultancy services. IRPA (Intensive Research Priority Area) research grants play a major role in SIRIM funding, i.e. development budget.

Developments since 2002
Of the 23 Malaysian counterparts trained in this project, 13 were trained in Japan. Of these 1 has past away where 4 had left SIRIM. Out of the remainder, 3 on study leave. The HRD fund covers for the employees on study leave. Current status of the counterparts is shown **Table A.**

In 2003, the Environmental and Bioprocesses Centre was established, merging two centres (EETC) and Bioprocesses Technology Centre. Two programs under EBTC are beneficiaries of the JICA Project: Environment Management Technology Program, and Pollution Assessment Treatment Technology Program.

The EBTC offers integrated risk assessment services (delisting and MSDS), maintains the standard sludge. Dr Yeoh mentioned that SIRIM had maintained certain activities at great cost to SIRIM, for instance, the "standard sludge", using SAMM 17025. This process required SIRIM to collect 10 samples from all over the country on a quarterly basis. Spread over 8 years, a huge cost had been incurred. SIRIM has been using standard testing procedures that were learnt during the Project, maintaining standards of the Project.

SIRIM also offers basic ecotoxicity tests (3 levels of algae, daphnia, and fish). SIRIM has modified the fish tests to include local species (e.g. *keli, sepat siam, lampan jawa*) and marine fisheries (*siakap*). It also offers gas chromatography for pesticides residue testing under Ministry of Health program.

Two persons have qualified for CHRA (Chemical Health Risk Assessment), where their JICA training in this project was recognised.

Focus of the Evaluation
The ex-post evaluation will focus on two areas, i.e. impact and sustainability since 2002, i.e., after project completion and lessons learned. The evaluation will be in the form of survey/interviews of:

- An assessment of the impact on SIRIM, its organisation, and also among the Malaysian counterparts, staffs (Organisational study), and
- Beneficiaries of SIRIM's enhanced services, i.e. industries.

It was highlighted that the assessment would also look for unanticipated outcomes, whether positive or negative, within SIRIM and beyond in the industrial sector, whether they have benefited or not benefited from the Project.

One area that was highlighted relates to the use of the skills gained from the Project in delivering consultancy services in a comprehensive manner to industry. For instance, sampling and Analysis services have expanded to cover other areas besides the areas in JICA project with consultancy services covering current needs of industry. It is within SIRIM's capability to provide for industry needs and if there are needs that cannot be covered then R&D projects with govt funding will be undertaken to upgrade those capabilities.

The consultants sought SIRIM's views on the ex-post evaluation, particularly aspects that SIRIM would like to have done but may not have undertaken so far. This additional work should of course be feasible within the resources made available to the consultants. Essentially, it should be confined to a one-month resource inputs.

The consultants requested for certain types of information related to the Project, i.e.

- SIRIM's assessment of the state of use of the equipment that was donated under the Project;
- Information on the staff that undergone training under the Project (provided as per **Table A**);
- Organisational changes that had occurred in SIRIM were also informed, as in the merging of the EETC and Bioprocesses Centres;
- A list of industrial beneficiaries that had received SIRIM's services;
- A list of seminars (Tech evaluation?), workshops, that are related to this Project, carried out since 2002;
- Evidence of sustainability in the form of continued project funding on similar tracks, such as continued funding under IRPA or other technical assistance;
- A compilation of jobs that had been done since project completion, tabulated by the five components of the JICA assistance, as well as by other skills used which were SIRIM's capabilities. This would provide a quantitative assessment of the assistance, and how they dove-tailed into SIRIM's own capability. Deadline for this task was set of 1st October 2004, and;
- SIRIM's requests for specific evaluation questions that could be added to the current evaluation.

In return, the consultants were asked/offered to furnish the following:

- A schedule of evaluation activities, indicating by the five areas, particularly interviews with staff, so that dates can be set aside;
- Evaluation methodology and approach;
- Survey questionnaire(s); and
- Additional data requests (to be provided before the next meeting).

A 2nd meeting is scheduled on 1 October 2004, which would be the official starting date for the Ex-Post Evaluation. At this meeting all parties in the evaluation will discuss the inputs and items mentioned above.

Table A: Current Status of Malaysian Counterparts trained in this project

	Mutagenicity Test	Ecotoxicity Test	Sampling & Analysis	Risk Assessment	Wastewater Treatment	Current Status
Abd Halim Abdul Aziz		X				passed away
Azyyati Ab Aziz	X					
Bakhtiar Main			X		X	
Chen Sau Soon				X		
Fadil Mohamad			X		X	study leave
Hasnah Mohd Zin	X					
Isnazunita Ismail	X					
Izham Bakar					X	
Letchumi Thannimalay				X		study leave
Nazimah Sheikh Abdul			X			left SIRIM (UPM)
Norshidah Baharuddin			X			
Putri Razreena Abdul Razak					X	
Quek Siew Young					X	left SIRIM (UPM)
Rahim Tambi		X				left SIRIM
Rahimah Abdullah	X					left SIRIM
Rohani Hasim (Project Leader)					X	
Siti Aishah Asmah Yusob		X				
Siti Shapura Mashood	X					posted to another division in SIRIM
Wan Mazlina Wan Hussein		X				
Wan Yusmin Wan Yusof	X					
Yati Kamarudzaman			X			
Yeoh Bee Ghin (Project Manager)		X				
Zulkarnain Abdullah		X				study leave

SECOND MEETING NOTES

Project : THE EX-POST EVALUATION STUDY ON PROJECT ON RISK MANAGEMENT OF HAZARDOUS CHEMICAL SUBSTANCES IN MALAYSIA

Date : 1 October 2004 (Friday)

Time : 11.00am to 12.30pm

Venue : Environment and Bioprocess Technology Centre
SIRIM Berhad
1, Persiaran Dato' Menteri
Section 2, P.O.Box 7035,
40911 Shah Alam, Selangor
Tel: 03-55446000 / Fax: 03-55108095
Website: http://www.sirim.my

Participants :

Environment and Bioprocess Technology Centre, SIRIM
1) Dr. Zainal Abidin Mohd Yusof (Senior General Manager)
2) Dr. Yeoh Bee Ghin (Senior Principal Consultant)
3) Dr. Rohani Hashim (Programme Head)
4) 8 other Technical Staff from EBTC

JICA Malaysia Office
5) Ueki Masahiro (Assistant Resident Representative)
6) Tan Siew Chan (Programme Manager)

Global Link Management
7) Shinobu Mamiya (Researcher)

PE Research Sdn Bhd
8) Chang Yii Tan (Senior Consultant)
9) Dr. Tan Guat Lin (Consultant)
10) T. Rajavijayan (Research Analyst)

Discussion brief

Dr. Zainal (EBTC, SIRIM) chaired the meeting and in his opening address highlighted the Project's benefits to SIRIM and to Malaysia. Dr. Zainal said that the counterparts had learned a lot from the Project and the knowledge gained had benefited the country. However, parts of the Project elements were "new" to the country: it takes time for industries to develop uses for these technologies or capabilities. He mentioned that SIRIM would give full cooperation for the Ex-Post evaluation study.

Mr. Ueki Masahiro (JICA) then continued with a brief on the terms of reference for the Ex-Post Evaluation Study and highlighted the reasons it. From the Ex-Post Study, JICA wants to learn lessons from its aid programs, which in turn will help improve its technical assistance programs so that it can increase benefits for its partners. In addition, JICA needs to be transparent and to explain to Japanese taxpayers on the benefits that its projects had brought to beneficiaries. A summary of the Evaluation's findings would be posted onto the JICA website. He said that PE Research Sdn Bhd had been selected by JICA to assist in the Evaluation. In an Ex-Post evaluation, Mr. Ueki indicated that the study would focus on

impact and sustainability aspects of the project, i.e., the contribution of the project to the country and whether it is maintained and how.

Mr. Tan Siew Chan (JICA) presented an outline of the Ex-Post Evaluation, highlighting the linkages between the project and program cycle, stakeholders and objectives. A brief description of the Impact and Sustainability criteria for the RMHCS project was also made and examples of crosscutting issues and sources of information were presented.

Mr. Chang Yii Tan (PE Research) described the methodology of the study using the Evaluation Grid that was circulated. He used elements of the Grid to highlight key questions that would be contained asked in three surveys. He emphasized that the context of the period 2002-2004 was important to establish as it formed the background to understand the findings of the Evaluation. Three surveys would be undertaken, as specified in the TOR, viz. management survey, a counterpart survey and user survey. He requested for SIRIM's assistance in identifying the key respondents and firms for the surveys, particularly the user survey. Each survey would contain questions that are specific to the type of respondent, particularly in trying to assess the impact and sustainability issues in the particular Project.

Dr. Zainal indicated that there are spin-offs from the Project. For instance, in the area of certification, SIRIM has used part of that knowledge to launch certain certification schemes, such as for eco-labelling, biodegradation, etc. The knowledge gained through the Project has been used as a basis for these certifications. However, he said that some of the methodologies required SIRIM to maintain certain procedures at a high cost to SIRIM.

In this regard, the fact that SIRIM had been corporatised was now an issue due to the high cost of maintenance of the technologies that had been gained. Although SIRIM is still the main government agency delivering technological services to industry, it has now to do this while still continuing to operate on a commercial basis. It was mentioned that even the corporatisation first posed certain problems for the Project, but eventually all parties accepted the status and position. Now SIRIM has to have business plans and to review all activities carefully so that it is kept within budget and resources.

Dr. Zainal indicated that SIRIM has taken a very good care of the facilities and equipment procured through this Project, despite the fact that it had been corporatised. SIRIM had used the Project's technologies for its consultancy work and services to industry. In fact 70 per cent of the revenue in the environmental areas are contributed by consultancy work. However, local industries are still not up to the level to use some of the technology from this project (for example mutagenicity tests). Nonetheless, due to the convergence of science and technology, SIRIM had begun moving into the area of biotechnology even prior to this Project. The risk assessment of hazardous chemical came in the right time to boost their knowledge so that it can be combined with their engineering core competence. Even the name of the centre had changed accordingly.

Dr. Yeoh indicated that JICA's role and contribution to SIRIM's technology capacity building could still be relevant. He wanted to know whether there could be further specification of the sustainability aspect within the original specification of the Project, i.e. SIRIM is looking for further collaboration between EBTC and JICA. He indicated that the findings of this study can be used for addressing shortcomings in the Project sustainability.

To that, Mr. Ueki on behalf of JICA indicated that the Project seems not to face any difficulties within the original scope of this Project based on the explanation given by Dr. Zainal, and with that SIRIM can cope with the sustainability of the Project.

SIRIM will provide comments to the evaluation grid as soon as possible, with an indication that it could be as early as Friday itself, as discussion of the time schedule of the Ex-Post

Evaluation centred on possible deadlines. It was mentioned that there were other requirements that would also be provided at the most opportune time, e.g. the list of firms and categorisation of Projects. SIRIM said that they would provide the required information as early as possible, and try to suit the proposed dates for the surveys. A list of possible times for the SIRIM management and counterparts were indicated and provisionally accepted.

The meeting ended with a confirmed date for the Management discussion fixed on 11 October 2004 at 10.00am. Other requests as made in the previous meetings will also be discussed at this time as well as the schedule for counterpart survey.

After the meeting, the JICA team members and the consultants were taken on a short tour of the facilities for mutagenicity, toxicity and sampling analysis laboratories. After the inspection, one internal meeting with JICA was held. The following had been discussed:

- Revision of the evaluation grid based on comment from JICA
- Date of submission of evaluation and questionnaire to JICA

MEETING NOTES

Project	:	THE EX-POST EVALUATION STUDY ON PROJECT ON RISK MANAGEMENT OF HAZARDOUS CHEMICAL SUBSTANCES IN MALAYSIA
Date	:	26 October 2004 (Tuesday)
Time	:	10.00a.m.
Venue	:	Jabatan Keselamatan & Kesihatan Pekerjaan Malaysia (JKKP) (DOSH) Ibu Pejabat (KEMENTERIAN SUMBER MANUSIA) Aras 2, 3 & 4 Blok D3, Parcel D Pusat Pentadbiran Kerajaan Persekutuan 62502 W.P. PUTRAJAYA
Participants	:	Jabatan Keselamatan & Kesihatan Pekerjaan Malaysia (DOSH) Ir Zainuddin Abdullah PE Research Sdn Bhd Dr. Tan Guat Lin (Consultant)

Questions for Interview with DOSH Deputy Director

1. Are there any changes particularly industrial trends with respect to the use of Risk Assessment & Hazardous chemicals technology?
2. Are there any changes in government policy that might affect or impact on the project goals?
3. In your opinion how does SIRIM compare with competitor firms in terms of technology, facilities, service levels & market share?
4. How do you rate SIRIM's capacity in Risk Management? How do you assess their capabilities?
5. Has DOSH been involved or organized any activities such as joint seminars or workshops with SIRIM in the area of hazardous chemical management?

After the preliminary introduction on the purpose of the Ex-Post Study on the Management of Hazardous Chemical Substances in Malaysia and the reason for the interview, it was remarked by Ir Zainuddin that SIRIM never contacted DOSH throughout the period of the project and that he was not aware of the project until he received the letter from PE Consultancy asking for an interview.

On hindsight he said that he suspected that there was a project going because he could recall that they (SIRIM) requested DOSH for a briefing on the USECHH (Use & Standards of Exposure to Chemicals hazardous to Health) Regs, 2000 and that was some time ago 3-4? years ago. A couple of years ago SIRIM, after queries on CHRA, sent one of their staff to attend course (probably at NIOSH) and then applied for registration as a Registered Chemical Health Risk Assessor. However DOSH has never received any CHRA reports from SIRIM up to present time (CHRA assessors are required to submit a copy of the report of all projects taken) to indicate that they were actively doing any CHRA consultancies for industries.

En Zainuddin could see the benefit of SIRIM's input in the writing of the CSDS (Chemical Safety Data Sheet) USECHH Regs, 1997 of hazardous chemicals which has to be supplied with every chemical used.

Since DOSH was not aware of the JICA project it was not possible for them to compare SIRIM's performance with competitor firms.

With regard to the changing trends with respect to risk assessments and to hazardous chemicals, our country is actively involved in the GHS activity (Globally Harmonised System) of classification and labelling of chemicals. It is a common coherent approach to defining & classifying hazards and communicating information on labels and safety data sheets. DOSH officers have attended and participated in international conventions and meetings on GHS. The secretariat for this is the MITI (Min of Trade & Industry). The elements of GHS will be integrated either by amendment or be tailored into the CPL regulations. Malaysia with our existing system will harmonise them to be consistent with the GHS. These amendments will be enforced by 2008.

With respect to any changes particularly industrial trends, since the enforcement of USECHH, 2000, DOSH has observed some visible changes in industry on management of hazardous chemicals. In the 2 "operasi" on USECHH in 2388 industries, between the 1st (2001) and 2nd (mid 2004) Operasi, the level of Compliance (Grade A&B = good compliance D&E = poor compliance) to the regulation improved from 95 per cent to 75 per cent for Grade D&E. The grading is based on 10 elements of the regulation such as fulfilling Chemical Register, CHRA, Control measure, labelling & relabelling, training & information, Monitoring, health surveillance, Medical protection, warning system, & record keeping.

Any Organized activities such as joint seminars or workshops etc. with SIRIM?

SIRIM staff has participated and was involved in the drawing up of standards, codes of practice or guidelines with DOSH, but these activities were not initiated by SIRIM. SIRIM members are also involved at the technical committee level and at general meetings.

Most of the chemical related activities of DOSH were together with an NGO, CICM (Chemical Industries Council of Malaysia) on such things as Responsible Care Programmes, but not with SIRIM.

In the near future, chemical related legislations that may impact on the project goals, are the CWC (Chemical Weapons Convention) regulations which has been delayed although it was due to be launched in Nov 2004.

The other activity will be the GHS being integrated with existing regulations. Dead line of implementation is proposed to be by the year 2008.

MEETING NOTES

Project	:	THE EX-POST EVALUATION STUDY ON PROJECT ON RISK MANAGEMENT OF HAZARDOUS CHEMICAL SUBSTANCES IN MALAYSIA
Date	:	26 October 2004 (Tuesday)
Time	:	9.00a.m.
Venue	:	Jabatan Alam Sekitar Malaysia (JAS) (DOE) (KEMENTERIAN SUMBER ALAM DAN ALAM SEKITAR) Aras 6, Blok C4, Parcel C Pusat Pentadbiran Kerajaan Persekutuan 62502 W.P. PUTRAJAYA
Participants	:	Department of Environment Ir Lee Heng Keng (Deputy Director General) PE Research Sdn Bhd Chang Yii Tan (Team Leader)

Questions for Interview with DOE Deputy Director General

1 Are there any changes particularly industrial trends with respect to the use of Risk Assessment & Hazardous chemicals technology?
2 Are there any changes in government policy that might affect or impact on the project goals?
3 In your opinion how does SIRIM compare with competitor firms in terms of technology, facilities, service levels & market share?
4 How do you rate SIRIM's capacity in Risk Management? How do you assess their capabilities?
5 Has DOE been involved or organized any activities such as joint seminars or workshops with SIRIM in the area of hazardous chemical management?

After the preliminary introduction on the purpose of the Ex-Post Study on the Management of Hazardous Chemical Substances in Malaysia and the reason for the interview, it was remarked by Ir Lee that he was not aware of the project until he received the letter from PE Consultancy asking for an interview. He had come to his post in 2002, and since then he had not heard of the Project.

He said however that there had been very significant changes in the DOE structures and most of the people who were handling this subject matter are deployed to other tasks. He suggested that the study team try to contact Puan Mariana, who was in-charge of such matters before her transfer to the KL Branch of the DOE.

With respect to hazardous chemical substances, Danida is still in the process of developing a program with DOE. But this is different from the scheduled waste issue, which deals only with wastes. [It is one of Danida's five components before their current environmental program closes in 2006].

Ir Lee is concerned about e-waste. He indicated that the DOE does not have information on this matter and would be keen to know more.

Annex 9: Persons/Institutions Interviewed

SIRIM Counterparts

Organisation	Name/Position	Contact
SIRIM Berhad, Environment and Bioprocess Technology Centre (EBTC) 1, Persiaran Dato' Menteri, Section 2, P.O.Box 7035, 40911 Shah Alam, Selangor	Dr. Yeoh Bee Ghin (Senior Principal Consultant)	Tel: 03-55446565 Fax: 03-55446588 Email: bee.ghin_yeo@sirim.my
	Wan Mazlina Wan Hussein (Researcher)	Tel: 03-55446000 Fax: 03-55108095
	Tan Yong Nee (Researcher)	Tel: 03-55446000 Fax: 03-55108095
	Izham Bin Bakar (Researcher)	Tel: 03-55446000 Fax: 03-55108095
	Hasnah Mohd Zin (Researcher)	Tel: 03-55446000 Fax: 03-55108095
	Dr. Zainal Abidin Mohd Yusof (Senior General Manager)	Tel: 03-55446000 Fax: 03-55108095
	Dr. Rohani Hashim (Programme Head)	Tel: 03-55446586 Fax: 03-55446590 Email: rohani_hashim@sirim.my
	Dr Chen Sau Soon (Programme Head)	Tel: 03-55446564 Fax: 03-55446590 Email: sau_soon_chen@sirim.my
	Putri Razreena Bt Abdul Razak (Researcher)	Tel: 03-55446000 Fax: 03-55108095
	Isnazunita Bt Ismail (Researcher)	Tel: 03-55446000 Fax: 03-55108095
	Wan Yusmin B. Wan Yusuf (Senior Asst Researcher)	Tel: 03-55446000 Fax: 03-55108095
	Bakhtiar Main (Principal Research Assistant)	Tel: 03-55446000 Fax: 03-55108095
	Siti Aishah Asmeh Yusob (Researcher)	Tel: 03-55446000 Fax: 03-55108095
	Yati bt. Kamarudzman Researcher	Tel: 03-55446000 Fax: 03-55108095

Ministries/Government Agencies

Date	Organisations	Name/Position	Contact
Oct 26, 2004	Occupation Safety and Health Department (DOSH), Ministry of Human Resource Aras 2, 3 & 4, Blok D3, Parcel D, Federal Government Administrative Centre, 62502 WP Putrajaya	Ir. Zainuddin Abdullah (Deputy Director General)	Tel: 03-88865000 Fax: 03-88892351 Web site: http://dosh.mohr.gov.my
Oct 26, 2004	Department of Environmental , Ministry of Nature Resource and Environment Level 3 – 7, Block C4, Federal Government Administrative Centre, 62502 WP Putrajaya.	Ir. Lee Heng Keng (Deputy Director General I)	Tel: 03-88858200 Fax: 03-88891034

User / Industry

Organisations	Name/Position	Contact
Bio-X Technologies Sdn Bhd, 31A, Jln Wan Kadir 2, TTDI, 60000 KL	R.S. Raj (General Manager)	Fax: 03-77261534
Sime Inax Sdn Bhd G5-M5, Malaysia Region Centre, Lot PT 11101, Kompleks Sime Darby, Jalan Kewajipan, 47600 Subang Jaya, Selangor	Stanley Tang (Marketing Service Manager)	Tel: 03-56380799 Fax: 03-56380418
Medilaund (M) Sdn Bhd	Ms Habibah, (Executive HR & Admin)	Tel: 03-31226161 Fax: 03-31228100
Petronas & Science Service Sdn Bhd.	Puan Noraini (Staff Scientist)	Tel: 03-89252731 Fax: 03-89258875
Hexa Corporation Sdn Bhd, 3A, !st Floor, Jalan USJ 10/1C, Taipan Business Park, 47620 Subang Jaya, Selangor	Tan Shyan Chert (Senior Manager)	Tel: 03-56362886 Fax: 03-56353216
BP Chemical (M) Sdn Bhd	Mohd Sukri Yaakub (Senior Environmental Specialist)	Tel: 09-5836705 Fax: 09-5836705
Envirex (M) Sdn Bhd 38C, Lorong Gelugor, Kawasan 18, 41300 Klang, Selangor	Wai Kok Chin (Assistant Programme Manager)	Tel: 03-33421844 Fax: 03-33421844

Organisations	Name/Position	Contact
Alequip Sdn Bhd	YT Sau, (General Manager)	Tel: 03-92850337 Fax: 03-92850098 Mobile: 012-2136008
Fermpro Sdn Bhd	Jegathesan (Factory Manager)	Tel: 04-9382892 Fax: 04-9382890
Flick Pest Control Sdn Bhd 10, Jln. PJS 7/21, Bdr Sunway, 46150 Petaling Jaya, Selangor	Martin (Operation Manager)	Tel: 03-56345366 Fax: 03-56343552
Toprank Industries Sdn Bhd.	Janet, (Business Development Manager)	Tel: 03-78063888 Fax: 03-78063666
Dah Yung Steel (M) Sdn Bhd, 19, Jalan Empat, off Jalan Chan Sow Lin 55200 Kuala Lumpur	Ng Ka Aik (Quality Control Executive)	Fax: 03-92218006
3R Waste Resource 3, Jln. Bakawali 36, Taman Johor Jaya 81100 Johor Bahru, Johor	Wong Choo Hooi (Director)	Tel: 07-3551325 Fax: 07-3551325
Pollution Engineering Sdn Bhd	Oh Ying Ying (Director)	Tel: 03-89617999 Fax: 03-89617629
LTK (Melaka) Sdn Bhd 102, Batu 11/2, Jln Meru 41050 Klang, Selangor	Tan Boon Eng (Marketing Manager)	Tel: 03-33422830 Fax: 03-33411967
IGC-Industrial Galvanizers Corp (M) Sdn Bhd, Lot 866 Jalan Subang 8 Kawasan SG. Penaga Industrial Park, 47500 Subang Jaya, Selangor	Azman Hafiz Mohd (Production Engineer)	Tel: 03-8024 9590 Fax: 03-8024 9719
DuoPharma (M) Sdn Bhd Lot 2599, Jalan Seruling 59, Kawasan 3, Taman Klang Jaya, 41200 Klang, Selangor	Lau Sze Chuan (QC Manager)	Tel: 03-33232759 Fax: 03-33233923
MYTI Corporation Sdn Bhd	Rosli Mohd Yunus (Operation Manager)	Tel: 03-89250201 Fax: 03-89250203
Hock Hin (Muar) Rubber Co. Sdn Bhd, 43 Jalan Maharani, 84000 Muar, Johor	Michael Lee (Senior Manager)	Tel: 06-952 2857 Fax: 06-952 6196
MKI (M) Sdn Bhd 45, Jalan Midah 7, Taman Midah, 56000 Kuala Lumpur	Chan Chee (Director)	Tel: 03- 9130 6926 Fax: 03-9131 2519

Organisations	Name/Position	Contact
Sinasahi Solder (M) Sdn Bhd, 62 & 64, Jalan Perdagangan 16 Taman Universiti Industrial Park, 81300 Skudai, Johor	Ong Peng Kong (Assistant Sales Manager)	Tel: 07-5202118 Fax: 07-5202128
Lam Soon Edible Oil Sdn Bhd, Wisma DLS, No 6, Jalan Jurunilai, U1/20, hicom-Glenmarie Industrial Park, 40761 Shah Alam, Selangor	Soit Mat Nor (QC Manager)	Tel: 03-78822399 Fax: 03-78822399
Ann Bee (M) Sdn Bhd Lot 586, 2nd Mile Jalan Batu Tiga Lama , 41300 Klang, Selangor	K Sivakumar (QA Manager)	Tel: 03-33424323 Fax: 03-33444769
Enco System Sdn Bhd Lot 43 Rawang Integrated Industrial Park, 48000 Rawang, Selangor	Ng Tai Ping (Finance Director)	Tel: 03-60913223 Fax: 03-60913222
Greenseal Product (m) Sdn Bhd, Lot 5 & 7, Jalan 35/10A, Taman Perindustrian IKS, Mukim Batu Caves, 68100 Kuala Lumpur	Darren Cha Sui Sung (Product Specialist)	Tel: 03-61882298 Fax: 03-61861298
Polymould Graphic (KL) Sdn Bhd 31, Jln PJS 11/14, Bandar Sunway, 46150 Petaling Jaya, Selangor	Ong Cheok Hui (Account & Admin Executive)	Tel: 03-56376028 Fax: 03-56376027
Metek/Kitamura (M) Sdn Bhd PT 1461, Senawang Industrial Estate, 70450 Seremban, Negeri Sembilan	Chew Sze Leong (Admin Section Manager)	Tel: 06-677 0710 Fax: 06-677 0710
Revertex Finewters Sdn Bhd, Lot 6394, off Sg. Rasa Industrial Area, 41300 Klang, Selangor	Chong Guat Lui (Senior Chemist)	Tel: 03-33428625 Fax: 03-33420657
Chemkimia Sdn Bhd. 19 Kenanga 6, Seksyen BB 11, Bdr Bkt Beruntung, 48300 Bukit Beruntung, Selangor	Tiong Kok Keong (Executive HR & Admin)	Tel: 03-60283888 Fax: 03-60281188
Tioxide Sdn Bhd	Arazm, (Senior Environment Safety Officer)	Tel: 09-8631688 Fax: 09-8631988
Malay-Sino Chemical Industries Sdn Bhd	Shahidan, (QA Executive)	Tel: 05-3224255 Fax: 05-3224097

Organisations	Name/Position	Contact
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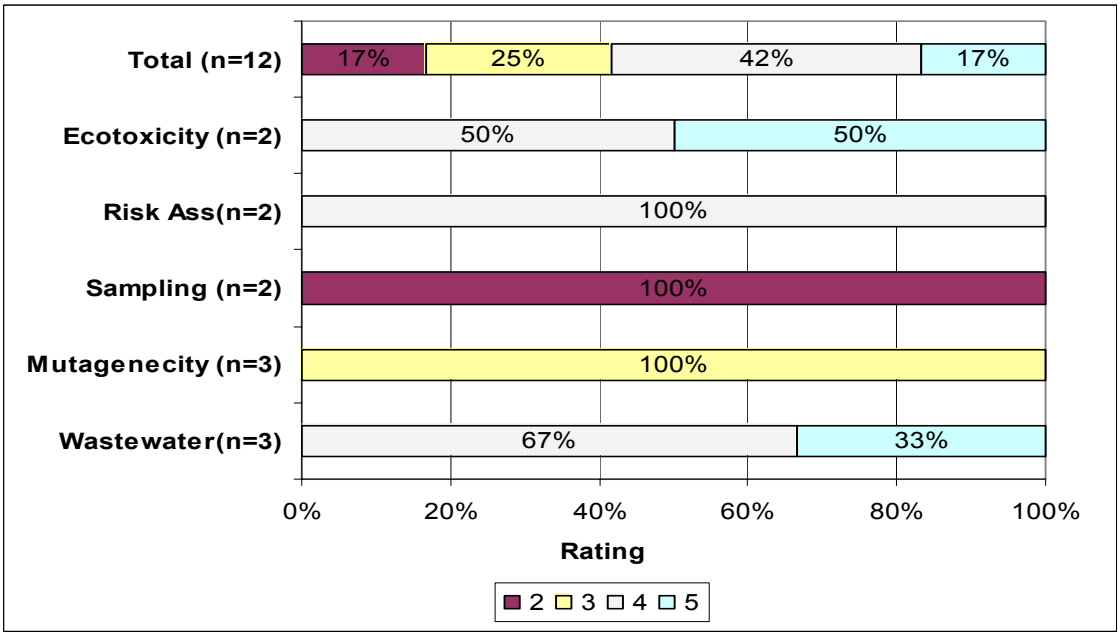
Columbia Chrome Malaysian SB No. 9, Jalan 16/9, Shah Alam 40000	Suria Prakasham (General Manager)	Tel: 03-5519 9633

Annex 10 Survey Findings

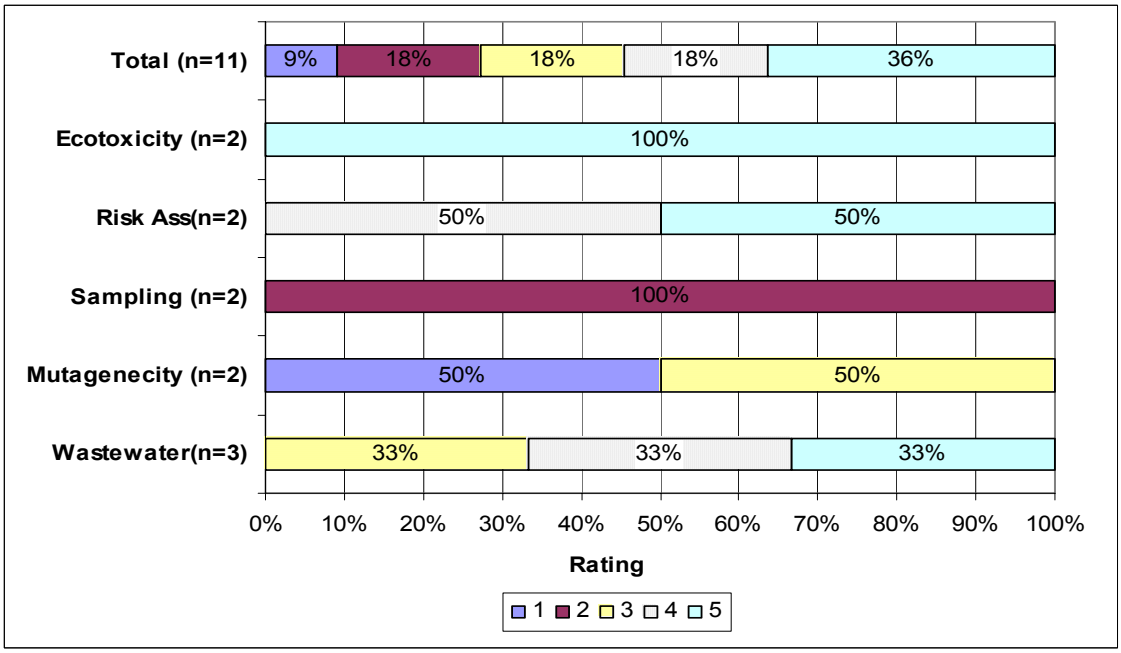
Counterpart Survey

Figure 6.1: Overall level of SIRIM's capability in Risk Assessment of Hazardous Chemicals, Counterpart Responses (n=12)



Source: Counterpart Survey Q1.1

Figure.6.2: Extent Project has enhanced your technological capability (n=12)



Source: Counterpart Survey Q1.2

Table 1: Number of Projects and Estimated Project skills Utilisation

Technical Field	Total No of Projects (ave)	% Range Projects using Project Skills
Mutagenecity	147 (n=3)	0 - 11%
Ecotoxicity	n.a.	n.a.
Sampling & Analysis	200 (n=1)	3.0%
Risk Assessment	100 (n=1)	40.0%
Wastewater Treatment	155 (n=2)	20 – 100%

Source: Counterpart Survey Q1.6

Table 2: Estimate of time spent using Project Equipment

Technical Field	% Range of time
Managers (n=3)	40%
Mutagenecity (n=3)	0 -10%
Ecotoxicity (n=2)	50%
Sampling & Analysis (n=2)	10 -20%
Risk Assessment (n=1)	40%
Wastewater Treatment (n=3)	40-70%

Source: Counterpart Survey Q1.7

Table 3: Number of other SIRIM staff trained

Technical Field	% of Counterpart Conducted Training	Number of SIRIM staff Trained
Management	67%	6
Mutagenecity	0%	0
Ecotoxicity	100%	2
Sampling & Analysis	0%	0
Risk Assessment	50%	6
Wastewater Treatment	100%	5.7
Mean	50%	4.5

Source: Counterpart Survey Q1.8

User Survey

Table 4: Types of firms that responded

Type of business	%
Manufacturing	57.6%
Environmental Service	15.2%
Government & university	0.0%
Others	27.3%
Number of firms interviewed	**33**

Source: User's Survey, Q.1

Table 5: Firm Used of SIRIM services

Used SIRIM services	%
Yes	78.8%
No	20.8%
Number of firms interviewed	**33**

Source: User's Survey, Q.4

Table 6: Equipment

Technical Field	Better than best private firm	Equivalent	Worse than best private firm	N
Mutagenecity	-	-	-	-
Ecotoxicity	-	100%	-	1
Sampling and Analysis	14.3%	57.1%	28.6%	7
Risk Assessment	100%	-	-	1
Wastewater Treatment	-	-	-	-

Source: User's Survey, Q. 6

Table 7: Service Levels

Technical Field	Better than best private firm	Equivalent	Worse than best private firm	N
Mutagenecity	-	-	-	-
Ecotoxicity	-	100%	-	2
Sampling and Analysis	20%	70%	10%	10
Risk Assessment	100%	-	-	1
Wastewater Treatment	-	-	-	-

Source: User's Survey, Q.6

Managementr Survey

Table 7: Unanticipated Impacts of the JICA Risk Assessment Project

Issues	Unanticipated impacts (positive or negative)
Industrial Policy	Counterparts can better serve in Government committees, e.g. on POPs (Persistent Organic Pollutants) and EHS (Environmentally Hazardous Substances).
Technological innovation	GHG (Green House Gas) sampling techniques was obtained through the experience from HVAS and gas trapping sampling techniques
Environmental protection	Developed an eco-labelling (Malodour Treatment Project of environmentally friendly products) scheme based on skills learnt in the Project
Social Aspects	No significant impact
Economic/Financial benefits	Chemical Safety Data Sheet; more types and varieties of projects that bring in additional value added
Institutional management	No significant impact
Others	High expenditure in terms of maintenance and repairs, affecting the financial performance of the EBTC. Did not foresee that equipments would become obsolete and even repairs and parts are difficult to source; certainly no one can repair some of the Project equipments

Source: SIRIM Management Survey, Q2.1

Table 8: Management Reasons vis-à-vis Maintenance of Project Equipment

	Yes	No	Comments
Mutagenecity	[x]	[ ]	
Ecotoxicity	[x]	[ ]	Parts replacement of pump (RM35K/yr); but some like costly maintenance of coulometers parts not even available because it's obsolete
Sampling/ Analysis	[x]	[ ]	Licensed software update cost RM15K/year
Risk Assessment	[x]	[ ]	
Wastewater Treatment	[x]	[ ]	

However, total parts replacement costs RM200K–300K/year (incl. calibration)
Source: Management Survey, Q.6.2

Equipment List

Table 9: Analysis of Project Equipment List, as at October 2004

	% equipment still in use	Never used	Repairs required	Others
Mutagenecity (50)	90%	2%	4%	4%
Ecotoxicity (15)	68%	6%	6%	20%
Sampling& Analysis (22)	45%	45%	5%	5%
Risk Assessment (10)	50%			50%
Wastewater Treatment (21)	52%	38%	5%	5%

Source: Equipment in Use and Maintenance List (see section 5.4)
Note: % equipment in use is all useable equipment by all equipments donated; whereas the next 3 columns are row percentages, and refer to those equipment not in use. Others refer to no information, incomplete, cannot use, no current application, and missing.

Table 10: No of Equipment maintained in 2003 and 2004

	2003	2004	Description of maintenance
Mutagenecity (50)	4	5	Different equipment in both years
Ecotoxicity (15)	6	6	Same equipment in both years
Sampling& Analysis (22)	0	0	
Risk Assessment (10)	5		License renewal in 2003
Wastewater Treatment(21)	1	1	For those that require maintenance

Source: Equipment in Use and Maintenance List (Annex 4 & 5)