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**Audit of Thailand's  
Science and Technology  
for Development  
Project No. 493-0340**

**Audit Report No. 2-493-91-02  
December 14, 1990**

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**The project is behind schedule because USAID/Thailand did not correct project design flaws or take effective actions as conditions for project implementation changed.**

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**UNITED STATES OF AMERICA**  
**AGENCY FOR INTERNATIONAL DEVELOPMENT**  
**REGIONAL INSPECTOR GENERAL/AUDIT**  
**MANILA**

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**DATE: December 14, 1990**

**MEMORANDUM**

**TO: Mr. Thomas Reese**  
**Director, USAID/Thailand**

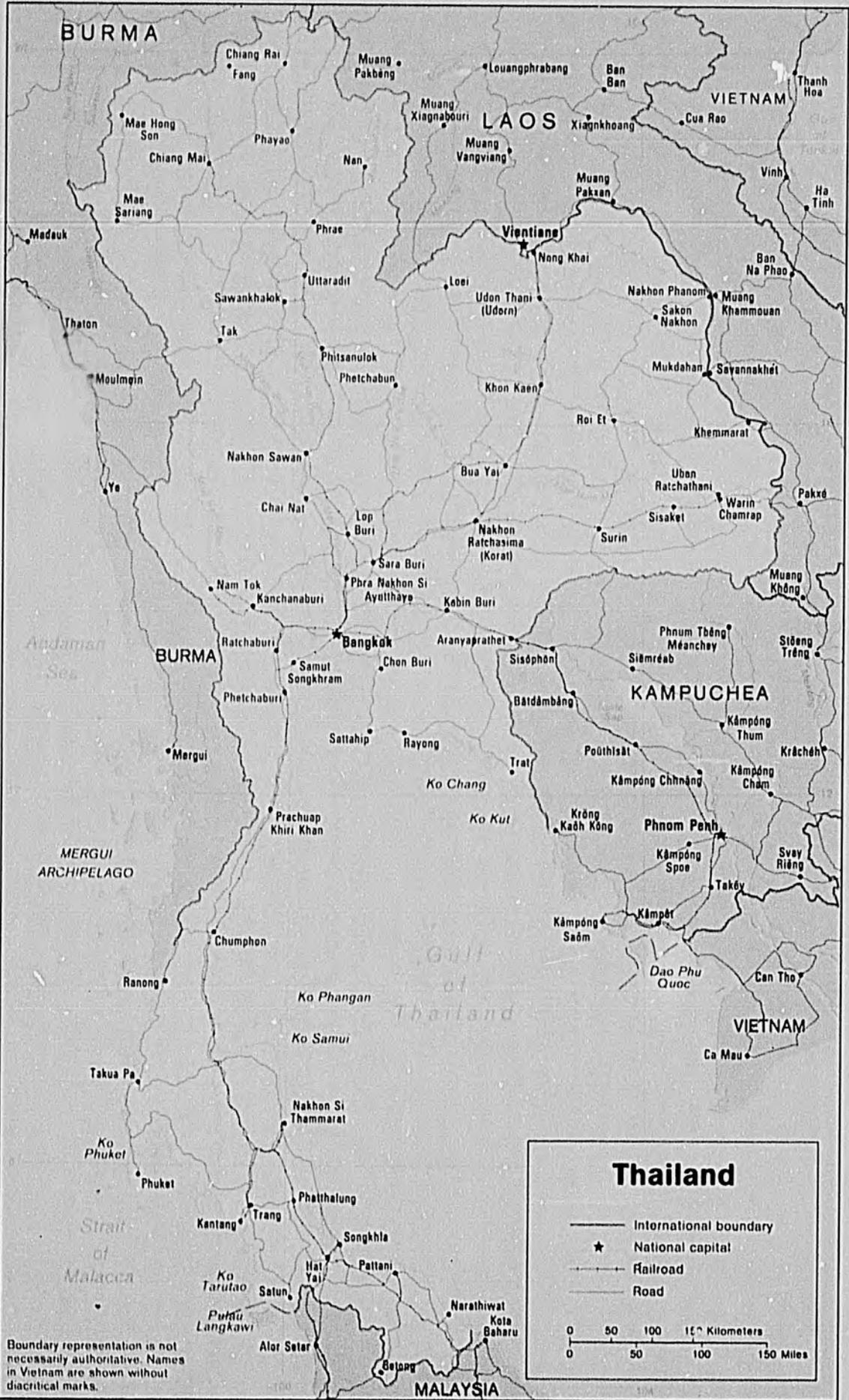
**FROM: *William C. Montoney***  
**William C. Montoney**  
**Regional Inspector General**

**SUBJECT: Audit of Thailand's Science and Technology**  
**for Development Project No. 493-0340**  
**Audit Report No. 2-493-91-02**

The Office of the Regional Inspector General for Audit/Manila has completed its Audit of Thailand's Science and Technology for Development Project. Five copies of the report are provided for your action.

The draft report was submitted to you for comment and your comments are attached to the report. The report contains four recommendations. Recommendations No. 1.2, 1.3, 2.1, 3.1 and 4 are resolved and can be closed when the actions in process are complete. Recommendations No. 1.1, 2.2 and 3.2 are unresolved pending agreement on a responsive plan of action.

I appreciate the courtesy and cooperation extended to my staff during the audit.



Boundary representation is not necessarily authoritative. Names in Vietnam are shown without diacritical marks.

## EXECUTIVE SUMMARY

The \$49 million Science and Technology for Development Project was expected to enhance the effectiveness and extent of public and private sector application of science and technology to Thailand's development. A.I.D.'s funds were to be used to strengthen the existing institutional framework; conduct research, development and engineering studies; review science and technology practices and support industrial development. Most of the funds were to be used for the research, development and engineering studies, which were to concentrate on technology-related problems or expand opportunities in the high priority areas of bioscience/biotechnology, material technology and applied electronics technology.

The project was initiated in August 1985 for seven years, but it was extended subsequent to this audit for two additional years. A.I.D. grant and loan funds totaling \$35.4 million were provided, and the Royal Thai Government and private sector were to contribute \$14 million. As of March 31, 1990, A.I.D. had obligated \$30.6 million, and project expenditures totaled \$8 million.

Audit work demonstrated that:

- Implementation has been slow and some project objectives may not be fully achieved because of errors in project planning and design and a lack of qualified people to carry out some planned activities;
- The project monitoring and reporting system did not ensure that subproject commodity procurement complied with A.I.D. regulations on source and origin or that commodities were properly marked;
- The financial activities of subproject were not routinely reviewed to determine whether A.I.D. funds were properly accounted for and

- Host-country and private-sector contributions may not equal the amounts agreed to or meet the statutory minimum.

The report contains four recommendations addressing these issues. USAID/Thailand generally disagreed with the conclusions of this report. Its reply to our draft report suggests that the conditions described therein were incorrectly stated; when in fact, most of the corrected conditions presented in its reply were achieved in response to the audit. Our report acknowledges the corrective actions taken to date, and most of the recommendations are resolved on report issuance.

*Office of the Inspector General*

Office of the Inspector General

December 14, 1990

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# INTRODUCTION

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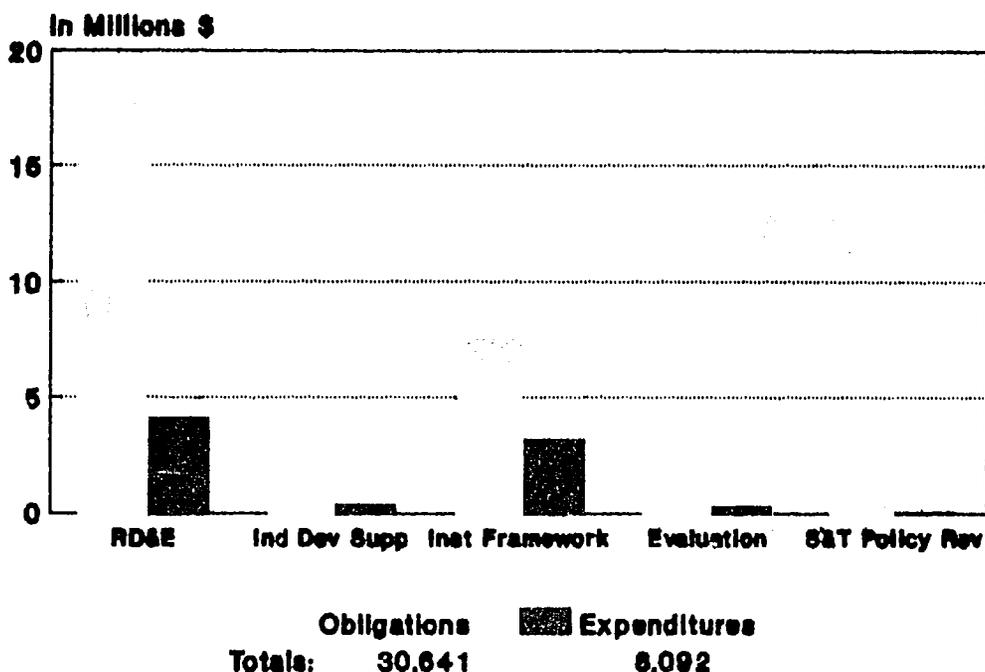
## Background

The objective of the \$49 million Science and Technology for Development Project was to enhance the effectiveness and extent of public and private sector application of science and technology (S&T) to Thailand's development. The project was to strengthen the existing institutional framework; conduct research, development and engineering (RD&E) studies; review S&T practices and support industrial development. The RD&E studies were to concentrate on technology-related problems or expand opportunities in the high priority areas of bioscience/biotechnology, material technology and applied electronics technology.

This project was initiated on August 15, 1985, when A.I.D. and the Royal Thai Government (RTG) signed a \$26.5 million loan agreement and a \$8.5 million grant agreement. On June 12, 1989, the grant was increased to \$15.8 million, and on October 26, 1989, the loan was decreased to \$19.6 million. A.I.D. funds were to be used as follows:

- \$20.3 million for RD&E studies;
- \$7.3 million for industrial development and support;
- \$4.9 million for activities to strengthen the existing institutional framework;
- \$2.2 million for evaluation, technical support and contingencies and
- \$0.7 million for S&T policy reviews.

## Obligations & Expenditures As of March 31, 1990



The RTG and the private sector were to provide \$14 million--\$12 million for cost sharing in the RD&E studies and \$2 million for utilities, travel and staff salaries. Subsequent to this audit, the project assistance completion date was extended for two years to September 30, 1994, to allow time for planned activities to be completed.

Planned project outputs included the completion of 126 RD&E studies, the establishment of a Science and Technology Development Board (STDB), review of 10 S&T policies and practices, and support for industrial development. The RD&E studies were to address known high priority problems, build the capacities of institutions, solve specific problems, and provide loan financing for private sector RD&E. RD&E costs eligible for funding included honoraria, technical assistance, equipment and travel. STDB

was established to manage day-to-day project implementation activities, including administrative support and monitoring. Several committees were established within STDB to assist in project implementation. The Board of Directors, composed of at least 20 public and private representatives, met once a year and provided policy direction. The Executive Committee of nine members met at least quarterly and performed project monitoring functions. The Technical Advisory Committee rendered advice on technical matters. A technical assistance contractor provided technical support to STDB for RD&E proposal preparation, screening and review and for the recruitment and selection of consultants. The Technical Information Access Center and the Technical Service Center for Industry were to provide data information services and consulting services, respectively.

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### **Audit Objectives**

The Regional Inspector General for Audit/Manila conducted a performance audit of the Science and Technology for Development Project to answer the following questions:

1. What is the progress of the project?
2. Will project objectives be achieved?
3. Was a monitoring and reporting system established to ensure that A.I.D. regulations were complied with and that A.I.D. funds were properly accounted for?
4. Were host-country and private-sector contributions made available for project purposes?

To answer the audit objectives, we tested whether USAID/Thailand (1) followed applicable internal control procedures and (2) complied with certain provisions of laws, regulations, grants and contracts. Our tests were sufficient to provide reasonable--but not absolute--assurance of detecting abuse or

illegal acts that could significantly affect the audit objectives. Because of limited time and resources, we did not continue testing when we found that, for the items tested, USAID/Thailand followed A.I.D. procedures and complied with legal requirements. Therefore, we limited our conclusions concerning these positive findings to the items actually tested. When we found problem areas, we performed additional work

- to determine if USAID/Thailand was not following a procedure or not complying with a legal requirement,
- to identify the cause and effect of the problems and
- to make recommendation to correct the condition and cause of the problems.

Appendix I contains a complete discussion of the scope and methodology for this audit.

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# REPORT OF AUDIT FINDINGS

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## What is the progress of the project?

The Science and Technology for Development Project is behind schedule. After almost five of the project's original seven-year life, 87 percent of the authorized funds had been obligated but only 26 percent of the obligations had been expended. As of March 31, 1990, the project had a pipeline of unliquidated obligations of about \$23 million. USAID/Thailand was considering deobligating \$4 million to \$5 million in obligated funds and about \$4.8 million of the \$35 million authorized for the project had not been obligated. The audit estimated that up to \$11 million could be reprogrammed from research, development and engineering (\$3.7 million), technical assistance for institutional framework development (\$1 million), institutional development support (\$1.7 million), policy studies (\$300,000) and unobligated funds (\$4.8 million).

The following graph illustrates the slow rate of project implementation by comparing actual expenditures with authorized and obligated funds from project inception through March 1990. As shown below, only \$8.1 million of the \$30.6 million obligated had been expended after almost five years of project implementation.

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## **Will project objectives be achieved?**

The project has been described as an innovative donor program for national science and technology (S&T); however, it may not fully achieve its purpose of enhancing the effectiveness and extent of public and private sector application of S&T to Thailand's development. The project has led to the establishment of the Science and Technology Development Board (STDB), the award of 189 graduate fellowship studies and the approval of 65 research, development and engineering (RD&E) subprojects. However, reviews of S&T policy and practice and support for industrial development have not been implemented as planned.

The project may not fully achieve its objective because of errors in project planning and design and a lack of qualified people to carry out some planned project activities. In addition, the status of some project expectations and outputs cannot be verified because baseline data needed to measure project results did not exist and has not been developed.

### **USAID/Thailand Needs to Reduce the Scope of the Project to Enhance Its Outputs**

A.I.D. regulations require the establishment of a project monitoring and oversight system. While the project has been successful in implementing certain project activities, some activities have not progressed well. This occurred because USAID/Thailand did not correct project design flaws or take effective actions as conditions for project implementation changed. As a result, A.I.D.'s \$35 million investment in the project may not deliver all of the intended outputs.

#### **Recommendation No. 1: We recommend that USAID/Thailand:**

- 1.1 identify project activities that can be accomplished, determine the amount of funds needed for those activities and reprogram excess funds;**

- 1.2 develop quantitative indicators of progress for those activities that can be achieved during the remaining life of the project; and
- 1.3 establish a project monitoring and reporting system that results in the initiation of corrective actions when progress indicators are not achieved.

A.I.D. Handbook 3, Chapter 12, requires Missions to establish a project monitoring and oversight system. This system is to include methods for comparing actual results of programs and projects with those anticipated when they were undertaken and for identifying alternative methods for attaining project objectives. Chapter 11 of the same handbook requires that projects be designed with explicit and achievable objectives and targets with time-specific progress indicators. The Supplemental Appropriations Act of 1955, Section 1311 requires annual project obligation reviews to ensure that only valid obligations are recorded. In addition, A.I.D. Handbook 19, Chapter 2 mandates the deobligation of funds when it is clear that the amounts obligated for the project exceed the amounts required to finance the A.I.D. assistance contemplated in the project agreement.

The project agreements required monitoring reports that summarize ongoing project activities, indicating their status, degree of completion, achievement of objectives, identification of problems and proposed methods for resolving problems. In addition, the agreements made STDB primarily responsible for project monitoring. To accomplish this, USAID/Thailand required STDB to prepare annual implementation and financial plans. While STDB prepared the plans, USAID/Thailand did not ensure that the planned activities were monitored effectively; therefore, USAID project officials were unable to take corrective actions as conditions for implementation changed. For instance, the S&T policy reviews, planned to be conducted in fiscal years 1989 and 1990, have not been initiated, but USAID/Thailand had not identified the cause of the delay and had not recommended measures to resolve the problem. Further, the first company-directed subproject was not awarded until two years after the first designated and competitive subprojects were awarded. However, project officials did not realize, until a year after the first award, that the slow start-up for these subprojects was caused by the banks'

requirement for real estate as collateral. Only then did project officials recommended a substitute program. In addition, the plan to establish a technical information access center, which duplicates existing services, should been discovered had USAID/Thailand monitored the implementation of this project component effectively.

USAID project officials said that project monitoring was the primary responsibility of STDB. While this is true, it does not relieve USAID/Thailand of its responsibility to ensure that the project is monitored effectively and that necessary corrective actions are taken as conditions for project implementation change.

The project paper listed 11 end-of-project expectations for the project purpose. The means of verifying accomplishments related to these expectations would be national statistics and various special studies. Comparing these expectations with the status of the project at the time of audit (see EXHIBIT 1), reveals that most of the expectations will not be determinable because baseline data was not developed. The project paper also described, in broad terms, the level of outputs to be achieved by project's end. Comparing these expected outputs to actual achievements, shows that the project has been slow to carry out project activities and will likely have difficulty achieving the planned level of outputs.

<u>Category of Outputs</u>	<u>Level of Outputs</u>	
	<u>Planned</u>	<u>Actual</u>
<b>1. Strengthen the existing institutional framework</b>		
A. Increase private sector use of indigenous S&T institutions in the application, adaptation and development of needed technologies	Undefined	Unknown
B. Establish STDB	1	Established

## 2. Review of S&T policy and practice

A. Undertake research studies on policy constraints	10	4
B. Hold meetings on key policy issues involving academic, private sector and public policy planners	10	None
C. Satisfy analytical capacity of selected policy institutions	Undefined	None

## 3. RD&E activities

A. Undertake research projects in bioscience/biotechnology, metallurgy/material science, and applied computer/electronic technology

Designated	48	44
Competitive	60	18
Company-directed	<u>18</u>	<u>3</u>
	<u>126</u>	<u>65</u>

## 4. Industrial development support

A. Shorten testing turn-around time and improve standards testing and quality control	Undefined	Un determinable
B. Establish Technical Information Access Center	1	Established
C. Establish Diagnostic/Research Design Service	1	Established

## Strengthen the Existing Institutional Framework

While STDB was established in July 1985, the legislation to make STDB a permanent organization within the Royal Thai Government (RTG) was still being considered by the RTG's lawmaking body. In addition, hiring full time professional staff for STDB has been a problem. The lack of job security and salary rates not being competitive with the private sector were cited as the reasons. Most of the professional staff were on temporary assignments from RTG agencies. At the time of the audit, 11 of 35 professional staff positions were identified as vacant.

### Review of S&T Policy and Practice

Four policy studies have been conducted. These include S&T manpower in Thailand, RD&E commercialization, the development capability of small and medium-scale industries and S&T baseline data. STDB officials said the policy studies were not useful and did not satisfy STDB requirements. For instance, the S&T manpower study did not recommend ways to address the huge gap between supply and demand for S&T manpower. Further, STDB refused to accept the results of the baseline study because STDB officials believed the study left many questions unanswered.

In December 1988, STDB established a plan for policy studies. The plan identified five areas and nine topics to be studied at an estimated cost of \$300,000 during fiscal years 1989 and 1990. None of the studies had been conducted. Although the RTG wanted local Thai consultants to perform these studies, STDB officials stated that there was a lack of qualified Thai consultants available. For instance, a Thai consulting firm bid for and was awarded one of the studies but later rejected the award for lack of qualified staff. As a result, STDB had to negotiate with the second bidder. Over a year after awarding the contract to the second bidder, work had not started because the contractor had to wait for staff to be freed from other work. STDB officials said they now plan to have foreign and Thai consulting firms jointly perform the policy studies.

## RD&E Activities

Through March 31, 1990, 65 RD&E subprojects were approved and about 12 more subprojects were expected to be approved by the end of fiscal year 1990. The following table shows the breakdown of loan-funded subprojects:

<u>Type of Subproject</u>	<u>No. of Subprojects</u>		<u>Funding Levels</u>		
	<u>Planned</u>	<u>Actual</u>	<u>Total</u>	<u>To date</u>	<u>Balance</u>
			<u>(in millions)</u>		
Designated	48	44	\$ 9.0	\$ 5.4	\$ 3.6
Competitive	60	18	6.75	1.8	4.95
Company-directed	<u>18</u>	<u>3</u>	<u>2.25</u>	<u>.2</u>	<u>2.05</u>
Totals	<u>126</u>	<u>65</u>	<u>\$18.00</u>	<u>\$ 7.4</u>	<u>\$10.6</u>

At the time of the audit, STDB was reviewing about 91 RD&E subproject proposals, including 20 designed to build the capacities of institutions (designated) and 71 designed to solve specific problems (competitive). While the planned 48 designated and 60 competitive subprojects may be reached, the target for subprojects designed to provide loan financing for private-sector RD&E (company-directed) likely will not be attained. An STDB official anticipates that company-directed subprojects may be difficult to initiate because of a stringent policy of Thai financial institutions requiring real estate as collateral. At the time of our audit, STDB was planning a company-directed grant program to augment the loan funds, which apparently will not be utilized.

Additional loan funds may not be utilized because approved subprojects were requiring less funding than planned. The project paper planned for an average A.I.D. contribution to RD&E subprojects at \$187,500, \$112,500 and \$125,000 for designated, competitive and company-directed subprojects, respectively. The planned average A.I.D. contribution to subprojects was not met. The average A.I.D. contribution to the 65 subprojects, thus far, was \$124,000, \$100,000 and \$67,000 for designated, competitive and company-directed subprojects, respectively. Because of the failure to reach

the average A.I.D. contribution to subprojects, about \$3.2 million in RD&E funds have not been used for the 65 approved subprojects. Additional funds may not be used if the average of future subprojects continues to be less than anticipated. While the number of subprojects can be increased to use excess funds, monitoring would pose a problem because STDB is short of staff to perform this function.

In addition to subprojects, RD&E activities include support of graduate fellowships, workshops and meetings. The project has been successful in implementing RD&E support activities. For example, 189 graduate fellowships have been awarded as of March 1990 and the workshops and meetings facilitated the award of the 65 RD&E subprojects.

In March 1989, the Support for Technology Assessment and Mastery Program was included as an RD&E activity. This was an experimental program to demonstrate to industrial firms and development-related promotion institutions the need for appropriate technology and how investments in capability development can secure efficient operation and improvement in the technology processes and resultant products. Nine projects valued at about \$360,000 were planned under this program for fiscal years 1989 and 1990. However, none of the planned subprojects has been initiated. STDB officials found that implementing these activities was difficult because the approval process for these activities was longer than the few weeks it takes most Thai businessmen to complete entire activities. As a result, there was a lack of interest in the program among Thai businessmen.

### Industrial Development Support

The three activities included in Industrial Development Support were (1) Standards, Testing and Quality Control (STQC), (2) Technical Information Access Center (TIAC) and (3) Diagnostic/Research Design Service (D/RDS). Each of these was behind schedule.

## **(1) Standards, Testing and Quality Control**

The implementation of this activity has been delayed. The technical assistance contractor prepared an implementation plan which was approved in June 1989, almost four years after the project started. About \$3.8 million of A.I.D. funds were to be spent on STQC for technical assistance, commodities and training. The activity has been successful, in part, in that technical assistance was provided, workshops were conducted, and working groups were organized to strengthen and enhance coordination among selected institutions. However, the initial batch of nine Thai officials selected for U.S. short-term training were still undergoing language training due to difficulties in meeting the English language requirement. Also, STDB officials said that equipment requirements identified for various institutions two years ago must be reviewed again to verify that a need still exists before procurement can proceed.

## **(2) Technical Information Access Center**

After almost five years, the project is still trying to establish TIAC. The project paper planned to link TIAC with another organization, the US/ASEAN Center for Technology Exchange in New York, but this plan was abandoned when it was found that the desired data linkage was already available in Thailand. A revised plan, developed in 1988, adopted a concept of organizing a consortium of Thai private and public institutions and identified about \$400,000 of computer equipment needed to operate the consortium. Both the project paper and the 1988 TIAC implementation plan assumed that technical data base access was not available in Thailand. The technical assistance contractor stated that no survey of the demand for information services or their availability in Thailand had been conducted. He said the demand for information services was an assumption he made based on his experience in other countries.

Although TIAC was implemented in late 1989, no consortium type of operation has yet developed. First, several institutions identified to join the TIAC consortium already had technical data base capability in-house or had access to U.S. data base vendors. Three institutions told us they were

reluctant to join the consortium for fear that they might need to provide additional resources. Second, the role of TIAC in the consortium has not been defined. STDB officials said that TIAC would be the coordinator of the consortium. The officials in the three institutions pointed out that data base information services in Thailand had been developed without TIAC. The same officials said that data obtained from the consortium would be expensive. For instance, the overhead cost of TIAC would be an added cost that the users would have to bear. Apparently, TIAC and the consortium were no longer relevant to the further development of data base information services in Thailand. The technical assistance contractor, in a revision (June 1990) to the 1988 TIAC implementation plan, recommended that STDB reassess the need for computer equipment before acquiring it for TIAC.

### (3) Diagnostic/Research Design Service

To implement the D/RDS, a host-country contract was awarded to Chula Unisearch in September 1989. The contract called for establishing a Technical Service Center for Industry to conduct factory visits, establish a data base of consultants and arrange for consulting services. Activities under the contract moved slowly. The contractor encountered difficulty finding qualified staff and, as a result, most of the work was performed by part-time graduate students. The contractor plans to renegotiate its contract with STDB to re-define what can be accomplished in the remaining time.

It appears that some project activities have limited potential for success even with the extension of the project completion date. Accordingly, project activities should be reduced to allow project officials to concentrate on those activities which have demonstrated some degree of success, such as the RD&E subprojects, graduate fellowships and workshops. Limiting the project activities would also allow USAID/Thailand to reprogram funds committed to slow-moving activities. The USAID project implementation report of June 1990 indicated that \$4 million to \$5 million in project funds could be

reprogrammed. The audit estimated that up to \$11 million could be reprogrammed from RD&E (\$3.7 million), technical assistance for institutional framework development (\$1 million), institutional development support (\$1.7 million), policy studies (\$300,000) and unobligated funds (\$4.8 million).

### **Management Comments and Our Evaluation**

USAID/Thailand did not agree with our conclusions. However, it did initiate a series of meetings with the RTG Minister of Science, Technology and Energy culminating in late June in a written agreement on a series of principles to strengthen STDB, support and serve private-sector R&D research and development needs, reduce the project's financial pipeline and reduce USAID management burdens. An important principle was the agreement to develop operational and financial plans for the remaining life of the project which, among other things, (1) identify specific programmatic and financial benchmarks for all project elements, (2) provide for increased RTG/STDB funding of project activities beginning in fiscal year 1992 and (3) identify new mechanisms for monitoring project activities by both STDB and USAID/Thailand. In late August, STDB and USAID/Thailand initiated a round of program and related budget and planning sessions which resulted in agreement on underlying program assumptions for budget projections through fiscal year 1994 and detailed budget projections based on these assumptions. Documents reflecting these analyses were then submitted to the STDB Executive Committee. These life-of-project projections are based on STDB achieving permanent legal status, expected by mid-1991. In addition, the USAID/Thailand monitoring system was identified as now including the submission of STDB financial reports, which show actual progress during the year against approved plans, and their analysis by USAID/Thailand for use in USAID's participation in STDB Executive Committee meetings and in internal project implementation reviews.

The USAID proposed course of action is responsive to all portions of the recommendation except the need to reconsider whether funds in excess of project needs have been provided. The financial plan submitted with the USAID comments is based on an assumption that AID-funded expenditures

in fiscal year 1991 will approximate those of the first five years of the project. It also assumes that the RTG will finance expenditures of about \$21 million over the remaining four years of the project, including \$15.5 million during the two-year project extension period, compared to RTG expenditures of \$1.1 million during the first five years of the project. Based on the progress of the project at the time of audit, these assumptions appear to be unrealistic. Accordingly, Recommendation No. 1.1 will remain unresolved pending a USAID review of project financing and approval of a life-of-project financial plan. Recommendation No. 1.2 is resolved and can be closed when an operational life-of-project plan is approved. Recommendation No. 1.3 is resolved and can be closed when evidence is provided that STDB is submitting financial reports that compare actual progress against plans to USAID for analysis--a process that did not exist at the time of audit.

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**Was a monitoring and reporting system established to ensure that A.I.D. regulations were complied with and that A.I.D. funds were properly accounted for?**

Although USAID/Thailand was required to establish a project monitoring and information system, the system did not ensure that commodity procurement for RD&E subprojects complied with A.I.D. regulations on source and origin or that commodities were properly marked. Also, the financial activities of RD&E subprojects were not routinely reviewed to determine that A.I.D. funds were properly accounted for.

#### **USAID/Thailand Needs to Monitor Project Procurements**

A.I.D. guidance states that a project monitoring system will be established. Yet, commodity procurements for RD&E subprojects were not fully monitored. This happened because USAID project officials did not ensure that STDB's project monitoring was adequate to ensure compliance with A.I.D. rules and regulations. As a result, commodity procurements did not always comply with A.I.D. regulations on source and origin and the commodities procured were not properly marked as provided by A.I.D.

**Recommendation No. 2: We recommend that USAID/Thailand:**

- 2.1 develop an end-use review plan to detect noncompliance with source and origin rules and marking requirements and**
- 2.2 recover any unallowable costs, including about \$50,000 in equipment costs and \$4,000 in freight costs identified in this audit as having been paid from AID-provided funds.**

A.I.D. Handbook 3, Chapter 11 requires that a project monitoring system be established to assure that A.I.D. funds are disbursed in accordance with statutory requirements. USAID/Thailand Order No. 430.10 requires the establishment of a project monitoring system that ensures compliance with A.I.D. rules and regulations.

The RD&E project agreement requires commodities to have their source and origin in Thailand and Code 941 countries and be shipped on U.S., Thai, or Code 941 flag carriers. A.I.D. Geographic Code 941 covers any independent country in the free world except the cooperating country and communist and developed countries. STDB provided assistance for RD&E subproject procurements and was able to secure source and origin waivers for some commodities. However, the audit revealed instances of noncompliance with A.I.D. procurement rules and regulations in the 15 RD&E subprojects reviewed. At the time of the audit, these subprojects had expended about \$1.3 million in A.I.D. funds. Among these expenditures was a \$39,000 emulator and logic analyzer with Singapore as its source and the United States as its origin. In addition, a \$6,000 lock-in amplifier had its source as the United States but its origin as Ireland, and a \$6,000 gas analyzer had its source and origin as England. Freight costs of about \$4,000 were also paid to non-eligible carriers. Exhibit 2 describes the ineligible equipment and freight costs that have been identified in this audit.

When an item did not meet A.I.D. source and origin requirements, STDB generally requested a waiver. In one case, the waiver was obtained after the procurement was completed, i.e., the \$6,000 gas analyzer made in England. The equipment was bought in January 1989 and received the following month,

but the waiver was not given until September 1989. Because subproject officials did not always advise suppliers of applicable A.I.D. procurement regulations, about \$54,000 in procured items did not comply with A.I.D. regulations or the project agreement.

A.I.D. Handbook 15, Chapter 10 requires the monitoring of AID-financed commodities to ensure that they are used in the project. Some procured equipment either did not work or was not being used. A \$53,000 furnace at the Thailand Institute of Science, Technology and Research was not being used because it was not calibrated. Subproject officials thought calibration could be performed locally but this had not been accomplished. Also, equipment, valued at about \$18,000, for a subproject at the RTG Ministry of Agriculture and Cooperatives was found to be in its original boxes. The equipment was purchased in late 1989 and early 1990 but was never used. The subproject is scheduled to end in September 1990. In both cases, subproject officials said that the unused items were similar to items already available in their institutions; hence, the subprojects didn't need the new equipment. Because commodity use was not monitored, USAID/Thailand did not know that \$70,000 worth of equipment was not needed in the two subprojects.

The Foreign Assistance Act of 1961, Section 641 requires programs carried out overseas to be identified as "American Aid." A.I.D. Handbook 15, Chapter 9 requires AID-financed commodities to be marked with the AID-handclasp emblem. The project agreements included this requirement, but the RD&E subproject agreements require that STDB-provided commodities be marked STDB. However, all commodities were provided with A.I.D. financing. As a result, the AID-financed commodities were not A.I.D. marked but were marked STDB. Because RD&E agreements did not require A.I.D. marking of commodities, appropriate publicity was not given to the A.I.D. assistance.

The monitoring plan of STDB called for RD&E subprojects to submit semi-annual reports and STDB to review the semi-annual reports and make periodic site visits. However, USAID/Thailand did not ensure that the monitoring plan was adequate to ensure compliance with A.I.D. rules and

regulations. The RD&E subprojects partially complied with the monitoring requirements. In the 15 RD&E subprojects reviewed, as of March 1990, 24 of the 66 required reports were not submitted while nine of the 42 reports received had not been reviewed. In addition, semi-annual reports, STDB reviews and periodic site visits failed to emphasize compliance with A.I.D. rules and regulations regarding source, origin and marking of commodities.

### **Financial Activities of Subprojects Need Review**

A.I.D. regulations require a monitoring system to ensure that A.I.D. funds are properly accounted for and utilized in accordance with agreed to terms and conditions. While A.I.D. funds were spent for project purposes, some funds were not properly utilized or accounted for. In addition, there was no assurance that the expenditures of a host-country contractor were allowable under the terms and conditions of the contract. This happened because USAID/Thailand did not ensure that STDB conducts routine financial reviews of subprojects and host-country contracts.

#### **Recommendation No. 3: We recommend that USAID/Thailand:**

- 3.1 develop a non-Federal audit plan for private-sector research, development and engineering subprojects and host-country contracts and**
- 3.2 ensure that the Science and Technology Development Board has the appropriate staff to conduct financial monitoring of the research, development and engineering subprojects.**

A.I.D. Handbook 3, Chapter 11 requires a monitoring system to ensure that A.I.D. funds are properly accounted for. A.I.D. Handbook 11, Chapter 4, Appendix 4B requires the audit of host-country contracts to determine the allowability, allocability and reasonableness of costs.

While the audit of 15 RD&E subprojects revealed that A.I.D. funds were

spent for subproject purposes, A.I.D. funds of about \$13,000 were used to pay for RTG expenses at two subprojects. Subproject financial reports indicated that these were RTG expenditures instead of A.I.D. expenditures, but STDB did not correct this misuse of A.I.D. funds. As a result, balances of A.I.D. funds were understated. In another subproject, with a budget of \$75,000, no financial reports had been submitted to STDB. Although the project had been ongoing for more than two years and despite repeated STDB reminders, the subproject official (principal investigator) had not reported the financial status of \$47,000 in advances from STDB. As a result, neither STDB nor USAID/Thailand knew what the funds had been used for. However, our audit showed that the principal investigator had kept records of expenditures and our tests did not reveal any misuse of funds.

In September 1989, STDB awarded an \$800,000 host-country contract to a local consulting firm for the implementation of D/RDS. The contract allowed STDB to reimburse costs incurred by the contractor. While financial reports indicate that funds were spent in accordance with the budget, neither A.I.D. nor STDB has assured that the expenditures were allowable in accordance with the terms and conditions of the contract. Although contractor officials stated that a local auditing firm conducts an annual audit of its financial statements, USAID/Thailand had not requested an audit of this contract as prescribed by A.I.D. Handbook 11.

Financial activities of some RD&E subprojects and a host-country contractor have not been reviewed because USAID/Thailand did not require STDB to conduct routine financial reviews. Moreover, STDB did not have adequate staff to conduct financial reviews. At the time of the audit, STDB had one financial reviewer for 65 RD&E subprojects. Therefore, financial reviews were not performed on a periodic basis. Although the RTG's Office of Auditor General conducts annual financial audits, STDB officials stated that the audits cover RTG agency operations and not private-sector RD&E subprojects or host-country contracts. Without routine financial reviews of RD&E subprojects and host-country contracts, A.I.D. does not have adequate assurance that funds are properly accounted for and utilized in accordance with the terms of its agreements.

## Management Comments and Our Evaluation

Responding to Recommendation No. 2, USAID/Thailand indicated that STDB has developed an end-use plan for monitoring USAID-financed procurements. Testing the STDB monitoring actions will be an integral part of a formal USAID/Thailand end-use plan that is being prepared for this project. Also, STDB and USAID/Thailand are investigating the procurement source and origin violations identified in the report. These actions are responsive to Recommendation No. 2.1, which is resolved and can be closed when USAID/Thailand's end-use plan is completed and in operation. Recommendation No. 2.2 is unresolved pending a determination on the items in question.

Responding to Recommendation No. 3, USAID/Thailand agreed to develop a non-Federal audit plan for private-sector RD&E subprojects and host-country contracts. Accordingly, Recommendation No. 3.1 is resolved and can be closed once the audit plan is completed and approved. However, USAID/Thailand did not agree that additional staff were needed at STDB to conduct financial reviews of subproject activities because, in addition to the one analyst conducting field reviews, STDB employed three full-time and one part-time staff in reviewing RD&E financial transactions and STDB planned to hire an internal auditor during 1991. Although the hiring of an internal auditor is a positive step, USAID/Thailand needs to assure itself that two field reviewers are adequate for a planned for 126 RD&E subprojects since the three full-time and one part-time staff referred to in the USAID response had not conducted any field financial reviews at the time of our audit. Accordingly, Recommendation No. 3.2 is unresolved pending the USAID determination and any related actions.

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**Were host-country and private-sector contributions made available for project purposes?**

For the items tested, host-country contributions were made available for project purposes. However, at the annual rate the RTG is providing funds, the total host-country and private-sector contributions may not reach the

agreed to \$14 million by the project completion date. Moreover, because private-sector contributions have not been monitored, the extent that they have been provided is not known.

**USAID/Thailand Needs to Assure  
That Host-Country and Private-Sector  
Contributions Are Provided and Expended**

A.I.D. regulations require the host country to provide at least 25 percent of the total project cost. The planned \$14 million host-country and private-sector contributions may not be reached. Also, the RTG contribution has not been fully expended because the RD&E subprojects have not been awarded as planned and subproject expenses have been less than expected. As a result, only about \$1 million of the \$5 million host-country contribution provided has been expended.

**Recommendation No. 4: We recommend that USAID/Thailand:**

- 4.1 ensure that the Royal Thai Government and private-sector contributions meet the minimum 25 percent requirement,**
- 4.2 revise the project financial plan to speed up the use of host-country and private-sector contributions and**
- 4.3 establish a tracking system for host-country contributions.**

The Foreign Assistance Act of 1961, Section 110 requires the host country to provide at least 25 percent of the total project cost. Host-country and private-sector contributions during the life of this project were to reach \$14 million--mostly cost sharing in RD&E subprojects. Annex 1 to the project agreement identified host-country contributions of \$7.5 million to the RD&E subprojects and private-sector contributions of \$4.5 million to the company-directed RD&E subprojects. In addition, the host country was to provide \$2 million for utilities, travel and support staff salaries for STDB operations. The host-country and private-sector contributions were identified

in the annual implementation and financial plans.

For fiscal years 1986 through 1990, budgeted host-country contributions and actual expenditures (through March 31, 1990) were as follows:

<u>Purpose</u>	<u>Budget</u>	<u>Expenditures</u>
	\$ (in thousands)	
STDB Operations	\$ 562	\$ 339
RD&E (excludes taxes)	3,043	420
Taxes	<u>1,512</u>	<u>159</u>
Totals	<u>\$ 5,117</u>	<u>\$ 918</u>

Although the RTG contribution was made available, the funds were not fully expended because the importation of research equipment was allowed tax free and the planned numbers of RD&E subprojects have not been reached. For instance, of the budgeted \$1.5 million contribution for taxes, about \$160,000 has been expended. While budgeted contributions for RD&E subprojects was \$3 million, actual expenditures totaled only about \$400,000. This occurred because only 65 of the planned 126 RD&E subprojects have been awarded and utilization of RTG funds has been slow. In the 15 RD&E subprojects reviewed, RTG contributions were to range from 5 percent to 43 percent of the subprojects' costs and total about \$500,000. However, actual expenditures ranged from zero to 34 percent. There have been no RTG expenditures in five of the 15 subprojects reviewed. As a result, only \$100,000 of the planned \$500,000 RTG contribution had been expended at the time of the audit. Since the \$900,000 of expenditures covers almost five of the original seven years of project implementation, it is questionable whether the RTG will be able to provide the minimum 25 percent contribution, or \$12 million of the total project cost. Also, the planned private-sector contribution in company-directed RD&E subprojects may not be reached because of STDB's plan to end that activity. Private-sector contributions in the three awarded company-directed subprojects were to be \$200,000. However, because of the

lack of monitoring, project officials did not know whether the \$200,000 was provided.

### **Management Comments and Our Evaluation**

The proposed financial plans for the life of the project provide that RTG contributions will increase substantially beginning in fiscal year 1991 (equal to 42.4 percent of projected total project costs) and that private-sector contributions will increase at a level sufficient to meet project requirements. Also, a system to track host-country contributions is in place which includes (1) financial reports from STDB covering actual contributions from all sources, (2) participation by USAID/Thailand in STDB Executive Committee meeting at which contributions from all sources are reviewed, (3) special attention to host-country contributions at the quarterly project implementation review meeting chaired by the USAID Director, (4) in-depth review of contributions from all sources at the time annual financial plans are developed and (5) active participation in professional exchange events and site visits to RD&E subprojects during which USAID staff will determine whether host-country contributions are made to these activities.

These actions are responsive to all parts of the recommendation, which is resolved. Recommendation No. 4 can be closed when the financial and operational plans encompassing the procedures for the provision and monitoring of host-country and private-sector contributions are completed and approved.

# REPORT ON INTERNAL CONTROLS

We audited USAID/Thailand's Science and Technology for Development Project for the period August 15, 1985, through March 31, 1990, and have issued our report thereon dated December 14, 1990.

We conducted our audit in accordance with generally accepted government auditing standards which require that we plan and perform the audit to fairly, objectively, and reliably answer the objectives of the audit. Those standards also require that we:

- assess the applicable internal controls when necessary to satisfy the audit objectives; and
- report on the controls assessed, the scope of our work, and any significant weaknesses found during the audit.

In planning and performing our audit, we considered A.I.D.'s internal control structure to determine our auditing procedures in order to answer each of the four audit objectives and not to provide assurance on the internal control structure.

The management of A.I.D., including USAID/Thailand, is responsible for establishing and maintaining adequate internal controls. Recognizing the need to re-emphasize the importance of internal controls in the Federal Government, Congress enacted the Federal Manager's Financial Integrity Act (the Integrity Act) in September 1982. This Act, which amends the Accounting and Auditing Act of 1950, makes the heads of executive agencies and other managers as delegated legally responsible for establishing and maintaining adequate internal controls. Also, the General Accounting Office has issued "Standards for Internal Controls in the Federal Government" to be used by agencies in establishing and maintaining such controls.

In response to the Integrity Act, the Office of Management and Budget has issued guidelines for the "Evaluation and Improvement of Reporting on Internal Controls Systems in the Federal Government." According to these guidelines, management is required to assess the expected benefits versus related costs of internal control policies and procedures. The objectives of internal control policies and procedures for federal assistance programs are to provide management with reasonable--but not absolute--assurance that resource use is consistent with laws, regulations, and policies; resources are safeguarded against waste, loss, and misuse; and reliable data is obtained, maintained, and fairly disclosed in reports. Because of inherent limitations in any internal control structure, errors or irregularities may occur and not be detected. Moreover, predicting whether a system will work in the future is risky because (1) changes in conditions may require additional procedures or (2) the effectiveness of the design and operation of policies and procedures may deteriorate.

For purposes of this report, we have classified significant internal control policies and procedures applicable to each of the audit objectives by categories. For each category, we obtained an understanding of the design of relevant policies and procedures and determined whether they have been placed in operation--and we assessed control risk. In doing this work, we found certain problems that we consider reportable under standards established by the Comptroller General of the United States. Reportable conditions are those relating to significant deficiencies in the design or operation of the internal control structure which we become aware of and which, in our judgment, could adversely affect USAID/Thailand's ability to assure that resource use is consistent with laws, regulations, and policies; resources are safeguarded against waste, loss, and misuse; and reliable data is obtained, maintained, and fairly disclosed in reports.

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## **Audit Objectives One and Two**

The first and second audit objectives were to gather and verify information on project progress and the extent that project objective will be realized. The

sources of this information included USAID/Thailand and RTG progress reports, financial reports, the 1989 evaluation report and interviews. In performing this work we considered the relevant internal control policies and procedures of A.I.D. Handbook 3, Chapter 11 and 12 and Handbook 19, Chapter 2. For this objective, we noted two reportable conditions:

- USAID/Thailand did not follow A.I.D. review procedures to ensure that only valid obligations are recorded and that excess funds are reprogrammed and
- USAID/Thailand did not establish a monitoring and reporting system that results in the initiation of corrective actions when project activities are not progressing satisfactorily.

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### **Audit Objectives Three and Four**

These audit objectives relate to USAID/Thailand's project monitoring system. In planning and performing our audit of the project monitoring system, we considered the relevant internal control policies and procedures cited in A.I.D. Handbooks 3, 4 and 15.

We noted the following reportable conditions:

- USAID/Thailand did not review STDB's monitoring plan to ensure that A.I.D. regulations on source and origin and commodity marking requirements were complied with;
- USAID/Thailand did not provide for routine financial reviews of subprojects and host-country contractor financial activities and
- USAID/Thailand did not develop a monitoring plan to ensure that host-country and private-sector contributions were provided and expended for subproject activities.

A material weakness is a reportable condition in which the design or operation of the specified internal control elements does not reduce to a relatively low level the risk that errors or irregularities in amounts that would be material in relation to the financial reports on projects funds being audited may occur and not be detected within a timely period by employees in the normal course of performing their assigned functions.

Our consideration of internal controls would not necessarily disclose all matters that might be reportable conditions and, accordingly, would not necessarily disclose all reportable conditions that are also considered to be material weaknesses as defined above. However, we believe the reportable conditions described under audit objectives numbered two, three and four are material weaknesses.

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# REPORT ON COMPLIANCE

We have audited USAID/Thailand's Science and Technology for Development Project for the period August 15, 1985, through March 31, 1990, and have issued our report thereon dated December 14, 1990.

We conducted our audit in accordance with generally accepted government auditing standards, which require that we plan and perform the audit to fairly, objectively, and reliably answer the audit objectives. Those standards also require that we:

- assess compliance with applicable requirements of laws and regulations when necessary to satisfy the audit objectives (which includes designing the audit to provide reasonable assurance of detecting abuse or illegal acts that could significantly affect the audit objectives) and
- report all significant instances of noncompliance and abuse and all indications or instances of illegal acts that could result in criminal prosecution that were found during or in connection with the audit.

Noncompliance is a failure to follow requirements, or a violation of prohibitions, contained in statutes, regulations, contracts, grants and binding policies and procedures governing entity conduct. Noncompliance constitutes an illegal act when the source of the requirement not followed or prohibition violated is a statute or implementing regulation. Noncompliance with internal control policies and procedures in the A.I.D. Handbooks generally does not fit into this definition and is included in our report on internal controls. Abuse is furnishing excessive services to beneficiaries or performing what may be considered improper practices, which do not involve compliance with laws and regulations.

Compliance with laws, regulations, contracts and grants applicable to the project is the overall responsibility of USAID/Thailand's management. As part of fairly, objectively, and reliably answering the audit objectives, we performed tests of USAID/Thailand, Royal Thai Government, contractor and grantee compliance with certain provisions of Federal laws and regulations, contracts and grants. However, our objective was not to provide an opinion on overall compliance with such provisions.

The results of our tests of compliance disclosed the following instances of noncompliance:

- some commodities procured under RD&E subprojects did not comply with A.I.D. Geographic Code 941 requirements on source and origin and shipping as required by the project agreements and
- AID-funded commodities were not marked as being provided by the United States Government as required by Section 641 of the Foreign Assistance Act of 1961.

Except as described, the results of our tests of compliance indicate that, with respect to the items tested, USAID/Thailand, the RTG, contractors and grantees complied, in all significant respects, with the provisions referred to in the fourth paragraph of this report. With respect to items not tested, nothing came to our attention that caused us to believe that USAID/Thailand, the RTG, contractors and grantees had not complied, in all significant respects, with those provisions.

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EXHIBIT 1

Comparison of End-of-Project Expectations for  
Project Purpose with Its Status at the Time of Audit

EXPECTED RESULTS

STATUS

Improved capacities of RD&E institutions in priority technical areas.

Undeterminable without baseline data, but the project has initiated 65 subprojects with 12 institutions.

Increased number and improved quality of RD&E researchers, faculty and students in key public and private institutions, industries and universities.

Undeterminable without baseline data, but the fellowship program has awarded 189 graduate studies and RD&E researchers from 12 institutions have participated in the project.

Problem focused and demand driven RD&E activities.

RD&E subprojects were demand driven and problem focused.

Formed meaningful working relationships between the private and public sectors, both domestic and foreign, and between local universities, government agencies and private sector entities.

The project has formed working groups with six industries in the private sector. In addition, public and private sector participation has been achieved in RD&E studies.

In place institutional and financial mechanisms for the private and public sectors to collaborate in RD&E activities.

Project-funded RD&E subprojects provide for institutional and financial mechanisms.

Increased private sector industries/companies use and application of RD&E.

Measurable and documentable investment in RD&E-based industries.

Increased private sector industry and RD&E institutions capacity to correctly diagnose technical problems and identify the appropriate technology to address given problems.

Efficiently operating standards, testing, and quality control activities with reduced turn-around time and enhanced utility.

Improved policy framework for the enhancement of RD&E activities and enterprises.

Demonstrable resolution of specific problems addressed by RD&E.

No evidence of increased application of RD&E in private sector industries/companies.

Undeterminable without baseline data.

No evidence of increased capacity to correctly diagnose problems and identify appropriate technology in private industries.

Undeterminable. This is an end-of-project goal. In addition, key project activities have just started, but workshops, technical assistance and working groups have been initiated.

The project has done four policy studies but their impact is unknown. However, by 1991 permanent legal status may be achieved by STDB, which has undertaken conferences, workshops, and professional exchanges.

All RD&E subprojects are still ongoing.

**Commodities and Shipping from  
Questionable Sources and Origins**

<u>Subproject No.</u>	<u>Type of Commodity</u>	<u>Source</u>	<u>Origin</u>	<u>Carrier</u>	<u>Questioned Cost</u>	
DSN-87A-3-08-083	Emulator and logic analyzer	Singapore	U.S.	Thai International	\$38,550	<u>1/</u>
DSN-87A-1-06-085	Micromanipulator	U.S.	U.S.	Japan Airlines	100	<u>2/</u>
DSN-87A-1-05-098	Potentiometer Viscograph	U.S.	U.S.	Lufthansa	209	<u>2/</u>
		F.R.G.*	F.R.G.*	Lufthansa	655	<u>2/</u>
DSN-87B-2-05-105	Torque rheometer	U.S.	U.S.	Japan Airlines	1,104	<u>2/</u>
DSN-88B-2-02-133	Low voltage measurement package	U.S.	U.S.	Japan Airlines	193	<u>2/</u>
	Lock-in amplifier	U.S.	Ireland	KLM	6,313	<u>1&amp;2/</u>
	Temperature controller	U.S.	U.S.	Japan Airlines	54	<u>2/</u>
CPT-87A-1-05-006	High speed digital centrifuge	U.K.*	U.K.*	Ming Energy (Rep. of China)	220	<u>2/</u>
	Incubator	F.R.G.*	F.R.G.*	Kuwait Airways	247	<u>2/</u>

\* with A.I.D. procurement waiver

1/ Commodity

2/ Freight

<u>Subproject No.</u>	<u>Type of Commodity</u>	<u>Source</u>	<u>Origin</u>	<u>Carrier</u>	<u>Questioned Cost</u>
CPT-87A-2-07-016	Microscope and accessories	U.S.	U.S.	China Airlines	254 <u>2/</u>
	Sight hearth assembly	U.S.	U.S.	Air France	60 <u>2/</u>
CPT-87A-2-06-021	Gas analyzer	Thailand	U.K.	Not indicated	<u>5,882</u> <u>1/</u>
				Total	<u>\$53,841</u>

\* with A.I.D. procurement waiver

1/ Commodity

2/ Freight

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# SCOPE AND METHODOLOGY

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## Scope

We audited USAID/Thailand's Science and Technology for Development Project in accordance with generally accepted government auditing standards. We conducted the audit from May through July 1990, and covered disbursements of about \$1.3 million, or about 16 percent of total A.I.D. expenditures through March 31, 1990. We conducted our field work in the offices of USAID/Thailand, the Royal Thai Government, a host-country contractor and six RTG institutions participating in research, development and engineering (RD&E) studies. We selected and reviewed 15 of the 65 RD&E subprojects. The 15 RD&E subprojects represented 25 percent of the A.I.D. commitments for RD&E activities through March 31, 1990.

## Methodology

The methodology for each audit objective follows.

### Audit Objectives One and Two

To accomplish the first and second objectives, we reviewed the project paper, activity implementation plans, progress reports of USAID/Thailand and the technical assistance contractor, the 1989 project evaluation report, the annual implementation and financial plans, Science and Technology Development Board (STDB) quarterly reports to the Executive Committee, and the Executive Committee's minutes of meetings. To give us an update on project progress, we held discussions with project officials from USAID/Thailand, the RTG and the host-country contractor.



### Audit Objectives Three and Four

To accomplish the third and fourth audit objectives, we determined whether (1) a monitoring system was established, (2) the monitoring system was adequate to ensure proper accounting of funds and compliance with A.I.D. rules and regulations and (3) host-country and private-sector contributions were made available. To accomplish these purposes, we reviewed the project paper and STDB and USAID/Thailand monitoring plans. We also analyzed the monitoring reports from the subprojects and STDB. To determine whether the funds were properly accounted for and contributions were made available, we verified the subprojects' financial reports to accounting records. We also analyzed STDB financial reports on host-country contributions. We reviewed commodity procurements costing over \$5,000 and conducted a physical inventory of AID-financed equipment to determine compliance with A.I.D rules and regulations.

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U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT  
USAID/THAILAND

APPENDIX II

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October 30, 1990

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Bangkok 10400 Thailand.

MEMORANDUM

To: Mr. Williams C. Montoney  
Regional Inspector General  
Manila

From: Thomas H. Reese, III  
Director, USAID/Thailand  
Bangkok

Subject: Draft Report: Audit of Science and Technology for  
Development Project No. 493-0340

As requested in your memorandum of September 17, 1990 following are our comments on the subject draft report.

In general, we find the audit report helpful in identifying the accomplishments as well as the problems encountered in creating and staffing the Science and Technology for Development Board (STDB), and in initiating the activities and programs of that office. The following comments are directed at clarifying findings contained in the report, correcting some of the information we believe has been misinterpreted and providing additional information which we believe should be contained in the report.

Title Page

The caption on the title page of the report inaccurately states that the project is behind schedule because "...USAID/Thailand did not effectively monitor the project or take actions as conditions for project implementation changed." It is true that the project is behind its original schedule, but this delay is due to circumstances clearly beyond the control or responsibility of USAID/Thailand. To the contrary, USAID/Thailand's strong and effective monitoring actions have played a major role in overcoming the problems encountered in establishing STDB and in mounting its varied programs.

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- As one example, delays were encountered in meeting the Conditions Precedent under the project (i.e., reaching agreement on the legal status and locus for STDB operations, establishing the STDB Executive Committee, hiring a Director); it was only after major work by USAID staff and with the personal intervention by the U.S Ambassador that the Deputy Prime Minister moved in and led efforts to establish and organize the institutional framework of STDB.
- There are numerous additional examples of monitoring actions undertaken by the USAID/Thailand staff. In fact, one criticism made by an outside management assessment team in February 1989 was that USAID/Thailand was too much involved in monitoring and "micro-managing" the project.

#### Page 4, Background

In the penultimate sentence of the paragraph at the top of this page, delete the word "local" from the types of consultants recruited and selected by the STDB technical assistance contractor. Both local and expatriate consultants are provided through this technical assistance contract.

#### Page 6, Report of Audit Findings

It is accurately stated that at the time of the audit work, USAID/Thailand was considering deobligating \$4 million to \$5 million of the obligated loan funds. However, it was an integral part of these considerations that a similar amount of funds would later be obligated (using future year grant funds) under the project, to be programmed for project activities which were significantly and effectively meeting project objectives.

USAID/Thailand did not contemplate that the remaining \$4.8 million of grant funds authorized would not be obligated. To the contrary, revised Life-of-Project estimates and plans have consistently and clearly called for obligating these funds as they are required. It has always been USAID/Thailand's plan to provide the full amount authorized under the project.

We are unable to identify how the auditors calculated the \$11 million which they claim can be reprogrammed. As indicated later in our comments, STDB and USAID/Thailand have completed a joint analysis of life-of-project requirements, based on which funds have been reallocated among the different project elements. These revised allocations of both grant and loan funds have recently been submitted to the RTG in Project Implementation Letters (PILs).

### Page 7, Planned Completion Date

The Project Assistance Completion Date (PACD) has now been extended two years, to September 30, 1994.

### Pages 8 and 9, Table Showing the Status of Expected Project Results

There clearly is "evidence of increased application of RD&E in private sector industries/companies.":

Each proposal for an RD&E award must not only pass rigorous screening for scientific and technical merit, but must also be approved by panels of end users comprising industrialists and business people from firms which are likely to commercialize the process or product to be developed. No RD&E proposal can be submitted to the STDB Executive Committee without first passing this acid test of market relevance. Similarly, the Company-Directed RD&E loan and grant awards are submitted directly by firms themselves to obtain STDB assistance in solving their research, development or engineering requirements. Recent awards include support for research on shrimp feed production, CAD-CAM/CIM production controls, raw material production for agar and agarose, tissue culture for commercial exports, diagnostics reagent development, biosensors for food processing, and other RD&E solutions for immediate commercial application.

Similarly, there is "evidence of increased capacity to correctly diagnose problems and identify appropriate technology in private industries.":

The STDB STAMP program, for example, has concluded agreements with Thai firms to assist in the transfer of U.S. technology for ultra high temperature milk processing, pharmaceutical grade aluminum hydroxide production, repair and manufacture of electromechanical load sensing devices, upgrading of injectable pharmaceutical manufacturing process to meet international standards, and other applications of appropriate diagnostic and technological assessments to meet the needs of the commercial sector. Indeed, the demand for these services has exceeded STDB's expectations.

Achieving the objective of an "Improved policy framework for the enhancement of RD&E activities and enterprises" has resulted not only through formal policy studies financed under this project. The extensive analytical work conducted by STDB, which resulted

in the drafting and Cabinet approval of legislation for permanent STDB status, is clear evidence of real progress towards this objective. Also, STDB has had discussions with the RTG Board of Investments which resulted in specific incentives for technology-based investments. In fact, one company has applied for and received incentives for establishing an R&D lab in Thailand. Other major efforts directed at meeting this objective have been undertaken by STDB: conferences, workshops, other professional exchange events, and the STDB semi-annual reviews of RD&E subproject accomplishments and issues.

- Other USAID-supported activities have also contributed to these efforts, i.e., three studies financed under the EPD II Project to assist the NESDB in preparing the RTG's Seventh Five Year Development Plan: "Barriers To and Strategies for Technology Acquisition", "Identification of Key Technologies for Industrial Development", and "Management of the R&D System to Support Industrial Development".

Page 10, USAID/Thailand Needs to Reduce the Scope of the Project to Enhance Its Outputs

As noted above, we can not agree that project activities have not progressed "because USAID/Thailand did not effectively monitor the project or take corrective actions as conditions for project implementation changed." Information in the USAID files clearly shows that USAID monitoring activities throughout the life of the project have resulted in real and effective actions taken to move with the dynamic, rapidly changing science and technology environment in Thailand. We believe that evidence provided throughout this Memorandum support our conclusion that USAID/Thailand has effectively monitored the project.

Pages 10 and 11, Recommendation No. 1

We believe that recent actions undertaken jointly by STDB and USAID/Thailand fully respond to all three parts of this Recommendation:

- a series of meetings with the Minister of Science, Technology and Energy culminated in late June in a written agreement on a series of principles to strengthen STDB, support and serve private sector R&D needs, reduce the project's financial pipeline, and reduce DTEC and USAID management burdens.
- an important principle was the agreement to develop operational and financial plans for the remaining life of the project which (a) identify specific programmatic

and financial benchmarks for all project elements, (b) reallocate USAID grant and loan funding to provide enhanced support to private sector needs, (c) identify any appropriate opportunities for shifting of loan funds to grant funds, (c) identify new mechanisms for monitoring of project activities by both STDB and USAID, and (d) provide for increased RTG/STDB funding of project activities beginning in Fiscal Year 1992.

- in late August, STDB and USAID initiated a round of program and related budget planning sessions which resulted in agreement on (a) underlying program assumptions for budget projections through Fiscal Year 1994, and (b) detailed budget projections based on these assumptions. Documents reflecting these analyses were then submitted to the STDB Executive Committee.
  - A copy of summary documents submitted to the Executive Committee are attached to this Memorandum. Detailed back-up data is available in USAID/Thailand project files. These documents are to be discussed at the STDB Executive Committee meeting on October 26, 1990.
  - It should be noted that the extended Life-of-Project projections, both programmatic and budgetary, are based on STDB achieving permanent legal status. Passage of this legislation by the Thai Parliament is now expected by mid-year 1991.

the USAID/Thailand monitoring system is composed of several elements:

- review and approval of Annual Implementation and Financial Plans, in conjunction with STDB, its Executive Committee, and the other organizations which provide funds to the project. This review includes analysis of prior year plans versus actual performance.
- submission of financial reports by STDB to USAID, showing actual progress during the year against approved plans. These reports are carefully analyzed and become an input to USAID's participation in Executive Committee meetings and to the internal USAID Project Implementation Reviews (PIRs).
- active participation in STDB Executive Committee meetings (which are currently being held each month) during which monitoring of actual progress versus approved plans have been and will continue

to be a special concern.

- quarterly USAID/Thailand Project Implementation Reviews, and annual reporting to AID/W on both programmatic and financial progress.
- participation in workshops and other professional exchange events, and in RD&E subproject site visits conducted by STDB.

Pages 11, 12 and 13, Delays in Project Implementation

In addition to the above comments on our project monitoring system, following are several special notes related to the second paragraph on page 11 and the table on pages 12 and 13:

- USAID/Thailand has since the beginning of the project periodically and regularly compared planned activities against actual results. For instance, our concerns regarding delays in implementation (comparisons of planned versus actual activities) have consistently been a major focus of our quarterly PIR reviews.
- the delay in implementing Company-Directed RD&E activities was not solely due to the collateral problem, nor was the USAID remiss in identifying and following up on that problem. Problems were also encountered in getting the banks' agreement to manage the program and to provide additional funding; reaching agreement on the funding mix, including RTG as well as USAID loan (and later, grant) funds; and obtaining agreement by the Executive Committee on procedures to be followed in the start-up of the program.

It should also be noted that the grant-funded Company-Directed program is a companion to, not a substitute for, the loan-funded activities.

- problems encountered in mounting the TIAC program were not due as much to erroneous project design (the design was appropriate at that time) but due to the astounding advances in information technology since the project was designed. It is important to give credence to this phenomenal increase in technology over the past five years.
- we suspect that "USAID/Thailand project officials" misunderstood the question, or their answers were misunderstood, concerning their monitoring of project activities. We suggest that the first full sentence on page 12 be changed to read "USAID/Thailand project officials said that project monitoring was primarily

the responsibility of STDB."

- we suggest that the first output on the top of page 13 be changed to read "Strengthen analytical capacity..." rather than "Satisfy analytical capacity...". Also, although planned outputs may not have been quantified, there in fact has been substantial strengthening of analytical capacity at TDRI and NESDB - as well as at the STDB itself - through training of staffs, professional exchanges, and technical assistance.
- we also believe the "shorthand" definition under Output Category 4.A. should be changed to "STQC improved, testing turn-around time shortened". Again, we believe that substantial progress has been made in this area as evidenced by the number of public/private sector groups (committees) set up and functioning as brainstorming and problem identifying/solving fora.

Thai business associations have participated actively with STDB in the STQC program. Thai manufacturers of latex rubber products and Thai producers of low-acid canned foods, for example, have formed working groups to benefit from the training and technical assistance offered under STQC, largely through appropriate U.S. firms and government agencies.

- finally, it should be noted that, although establishment of the Diagnostic/Research Design Service was initially contracted with Chula Unisearch, the decision was recently taken by STDB to bring this function back into the STDB organization. Revised plans for enhancing the D/RDS function are now being developed.

#### Page 14, Strengthen the Existing Institutional Framework

Information included in this paragraph is essentially correct. However, we believe that more up-to-date statistics on the STDB staff indicates a very positive trend:

- Only 8 of the STDB professional staff members on board as of September 5, 1990 were on temporary assignments from RTG agencies.

of the 11 vacancies in the professional staff positions at the time of the audit, 6 have now been filled. It is especially significant that all positions in the RD&E Support Office are now filled.

Page 14, Review of S&T Policy and Practice

We suggest that the final sentence of the first paragraph of this section be changed to "Further, STDB officials refused to accept the results of the baseline study because they believed it left many questions unanswered. STDB has requested that the contractor provide additional information."

We also suggest that the fifth, sixth and seventh sentences of the second paragraph of this section be changed to more accurately state the circumstances concerning the consulting contract: "For instance, a Thai consulting firm bid for and was awarded one of the studies but later STDB rejected the award because of the lack of qualified staff. As a result, STDB had to negotiate with the second bidder. Over a year after selecting the second bidder, work had not started because the contractor had to wait for staff to be freed from other jobs."

Page 15, RD&E Activities

We agree that difficulties were encountered in initiating the Company-Directed program. However, two additional Company-Directed loan subprojects have been awarded since the audit work was performed. We therefore suggest that the final two sentences of the second paragraph of this section be changed to read "STDB officials anticipate that company-directed subprojects will continue to be difficult to market because of a stringent policy of Thai financial institutions requiring real estate as collateral. At the time of our audit, STDB was also planning a company-directed grant program as a companion to the loan program."

The average A.I.D. contribution for company-directed subprojects, as stated in the final paragraph on page 15 is correct, but does not take into consideration that the total value of these subprojects is \$200,000 due to the additional funds provided by the managing banks. It is noted that additional USAID grant funding is also provided for international collaboration costs of Designated and Competitive subprojects - but these costs are not included in the average value quoted in the audit report.

It is important to note, however, that all authorized loan and grant funds are expected to be fully utilized for project activities. As described below, an extensive analysis of life-of-project requirements has recently been completed by USAID/Thailand and STDB. This analysis, while recognizing the need to reprogram funds among project elements (as provided for in the loan and grant agreements), estimates that all A.I.D. funds authorized in the loan and grant agreements will be expended over the life of the project.

Regarding the second full sentence at the top of page 16, it is again noted that all STDB positions in the RD&E Support Office are now filled. Existing staff is capable of monitoring any increased numbers of RD&E subprojects. It should also be noted that the two-year extension of the project will further enable the STDB staff to manage any increase in the total number of subprojects.

The STAMP program (in the second full paragraph on page 16, please change the title of this program to "Support for Technology Assessment and Mastery Program") did get off to a slow start. However, four STAMP programs were signed in Fiscal Year 1990, with an additional five under consideration for Fiscal Year 1991. The pessimism concerning this program, referred to in this paragraph, is definitely not shared by the management of STDB nor by USAID/Thailand.

Pages 16 and 17, Standards, Testing and Quality Control (STQC)

Recognizing that detailed annual implementation and financial plans were prepared, approved and implemented for the STQC program, we suggest that the first sentence of this section should refer to the delay in approval of a detailed life-of-project implementation plan.

The penultimate sentence of this paragraph incorrectly states that the officials are still in English-language training because of a four-year delay in approval of the STQC implementation plan. It is true that some of the selected officials have had difficulty in meeting the English language requirements and therefore were still undergoing language training at the time the audit work was performed - however, the delay in the U.S. training program was caused by this difficulty with English language, not by a delay in approval of the STQC implementation plan.

Pages 17 and 18, Technical Information Access Center (TIAC)

As noted above the phenomenal, rapid changes in information technology throughout the world - including Thailand - since the design of the project has resulted in substantial re-design of this element. The reassessment recommended by the technical assistance contractor, as noted in this section, has been completed. Although much of the computer equipment will still be required, the technology and equipment needed to access and disseminate the needed information is being changed in accordance with the contractor's recommendations.

Page 18, Diagnostic/Research Design Service (D/RDS)

As noted above, STDB with the concurrence of its Executive Committee, has subsequently cancelled the D/RDS contract with Chula Unisearch. This element of the project is currently undergoing substantial re-thinking, with revised plans to be submitted to the STDB Executive Committee in the near future.

Page 19, Project Monitoring

We must strongly disagree with the audit conclusions, as stated at the top of page 19, that USAID/Thailand (a) did not establish a project monitoring system, and (b) that financial activities of RD&E subprojects were not reviewed.

We request that these conclusions be changed to more accurately reflect USAID/Thailand and STDB monitoring activities:

- STDB financial and administrative handbooks containing detailed operational procedures (including monitoring activities) were developed jointly by STDB and USAID/Thailand. These operational procedures have been reviewed periodically by both STDB and USAID/Thailand, and the Handbooks have been updated to reflect actual practices. Copies of the latest revisions to these handbooks were provided to the auditors, at their request.
- Specific and detailed operating policies and procedures for each of the discrete STDB program activities (i.e., RD&E, STAMP, TIAC, fellowship programs, professional exchange events) have been developed, approved by the STDB Executive Committee, and reviewed and formally approved by USAID/Thailand through Project Implementation Letters (PILs). USAID/Thailand periodically reviews actual STDB practices to ensure compliance with these approved procedures.
- USAID/Thailand participates actively in all meetings of the STDB Executive Committee. Minutes of these meetings reveal the extent to which operating policies and procedures are monitored by that Committee.
- USAID/Thailand staff members accompany STDB officials on site visits to monitor project activities. Clear evidence of these site visits exist in USAID/Thailand files.
- USAID-financed contractors have visited RD&E subproject organizations to review financial procedures and practices. Their reviews have resulted in some changes

to STDB procedures.

- As noted above, detailed annual implementation and financial plans are approved by the STDB Executive Committee (with participation by USAID/Thailand); and are then submitted for comprehensive analysis and approval by the Ministry of Finance, DTEC and USAID/Thailand. This involves a lengthy, detailed analysis of all program activities and funding proposed from all sources. Copies of these plans and correspondence relating to their review and approval by USAID/Thailand are in the project files and were made available to the auditors.

#### Page 19, Monitoring of Project Procurements

The STDB system for monitoring procurements has been strengthened regarding source and origin rules. This system consists of five components: (1) in Budget Committee meetings held with a proposing organization before any subproject is approved, (2) strict regulations set forth in each RD&E agreement, (3) Thai language handbooks on source and origin requirements are provided to not only individual investigators but also to deans, faculty heads and other administrators, (4) periodic reminders via telephone and letter, and (5) site visits. It should also be noted that a total of 345 pieces of equipment have been financed under the RD&E subprojects and that with very few exceptions, A.I.D. source and origin rules have been complied with. We suggest that the sentence preceding Recommendation 2 be changed to read "As a result, commodity procurements did not always comply with A.I.D. regulations on source and origin ...".

#### Page 19, Recommendation No. 2

STDB has developed an end-use plan for monitoring USAID-financed procurements. Testing the STDB monitoring actions will be an integral part of a formal USAID/Thailand end-use plan for the project, which is now being prepared.

STDB and USAID/Thailand are also investigating each of the alleged source and origin violations listed in Exhibit I of the draft audit report.

#### Pages 20 and 21, Utilization of AID-financed Commodities

Following is additional information relating to the two instances of non-utilization of equipment identified by the auditors:

- Regarding the furnace financed for the Thailand

Institute of Science, Technology and Research (TISTR), an analysis conducted by STDB revealed that it was not being used at the time of the auditors' visit because (a) the furnace had not been properly calibrated and (b) as a result, the furnace core melted when it was put into operation. Subsequently, STDB assisted TISTR in getting the furnace fixed. It is now functioning. TISTR also states that the furnace is needed for subproject work.

- The equipment for the RTG Ministry of Agriculture and Cooperatives (Department of Fisheries) had only recently been received and the required RTG inspection completed at the time of the auditors' visit. It should also be noted that the subproject in question (Agreement No. DSN88A-1-14-128) will end in September 1991, not September 1990 as stated in the audit report (this is the original completion date, which has not been extended). Department of Fisheries officials also state that the auditors must have misunderstood them, since they never stated that the equipment was not needed. It is needed and is in use.

#### Page 21, Compliance with A.I.D. Marking and Other Requirements

The second sentence of the first full paragraph on this page incorrectly states that "RD&E project agreements require that the commodities be marked STDB." These agreements do not include such a requirement.

Absence of the A.I.D. emblem on project commodities financed by A.I.D. apparently resulted from a misinterpretation by project staff of Handbook 15 provisions that emblems are not required for locally-purchased items. A.I.D. emblems will be supplied to STDB, and during site visits will be placed on equipment not appropriately marked as required by the Foreign Assistance Act. STDB will ensure that these requirements will be met for future transactions.

The final sentence of the second full paragraph does not accurately reflect that STDB strongly emphasizes compliance with A.I.D. rules and regulations at each stage in its review, approval and implementation of RD&E subprojects. The STDB monitoring system is described above in our comments on its monitoring of project procurements.

#### Pages 21, 22 and 23, Financial Review of Subproject Activities

The introductory paragraph to this section contains two statements which we consider to be inaccurate:

- "...there was no assurance that the expenditures of a host-country contractor were allowable under the terms and conditions of the contract."

On the contrary, STDB received receipts and conducted a 100% pre-audit of each and every expenditure claimed for reimbursement by the D/RDS contractor. STDB files contain these receipts.

- "USAID/Thailand did not ensure that STDB conducted routine financial reviews of subprojects and host-country contracts."

STDB conducts routine financial reviews of subprojects and host country contracts, both at the STDB offices as well as through site visits to the organizations. USAID/Thailand has ensured that both types of reviews are conducted - and in many cases, accompanies the STDB reviewers on their site visits (reports of findings during these site visits are in USAID project files).

The audit report refers to two subprojects where A.I.D. funds were used to pay for RTG expenses, and states that STDB did not correct this misuse of A.I.D. funds. We believe it is important to note that in these two cases, A.I.D. funds were initially used to pay for expenses budgeted for RTG funding - but were subsequently refunded to the A.I.D. account after RTG funds were obtained. Secondly, STDB became aware of this problem, brought it to the attention of the organizations involved, and have subsequently ensured that A.I.D. funds were returned.

- This illustrates one of the difficult operational problems encountered by STDB in managing funds received from four sources. For RD&E subprojects, RTG funds are in a special budget category under which RTG Ministry of Finance regulations do not allow advances - expenditures must first be made using funds from other sources, after which reimbursement is claimed by the RD&E organizations. This causes obvious problems when a Principle Investigator has no other sources of funds other than RTG or A.I.D. However, subproject agreements stipulate that USAID funds may not be temporarily used for this purpose, and neither USAID nor STDB will allow such a practice. STDB is currently working on a Cabinet resolution to allow advances of RTG funds to be made by the Ministry of Finance.

As stated above, all expenditures under the host-country contract for implementing the D/RDS contract were subjected to a 100% pre-audit by STDB. We therefore request that the final paragraph on page 22 (continued on page 23) be deleted from the audit report.

We also request that the first full paragraph on page 23 be

revised to reflect our earlier comments on STDB financial reviews of RD&E subprojects. It is also important that other misunderstandings reflected in this paragraph be corrected:

- At the time of the audit work, STDB had only one analyst who conducted field financial reviews of RD&E subprojects. However, a total of three persons in the STDB Office of Finance were at that time working full time, plus one person was working half-time, in reviewing RD&E subproject financial transactions. It is also noted that the STDB Financial Plan for Fiscal Year 1991 includes funds for an Internal Auditor who will be responsible for monitoring all STDB programs involving releases of funds to other organizations.
- There apparently was a misunderstanding concerning the extent of audit responsibility of the RTG Office of Auditor General (OAG). Although the OAG staff which audits the STDB financial transactions is responsible only for STDB's operations, other OAG auditors are responsible for auditing activities of other organizations, including USAID-funded transactions under their STDB subproject agreements (as with U.S. Government audit responsibilities, separate auditor groups are assigned to educational institutions, different RTG ministries, etc.). It is important to note that the OAG is responsible for auditing all project expenditures of all public organizations involved in the project.

Since this paragraph concerns only loan-funded activities, reference to DTEC financial audits is not applicable. However, it is correct that DTEC conducts annual audits of all grant-funded activities.

#### Page 22, Recommendation No. 3

Based on the additional information provided above, we believe that a non-Federal audit plan is not needed for RD&E subprojects and host country contracts involving public sector organizations. However, we agree to develop a plan for activities where funds are provided to private sector organizations.

We believe that actions have been taken to ensure that STDB has the appropriate staff to monitor the RD&E subprojects. We suggest that Recommendation 3.2 therefore be closed.

#### Page 23, Monitoring Private Sector Contributions

It is not correct that private-sector contributions can not be

determined:

- for both the STAMP and Company-Directed grant programs, private sector organizations must first expend their funds, and present evidence to STDB of these expenditures before any USAID funds are disbursed.
- for loan-funded Company-Directed subprojects, STDB has assurance that the managing banks provide their contributions, since those banks advance funds after the loans have been approved, prior to the release of RTG and USAID funds. STDB has also prepared a monitoring plan for these subprojects which involves (a) regular, periodic reviews of expenditure reports of all private-sector contributions and (b) site visits to monitor overall progress of the subprojects including the timely provision of the companies' contributions.

Page 24, Recommendation No. 4

The attachment to this Memorandum includes specific information on projected life-of-project contributions from the RTG and the private sector, and is an integral part of the principles agreed to by the Minister of Science, Technology and Energy. Total RTG contributions (RTG Budget plus DTEC Counterpart but excluding RTG Customs Duties and Taxes, which are not considered project contributions) over the extended life of the project are now projected at \$29.2 million, equal to 42.4 percent of the projected total project costs. Private sector contributions are projected at \$4.3 million, or 6.2 percent of the total project costs.

- As noted earlier, these revised Life-of-Project estimated RTG contributions are based on the STDB achieving permanent legal status, now expected to be acted upon by the Thai Parliament in mid-1991.

The attached revised project financial plan also provides that RTG contributions (both commitments and expenditures) will increase substantially beginning in Fiscal Year 1991. Private sector contributions are estimated to increase at a level sufficient to meet the percentage required by the Company-Directed RD&E program.

As also stated above, a system is in place to track host-country contributions. This involves (a) financial reports from STDB which include actual contributions from all sources, (b) active participation by USAID/Thailand in STDB Executive Committee meetings at which contributions from all sources are reviewed, (c) special attention to host-country contributions at the quarterly PIR meetings chaired by the USAID Director, (d) in-

depth reviews of contributions from all sources at the time annual financial plans are developed, and (e) active participation in professional exchange events and site visits to RD&E subprojects during which USAID staff determines that host-country contributions are made to these activities.

We suggest that the above actions, already in place, are sufficient to allow all three parts of Recommendation No.4 be closed upon issuance of the audit report.

We also suggest that comments on page 25 concerning RTG expenditures be changed to reflect the recently revised Life-of-Project financial plan, as shown on the attachment. It should be noted that the revised financial plan provides that all Designated and Competitive RD&E subprojects approved after Fiscal Year 1991 will be fully financed by the RTG.

#### Pages 28, Report on Internal Controls

We request that the "reportable conditions" be changed to reflect comments contained throughout this memorandum.

The "reportable condition" that "USAID/Thailand did not follow A.I.D. review procedures to ensure that only valid obligations are recorded..." is different from findings reported in other sections of the draft audit report. As indicated above in our comments on page 15 of the audit report, there were no invalid obligations recorded by USAID/Thailand; to the contrary, the recently completed life-of-project financial plan projects the full use of all authorized A.I.D. funds, including funds not yet obligated - as well as projections of significantly increased RTG contributions.

Executive Report of STDB Responses to Future Operational  
Needs and New Directions As Required by Evolving  
Thai - U.S. Relations on Science & Technology Development  
and Application in Thailand

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Preamble: The initial Science & Technology for Development project, which created the Science & Technology Development Board of Thailand (STDB) as the operating and Executive instrument for its management and execution over a 7-year period, has recently been extended by 2-years with a new PACD of September 1994. The 2-year extension has been based on a mutually acceptable set of 4 general principles of change and new efforts that concern (A) Strengthening STDB; (B) Supporting and Serving the Private Sectors; (C) Reducing the Project's Financial Pipeline; and (D) Reducing DTEC and USAID Management Burdens. These changes in emphasis and the addition of "new directions" have been formally incorporated in a broader set of principles that define the interests of the Royal Thai Government and the Government of the United States of America for "Advancing Mutual Interests in a Rapidly Changing International Environment". This Government - to - Government MOU was signed by the Minister of the Prime Minister's office of the RTG and by the AID Administrator of the United States on July 12, 1990. A new round of program planning and associated budgetary estimates have been initiated by the STDB along with informal consultation with USAID to produce a summary of current program status and anticipated changes that would be responsive, in a phased fashion, to the new principles of operations and the new directions outlined in the recently executed MOU of July 12, 1990. The attached budgetary projections are reasonably in line with the new principles and the new directions and serve to define the operational changes and funding obligations of USAID and the RTG during the transitional phase of 1992-1994.

Underlying Program Assumptions for Budget Projections through 1994  
Including the Transitional Extension Period of 1992-1994;

1. RD&E program of STDB: the process for the development and funding of RD&E grants through the screening and review process of TRP, TAC, Budget Committee, EC and final contract negotiations has matured to a point of being able to efficiently process some 30-40 research grants per year in the strategic technical areas of Biotechnology, Materials Technology, Electronics and Computer Technology. For budgetary purposes a norm of 36 research grants (3/month) is assumed with a possible spread of 2-5 grants/month from experience with the variability of work-loads in the Universities and private sector. The process of development has become flexible and to some degree sophisticated with the addition of frequent use of end-user panels, site visits, and Project Design workshops in selected technical industrial areas. Also, the University base of scientific experience and competence has grown where the IDIS concept for the creation of University - Private Sector Institutes is now coming into focus as a natural rather than forced need and capability. The RD&E program of STDB can add to these efforts an element of initial support for R&D and other elements of STDB can add business development analysis support for market survey, legal guidance, and a review of financial options for support of continued operations.

It is assumed that the RD&E grant program process that now totals approximately 80 research grants, will be continued, at least at the level that has now been achieved (36/year) into the indefinite future. This assumption applies to all elements of the RD&E program to include the graduate fellowship program which reached a level of 58 fellowship grants in 1989. However the continuation of these two elements (research grants and graduate fellowships) of the RD&E development program beyond 1992 is dependent mainly on additional RTG funding in accordance with the "new principles" now agreed to by USAID and MOSTE.

2. Industrial Development Program:

The principal STDB programs affected by STDB's response to the evolving Thai-U.S. relationship as well as to STDB's own desire to adjust to lessons learned from its past operation are those directed toward industry. Three of these, CD, STAMP and DRDS are aimed at providing support to specific companies through various mechanisms. From a company's point of view, it would make more sense to be able to go to STDB for a package of support to meet its needs and not worry about which window or windows it goes to. Therefore, these three program elements will in the future be integrated into a "Business Development" function once the pending STDB legislation has been approved by Parliament and promulgated into law, expected to be in July 1991. The criteria for applicant qualification will be modified accordingly. The application procedures will be reviewed and simplified where possible. This integrated set of program elements also has all the necessary mechanisms to support existing Thai-U.S. joint ventures as well as those necessary to stimulate the formation of such ventures. Other STDB program elements that have industrial support as a part of a broader mandate, i.e., TIAC, STQC and NAS, will support the three integrated program elements allowing a full range of STDB services to be available from one STDB window.

Following is a brief description of the program elements that make up this integrated package. The level of expenditures, reflected in the attached budget, are based on this integrated, standardized and simplified offering to industry.

Company Directed RD&E:

The total number of projects to be funded under this program as currently budgeted is 23--11 as loans and 12 as grants. So far, three project loans have been made. Additionally, four project proposals have passed through the STDB approval process -- two loans and two grants -- and await formal signing with STDB in the case of the grants and the participating banks in the case of the loans. In addition, STDB has invited, received and is evaluating three additional formal proposals. It has, based on company concepts, invited an additional 13 proposals.

The program element is budgeted to fund three loan and five grant projects in both FY 91 and 92. Procedures for project approval will be simplified and criteria for qualification will be revised. Thai-U.S. joint ventures will be explicitly targeted for program marketing activities. The possibility of utilising USAID as a loan guarantee organisation will also be explored.

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STAMP:

There is funding budgeted for approximately 20 agreements. Companies, however, may apply for multiple agreements so the number of companies assisted may be less than 20. At present, one agreement is on the books. Approximately, 12 other companies are discussing projects with applications at varying stages of development. It is projected that two additional agreements will be signed in FY 90 and the remainder in FY 91.

Company qualification criteria will be simplified such that the program element can directly assist companies master technology which they already possess. The amount of needed Thai equity in Thai-U.S. joint ventures will also be re-considered.

DRDS:

The DRDS function to be carried out by a contractor according to the rules and regulations imposed in the contract has proven to be unsuccessful and management of a reduced DRDS mandated program will be brought back inside STDB. The former mandate had the contractor (1) providing contract consulting services to industry itself at a subsidized rate and (2) diagnosing with companies their problems and then helping them locate other consultants or consulting firms to contract with at a subsidized rate for the needed services, thus assisting the companies with their problems as well as stimulating the development of the contract consulting industry in Thailand. Only the latter function will be carried out by the new DRDS program management.

Two of three technical staff members needed to conduct this program element at STDB are on board. Simplified procedures will be developed for providing companies consulting support that are compatible with the Company Directed RD&E and STAMP elements. The program element is budgeted for a total of approximately 100 consulting agreements. We are projecting contracting agreements for FY 91, 92, 93 and 94 at a level of 15, 20, 30 and 35 in the respective years. No agreements are projected for FY 90 although program element activities within STDB have already been initiated.

TIAC:

This program element is responsible for serving both industry and university/institutional information needs. At present, it has access to on-line U.S. data bases that cover much of what university/institutional sources are likely to request. A number of data bases that contain information that industry would be interested in are also covered but there is much that companies would want that is not yet covered, for example, information on equipment and technology sources, specifications and costs; industrial standards and codes; and much "Thai specific data and information". TIAC will increase its capabilities and concentrate its resources to satisfy these industry - related needs.

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The TIAC staff needs additional training to "digest" the technology it currently has. It will need more training and time to identify and absorb data bases and associated delivery technologies that are needed by industry. The initial need for TIAC is recognized to be that of an information broker with the specific "first" clients being the University Research & Development Community and the Private Sector that will use new technology, financial and marketing data to start-up, expand and grow in domestic, regional, and world markets.

STQC:

This program element is operational. A program coordinator has been hired and will join STDB next month. The program should now begin to pick up momentum and the attached budget reflects this.

NAS:

It is anticipated that as the "industrial development office" of STDB energizes the industrial support programs, there will be a concomitant requirement for support from the Academy. This will also be responsive to the desire to increase Thai-U.S. cooperative activities.

3. Planning, Program Development & Policy Review: STDB recognizes that there have been discrepancies between annual budgetary planning and program execution in the past. Although there have been a number of constraints to the implementation of various programs, the annual planning itself for the most part has been too optimistic. A mechanism will be set up to periodically review annual plans and budgetary projections so that the progress of each program can be closely monitored and additional management, administrative or technical assistance can be provided to increase the efficiency of program execution. It is anticipated that the review will be made on all STDB program elements on a quarterly basis and the lessons learned will also be utilized in the future annual planning.

Program Development activities will concentrate in the future mainly on activities associated with the "new principles" of operation and the "new directions" covered by the MOSTE - USAID agreement and the Thai-U.S. Memorandum of Understanding.

The third element of this sector of STDB activities and responsibility - that for conducting major Policy Studies will be modified in recognition that any policy analysis will have significant impacts on policy formulation only if the policy-making organisations concerned are not only actively involved in the process of policy analysis but also play key roles in initiating the policy studies themselves. In this respect, the STDB will focus on providing support and inputs to the development of 5-year plans of the NESDB and to the formulation of development programs of industrial and technological promotion organisations such as the BOI and FTI. It is anticipated that the studies to be supported will focus on such issues as S&T infrastructural development, international technology transfer and human resource development.

There is indeed an indication that the BOI is seeking supports for conducting studies to guide industrial promotion strategies for further fostering industrial linkages and enhancing technology transfer. There are also ongoing discussions about the possibility of utilizing the FTI in promoting the development of industrial-sector technical universities and training centers.

In order to facilitate the transition of the STD project to a permanent STDB, resources under the Policy Studies item will also be allocated to carry out studies or other activities that are needed. This aspect of Policy Review will thus become part and parcel of Planning and Program Development activities.

4. Operational Requirements with Regard to Professional and Support Staff: STDB is almost fully staffed for the first time in its history so that manpower numbers in either category is not a major concern, the "new principles" and "new directions" of operation have caused a change in emphasis however on the qualifications of the professional staff with regard to formal training and the type and level of experience. When one shifts to serving and supporting the private sector, breadth of experience with regard to technology and system engineering as well as management practice, finances and marketing - become dominant considerations. This change in personnel can take place over a 1-2- year period as the new modes of operation are expanded from existing bases of science and technology experience - a process of building from the ground in a step-by-step fashion. We identify therefore a transition phase that will be largely filled with regard to immediate needs by short-term consultants (i.e. less than 130 day contracts), joint Thai-U.S. task forces and such other mechanisms as may be possible and appropriate under the NAS support contract for Project Design, Technology Transfer, Policy Studies, D/RDS, STQC and TIAC support.
5. NAS Grant and Loan Contracts: The "new principles" and the "new directions" of operations require a broader range of support activities from the Technical Assistance Contractor than is now required through the NAS (BOSTID) relationship.

It is desirable to continue the NAS (BOSTID) contract through 1994 but funding limitations make this requirement a necessary compromise.

6. Friendship Fund: In order to further strengthen the Thai-U.S. co-operations as emphasized in the above-mentioned Memorandum of Understanding, it is anticipated that the business-oriented programs of STDB such as the Company-Directed RD&E Grant and STAMP Support as well as activities which enable Thai professionals to receive specialised training in the U.S. industries should be significantly expanded. It is envisaged that additional funds would be needed, possibly after 1992, to fulfil such objectives. One possibility is through the "Friendship Fund" stated in the MOU.

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	FY 1986 - 1990	FY 1991	FY 1992	FY 1993	FY 1994	Total
<b>USAID Grant</b>						
STDB Operations	2,038,554	883,673	811,300	881,800	495,200	5,110,527
S&T Policy Review	26,025	201,177	60,000	60,000	60,000	407,202
Research, Development and Engineering	1,256,608	1,185,372	1,172,800	96,400	65,000	3,776,180
Industrial Development Support	504,862	819,660	594,610	410,880	216,881	2,546,893
NAS Contract	3,380,000					3,380,000
Evaluations	110,019				100,000	210,019
USAID Provided TA	330,000					330,000
<b>Total USAID Grant</b>	<b>7,646,068</b>	<b>3,089,882</b>	<b>2,638,710</b>	<b>1,449,080</b>	<b>937,081</b>	<b>15,760,821</b>
<b>USAID Loan</b>						
STDB Operations	90,300					90,300
Research, Development and Engineering	8,722,640	5,931,372	196,078			14,850,090
Industrial Development Support	419,175	988,235	924,515	35,300	41,200	2,408,425
NAS Contract	1,875,000					1,875,000
<b>Total USAID Loan</b>	<b>11,107,115</b>	<b>6,919,607</b>	<b>1,120,593</b>	<b>35,300</b>	<b>41,200</b>	<b>19,223,815</b>
<b>DTEC Counterpart</b>						
STDB Operations	289,489	130,000	130,000	140,000	150,000	839,489
Industrial Development Support	4,706	23,529	10,000			38,235
<b>Total DTEC Counterpart</b>	<b>294,195</b>	<b>153,529</b>	<b>140,000</b>	<b>140,000</b>	<b>150,000</b>	<b>877,724</b>
<b>RTG Budget</b>						
STDB Operations	143,187	57,255	98,750	555,750	218,000	1,072,942
Research, Development and Engineering	2,998,328	2,107,843	7,395,078	7,395,000	7,059,000	26,955,249
Industrial Development Support				102,400	200,000	302,400
RTG Customs Duties and Taxes	200,251	231,372	250,000	250,000		931,623
<b>Total RTG Budget</b>	<b>3,341,766</b>	<b>2,396,470</b>	<b>7,743,828</b>	<b>8,303,150</b>	<b>7,477,000</b>	<b>29,262,214</b>
<b>Private Sector</b>						
Research, Development and Engineering	1,307,150	1,372,549	1,608,314			4,288,013
<b>Total Project Commitments</b>	<b>23,696,394</b>	<b>13,932,037</b>	<b>13,251,445</b>	<b>9,927,530</b>	<b>8,605,281</b>	<b>69,412,587</b>

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## Science and Technology for Development

Source of Funds: All Sources  
Summary of Expenditures by Year

	FY 1986 - 1990	FY 1991	FY 1992	FY 1993	FY 1994	Total
<b>USAID Grant</b>						
STDB Operations	1,740,264	916,656	798,157	859,650	795,800	5,110,527
S&T Policy Review	26,025	142,353	118,824	60,000	60,000	407,202
Research, Development and Engineering	826,555	1,116,487	1,198,901	404,437	229,800	3,776,180
Industrial Development Support	284,573	1,023,635	610,924	410,880	216,881	2,546,893
NAS Contract	1,401,393	700,000	850,000	428,607		3,380,000
Evaluations	110,019				100,000	210,019
USAID Provided TA	330,000					330,000
<b>Total USAID Grant</b>	<b>4,718,829</b>	<b>3,899,131</b>	<b>3,576,806</b>	<b>2,163,574</b>	<b>1,402,481</b>	<b>15,760,821</b>
<b>USAID Loan</b>						
STDB Operations	90,300					90,300
Research, Development and Engineering	5,007,778	4,755,979	3,365,745	1,720,588		14,850,090
Industrial Development Support	108,929	1,298,481	924,515	35,300	41,200	2,408,425
NAS Contract	544,953	400,000	300,000	180,047		1,425,000
<b>Total USAID Loan</b>	<b>5,751,960</b>	<b>6,454,460</b>	<b>4,590,260</b>	<b>1,935,935</b>	<b>41,200</b>	<b>18,773,015</b>
<b>DTEC Counterpart</b>						
STDB Operations	289,489	130,000	130,000	140,000	150,000	839,489
Industrial Development Support	4,706	23,529	10,000			38,235
<b>Total DTEC Counterpart</b>	<b>294,195</b>	<b>153,529</b>	<b>140,000</b>	<b>140,000</b>	<b>150,000</b>	<b>877,724</b>
<b>RTG Budget</b>						
STDB Operations	143,187	57,255	98,750	444,600	329,150	1,072,942
Research, Development and Engineering	785,366	2,209,072	3,383,669	6,330,132	7,893,900	20,602,139
Industrial Development Support				102,400	200,000	302,400
RTG Customs Duties and Taxes	200,251	231,372	250,000	250,000		931,623
<b>Total RTG Budget</b>	<b>1,128,804</b>	<b>2,497,699</b>	<b>3,732,419</b>	<b>7,127,132</b>	<b>8,423,050</b>	<b>22,909,104</b>
<b>Private Sector</b>						
Research, Development and Engineering	1,307,190	1,137,255	1,396,361	282,447	164,800	4,288,053
<b>Total Project Expenditures</b>	<b>13,200,978</b>	<b>14,142,074</b>	<b>13,435,846</b>	<b>11,649,088</b>	<b>10,181,531</b>	<b>62,609,517</b>

Science and Technology for Development

Source of Funds: All Sources  
Life of Project Commitments

	USAID Grant	USAID Loan	DTEC Counterpart	RTG Budget	Private Sector	Total Commitments
<b>1. STDB Operations</b>						
1.1 STDB Operating Expenses	3,820,511	90,300	839,489	1,072,942		5,823,242
1.2 Professional Exchange Events	409,182					409,182
1.3 Technical Assistance	880,834					880,834
Sub Total	5,110,527	90,300	839,489	1,072,942	0	7,113,258
<b>2. S&amp;T Policy Review</b>						
2.1 Studies	304,934					304,934
2.2 Professional Exchange Events	102,268					102,268
Sub Total	407,202	0	0	0	0	407,202
<b>3. Research, Development and Engineering</b>						
3.1 Projects						
3.1.1 Designated, Competitive & IDIS	390,099	14,115,837		25,760,296		33,913,122
3.1.2 Company Directed	1,412,235	718,953		718,953	4,288,053	7,138,194
3.2 Technical Support						
3.2.1 Local Consultants	28,412	15,300				43,712
3.2.2 Project Initiative Fund	50,471					50,471
3.3 STAMP	342,478			196,000		538,478
3.4 Professional Exchange Events	474,317			280,000		754,317
3.5 University Fellowships	1,078,168					1,078,168
Sub Total	3,776,180	14,850,090	0	26,955,249	4,288,053	43,516,462

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Science and Technology for Development

Source of Funds: All Sources  
Life of Project Commitments

	USAID Grant	USAID Loan	DTEC Counterpart	RTG Budget	Private Sector	Total Commitments
4. Industrial Development Support						
4.1 Standards, Testing & Quality Control						
4.1.1 Technical Assistance (Local)	119,216					119,216
4.1.2 U.S. Training	195,000		38,235			233,235
4.1.3 Professional Exchange Events	499,967	825		302,400		803,192
4.1.4 Equipment		1,500,000				1,500,000
Sub Total	814,183	1,500,825	38,235	302,400	0	2,655,643
4.2 Technical Information Access Center	1,732,710	727,000				2,459,710
4.3 D/RDS		180,600				180,600
Sub Total - IDS	2,546,893	2,408,425	38,235	302,400	0	5,295,953
5. MAS Contract	3,380,000	1,875,000				5,255,000
6. RTG Customs Duties and Taxes				931,623		931,623
7. Evaluations	210,019					210,019
8. USAID Provided TA	330,000					330,000
TOTAL ALL PROJECT ELEMENTS	15,760,821	19,223,815	877,724	29,262,214	4,288,053	69,412,627

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Source of Funds: All Sources  
Life of Project Expenditures

Science and Technology for Development

	USAID Grant	USAID Loan	DTEC Counterpart	RTG Budget	Private Sector	Total Expenditures
<b>1. STDB Operations</b>						
1.1 STDB Operating Expenses	3,820,511	90,300	839,489	1,072,942		5,823,242
1.2 Professional Exchange Events	409,182					409,182
1.3 Technical Assistance	880,834					880,834
Sub Total	5,110,527	90,300	839,489	1,072,942	0	7,113,258
<b>2. S&amp;T Policy Review</b>						
2.1 Studies	304,934					304,934
2.2 Professional Exchange Events	102,268					102,268
Sub Total	407,202	0	0	0	0	407,202
<b>3. Research, Development and Engineering</b>						
<b>3.1 Projects</b>						
3.1.1 Designated, Competitive & IDIS	390,099	14,115,837		19,407,186		33,913,122
3.1.2 Company Directed	1,412,235	718,953		718,953	4,283,053	7,138,194
<b>3.2 Technical Support</b>						
3.2.1 Local Consultants	28,412	15,300				43,712
3.2.2 Project Initiative Fund	50,471					50,471
3.3 STAMP	342,478			196,000		538,478
3.4 Professional Exchange Events	474,317					474,317
3.5 University Fellowships	1,078,168			280,000		1,358,168
Sub Total	3,776,180	14,850,090	0	20,602,139	4,283,053	43,516,462

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4.1 Standards, Testing & Quality Control						
-----						
4.1.1 Technical Assistance (Local)	119,216					119,216
4.1.2 U.S. Training	195,000		38,235			233,235
4.1.3 Professional Exchange Events	499,967	825		302,400		803,192
4.1.4 Equipment		1,500,000				1,500,000
	-----	-----	-----	-----	-----	-----
Sub Total	814,183	1,500,825	38,235	302,400	0	2,655,643
4.2 Technical Information Access Center	1,732,710	727,000				2,459,710
-----						
4.3 O/RDS		180,600				180,600
-----		-----	-----	-----	-----	-----
Sub Total - IDS	2,546,893	2,408,425	38,235	302,400	0	5,295,953
5. NAS Contract	3,380,000	1,425,000				4,805,000
-----						
6. RTG Customs Duties and Taxes				931,623		931,623
-----						
7. Evaluations	210,019					210,019
-----						
8. USAID Provided TA	330,000					330,000
-----						
TOTAL ALL PROJECT ELEMENTS	15,760,821	18,773,815	877,724	22,909,104	4,288,053	62,609,517
	=====	=====	=====	=====	=====	=====

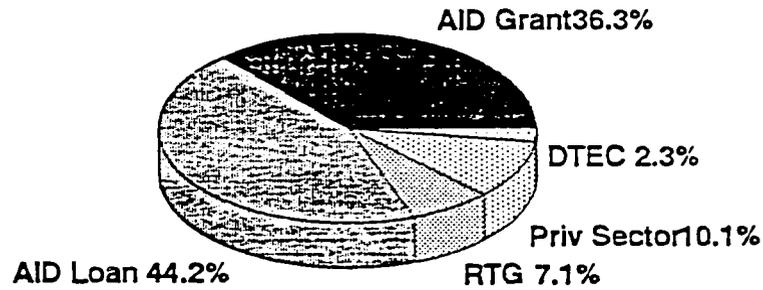
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Science and Technology for Development

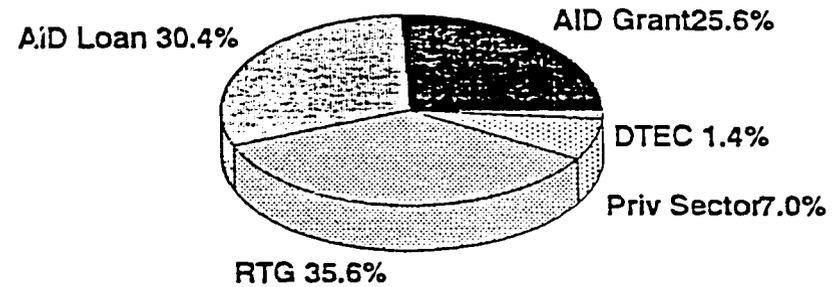
Source of Funds: USAID Grant and Loan  
Pipeline

	FY 1986 - 1990 -----	FY 1991 -----	FY 1992 -----	FY 1993 -----	FY 1994 -----
<b>USAID Grant</b> =====					
USAID Obligations	11,041,000	12,841,000	14,341,000	15,800,000	15,800,000
Commitments (Cumulative)	7,646,068	10,735,950	13,374,660	14,823,740	15,760,821
Expenditures (Cumulative)	4,718,829	8,617,960	12,194,766	14,358,340	15,760,821
Pipeline (Obligations Minus Expenditures)	6,322,171	4,223,040	2,146,234	1,441,660	39,179
<b>USAID Loan</b> =====					
USAID Obligations	19,600,000	19,600,000	19,600,000	19,600,000	19,600,000
Commitments (Cumulative)	11,107,115	18,026,722	19,147,315	19,182,615	19,223,815
Expenditures (Cumulative)	5,751,960	12,206,420	16,796,680	18,732,615	18,773,815
Pipeline (Obligations Minus Expenditures)	13,848,040	7,393,580	2,803,320	867,385	826,185
<b>Total USAID Funds</b> =====					
USAID Obligations	30,641,000	32,441,000	33,941,000	35,400,000	35,400,000
Commitments (Cumulative)	18,753,183	28,762,672	32,521,975	34,006,355	34,984,636
Expenditures (Cumulative)	10,470,789	20,824,380	28,991,446	33,090,955	34,534,636
Pipeline (Obligations Minus Expenditures)	20,170,211	11,616,620	4,949,554	2,309,045	865,364

## Science and Technology for Development Project Contributions (Expenditures)



**1986 - 1990**

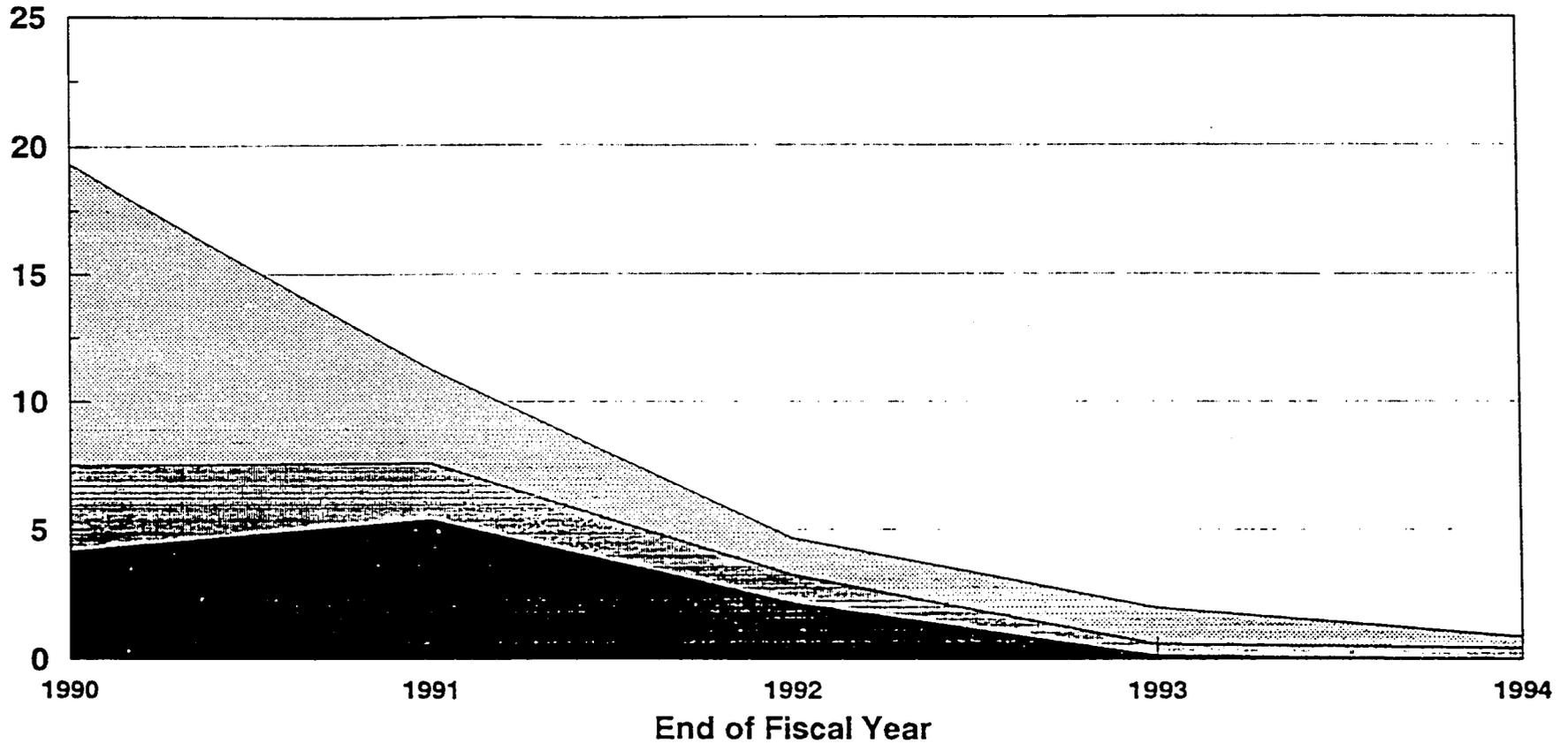


**Projected LOP  
(1986 - 1994)**

**Note: RTG Budget amounts do not include  
RTG Customs Duties and Taxes**

Science and Technology for Development  
Projected USAID Grant and Loan Pipeline  
RD&E, NAS Contract, and Uncommitted Elements

\$ Millions



RD&E NAS Contract Uncommitted

Note: Other Project Elements have relatively minor pipeline amounts in all years

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