

PDMM 020

**MEASURABLE GOALS AND LONG-TERM
MAINTENANCE
SHOULD BE EMPHASIZED FOR THE REVISED
NORTHEAST THAILAND SMALL SCALE
IRRIGATION PROJECT**

**USAID/THAILAND
AUDIT REPORT NO. 2-493-85-01
November 30, 1984**

AID has targeted \$8.6 million in mixed loan and grant funding to rebuild canals and train farmers in one of the poorest areas of Thailand. Reliance on a seriously flawed feasibility study, and initiation of a series of design and construction changes by the Royal Thai Government, have led to skyrocketing costs and glacial implementation. Project goals which can serve as verifiable indicators of progress need to be developed, implemented and monitored in order to achieve an acceptable level of project benefits. Further, management should address operation and maintenance needs in accordance with AID policy guidance.

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GLOSSARY

A.I.T.	Asian Institute of Technology
CTF	Consultant Task Force
DOAE	Department of Agricultural Extension
DTEC	Department of Technological and Economic Cooperation
GAO	U.S. General Accounting Office
NESSI	Northeast Small Scale Irrigation Project
O&M	Operation and Maintenance
RID	Royal Irrigation Department
RTG	Royal Thai Government
"Tank"	Reservoir
USAID/Thailand	U.S. Agency for International Development's Mission to Thailand

EXECUTIVE SUMMARY

In the fall of 1980, AID made available to the Royal Thai Government (RTG) \$8.6 million in mixed loan and grant funds to launch the Northeast Small Scale Irrigation Project (NESSI). The RTG would provide the remaining funding for this \$16.95 million effort. The project depends upon both American and Thai consultants to advise and instruct farmers and Thai Government personnel in rebuilding and maintaining NESSI irrigation systems. The project was designed to rehabilitate irrigation systems fed by 7 small reservoirs situated throughout the Northeast. Should the project's "model" prove successful, it could be replicated at over 200 reservoir sites.

Implementation of the NESSI project has been very slow and costs have doubled because the mission and RTG relied upon a seriously flawed feasibility study to design the project. Project plans called for development of 7 tank sites. As of July 1984, more than half-way through the project development period, construction of only about 30 percent of one site has been completed. Some of the increased cost is beneficial because operation and maintenance (O&M) will be simplified. However, the project scope had to be reduced from 7 to 3 sites because of the increased cost.

Since the project is scheduled to terminate in October 1986, and the consultancy contract in August 1985, the project will be placed under severe time constraints in completing any of the planned sites. According to the project manager, it will require virtually problem-free implementation from the beginning of the upcoming dry season in November 1984, through 1986 to complete 3 sites. Further, the RTG and Mission have not reached agreement on funding responsibility. For instance, in February 1984, the RTG informed AID that it would request that AID loan funds be used not only to construct main ditches and on-farm systems but also to construct the main canal system at a fourth project site. At the time of our field work, neither the formal request nor AID's reply had been formulated.

The Mission has defined replicability as: "an accepted and institutionalized system whereby the RTG decision makers are engaged in making rational and realistic investment decisions with economic feasibility as a determinant of site selection to rehabilitate and utilize tank irrigation in the Northeast." This definition is inadequate. It offers managers no guidance in determining progress toward replicability. Further, one of the primary criteria of replicability is economic feasibility. Economic feasibility, in turn, is based upon both cost of construction, including O&M, and increased farmer profits. These factors of economic feasibility have not been addressed by project planners.

While AID spent over \$1 million for consultant technical help, inadequate organization and leadership hampered the consultant team into the summer of 1983. At that time a new team leader was appointed and consultant performance improved. These early problems led to a curtailment of the consultants' scope of work which still threatens to severely affect operations, maintenance, and farmer

related management services. For instance, the consultants have not yet developed detailed individual work plans which are needed to direct their efforts in the short time remaining under their contracts, which terminate in 1985.

Lack of adequate O&M has proven to be one of the most serious deficiencies in irrigation projects throughout Southeast Asia, including NESSI. Responsibility and cost is usually borne by parties who have little incentive to perform O&M. For instance, farmers may be reluctant to finance O&M because cost often outweighs benefits. The host government may find it easier to persuade donors to finance rehabilitation projects than to raise O&M funds from their own resources. In this regard, the Mission should quickly assess the likelihood that O&M will be performed by the RTG and farmers as required or initiate stopgap funding as authorized by AID policy.

We believe that USAID/Thailand management should review the objectives of the revised Northeast Small Scale Irrigation Project, establish necessary management practices, and take actions regarding O&M in accordance with AID policy. Accordingly, we recommend that USAID/Thailand

- quantify project goals, allowing project managers to measure progress and realistically assess project achievement (see page 8);
- instruct project consultants to systematize and prioritize their activities in a detailed work plan (see page 11);
- make an early decision on the reduced number of sites to be AID financed, using excess funds to improve the project's operations and maintenance components (see page 16); and
- seek long-term solutions to the operations and maintenance needs of AID financed capital projects in Thailand (see page 16).

MANAGEMENT COMMENTS

USAID is in general agreement with the report. They have completed action on one recommendation which has been deleted from the report and they have begun action on the other recommendations. The USAID asked that we revise recommendation No. 1 and 3 on the basis of need for flexibility in managing the project. We revised the recommendations to accommodate the need for flexibility and also made the recommendations more specific.

The report was also revised in other instances where appropriate to reflect management comments.

See Appendix A for the complete text of the USAID/Thailand response to the draft report.

BACKGROUND

Northeastern Thailand is a region of 16 provinces and 15 million people who are mostly farmers. It has the lowest per capita income of any of Thailand's four major regions. Soils tend to be sloped, highly erodible, sandy, acidic, and infertile, having poor structure, low water holding capacity and low organic matter, potassium, and phosphorous content. The region has two seasons: a wet season from May to October followed by a dry season from November to April. Eighty-nine percent of average annual rainfall occurs during the wet season. Even during the wet season, the distribution of rainfall is erratic, which frequently results in prolonged draughts. During the dry season, evaporation greatly exceeds rainfall, precluding dry season cropping without irrigation. Crop yields are generally low.

To help alleviate the conditions of the Northeast farmers, AID and the Royal Thai Government (RTG) launched the \$16.95 million Northeast Small Scale Irrigation Project (NESSI), in the fall of 1980. The project sought to develop a sustainable system for increasing the agricultural productivity and income of more than 35,000 rural poor around 7 existing, small to medium sized tanks (reservoirs) in the Northeast. The RTG places a high priority upon the NESSI project. Should the project's irrigation model prove successful, it could be replicated in an area encompassing over 200 additional tank sites in Northeast Thailand.

AID provided \$5.8 million through loan agreement 493-T-024 of September 1980. These funds would be used for land preparation of on-farm systems, rehabilitation or construction of sub-lateral canals, and RTG staff support (primarily to operate and maintain project vehicles). AID also provided \$2.8 million through grant 493-0312 of August 1980, for technical and marketing support, crop insurance, research, farmer travel, seeds, fertilizers and pesticides. The RTG agreed to provide the equivalent of \$8.35 million, through three implementing agencies: the Department of Technological and Economic Cooperation (DTEC), the Royal Irrigation Department (RID), and the Department of Agricultural Extension (DOAE). These funds would be used to build or reconstruct embankments, canals and access roads; to maintain main and lateral canals, drainage ways, structures and roads; and to provide RTG staff salaries.

Technical assistance is provided through host country contracts with Parsons Overseas Company (\$1.05 million) and TEAM Consulting Engineers Company, Ltd. (\$.811 million). These contracts are funded through the AID grant.

The project, which began in the fall of 1980, is scheduled to end in October 1986.

PURPOSE, SCOPE, AND METHODOLOGY

We focused our attention upon efficiency, economy, and program results, including prospects for long-term success and replicability of the project. We also reviewed USAID/Thailand management oversight activities. Our methodology included interviews with Mission project managers, contractor consultants in the project area, and RTG project managers in Northeast Thailand. Mission, consultant, and RTG planning and implementation documents were reviewed and analyzed. Finally, we inspected construction sites in the project area, including main, lateral, sub-lateral, and on-farm canals, tanks, and agricultural demonstration plots. We performed our field work in February and June 1984, and our audit covers the period from project inception in 1980 through the period of our field work.

This is the first IG audit of the NESSI Project.

We performed our review in accordance with the Comptroller General's Standards for Audit of Governmental Organizations, Programs, Activities, and Functions, giving due regard to applicable AID regulations.

FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

MEASURABLE REALISTIC GOALS NEED TO BE DEVELOPED SO THAT THE PROJECT CAN BE EFFECTIVELY MANAGED

Implementation of the NESSI project has been very slow and costs have doubled because the mission and RTG relied upon a seriously flawed feasibility study to design the project. Project plans called for development of 7 tank sites, however, as of July 1984, more than half way through the project, construction of only about 30 percent of one site has been completed. No construction had begun at any of the other 6 sites. One reason for increased costs and delays is that radical alternation in construction plans and designs caused disagreements between AID and RTG over funding responsibility. Some of the increased cost should be beneficial because operation and maintenance (O&M) will be simplified. Nevertheless, because of increased costs the project scope may be reduced from 7 to 3 sites.

Although the NESSI project is now through over half its anticipated lifespan, it has not

- finalized construction specifications;
- determined how many sites will be rehabilitated;
- completed construction of the initial site at Hwai Aeng; or
- awarded construction contracts for any of the remaining sites.

Managers do not know the specific impact these planning and implementation shortfalls will have on the ultimate achievement of the project objectives. However, major revisions are being made to the project and managers say that to complete even a reduced number of sites by the end of the project time period will require flawless progress. Since the project is scheduled to terminate in October 1986, and the consultancy contracts in August 1985, the project will be placed under severe time constraints in completing any of the planned sites. According to the project manager, it would require virtually problem-free implementation from the beginning of the upcoming dry season in November 1984, through 1986 to complete 3 sites.

In order to effectively monitor project results, specific project goals and milestones need to be developed. A system is also needed to measure project progress against goals and milestones through the life of the project so that adjustments can be made in a timely and effective manner rather than discovering and attempting to make corrections on a crisis basis.

The Project Is Being Revised Because Of A Flawed Design Study

As shown in Exhibit A, project planners believed that 7 tank sites would be rehabilitated with a doubling of irrigated area in the wet season and a two and one-half fold increase in the dry season. These figures were based upon an AID funded feasibility study performed by the Asian Institute of Technology (A.I.T.). Unfortunately, though statistically detailed, Mission managers reported that the study was faulty. They said, for example:

- It severely overestimated the operational status of several main canal systems. In one instance, the study noted that one system was 80 percent operational, when it was, in fact, virtually 100 percent inoperable.
- It did not consider tank siltation rates in calculating holding capacity and thus water availability. Siltation had reduced tank holding capacity up to 20 percent since original construction.
- It underestimated the resources and training required to adequately operate and maintain the irrigation canal systems.
- It overlooked the fact that at least twenty sites are located next to growing villages which depend upon the nearby tanks as their sole source of water. USAID/Thailand engineers believe that the rapid growth projected for these villages will substantially reduce the amount of water available for irrigation.

In determining the feasibility of rehabilitating the Huai Aeng tank site (the only site at which construction has begun), the A.I.T. evaluators also

- based their design on outdated topographic maps which lacked important details such as villages, public places, and high ground;
- improperly represented land contour lines on topographic maps;
- incorrectly represented existing canal routes;
- misrepresented service areas along canals; and
- seriously underestimated the length of farm ditches needed at the site.

Although Mission managers believed the project was severely burdened by "incredibly bad design", we could find no evidence that they sought to independently verify any of the study's conclusions. The resulting Project Paper, while reducing the number of proposed project sites from 9 to 7, retained most of the data and assumptions

generated by the feasibility study. As a consequence, project consultants have found it necessary to revise much of the feasibility study to verify and correct erroneous data. This has delayed project implementation by diverting consultant work efforts and by forcing continuing alterations in project design. For example, the project has only recently accurately measured water flow and siltation rates at the tank sites. This new data will need to be analyzed for the redesign of the canal systems.

Design Changes Increased Construction Costs And Raised Questions On Funding Responsibility

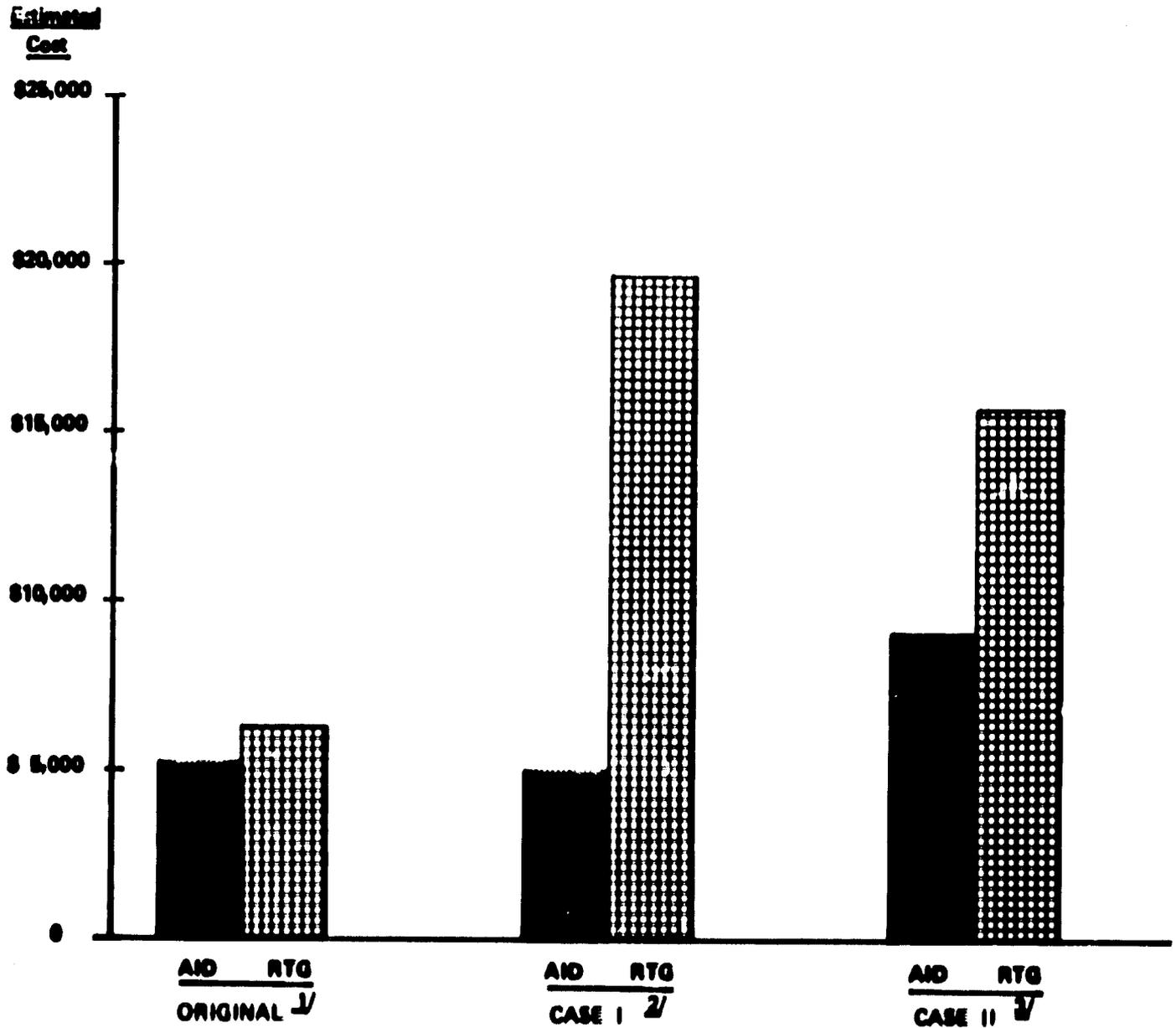
As a result of design changes, the estimated cost of construction has risen approximately \$11,540,000, to \$24,832,000. ^{1/} Most of this increase derived from the RTG decision to construct additional concrete lined lateral and sub-lateral canals. Since such canals are generally considered to be part of an irrigation network's main canal system, and since the project loan agreement called for AID to finance only on-farm construction, this entire increase would fall into the RTG financed portion of the project budget. The estimated AID contribution for construction actually dropped from \$5,246,000 to \$5,075,502.

In an attempt to raise the AID construction contribution and decrease its own costs, the RTG altered the irrigation system nomenclature. The RTG renamed the lateral and sub-lateral canals as main ditches. These were then defined to be on-farm systems and thus reimbursable under the AID loan. This nomenclature change also benefited the RTG in several other ways. By re-naming laterals and sub-laterals as "main ditches", and defining main ditches as part of the on-farm canal system, the RTG avoided the legal requirement of reimbursing participating farmers for land taken for canal construction, and avoided legal prohibitions against requiring farmers to pay O&M costs of main canal systems. The former on-farm (unlined) ditches were re-named tertiary canals.

In December 1983, the Mission agreed to fund lateral and sub-lateral construction. It accepted the shift in funding responsibility in the belief that the construction and lining of such canals would increase the project's viability and that the RTG would be unable or unwilling to bear the entire increase. It produced a drastic alteration in the funding ratio between RTG and AID, as shown below.

^{1/} For consistency, an exchange rate of Baht 22.9 = \$1 is used throughout this report.

PROGRESSION OF NESSI ESTIMATED CONSTRUCTION COSTS
 (\$000)



- 1/ From Project Paper
- 2/ After Design Change
- 3/ After Nomenclature Change

The project's inability thus far to finalize construction specifications cast doubt upon its ability to successfully complete the anticipated sites. Further, because of irrigation system design the RTG and Mission have not reached agreement on the relative funding responsibility. For instance, in February 1984, the RTG informed AID that it would request that AID loan funds be used not only to construct main ditches and on-farm systems but also to construct the main canal system at a fourth project site. At the time of our field work, neither the formal request nor AID's reply had been formulated.

Replicability Should Be Adequately Defined And Goals Should Be Set For Determining Its Achievement And The Achievement Of Other Project Objectives

The Mission has defined replicability as: "an accepted and institutionalized system whereby the RTG decision makers are engaged in making rational and realistic investment decisions with economic feasibility as a determinant of site selection to rehabilitate and utilize tank irrigation in the Northeast." This definition is inadequate because it offers managers no guidance in determining progress toward replicability. As an example, one of the primary criteria of replicability is economic feasibility. Economic feasibility, in turn, is based upon both cost of construction, including O&M, and increased farmer profits. These factors of economic feasibility have not been addressed by project planners.

Project managers and consultants agree that at least three sites must be successfully operating by project close if NESSI is to have any hope of demonstrating a replicable model for small to medium tank development in Thailand. As shown below, with the increases in estimated construction costs, the unit cost to rehabilitate NESSI irrigation sites has risen by more than 100 percent.

INCREASE IN UNIT COSTS TO REHABILITATE NESSI IRRIGATION SITES

<u>No. of Sites</u>	<u>Unit Costs (per site)</u>		
	<u>Original ^{1/} Estimate (\$)</u>	<u>Case II ^{2/} Estimate (\$)</u>	<u>Increase (%)</u>
Seven	1,648,682	3,547,142	115
Four	1,639,679	3,651,201	123
Three	1,658,310	3,847,584	132

^{1/} From Project Paper.

^{2/} After nomenclature change.

While unit costs of rehabilitation have more than doubled, the project has not developed data indicating total farmer costs to operate and maintain the irrigation systems. In addition, the project loan agreement calls for the RTG to make "best efforts" to recover at least a portion of its land development investment costs from participating farmers. At the time of our audit, the Mission believed the RTG should limit this recovery to O&M costs and should not attempt to recoup capital construction costs. The RTG had not, however, officially announced its plan to satisfy this loan condition. The possibility still exists that such recoupment may become a component of the "NESSI model".

The consultant's feasibility report prepared in 1983 concluded that successful implementation at the Huai Aeng site would enable participating farmers to increase their net yearly profit for paddy rice production from an estimated average of \$98 per capita to \$504 per capita with rehabilitation of the irrigation system, an increase of over 400 percent. Mission project managers consider this estimate to be extremely optimistic, since:

- It assumed that the DOAE can fully perform its implementation responsibilities. However, DOAE agents have had little training in water management and are not generally equipped to respond to farmers' questions on irrigated cropping and management requirements.
- It assumed that farmers would reach maximum production in 5 years. Ten to 15 years is a more reasonable estimate.
- It did not take into account heavy "sunk" costs (e.g. for construction) and essentially assumed Huai Aeng farmers would be receiving "free" water. They may not, as discussed above.
- It did not attempt to calculate farmer income from off-farm employment during the dry season. Further, project officials do not know whether an anticipated increase in farming income will provide an adequate incentive to keep farmers in the Northeast during the dry season.

Conclusion And Recommendation

Project planners should analyze relevant economic factors to determine whether replicability of tank irrigation is in the best economic interest of farmers in Northeast Thailand. Should this be the case, replicability needs to be developed into a goal oriented model which sets milestones that can be monitored and adjusted as necessary. The Mission must also develop quantifiable parameters (i.e., average cost of site construction, O&M cost per hectare of irrigated land, net increase in farmer profits, etc.) for defining replicability so that progress can be monitored. Since the RTG must ultimately determine whether NESSI illustrates a replicable model, the Thai

government must be a partner in any such analysis. Such an analysis would enable the Mission to concentrate its efforts upon project components which are of the most vital concern to RTG officials. Accordingly, we recommend that:

Recommendation No. 1

USAID/Thailand quantify project goals, and set milestones which will allow project managers to measure progress and realistically assess project achievement.

Management Comments

We initially recommended that USAID Thailand re-analyze whether replicability should be retained as a primary goal. The Mission, asked that the recommendation be modified because it will be awkward to delete the goal of replicability in view of the approach being taken by RTG officials. We revised our recommendation accordingly.

WORK PLAN NEEDED FOR MANAGING CONSULTANT PERFORMANCE

The NESSI project depends heavily upon a Consultant Task Force (CTF) to provide advice and oversight in physical rehabilitation of irrigation systems, and expertise in transferring appropriate technology to farmers and RTG personnel. The requisite host country contracts to provide these services were signed in the summer of 1982. However, inadequate organization and leadership hampered project implementation. As a result, several activities in the contract scope of work have been delayed or abandoned.

In August 1982, the RTG signed contracts with Parsons Overseas Company, an American firm, and TEAM Consulting Engineers, Co., Ltd., a Thai company, to provide desired technical expertise. The Thai consultants were under direct operational control of the Parsons team leader. Ninety-three percent of the contract's \$1.980 million cost was funded through the AID grant, with the remainder being provided by the RTG.

While AID had expended \$1.166 million under these contracts by March 1984, the consultants had not begun or had delayed completion of many activities specified in their contracts. For example, the CTF had

- not completed a maintenance manual although maintenance training had already begun at the Huai Aeng site,
- not begun to formulate a work plan for extension of improved irrigated agricultural practices,
- not begun assistance to personnel responsible for operational research and extension, and
- delayed or eliminated studies of domestic market demand. 1/

Much of the reason for this slow rate of progress can be attributed to the project's numerous design changes and the consultants' efforts to rectify the original feasibility study. Mission managers also pointed to these internal problems within the CTF as contributing to the consultants' "passive" role in assisting the project.

A consultant home office review of the CTF found that the management of the CTF was unsuccessful in keeping the project activities on schedule. For example, the home office noted that the CTF management had not adequately defined the detailed objectives of individual team members and, therefore, could not monitor progress. As a result, the home office concluded "the overall performance of the CTF has been at times inadequate."

1/ A listing of CTF progress in providing its agreed upon services is found in Exhibit C.

In July of 1983, the CTF team leader was replaced. By the time of our fieldwork in April of 1984, the CTF was operating more effectively. For example, long overdue construction quality and operations manuals had been drafted and quarterly progress reports were substantially improved. The effect of the CTF's early difficulties is still apparent in the large number of delayed or cancelled services, as shown in Exhibit C. Of particular concern is that a majority of the delayed activities affect either system O&M or non-construction, i.e., farmer related, management services.

Conclusion and Recommendation

With less than one and one half years remaining under the consultancy contracts, the CTF should provide as many contracted-for services as possible. In this regard, a detailed work plan should be developed with target dates, and prioritized activities, for each team member. This will allow (1) the CTF team leader to most efficiently allocate the work-time still available and (2) the USAID and RTG to more effectively monitor and evaluate performance of the consultant's work. Accordingly we recommend that:

Recommendation No. 2

USAID/Thailand require the Consultant Task Force leader to formulate a detailed work plan with target dates and prioritized objectives for each task force member.

MANAGERS SHOULD ADDRESS O&M NEEDS IN ACCORDANCE WITH AID POLICY GUIDANCE

AID has adopted an activist policy and formulated a structured framework for attacking the O&M problem of capital development projects. ^{1/} In countries where recurrent cost problems are important, recurrent cost issues should constitute a major part of the policy dialogue. If a recipient country has sufficient resources to provide for adequate O&M, but, for various reasons, has deigned not to allocate them to this end, Missions should

- attempt to persuade governments to make necessary reforms;
- enlist the support of the donor community for policy reform; and
- provide technical assistance in the form of expertise and training to support reforms, including such areas as fiscal policies and tax administration.

^{1/} "Recurrent Costs Problems in Less Developed Countries", AID Policy Paper of May 1982.

Should a recipient country be unable to bear the financial burden of adequately supporting O&M activities, AID policy supports direct funding of such costs under narrowly defined conditions. These include

- an assurance that recurrent cost support has higher development impact than new investments;
- an inability of the host country to undertake recurrent cost financing; and
- existence of a carefully phased plan for shifting the entire burden to the host country.

USAID/Thailand has not undertaken such an analysis.

Irrigation systems in most developing countries are less than 50 percent efficient. In many instances, irrigation systems have been so neglected that donors have been forced to spend millions of dollars for early rehabilitation -- the NESSI project is such a rehabilitation effort. These conditions are caused because of inadequate host country attention to O&M in irrigation projects.

U.S. General Accounting Office (GAO) auditors found that three AID irrigation projects which they surveyed in Thailand, including early NESSI construction, were plagued by silt and weeds in canals and holes and cracks in concrete canal linings. ^{1/} The Lam Nam Oon irrigation system had deteriorated so badly that in 1981, it could not deliver enough water to meet anticipated farmer requirements. The GAO concluded that the RTC chronically underfunds the O&M components of irrigation works throughout Thailand. They found that the RTC's O&M budget allocation increased from about 7 percent of total annual construction outlay in 1973 to between 10 and 13 percent from 1974 to 1981. However, new construction also requires O&M expenditures. Allocating a constant percentage of annual construction costs to O&M has effectively resulted in a drastic decline in available funds.

O&M problems are not restricted to AID funded projects. A World Bank audit report ^{2/} noted that dry season cropping and yields under its Northeast Thailand Irrigation Improvement project were less than anticipated due to poor O&M. They attributed this to the project's failure to establish O&M procedures, and the RTC's failure to devote sufficient numbers of trained personnel to this work. The RTC in turn blamed insufficient budget allocations and higher than anticipated costs for the project's O&M difficulties.

^{1/} "Irrigation Assistance to Developing Countries Should Require Stronger Commitments to Operation and Maintenance", GAO/NSIAD-83-31 of August 29, 1983.

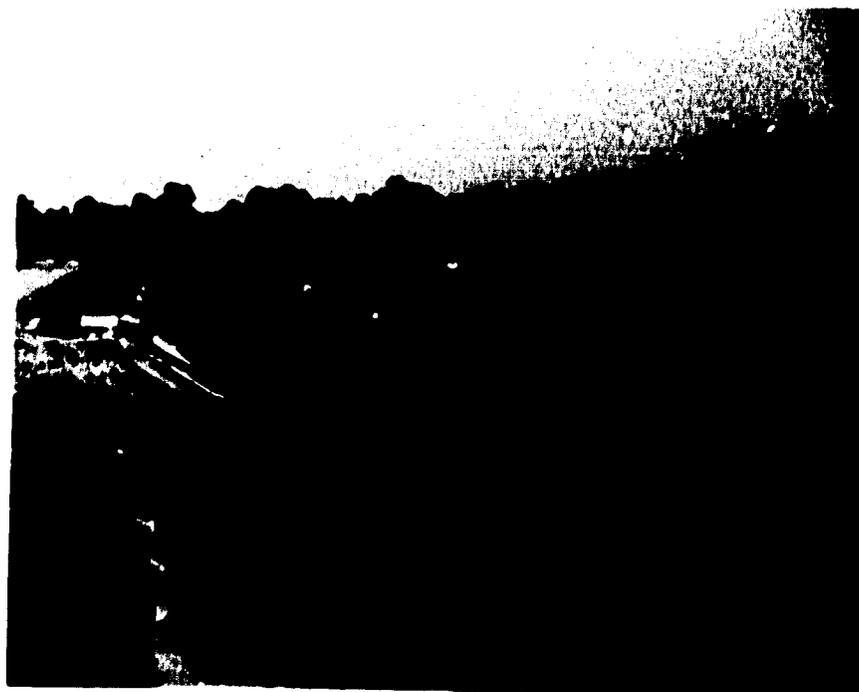
^{2/} "Thailand" Northeast Irrigation Improvement Project" (Credit 461-TH), World Bank Project Performance Audit Report No. 4203 of November 29, 1982.

NESSI Exemplifies The Insufficient Emphasis Placed On O&M

Donors have exacerbated the O&M problem by tending to limit their financing to construction components over O&M activities. The NESSI project loan agreement, for example, calls for development of an O&M plan for each tank site and places responsibility upon the RTG to establish on-farm and main system O&M programs. The loan agreement does not address the content of such programs. There are also no loan or grant funds targeted for system O&M. In addition, the RTG is apparently using the NESSI project as a "test case" by devolving increased O&M responsibilities upon participating farmers as an alternative to increased recurrent cost budget allocations.

AID policy guidance generally requires that recurring costs such as O&M be funded by the host government. AID policy guidance on recurring costs also requires a mission to evaluate the capacity and willingness of host government to assume recurring cost responsibility. This has not been done by USAID/Thailand. The project agreements also call for the RTG to assure an effective O&M program and an adequate annual O&M budget for all infrastructure components of the project. The Thai government also agreed to establish an on-farm O&M program for each site. Neither program was established at the time of our fieldwork.

Through March of 1984, the project had expended about \$.313 million in AID loan funds, plus an undetermined amount of RTG funds to rehabilitate the Huai Aeng main and on-farm systems. We found that the site, only about 30 percent completed, was already showing the effects of inadequate O&M. For example, about 100 meters of the right main canal wall had washed out in July 1983. Despite the imminent onset of the 1984 rainy season in May, we saw no repair work in progress.



Damage To Main Canal At Huai Aeng



Weed Growth In Main Canal At Huai Aeng



Canals At Huai Aeng With No Turn-Out Gate

Only recently had the RTG begun to implement any of its O&M activities. Consultants began organizing Huai Aeng farmers into Water User Groups in January 1984, although functioning Groups should have been in place by April 1983. Without a definitive design, however, project managers did not know how many of these Groups should be organized. Moreover, neither consultants nor RTG project managers could tell us how many Groups had been established.

Project agreements called for consultants to provide technical assistance to develop adequate O&M procedures, activities, budgets, staffing, and scheduling, and a day-to-day O&M handbook. Although the consultants completed and delivered a draft operations manual, they had not developed a manual to guide farmers and RID personnel in maintaining main and on-farm systems. The consultant team leader told us that a member of his staff was tasked to draft the manual but had been overburdened by RTG project manager requests to perform various project related studies.

The RTG has not announced any O&M budget for the main canal system. Thus far, some ad hoc repair work has been funded through the RID construction budget, but such repairs are already inadequate. Of equal importance, the project has not estimated the total O&M funding burden to be placed on participating farmers.

Both RTG and USAID/Thailand are in the process of redefining the NESSI project's scope. Should the project reduce the number of tank rehabilitation sites from 7 to 3, AID's estimated construction contribution would be approximately \$4.374 million, i.e., about \$.87 million less than the Project Paper's estimated contribution for 7 sites. The freeing of these funds would allow

- increased O&M training for both RID personnel and participating farmers;
- immediate repair of already degraded structures and systems; and
- experimentation with more flexible and innovative procedures, for example, establishment of mobile O&M repair units to service main and, possibly, on-farm systems.

As a result of low levels of O&M funding, Thailand, like other developing countries in Asia, tends to defer routine maintenance until systems deteriorate to a point at which major but premature rehabilitation is required. For the RTG, however, this may be "good business". As AID has pointed out in a recent analysis of recurrent costs problems "For many poor countries, the funds available for new capital projects, because they come largely from concessional assistance, are more plentiful than the funds available for financing the recurrent costs of existing projects, which come largely from domestic resources." ^{1/}

^{1/} "Recurrent Costs Problems in Less Developed Countries", op. cit.

Conclusion and Recommendations

Recurrent cost funding for irrigation system O&M has been a long-standing problem in Thailand. Responsibility and cost is usually borne by parties who have little incentive to perform O&M. For instance, farmers may be reluctant to finance O&M because costs often outweigh benefits. The host government may find it easier to persuade donors to finance rehabilitation projects than to raise O&M funds from their own resources. Donors also have not devoted sufficient resources to assuring that newly constructed and rehabilitated systems are kept in satisfactory operating condition.

The NESSI project documents do not adequately address the problem of long- or short-term maintenance, relying instead upon standard RTG maintenance procedures and funding levels. These are inadequate as shown by the deteriorated condition of Thai irrigation projects, including NESSI. Such neglect necessitates pre-mature rehabilitation leading to inefficient and wasteful expenditure of scarce donor resources.

AID has developed policy guidelines designed to help alleviate this problem. Under these guidelines, the Mission was supposed to analyze RTG's ability and commitment to maintaining such systems. USAID/Thailand has not made such an analysis. Accordingly, we recommend that:

Recommendation No. 3

USAID/Thailand decide in the near future on the reduced number of sites to receive AID financing and, to the extent possible, utilize funds freed by the reduction of the NESSI project's scope to upgrade the project's long and short-term O&M capabilities.

Recommendation No. 4

USAID/Thailand determine whether the RTG is financially or otherwise capable and willing to provide adequate O&M for all AID-financed capital projects, and develop an appropriate program of O&M reform or support in accordance with AID policy.

Management Comments

We initially recommended that AID support be limited to 3 sites. The mission agrees that USAID support to 3 sites may be the most desirable alternative, but asks that the recommendation be revised to allow management flexibility. We revised the recommendation as requested and instead asked that the decision be made in the near future so that both the project goals and the O&M can be provided in a timely manner.

**ANTICIPATED INCREASE IN LAND UNDER
IRRIGATION BY CLOSE OF PROJECT**

<u>TANK SITE</u>	PRE-PROJECT IRRIGATED AREA		END OF PROJECT IRRIGATED AREA	
	(HECTARES) ^{1/}		(HECTARES)	
	<u>WET SEASON</u>	<u>DRY SEASON</u>	<u>WET SEASON</u>	<u>DRY SEASON</u>
Huai Aeng	1840	450	3040	1250
Huai Kaeng	960	105	2400	1600
Phuttha Utthayan	770	55	2240	0
Huai Khilak	420	90	1440	1440
Huai Talat	480	35	2240	880
Huai Chorakke Mak	1120	440 ^{2/}	1120	160
Huai Lam Chamusak	1410	325	1730	0
Totals	<u>7000</u>	<u>1500</u>	<u>14210</u>	<u>5330</u>

1/ Indicates amount of land effectively irrigated.

2/ Not sustainable.

STATUS OF AID FUNDS THROUGH MARCH 1984
(\$000)

Funding Source	Component	Oblig- ation	Commit- ment	Expenditures			
				Planned \$	1/ % of Oblig.	Actual \$	% of Plan.
Loan	Construction Rehabilitation RTG Staff Support	3,280	350	2,560	78	313	12
	Design & Const- ruction of Service Centers	340	207	325	96	184	57
	Other (Soil Interpreta- ion Works)	0	0	80	-	0	0
	Contingency	3	3	0	0	3	-
	Inflation	547	-	-	-	-	-
		1,630	-	-	-	-	-
	Sub-Total	<u>5,800</u>	<u>560</u>	<u>2,965</u>	<u>51</u>	<u>500</u>	<u>17</u> <u>2/</u>
Grant	Technical Support	1,844	1,844	1,750	95	1,166	67
	Grant Support	390	122	295	76	68	23
	Evaluation	100	0	65	65	0	0
	Contingency/ Inflation	466	0	-	-	0	-
	Sub-Total	<u>2,800</u>	<u>1,966</u>	<u>2,110</u>	<u>75</u>	<u>1,234</u>	<u>59</u> <u>3/</u>
Total (L&G)	<u>8,600</u>	<u>2,526</u>	<u>5,075</u>	<u>59</u>	<u>1,734</u>	<u>34</u> <u>4/</u>	

1/ Amount planned to be spent through March 1984, from Project Paper.

2/ Nine percent of obligation funds.

3/ Forty-four percent of obligated funds.

4/ Twenty percent of obligated funds.

EXHIBIT 2

CONSULTANT PROGRESS IN PROVIDING CONTRACT SERVICES
THROUGH APRIL 1984

EXHIBIT 3

<u>Contract Section</u>	<u>Services</u>	<u>Status</u>		
		<u>Completed or on-going</u>	<u>Delayed</u>	<u>Cancelled</u> <u>1/</u>
<u>Review of Studies & Designs</u>				
4.2.1.	Review of relevant reports, data & designs Inception Report Submitted to USAID/Thailand	X X		
4.2.2	Develop design criteria for sites 2 through 7	X		
4.2.3	Detailed specifications of topograph- ical surveys & land classification		X <u>2/</u>	
4.2.4	Review designs & technical specifi- cations for irrigation & drainage systems	X		
<u>Drainage System</u>				
4.2.5	Assist with hydraulic studies and drainage design		X <u>3/</u>	
<u>Canals & Drainage Systems</u>				
4.2.6	Recommend animal crossing locations in canal design Modify designs to prevent water pooling Recommend program of weed control Recommend & design method to control siltation	X	X <u>5/</u> X <u>5/</u>	X <u>4/</u>

CONSULTANT PROGRESS IN PROVIDING CONTRACT SERVICES
THROUGH APRIL 1984

<u>Contract</u> <u>Section</u>	<u>Services</u>	<u>Status</u>		
		<u>Completed</u> <u>or on-going</u>	<u>Delayed</u>	<u>Cancelled</u> <u>1/</u>
<u>Improve/Increase</u> <u>Agricultural</u> <u>Production</u>				
4.2.7	Review relevant literature	X		
	Investigate status of relevant academic & institutional research		X	
	Investigate current RTG programs & staffing & determine potential capability to support project	X <u>6/</u>		
	Assist in developing a work plan for operational research	X		
	Assist in developing work plan for extension of improved agricultural practices		X <u>7/</u>	
	Technical assistance to extension & research personnel		X <u>6/</u>	
<u>Marketing &</u> <u>Increased</u> <u>Agricultural</u> <u>Production</u>				
4.2.8	Estimate domestic market demand		X <u>8/</u>	
	Recommend cropping options for each site beginning Jan. 1983. (Estimate increased cropping levels)		X <u>9/</u>	
	Develop plans for selling produce	X		
	Organize system of grading & quality control			X <u>10/</u>
	Maintain links with private sector & RTG elements that influence markets	X		

EXHIBIT 3

CONSULTANT PROGRESS IN PROVIDING CONTRACT SERVICES
THROUGH APRIL 1984

EXHIBIT 3

<u>Contract Section</u>	<u>Services</u>	<u>Status</u>		
		<u>Completed or on-going</u>	<u>Delayed</u>	<u>Cancelled 1/</u>
	<u>Training, Work-shops, Seminars, O&M</u>			
4.2.9	Provide on-the-job training in on-farm techniques at Huai Aeng to RTG design teams & personnel	X 11/		
	Provide technical assistance to RTG on canal construction & access roads	X 12/		
	Provide on-the-job training in water management & system operation and maintenance	X 12/		
	Provide technical assistance to develop adequate O&M procedures, activities, budgets, staffing, scheduling and day-to-day O&M handbook		X 13/	
	Provide seminars and workshops for WUG's		X 14/	
	Provide organizational assistance to farmers in WUGs to improve water management		X 14/	
	Develop a schedule & agenda for farmers fieldtrips	X		
	Provide technical assistance in agricultural support services (agricultural extension, research, etc.)		X 7/	
	Develop & help establish a replicable approach		X 15/	
	<u>Implementation Schedule</u>			
4.2.10	Submit updated implementation schedule		X 16/	

CONSULTANT PROGRESS IN PROVIDING CONTRACT SERVICES
THROUGH APRIL 1984

<u>Contract Section</u>	<u>Services</u>	<u>Status</u>		
		<u>Completed or on-going</u>	<u>Delayed</u>	<u>Cancelled</u> <u>1/</u>
<u>Project Estimates</u>				
4.2.11	Prepare a capital cost estimate for each site & activity		X	<u>17/</u>
	Recommend improvements to increase cost effectiveness of Huai Aeng construction and O&M		X	
<u>Construction Documents</u>				
4.2.12	Advise MOAC in preparation of construction drawings	X		
<u>Supervision of Construction</u>				
4.2.13	Review supplementary designs		X	<u>18/</u>
	Assist in technical supervision	X		
	Assist in certification of construction contractors' invoices			X <u>19/</u>
	Assist in preparation of detailed progress reports	X		
	Review As-Built drawings			X <u>20/</u>
<u>Progress Reports</u>				
5.1	Submit on quarterly basis	X		
<u>Other Deliverables</u>				
5.3	Implementation work plan	X		
	Preliminary project implementation schedule		X	
	Inception Report	X		

EXHIBIT 3

**CONSULTANT PROGRESS IN PROVIDING CONTRACT SERVICES
THROUGH APRIL 1984**

<u>Contract Section</u>	<u>Services</u>	<u>Status</u>		
		<u>Completed or on-going</u>	<u>Delayed</u>	<u>Cancelled</u> <u>1/</u>
	Construction Quality Control Manual		x <u>21/</u>	
	Project Interim Status Report	X		
	Final Construction Quality Control Manual			To be delivered at end of Project
	Site I O&M Manual		x <u>13/</u>	

- 1/ Status is opinion of CTF team leader and does not represent formal decision of USAID/Thailand, RTG or Parsons Overseas Company.
- 2/ RTG has not provided required data.
- 3/ Design criteria not yet finalized by RTG.
- 4/ Virtually impossible in rice-paddy farming.
- 5/ To be part of maintenance manual.
- 6/ RTG not providing sufficient number of extension agents.
- 7/ No extension consultant on CTF. Will arrive summer of 1984.
- 8/ Underway for Huai Aeng, but not finished. Plans to perform same service for other sites cancelled.
- 9/ DOAE has expressed no interest in having this done.
- 10/ No staff member qualified to do this.
- 11/ On-the-job training given to engineers & hydrologists, but delay in training extension workers. DOAE has not provided personnel.
- 12/ Will only be done at Huai Aeng. Done orally, no written guidance.
- 13/ See p. 15 of text.
- 14/ Underway at Huai Aeng, but not yet underway at other sites (Sites not yet determined)
- 15/ Baseline data not yet complete.
- 16/ Implementation schedule delayed 9 months through inability of initial CTF consultants to develop format.
- 17/ No construction contracts finalized.
- 18/ No supplementary design or drawings yet produced by CTF or RTG.
- 19/ No construction contracts yet awarded. CTF does not have adequate staff for anymore than cursory review.
- 20/ No "as-built" drawing produced.
- 21/ Draft manual delivered 16 months behind schedule.

EXHIBIT 3

USAID/THAILAND RESPONSE TO DRAFT REPORT
U.S. INTERNATIONAL DEVELOPMENT COOPERATION AGENCY

USAID THAILAND
BANGKOK, THAILAND



CABLE : USAID THAILAND

TELEPHONE: 262-9191-9

SEP 10 1984

Mr. Aubrey F. Mills
Acting RIG/A/M
USAID Manila
Philippines

Dear Mr. Mills:

We have reviewed the Draft Audit Report for the Northeast Small Scale Irrigation Project, and submit the attached memo in response.

The matter of replicability involves factors noted in my memorandum. Although delays have been troublesome and costly, most have resulted, as well, in improved design. The Director General of RID views the current approach as quite positive making either modification or deletion of the goal of replicability awkward. I suggest that Recommendation No. 1 be removed or modified in the final report.

While I continue to believe that limiting support to 3 sites may be most desirable I would prefer to retain flexibility of position at this time and thus request that Recommendation # 2 be deleted or rephrased to allow a determination on the number of sites to be supported to be made following clarification of RTG intentions.

The issue of O&M as addressed in Recommendation # 3 remains a serious matter. It is receiving all possible attention from my staff. The recommendation itself demonstrates the unanimity of USAID's position and will be useful in pursuing the goal of improved maintenance and operation of irrigation systems.

My memo again provides the background of the situation regarding Recommendation # 4. Our monitoring of the CTF will be more formal as a result of the use of detailed plans against which we can measure and evaluate execution of the CTF contract.

Location of the "Missing" equipment should make Recommendation # 5 unnecessary.

USAID/Thailand appreciates Mr. Burns' work which he completed with professionalism and courtesy. Please contact us if additional information is required for finalization of this audit.

Sincerely,

Robert Halligan
Robert Halligan
Director



memorandum

DATE: September 10, 1984

REPLY TO
ATTN OF: Robert Halligan, Director, USAID/Thailand *RH*

SUBJECT: Reply to the Draft Audit Report for
Northeast Small-Scale Irrigation Project

TO: Mr. Aubrey F. Mills, Acting RIG/A/M

We have received the draft of Audit Report No. 2-497-84-08 reporting the findings of Auditor J.J. Burns on the Northeast Small-Scale Irrigation Project. The report is thorough and fair, even if we are not in full agreement with the recommendations.

Regarding Recommendation No. 1, the Mission feels that matters such as redesign of structures in the interests of both economy and simplicity of operation or the change in philosophy underlying the RTG decision to shift greater responsibility for O&M to the farmers, while delaying implementation, do not impair replicability. Rather, these were necessary corrective measures for the "Acceptance of a Flawed Design Study..." as noted by the auditor and listed as the second finding in the executive summary.

A. While a cost of \$1,454 per hectare is high, we believe that it will lead to a simpler and more economic system of operation maintenance. Therefore, we do not believe that the increased costs will negate the possibility of replication. The Director General of RID now states that the NESSI design is the most practical model thus far projected for Northeast Thailand.

The draft audit report recommends either dropping the goal of replicability or quantifying what is meant by replication. While we cannot quantify replication or guarantee that the methodologies developed under NESSI will be applied, we are reluctant to drop the replication goal. The design which has evolved is considered quite acceptable as a major innovation in the plan to shift additional responsibility for O&M to the farmers. It is, rather, unique attitudes related to ethno-linguistic problems, plus essentially very marginally productive land, even with a workable irrigation system, that calls replicability into question. A formal deletion of replicability as a primary goal could prejudice the acceptability of fundamentally sound design principles. Therefore, we suggest that the recommendation be reworded to reassess project objectives and set out new verifiable indicators.

As for Recommendation No. 2, USAID/Thailand has agreed within the Mission that in purely financial and economic terms it would be best to limit AID financial support to implementation at 3 sites. This view is a matter of

record and is included in the PIR Report for March 30, 1984. Following this project-level decision, the RID submitted the issue of the reduced scope of construction for the project to the Cabinet to determine if the reduction of scope would be interpreted as a breach of the original agreement. The Cabinet was requested to choose among 3 alternatives:

- a. Concur in continuation at 3 sites only;
- b. Authorize additional funding to allow work on all 7 sites as originally planned; or,
- c. Discontinue all activities on the project.

On May 10, 1984, I wrote to the Director General of RID urging submission to USAID of the plans for each site as soon as possible (copy attached). It was not until August, 1984, however, that the Mission was verbally notified that work on the first three NESSI sites should continue, and that the issue of the final four sites was still under consideration. As of August 23, RID, assured of authority to continue implementation at three sites, began drafting a reply to my letter of May 10, 1984.

While the mission has suggested that construction should be limited to the first three sites, the position of the RTG, as noted in the draft report on page 16, is not clear. Efforts are being made by RID to transfer funds surplus to other activities, to the NESSI Project. The RTG feels commitment to the seven sites and would like to retain the option of working on all of them as part of the project.

I would like to point out that the bulk of NESSI loan funds will be expended on construction at the initial three sites. Only approximately \$1.5 million will remain to support construction at the final four sites. While these funds could theoretically be shifted to O&M the RTG would prefer not to do so. Rather, the RTG is increasing its own budgetary resources devoted to O&M. We would like to be supportive of their efforts and their interest in working at all seven sites. Therefore, we suggest that Recommendation No. 2 be revised to urge speedy resolution of the number of sites to be covered under the project and an exchange of PILS and firm work plans for the agreed upon number of sites.

Recommendation No. 3 is recognized as a continuing problem. Since the completion of audit field work, RID has made available a significant amount of additional funds nationwide for O&M, reportedly Baht 1,600,000,000 or approximately \$70 Million. The funds are considered adequate for the capacity of the RID/O&M at this time. Further, increased time and priority for O&M on extant irrigation facilities is seen by RID as a corollary to the RTG's decision to deemphasize construction of new irrigation works. At the same time it is fully recognized that achievement of acceptable maintenance and efficient operation of systems, especially those functions now falling to farmers themselves, will require the full attention and priority of appropriate Mission staff.

The Mission is actively exploring the problem of small farmer organizations and their potential role in irrigation systems O&M.

USAID personnel assigned to the NESSI Project may have been remiss in not requiring of the Consultant Task Force (CTF) the type of detailed planning proposed in Recommendation No. 4. Mission staff did, however, informally review work plans prepared in mid 1983 by the CTF team leader, a consultant with more than 30 years of management experience. Although the work plan was not officially submitted to USAID, it was used as a basis for his direction of the task force. Further, required annual work plans provide direction for the CTF. While there were problems with the team fielded at the beginning of the project, the quality and performance of those who replaced that group just over one year ago has been highly satisfactory to both the RID and Mission personnel assigned to the Project. The USAID Project Officer and the Assistant Project Officer have visited the project site on a regular basis and have attended the bulk of the bi-weekly field implementation meetings where work plans for the CTF and all other projects elements are discussed. Contingencies, such as the unexpected high utilization of dry season water in 1984 in the pilot area, and the consequent need to quickly develop a local marketing scheme for the produce, cannot be anticipated or planned for. Thus, while the Mission accepts the recommendation for a CTF detailed work plan and has requested such, we would like to ensure you that more detailed planning had been done than was formally recorded in project documentation.

The "missing" equipment noted in Recommendation No. 5 was located soon after the departure of Mr. Burns. Unfortunately, neither the current RID Project Field Director or the current USAID Project Officer was assigned to the NESSI Project at the time the equipment was purchased. The equipment, a soil salinity tester and a set of pocket penetrometers, were procured by the Department of Land Development (DLD) and were held by that department, thereby escaping attention. The tester is now in Bangkok while the penetrometers are assigned to DLD personnel at the project site and are available for inspection.

Attachment: a/s

April 10 1984

Capt. Sunthorn Ruanglek
Director-General
Royal Irrigation Department
Samsen Road, Bangkok

Subject: Northeast Small-Scale Irrigation Project (A03-0312)

Dear Capt. Sunthorn:

Since early 1981, both your office and USAID/Thailand have been attempting to work out an acceptable design for the reduced scope of the NESSI Project and a time frame for completing work at agreed upon sites. In March, the efforts to negotiate and award the contracts were proceeding well and it appeared that work at three sites would be initiated this year. However, unforeseen circumstances have now delayed finalization of the contracts and the beginning of construction until next dry season. Further, several different suggestions concerning work at sites other than Huai Aeng, Phuttha Uttiayan and Huai Kaeng have been discussed. These delays and problems have resulted in considerable uncertainty about the future of the NESSI Project.

During USAID's most recent internal review of progress under the NESSI Project, we discussed the reasons for the delay in contracting and construction. While I am sympathetic to the reasons, I am concerned that the problems be resolved and that we agree upon a mutually acceptable future plan of work as soon as possible. Therefore, I request that the NESSI Project Team submit to USAID its plans for the various NESSI sites and a work schedule for each.

We look forward to receiving this information soon, and to working out details that will allow an early start of construction in the 1984/85 dry season. If USAID can be of any assistance in preparing the plans, please feel free to contact Richard Flaspohler, NESSI Project Officer, or me.

Sincerely,

R/Robert Halligan

Robert Halligan
Director

cc: Mr. Suha Tianomsingha, RIO
Mr. Thana Tjongton, IADAC
Mr. Vira Hongsangnak, RIO
Mrs. Puangpot Klahan, BOB

O/AGR:REFlaspohler:rs:5/19/84
Clearances in draft:O/AGR:RRessegule
J/AGW:JAFotl
D/CAPeasley
D:RHalligan

LIST OF REPORT RECOMMENDATIONS

Recommendation No. 1

USAID/Thailand quantify project goals, and set milestones which will allow project managers to measure progress and realistically assess project achievement. (Page 9.)

Recommendation No. 2

USAID/Thailand require the Consultant Task Force leader to formulate a detailed work plan with target dates and prioritized objectives for each task force member. (Page 11.)

Recommendation No. 3

USAID/Thailand decide in the near future on the reduced number of sites to receive AID financing, and, to the extent possible, utilize funds freed by the reduction of the NESSI project's scope to upgrade the project's long and short-term O&M capabilities. (Page 17.)

Recommendation No. 4

USAID/Thailand determine whether the RTG is financially capable and willing to provide adequate O&M for all AID-financed capital projects and develop an appropriate program of O&M reform or support in accordance with AID policy. (Page 17.)

LIST OF REPORT RECIPIENT

USAID/Thailand

Director 5

AID/W

Bureau for Asia:

Assistant Administrator 1
Deputy Assistant Administrator (Audit
Liaison Officer) 2
Office of the Philippines, Thailand & Burma
Affairs (ASIA/PTB) 1

Bureau for Science & Technology:

Office of Development Information & Utilization
(S&T/DIU) 2

Bureau for Program and Policy Coordination

Office of Evaluation (PPC/E) 1
Center for Development Information and Evaluation
Development Information Division (PPC/CDIE/DI) 2

Bureau for Management:

Assistant to the Administrator for Management 1
Accounting System Division (F/FM/ASD) 2
Office of Contract Management (M/SER/CM) 3

Bureau for External Affairs

Office of Public Affairs (XA/OPA) 2

Office of the Inspector General:

Inspector General (IG) 1
Assistant Inspector General (AIG) 1
Office of Investigations and Inspections (IG/II) 1
Communications and Records (IG/EMS/C&R) 12
Policy, Plans & Programs (IG/PPP) 1

Office of Legislative Affairs (LEG) 1
Office of the General Counsel (GC) 1

Regional Inspector Generals:

RIG/A/Washington 1
RIG/A/Nairobi (East Africa) 1
RIG/A/Dakar (West Africa) 1
RIG/A/Cairo (Egypt) 1
RIG/A Karachi (Near East) 1
RIG/A/Latin America 1
RIG/II/Manila 1