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**PACT - A RETROSPECTIVE
COMMENTARY AND A PLAN
FOR THE FUTURE**

by

**BATTELLE
PACT/U.S. PROGRAM ADVISOR**

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EXECUTIVE SUMMARY

The Program for the Advancement of Commercial Technology (PACT) is an initiative geared toward the development of technology-based joint ventures, bringing together the technological talents of India with the technology management and commercialization expertise of U.S. companies. The PACT concept was developed with the support of the U.S. Agency for International Development (USAID), in cooperation with the Industrial Credit and Investment Corporation of India (ICICI). As an experiment in fostering international commercial technology cooperation, PACT was initiated in 1986 with the aims of promoting economic development, expanding the capabilities of both Indian and U.S. firms, and producing effects that would enhance both domestic and international commerce.

The execution of the PACT program has produced a series of projects that cover a broad range of technologies, and has developed a strong modus operandi that links two diverse institutions: ICICI and Battelle's Columbus Operations. ICICI brings to the working partnership the detailed knowledge of the Indian economy, Indian industry, and a strong financial operation. Battelle, the U.S. Program Advisor, brings expertise in a broad range of technologies, technology development and management, and expert awareness of U.S. business practices.

The PACT experiment has resulted in the development of a wide range of projects, covering technical fields as diverse as mushroom growing, software development, medical instrumentation, biological insecticides, waste treatment, chemicals production, novel permanent magnet alternators, and training simulators. It has further fostered viable working relationships between Indian and U.S. companies and technical organizations. As a secondary benefit, PACT served as a model that has inspired emulation: the initiation of technology-development funding mechanisms in other Indian development banks, and the expansion of ICICI programs funded through USAID and the World Bank.

The role of Program Advisor has required a number of different types of activities that relate to overall program promotion, individual project development, technical evaluation and enhancement of proposals, monitoring of approved projects, and a range of other general support activities. As might be expected of any experiment, the role of the Program Advisor, and its relationships with ICICI, AID, and the PACT-supported companies, has evolved over the duration of the program. As the program nears the end of the first five-year period, decisions must be made relative to the following basic issues: (1) continuing the functions of the U.S. Program Advisor; (2) refining the execution of that role; and (3) what clarifying capabilities which will be needed to execute the U.S. Advisor function.

This report provides guidance on these issues based upon Battelle's experience. Through a critical evaluation of both the expectations and the execution, the report discusses the major activities that were expected of the Program Advisor as defined in the RFP, the rationale for modification of the duties, the

approaches undertaken by Battelle, and recommendations relative to the continuing presence of this function. Special emphasis is given to two principal perspectives: the activities required for the development, support, and monitoring of individual projects that qualify for PACT investment; and the activities that are required for promotion of the PACT concept as an integral part of future USAID programs and initiatives.

The paper, in essence, draws two major conclusions. First, the success of individual PACT projects requires full communications among the participating organizations at all stages of the program. As a program thrust, PACT is conceptually sound; but there are many opportunities for the concept to break down.

- If the technology is not well founded...
- If the marketing and business plans do not develop in concert with the technical development...
- If the progress on projects is not critically evaluated at all stages of development...
- If the division of duties between the two partner companies is not well-defined...
- If the commitment to the project does not represent a high priority with the individual partners...

If any of these project attributes are deficient, the project will most likely not accomplish its objectives.

Second, the success of PACT as an ongoing program designed to accomplish the long-term goals of AID and the host country requires that specialized versions of PACT be defined within the framework of local capabilities and cultures. The approach offers a means whereby joint private-sector collaborations can be promoted to pursue the overall goals of the public sectors. But the approach must also include means whereby the supporting agencies can be assured that the overall investment will be well spent. The host country Program Advisor--usually expected to be a development bank--must make investment decisions that will support both the local industry needs and the local government development policies. The U.S. Program Advisor must have the capabilities to understand and support the U.S. partner and the goals of USAID, or other funding source.

The present Indo/U.S. PACT initiative has succeeded in bring together industries and institutions which complement each other in the execution of the duties required in the pursuit of the objectives. The continuation of the present PACT program, and its emulation in other countries, will succeed if this basic recipe is continued.

INTRODUCTION

The Program for the Advancement of Commercial Technology (PACT) has been operational for almost five years. PACT, an initiative supported by the India Mission of the United States Agency for International Development (USAID) and operated through the Industrial Credit and Investment Corporation of India (ICICI), was initiated as an experiment to promote the fuller utilization of Indian R&D capacity, to merge this capacity with U.S. business development expertise, and, through collaborative effort to create new jobs, new markets, and new economic activity that would benefit all parties concerned.

From the beginning of this program, ICICI has cooperated with two Advisory Councils (one in India and one in the U.S.) and a U.S. Program Advisor (USPA). Following the issuance of a Request for Proposal and the evaluation of responses, the position of USPA was assigned to the Columbus Operations of the Battelle Memorial Institute (hereinafter referred to only as "Battelle"). The roles of the Program Advisor were many and varied, including:

- promotion of the program concept
- solicitation of individual proposals
- evaluation of proposals
- monitoring of projects that were funded by PACT
- searching for appropriate U.S. partners
- development of protocols for program management.

In addition, the USPA conducted additional activities in support of PACT, AID, ICICI, and the broader concept of Indo/U.S. collaboration, including interaction with trade missions, development and presentation of conference materials aimed at promoting other research collaborations, and distribution of information relative to non-PACT financing.

The original USAID allocation to the PACT Technology Development Fund was \$10 million, with additional funds provided to cover administrative support from ICICI and the costs incurred by the USPA. Repayment for successful projects was limited to 200 percent of the grant amount. The activities to be undertaken by the USPA were scheduled to have covered the first five years of the PACT program. With a view to make the PACT self-sustainable, \$5.5 million was added to the PACT Technology Development Fund in September, 1990, and the repayment ceiling was raised to 250 percent. In addition, the Project Assistance Completion Date was extended to July 31, 1995. In view of what has been learned over the original experimental period, a question that must be addressed at this time is whether the continuing phases of PACT will require the services of a U.S. Program Advisor.

Inasmuch as AID, in cooperation with ICICI and the Indian and U.S. Advisory Councils, must now come to a decision relative to the role of any Program Advisor, it is appropriate that Battelle provide an overview of what that role has been. The following discussion is directed toward a statement of: (1) the original roles that had been suggested for the Program Advisor, (2) the manner in which these roles have

changed and evolved during the course of the program, and (3) the suggestions as to which elements of the Program Advisor's activities are deemed to be necessary for the continued success of PACT.

BACKGROUND

In August, 1985, the Government of India and the Government of the United States of America entered into an agreement to establish the Program for the Advancement of Commercial Technology (PACT). PACT--officially started in 1986--is best described as an initiative to foster the development of technology in India, and to do so in such manner as to promote private sector involvement. According to the agreement, USAID would initiate and support the initiative with funding over a specified period of time.

A council of eminent business, government, and technical leaders (five each in the U.S. and India) was established to guide the program. The Industrial Credit and Investment Corporation of India Limited (ICICI) was given the responsibility for managing and administering the funds and developing guidelines for program eligibility. Battelle, the Program Advisor located in the United States, supports ICICI through the execution of a number of different functions. Other technical advisors in the U.S. and India are called upon for advice under appropriate circumstances.

PACT is an experimental project that is designed to foster the growth of technology-based business in India by reducing the risk to the private sector in bringing a new product or process to commercialization. Its principal objective is to build the market-oriented research and development capacity of India's private sector through the promotion of selected areas of advanced technology, while sharing in the financing and risks. To accomplish this objective, PACT engages in activities that

- Accelerate the pace and enhance the quality of technological innovations in India
- Contribute to the enhancement of capabilities to conduct and commercialize new technology
- Promote Indo-U.S. joint development and business collaborations
- Encourage thorough up-front technical and business planning.

Consequently, PACT provides assistance and incentives to private Indian and U.S. enterprises that agree to work as partners for the purpose of developing and promoting new technology and processes, and expanding viable business opportunities for both firms. In such a partnership, the Indian firm has an opportunity to become acquainted with U.S. R&D strategy, project selection methodologies, market identification and development, and R&D management techniques.

PACT expects to recoup its investment from royalties paid on the sale of products or processes which are successfully developed through the PACT-funded efforts. The recovered funding would then be applied to future projects that qualify for development support.

The Principal Participants in the Implementation of PACT

PACT is implemented by ICICI, an all-Indian PACT Project Screening Committee, and the U.S. Program Advisor. Their functions are described briefly in the following paragraphs.

PACT Administrator

As PACT administrator, ICICI has principal responsibility for guidance and liaison with other organizations in implementing the PACT program. It establishes the eligibility criteria for PACT support of joint Indo-U.S. ventures, and monitors promotional efforts. ICICI's PACT Division also arranges the review of project proposals (technology development and business plans) by appropriate technical specialists in India and by the U.S. Program Advisor, and presents proposals to a Screening Committee for final approval. Before a joint venture can start development work on a proposed project, ICICI, the Indian partner, and the U.S. partner execute a conditional grant agreement that itemizes the conditions for PACT grant disbursements and repayments.

ICICI also monitors progress, determines the amount and timing of PACT disbursements, collects the repayments, and assumes principal responsibility for terminating projects which are unsuccessful or which appear to offer little promise of attaining goals.

PACT Screening Committee

The PACT Screening Committee examines all acceptable and eligible proposals and approves the appropriate funding breakdown. Following approval, a cooperation and financing agreement is drawn up by ICICI and the proposer. The Screening Committee's deliberations consider a broad range of factors, including the technical feasibility, the market (both in India and elsewhere), the extent to which the project coincides with broader development interests in India, and the competing technologies or products and processes. The Screening Committee is composed of representatives from ICICI, from industry, and from the Government of India.

U.S. Program Advisor

The U.S. Program Advisor, Battelle, represents the USAID and the interests of the U.S. government on the PACT program. Battelle assists in the identification of appropriate U.S. businesses interested in international cooperative ventures, and in monitoring the status of approved projects. Battelle also aids the program administrator in establishing procedures, identifying and qualifying projects, reviewing technical and (selected) business plans, and monitoring the progress of approved PACT projects.

Specific Roles of the U.S. Advisor

The original work statement describes broad activities that the U.S. advisor is expected to carry out to assure the success of PACT. Battelle's experience with the promotion of technology-based joint ventures under the aegis of PACT suggests that a wide range of activities must be coordinated to achieve optimum results. For the purposes of this discussion, it is appropriate to enumerate the major roles that were required of the U.S. Program Advisor, the Battelle response to these roles, an assessment of impact and importance, and recommendations for future activities.

The Objectives and Roles of the U.S. Program Advisor, as specified in the original Request for Proposal, are summarized as follows:

1. Identify U.S. firms interested in R&D collaboration with Indian firms, assess their capabilities, and assist them in preparing appropriate business and technology proposals.
2. Plan and execute a marketing effort in the United States to inform U.S. businesses about the opportunities and incentives available for joint ventures in R&D in India through this project.
3. Promote and disseminate PACT information to the U.S. business community.
4. Perform initial evaluation of project concepts and ideas with regard to potential acceptability to PACT.
5. Assist U.S. firms in preparing business and technology development plans for PACT financing.
6. Provide the necessary project liaison to the U.S.-based PACT Council, PACT, Indo-U.S. business groups, and project evaluation agencies, such as the National Bureau of Standards.
7. Monitor approved PACT projects.
8. Maintain information on U.S. and Indian companies interested in joint ventures; identify technological opportunities for Indian, U.S., or third country markets.
9. Develop and maintain ties with innovative, technology oriented companies in the U.S.
10. Provide guidance on strategies and operating procedures to effectively implement the program.
11. Advise PACT of new opportunities and strategies for program development.

As noted in the ensuing discussion, not all of these objectives and roles, or even the tasks undertaken to satisfy them, are completely independent. To reduce repetition, several of these will be grouped together. They are presented in the sequence in which the PACT program and/or individual PACT projects have proceeded.

Objectives/Roles 1, 2, and 3.

Identify U.S. firms interested in R&D collaboration with Indian firms; assess their capabilities; assist them in preparing appropriate business and technology proposals.

Plan and execute a marketing effort in the United States to inform U.S. businesses about the opportunities and incentives available for joint ventures in R&D in India through this project.

Promote and disseminate PACT information to U.S. business community.

In general the activities above are designed to gain the attention of those business leaders, in both the U.S. and India, who influence R&D decisions, who demonstrate a receptive attitude to international business collaboration, and who recognize the advantages of assisting developers with the proper know-how to bring emerging products and processes to commercial success. Over time, the promotional activities of the U.S. advisor were modified at the direction of ICICI and Battelle, with the concurrence of USAID.

As U.S. Program Advisor, Battelle has promoted PACT opportunities through informational brochures mailed to target clients and others referred to the program through various governmental agencies and offices, including the U.S. AID/Washington and New Delhi offices, the U.S. Department of Commerce, the Indo-American Chamber of Commerce, the Association of Asian Indians in North America, the Indian Investment Center, and the International Trade Division of the Ohio Department of Development. Battelle prepared news releases and other promotional materials for business development activities associated with state governments and private promoters. Battelle also developed outreach programs in conjunction with international groups, university seminars, and business functions and exhibitions. Furthermore, Battelle provided briefing materials for trade missions to India that were operated by the States of Ohio, California and New Jersey. Trade missions from India to the U.S. have also been briefed on the PACT program and the opportunities for joint technical development. These latter groups included missions that were sponsored by the Confederation of Engineering Industry, the Punjab-Haryana-Delhi Chamber of Commerce and Industry, and the Indo-American Chamber of Commerce.

To date, Battelle also has participated in educational/promotional meetings supported by the Silicon Valley Indian Professional Association and the Florida Governor's Conference on World Trade.

In addition, Battelle delivered detailed oral presentations on PACT at the International Seminar on Technological Innovation, held in Trinidad in 1988 in conjunction with the General Assembly of World Association of Industrial and Technological Research Organizations. Battelle also participated in the 1989 International Trade Fair New Delhi, promoting PACT at an exhibit booth and providing speakers at technical seminars. In other activities in India, Battelle supplemented ICICI's promotional work in India by briefing various Chambers of Commerce and presenting seminars at local chapters of the Indian Confederation of Engineering Industry, as well as at the Punjab-Haryana-Delhi, Madras, Calcutta, and Bombay Chambers of Commerce and Industry. As a member of an Ohio Trade Mission to India,

Battelle further promoted PACT in meetings with over 80 different technology-based businesses throughout the country.

As a result of these promotional efforts, as well as additional interactions with other institutions, direct feedback and inquiries were received and processed over the entire course of the program. Many of these continue to be generated through contacts with the Indian Embassy (Washington), the Indian Consulates (San Francisco and New York), the Indo-U.S. Joint Business Council, Overseas Private Investment Corporation, the Association of North American Indians of Asian Origin, the Indo-American Chamber of Commerce and the Indian Investment Center, the U.S. Chamber of Commerce and the U.S. Department of Commerce.

ICICI, USAID, the Advisory Councils, and Battelle all had initial expectations that many U.S. companies would be interested in establishing joint ventures with Indian counterparts. In actual practice, this was overly optimistic; the cool response was due, in large part, to the vastly different cultural practices and business approaches prevailing at the time and even continuing to this day.

In elaborating on this point (and as guidance to future activities by the U.S. Program Advisor), it became abundantly clear that the lack of enthusiasm for joint programs in India was fostered by ignorance and by the pressures of the day. The lack of knowledge regarding India and its practices and capabilities could be overcome through an education and awareness program, which was pursued throughout the promotional activities.

A more significant factor, however, was the greater concern with issues related to the ability to add another significant project to an already full menu of activities. This is particularly true of small and medium-sized companies--the very group that could reap the greatest benefits and could relate better to their medium-sized Indian partners.

The provisions of the RFP and Battelle's response called for very broad publicity relative to the PACT program. The initial experience showed, however, that such approaches were not cost effective. Consequently, greater effort was directed toward more selective publicity, concentrating on audiences that were pre-disposed toward international business, and with specific interest in India. Thus, the promotion effort evolved into one that stressed interaction with audiences, companies, and individuals that required less "basic training" relative to the Indian technology establishment, the rules of doing business in India, and similar items. It is strongly recommended that any future PACT-promotion activities follow a similar approach, relying upon established networks that maintain an awareness of business opportunities in India.

One should not infer, however, that contact with such pre-screened entities will produce large numbers of potential U.S. partners or originators of PACT projects. The dissemination of PACT information to an individual U.S. business will not be successful unless it is timely, addressing a need or opportunity that is of nearly immediate concern. Unless a joint program is of interest for the very near future, it is likely that an otherwise receptive audience will focus attention on other priorities.

Overall, the promotion efforts have been quite successful in terms of finding interest within a selected portion of the U.S. business environment. As the program developed, a larger proportion of Non-Resident Indians (NRIs) became more aware of the program, and their interest and response have been quite substantial.

It is important that continued efforts be directed to the promotion of not only the PACT initiative but also the broader concept of Indo/U.S. technology-based cooperation. The continuing U.S. Program Advisor role should take a broad stance relative to both of these issues. Simple deal-making, while very important to PACT and to the furtherance of private sector cooperation, will not be sufficient to permit the accomplishment of the broad and long-term goals of the two governments and the agencies which represent them.

In keeping with the agreement between the Governments of the U.S. and India, a project must have a technology development component to be eligible for PACT support. This excludes any project that is directed solely to technology transfer or licensing. Consequently, the technical expertise available at a firm in India must be matched to technical and management expertise of a U.S. partner.

Objectives/Roles 4.

Perform initial evaluation of project concepts and ideas with regard to potential acceptability to PACT.

Initially the U.S. advisor was expected to play a very broad role in the technical evaluation of project proposals for joint ventures, and that role has been incorporated into the Battelle activities. It is important in this regard to consider a substantial contrast between the operations of PACT and those of the U.S.-Israeli Binational Industrial Research and Development (BIRD) Foundation. The original design for PACT drew, in part, from the experiences of the BIRD Foundation. One feature of BIRD involved project proposal review by the U.S. National Bureau of Standards (NBS),¹ and the original PACT procedures retained this role.

The actual performance of Battelle's activities precluded the necessity of utilizing NBS in this manner. Three points should be made with regard to this change in operations. First, the character of BIRD-sponsored programs had a much greater emphasis toward basic research, an area in which NBS excels, and for which it might be natural to consider as an appropriate technical review body. This was, to be sure, not the case with PACT-supported program, which are much more developmental in nature. Second, the Bureau (according to discussions with senior NBS staff) was never especially excited about the conduct of such reviews for BIRD. Although they generally found the projects to be challenging and worthwhile, the process was seen as a "diversion"; the applied research, development, and commercialization aspects of PACT projects was even further from their areas of interest. And, third, the Bureau staff was not particularly attuned to the "business" aspects of technology, and did not relate well to that feature of the PACT program.

The broad range of technical capabilities, and the constant interactions with the applied research, development, commercialization, and business sensitivity that characterizes Battelle led to the conclusion that technical review by NBS was not necessary. Thus, with only a few exceptions where Battelle felt that it did not have the requisite capabilities, all projects were subjected to Battelle's technical review, drawing

¹ Now renamed as the National Institute for Standards and Technology.

upon the more than 1500 scientific and technical research staff who are formally trained in the appropriate disciplines.²

Additional important differences made it clear that the BIRD approach could not be exactly replicated in PACT. For example, BIRD derives its primary income from the interest on an endowment; BIRD does not specify a repayment schedule for its grants, but rather collects a royalty on successful products. Furthermore, BIRD provides some assistance oriented more toward basic research, rather than on the business development side.

Battelle has assisted ICICI in evaluating literally hundreds of informal inquiries, pro formas, and proposals for joint ventures seeking PACT support. These efforts prepared the way for Screening Committee approval of 26 projects and four prefeasibility studies through December 1990. The specific activities on this task include:

- review of technology and business development plans
- identification and qualification of U.S. partners
- providing guidance to the U.S. and, where requested, the Indian partners during the proposal writing stage.

ICICI's PACT Division has been able to rely on timely assistance from Battelle to respond quickly and effectively to the challenge of qualifying potential cooperative ventures and identifying appropriate conditions for funding support. This is due in large part to the availability of in-house expertise at ICICI to evaluate the Indian side of the partnership, and the availability of in-house expertise at Battelle to evaluate the U.S. side of the proposals. Either organization has the responsibility for identifying and using the appropriate expertise to conduct a thorough evaluation. In some cases, outside resources may be named as members of a technical advisory committee; in others, the experts maintain an informal relationship to the responsible organization. This approach makes it possible to conduct a thorough evaluation of ideas for action before a project proposal is sent to the PACT Screening Committee.

To ensure that PACT--as well as similar initiatives operated through other financing sources---can operate effectively in the future, the Program Advisor should assume an active role in undertaking or coordinating project review. Given the shortage of funds that are available for initiating and sustaining innovative approaches to international technology development and collaboration, it is incumbent upon all parties concerned to assure that the limited funds are dispensed efficiently and efficaciously.

To be sure, the technical aspects of technology development and commercialization are not always the deciding factors; however, without solid technology to support an eventual process or product, the PACT approach will break down and the resultant reflows to the program will not permit continuation and expansion. Thus, the continuing access to an independent technology-assessment and evaluation source will be required.

²It was learned during the course of the program that there had been some technical reviews done by NBS, these having come to NBS directly from ICICI. It is believed that this practice was not followed extensively, and was subsequently discontinued. As far as we can tell, there were no discrepancies between the Battelle and NBS conclusions.

Objectives/Roles 5.

Assist U.S. firms in preparing business and technology development plans for PACT financing.

The overall PACT project selection process is one which, in theory, is designed to produce projects which satisfy various criteria:

- the projects should be technically sound, representing an approach to a process or product which is consistent with good technical principals
- the technical status of projects should be sufficiently advanced such that one might expect a two-year period to elapse from the existing state to one in which there are commercializable products or processes
- the technical approach--while cognizant of the fact that mid-course corrections would be necessary--would lend itself to monitoring and evaluation
- the projects should address technical areas that coincide with the broad technology-development areas that have been stressed by the Government of India
- the projects should have a significant market in India, or in the U.S., or in any third countries.

One of the more significant roles of the Program Advisor has been to assure that the first two of these criteria are met. Throughout the course of the PACT initiative, and particularly in the earliest stages of the program, a large number of project profiles that were submitted by both Indian and U.S. companies were so ill-prepared that it was particularly difficult to provide a meaningful evaluation. While the objectives might have appeared to be worthwhile, the technical approach was stated in such a manner that it was almost impossible to determine whether the proposer fully appreciated the technical aspects of the project. Thus, a significant effort was directed toward establishing the format and content of proposals that were to be eventually submitted for consideration.

In addition, the Program Advisor provided early counsel to prospective participants, discussing the suggested projects and working toward a focusing of the proposer's concepts. Subsequent submission and review of the technical development plans was followed by a monitoring process (see later) which identified problems in technical development. In selected cases, the Program Advisor could facilitate the technical progress by providing direct technical inputs or advice.³

The execution of this aspect of the Program Advisor's role was facilitated by the ready access to technologists who were conversant with the problem, the approach, the competing technologies, and (in

³ We note, in this context, that the direct input of technical assistance to the proposing teams was not a defined role of the U.S. Program Advisor. However, in a few selected cases, such inputs were offered and made.

some cases) the market. This function is deemed to be an important ingredient in any future Program Advisor's roles.

Whether a project is initiated by an Indian or U.S. firm, one major challenge for the U.S. advisor is to identify the appropriate mix of technical and marketing expertise in a U.S. firm to complement a given Indian-based research and development effort that is potentially eligible for PACT support. Battelle is able to do this effectively because of its own broad-based technology development efforts and multi-client programs, many of which include international clients.

In addition, in those cases where business plan review has been required, Battelle has been able to use its venture capital subsidiary, Scientific Advances, Inc., to provide this aspect of support to the PACT program.

Objective/Roles 6.

Provide the necessary project liaison to the U.S.-based PACT Council, PACT, Indo-U.S. business groups, and project evaluation agencies, such as the National Bureau of Standards.

A number of different activities fall under the broad rubric of "Project Liaison", not the least of which include formal periodic communications, staff assistance, the utilization of resources, and program promotion. The program promotion aspects--such as coordination and interaction with Indo/U.S. business groups--has been covered in detail above.

Periodic communications in the form of quarterly status reports and annual reviews have been prepared on a regular basis in keeping with the provisions of the contract and role. These have served to provide ICICI, USAID, and the Advisory Councils with information regarding the progress of the overall program, as well as the progress on individual projects supported by PACT. In pursuance of this objective, Battelle prepared the template to be followed by both the Indian and U.S. partners, and has worked directly with the individual project teams to attempt to elicit project information in a form that permits rapid and consistent review of progress.

It is necessary to ensure that pertinent information is exchanged and potential problems are identified and communicated in a timely manner to maximize the number of successful projects. Thus, Battelle maintains regular contact with ICICI relative to reviews of profiles and proposals, the qualifications and capabilities of the U.S. partner, problems faced by individual PACT projects, and other project activities.

Furthermore, Battelle has interacted with selected members of the U.S. Advisory Council relative to issues on technical merit, business opportunities, the identification and evaluation of candidate U.S. partner companies, and other issues.

Battelle also provides direct program liaison through participation in meetings of the Joint Councils that are held in India or the U.S. Such participation includes reviews of the status of activities in the U.S., an enumeration of technical problems that have been faced by the individual project teams, and insights into the non-technical factors that may be influencing progress.

Where needed, Battelle also makes local arrangements for the Joint Council meetings, with a series of activities that relate to accommodations, travel, meals, meeting rooms and supplies, and similar support staff functions.

No special efforts were required for Battelle to “provide ... liaison [with] project evaluation agencies” since, in the vast majority of instances, the project evaluation functions were managed with the available in-house expertise. Although limited contact was made with the National Bureau of Standards, no formal project liaison was pursued. See the earlier comments under the discussion that relates to “Objectives/Roles 4”.

Future activities by a U.S. Program Advisor should include all of the above, with particular emphasis on the communication relative to problems which arise in the execution of individual PACT projects. Experience during the PACT program has shown that many of the problems that arise relate to inaccurate assessments of the markets, insufficient communications between the performing partners, and a lack of timely response to issues. The Program Advisor must, at times, take on an advocacy role on behalf of the U.S. partner in order to ensure that progress can be made.

As the PACT program continues, with the likelihood that there will be additional new projects proposed, the responsibility for assuring the technical competence of the approach and the progress should remain with the Program Advisor. Thus, liaison with qualified sources of independent technical evaluation will be required.

Objectives/Roles 7.

Monitor approved PACT projects.

Battelle provides continuing assistance to ICICI in the monitoring of approved and active projects in the U.S. The activities on this task include:

- frequent telephone contacts with U.S. partners to obtain verbal reports on technical and commercialization progress.
- visits with U.S. partners that have significant hands-on development responsibilities in the U.S.
- analysis of written quarterly status reports that are submitted by either or both of the participating Indo/U.S. collaborators.

It is essential to monitor projects for compliance with USAID’s long-term objectives and to ensure that PACT-funded projects will progress toward the commercialization stage expeditiously and successfully. The monitoring process is also necessary for the timely disbursement of PACT funds and the continuous support of projects as they progress from one stage to another.

When approached with the attitude of assisting in the successful execution of both the individual projects and the overall PACT program, the monitoring task is not an insignificant effort. Well prepared initial proposals will include specification of anticipated milestones, which mark the path from concept/laboratory test to commercial application. However, as in all such programs, one expects that

deviations from projected milestones and accomplishments will be common. Thus, a well-structured and cooperatively-executed monitoring process provides two principal outputs: (1) it permits an identification of major problems and, thus, a means to identify corrective action; and (2) it serves to identify those situations in which projects should be terminated.

The monitoring process works well when all parties make the effort to follow procedures. Without a concerted effort to maintain awareness of the projects' progress, the system can break down; the result is a lack of sufficient guideposts by which to measure progress, to allocate disbursements, or to anticipate reflows of funds to the PACT program. In view of the both technical and market uncertainties that can influence the successful completion of a PACT project, the monitoring process should be undertaken judiciously and continuously by both ICICI and the U.S. Program Advisor.

Objectives/Roles 8.

Maintain information on U.S. and Indian companies interested in joint ventures; identify technological opportunities for Indian, U.S. or third country markets.

The activities contained within this statement of Objectives/Roles are quite broad and diverse, and were addressed in different manners. For purposes of this discussion, it is best to divide this discussion into three portions: (1) the awareness of Indian companies' interests; (2) the awareness of U.S. companies' interest; (3) the identification of technological opportunities and an awareness of markets.

(1) Indian company interests. As the project actually evolved, the principal responsibility for this phase of the activities actually fell to ICICI, as might be expected. ICICI has a very significant number of existing clients, many of whom were (and have continued to be) appropriate for consideration as potential PACT participants. During the initial phases of the program, ICICI provided briefings throughout India, explaining the PACT scheme and inviting inputs and project profiles that would serve as the original submissions to the program. ICICI has continued to maintain awareness of the Indian industry, and has brought many preliminary profiles into the process.

In addition, Battelle made presentations to Indian companies (see earlier discussion) in an effort to further explain the program and to provide additional information regarding Battelle's role and activities. Although Battelle has no record of the number and diversity of contacts which were initiated by ICICI, our own correspondence files provide ample evidence of the breadth and depth of the impact of our direct interactions with Indian firms. In addition, Battelle's continuing interaction with PHDCCI and CEI provides a basis for suggesting potential Indian partners for programs that U.S. firms initiate.

(2) U.S. companies' interests. Awareness of U.S. companies' interests has been promoted through the public awareness campaigns discussed earlier, as well as the continuous interaction with the broad base of Battelle's other present and former clients.

It was recognized from the outset that Battelle's basic business requires a continuing knowledge of industrial development, in terms of both the technical questions that face industry as well as the overall environment within which industrial decisions and actions are based. Battelle approached the goal of providing information to a broad spectrum of industry by using two routes: public awareness activities

and direct contact with the existing client base. The PACT Program Advisor staff provided direct education to the entire staff through the involvement in individual project or proposal evaluations. Through this cadre of evaluators, information was also made available to clients regarding the PACT program and the manner in which the existing clients could consider this avenue toward technology development and commercialization.

The initial program plan also called for the U.S. technical advisor to compile and maintain information on U.S. and Indian companies interested in joint ventures. This effort was interpreted to mean more than establishing a data base of interested companies. Battelle realized that to enhance the prospects for success of PACT, the effort should be directed to identifying potential U.S. candidates from among the interested and motivated companies, rather than attempting to educate the entire business community in general regarding opportunities in India. This identification process resulted from a selective procedure for disseminating PACT information, focusing the promotion efforts on interaction with pre-sensitized audiences, and working directly with organizations such as the Indian Investment Center, the Indo-American Chamber of Commerce, and the like. In this manner, Battelle was able to concentrate its efforts on more promising U.S.-generated profiles and proposals.

(3) Identification of Technological Opportunities and Market Awareness. The original RFP tasks included an activity to identify technology opportunities for Indian, U.S., or third country markets. In a deviation from the provisions of the RFP, and in consultation with ICICI and USAID/India, it was agreed among all parties that the identification of Indian and third-country (non-U.S.) markets was to be the responsibility of ICICI. Furthermore, the Program Advisor's evaluation of the business plans was to be similarly confined to those for which the U.S. market was the primary objective. When requested, however, business plans submitted by PACT proposers were critiqued by Scientific Advances, Inc., Battelle's venture capital subsidiary.

At the outset of the PACT program, it was suggested that Battelle should attempt to develop projects that addressed some fairly basic Indian needs. In general, this charge appeared to be reasonable, given the anticipated overall objectives of USAID and the Government of India. However, upon later reflection, less emphasis was given to this aspect of the program.

That such should be the case is understood from the viewpoint that "basic needs" are so pervasive that the approach under PACT was inadequate. For example, projects were defined that could have an impact on a series of interrelated problems, such as the shortage of newsprint, the decimation of forests, and the accumulation of bagasse from sugar operations. In theory, the development of processes to convert bagasse into usable newsprint would have been a desirable project for the benefit of India. However, the complications with the technology and the minimal interest on the part of U.S. industry precluded this as a viable PACT project.

On the other hand, problems associated with waste treatment--as applied to specific sectors, such as the leather or distillery industries--had a significant potential impact over a relatively short time period. Efforts were directed toward the definition and execution of projects in this field. Furthermore, projects that relate to biological insecticides, avoiding many problems associated with chemical means of pest and insect control, were addressed, for these have world-wide implications.

In the continuing activities of the PACT program, it is recommended that ICICI and the Program Advisor, continue the established focus on projects that can come to fruition within a short time period. Obviously, this precludes massive efforts at addressing "problems" which are, in the larger sense,

“issues”--that is, situations where the problem is both pervasive and of long standing, and which will require significant central government involvement in order that the issues can be adequately resolved. The major problems which are of national scale do not lend themselves to the laboratory-to-commercialization schemes and time-lines that are associated with the PACT concept.

Objectives/Roles 9.

Develop and maintain ties with innovative, technology oriented companies in the U.S.

Battelle's basic business requires that it maintain close ties with innovative, technology-based business. For over 60 years, Battelle has served the R&D needs of industry and government alike, with its industrial clientele spanning the range from the very large (Fortune 500) to medium- and small-sized companies. In many instances, Battelle serves as the R&D arm of individual companies, trade and professional associations, and groups of similar or dissimilar companies that are interested in one phase of technology development.

The importance to PACT is that Battelle's clientele are almost uniformly concerned with technical problems as well as the manner in which technical solutions can be infused into existing or expanding markets. Battelle can draw from its client base (already well qualified to undertake development-to-commercialization activities) in the search for potential PACT partners. Furthermore, the very fact that they are already Battelle clients is proof of their general ability to sustain an R&D effort and be in a position to assume some of the risks of commercialization.

In many respects, Battelle's technical association with its clientele (supported by a knowledge of their financial stability) is a direct converse of ICICI's position with their clients (a financial association supported by a knowledge of their technical capacity).

As the PACT program proceeds--and as similar programs move forth with ICICI or other Indian financial institutions, it is incumbent upon the U.S. Program Advisor to maintain close association with technology-based companies in the U.S. One must note, however, that “association” means more than mere knowledge of the existence of candidate partners; in order that a cooperative project can be developed and that the available project and support funds can be spent most efficaciously, this association should be grounded in a firm appreciation of the technical issues involved. “Deals” are important, but deal-making alone will not institutionalize a program that spans a broad spectrum of technology. And institutionalization alone will not ensure a process that can promote, select, and monitor individual projects to the benefit of all parties concerned.

Objectives/Roles 10 and 11.

Provide guidance on strategies and operating procedures to effectively implement the program.

Advise PACT of new opportunities and strategies for program development.

In the role of Program Advisor, Battelle has taken the posture that there are two most significant aspects to the PACT program. First, it is incumbent upon all participants in the program--USAID, ICICI, both Advisory Councils, Battelle and the individual joint project participants--to appreciate the necessity of developing projects that will fulfill the objectives of Indo/U.S. technical development and collaboration; without the individual projects or "deals", PACT cannot and should not survive. Second, the overall concept of PACT--if shown to be a successful experiment--should evolve into a self-sustaining modus operandi for as long as it provides opportunities for similar private sector cooperation and the attendant economic well-being of the companies involved and their host countries.

Given the need to look at both the short- and the long-range objectives, and based upon Battelle's own experiences in project development and evaluation, special emphasis was devoted to the establishment of review formats and procedures that would lead to the definition and delivery of projects that reflect these goals. This is not a trivial task, for it has required an understanding of diverse objectives and a means to bring order to what otherwise might be chaotic. The execution of these duties has required that:

- the individual project teams should be capable of bringing together the right mix of technical and entrepreneurial skills
- the technical approach must be one that addresses the market
- the proposals must be prepared in such manner that they establish both direction and timing, with milestones defined such that measurable progress could be monitored; and
- project selection should cover a spectrum of technologies that is sufficiently broad so as to permit generalizations.

At the same time, it was essential that the procedures be developed such that they provide guidelines, rather than recipes. It was necessary from the outset--and as a continuing operating philosophy--to understand that flexibility would be required: no two situations would be exactly alike. And it was also critical to understand that the role of the Program Advisor was not to turn down requests for assistance (although there were, and continue to be, ample opportunities to do so), but to make every effort to provide positive contributions until the requests were qualified as viable projects.

The short- and long-range goals of PACT and AID were also considered as an integral part of the program promotion activities. To be sure, the initial promotional activities were concentrated on providing information to prospective U.S. and Indian partners, emphasizing the basic features of the PACT approach and the broader opportunities for collaborative investment in India.

As the program passed into its third year and beyond, these efforts were supplemented with discussions that stressed the broad programmatic aspects of the PACT approach. This latter activity contained two basic thrusts: (1) the manner in which the PACT concept could be replicated, with appropriate modifications, to fit the needs of other host countries, taking into account the indigenous technical resources and needs; and (2) the broadening of the PACT concept to other forms of Indo/U.S. private sector partnerships, including the development of relationships between industry and research-performing institutions. The view taken in these more recent activities rests upon the assumption that such interactions can accelerate technological and economic growth, and that these goals can be attained with a minimal level of public sector financial support. A continuing effort is being directed toward focusing on this aspect of international cooperation.

It is important to note in this connection that Battelle continues to review and respond to comments and evaluations of the PACT program. The interim program review, conducted by an independent evaluator, permitted both internal self-examination and an external context analysis. Similarly, feedback from the U.S. Advisory Council (and Battelle's own internal management review and external advisors) has been most useful in terms of the continuously changing environment within which PACT should operate. In being as objective as possible, Battelle is documenting the merits and lessons learned from the program, and expects to disseminate this information in reports designed for USAID use, and articles for trade magazines, development journals, and other appropriate media.

PACT is not, or should not be, a one-time experiment. To be sure, it was designed to be able to eventually take on a continuing role without future investments by AID. Given the needs for both technical review and other assistance, the execution of the future role of a U.S. Program Advisor should include the capabilities for performing the technical assessments, carrying through on monitoring of progress, and providing the kind of sensitivity needed to ameliorate the oftentimes-difficult communications and interactions problems.

In brief, the strategies and procedures that were developed for PACT program promotion, project evaluation, and project monitoring, and for PACT concept promotion, were all undertaken with a short-term view (related to projects) and a long-term view (related to the PACT program concept). This discussion paper itself represents considerations on the future role of PACT, as well as the manner in which the Program Advisor can best serve the interests of PACT and USAID.

RECOMMENDATIONS FOR FUTURE ACTIONS

Based on the experiences and observations of Battelle, the U.S. Program Advisor to the PACT initiative, there are three distinct classes of recommendations for future activities under the broad rubric of private sector technology-based business development. Basically, these fall into the categories:

- (1) Continuation/expansion of the existing PACT initiative
- (2) Other initiatives in India, and
- (3) PACT-type programs in other countries.

1. PACT efforts and achievements have made a significant impact on the R&D business climate in India, and products developed under this program will soon appear on the market. There is every indication that PACT has been a successful experiment and will make a positive contribution to the economy of India. The interest in PACT continues within India and in the U.S., with a flow of inquiries and suggested profiles that will most likely provide a flow of qualified projects. From Battelle's point of view, it is particularly satisfying to note that the basic USAID funds have been expanded, and that the PACT program, as originally conceived, is making progress toward its stated objectives.

However, one cannot be complacent with the status quo and relax the standards that have been forwarded. In order that the fundamental principles of PACT can be maintained, it is recommended that there be a continuing relationship between ICICI and a U.S. Program Advisor, and that almost all of the original duties and approaches of the Program Advisor be continued. Program promotion is important for the continuing development of qualified projects that can have an impact. Independent proposal and partner review must be maintained, so as to assure that the projects make technical sense and that the funds are well spent. Project monitoring should continue, for the purposes of assuring a focus to the effort and to provide, where needed, technical or market intelligence assistance. And, to the extent that a need is obvious, project management assistance--over and above mere technical assistance--should be provided to help steer the development effort.

It is strongly recommended that the role and capabilities of the U.S. Program Advisor be such that these functions can be undertaken in a timely manner, and that they are integrated into the long-term activities of PACT, regardless of whether USAID support continues or whether, through reflow of funds, PACT can be entirely self-sustaining.

2. Perhaps to the surprise of all parties concerned, PACT had an influence on other financial institutions in India at a much earlier time than expected. To be sure, it was anticipated that the PACT experiment might be replicated, that there would occur an expansion of the concept of technology-based venture capital, and that investments in research-to-commercialization would become a part of the basic financial structure. It is surely to the credit of ICICI and the observed successes of PACT that this initiative emerged at all; the fact that it came into being within three years of the initiation of the PACT program was a totally unexpected bonus!

As other banking institutions become involved, there will be a continuing need for both technical and market evaluations. Where these other programs involve collaborations between Indian and U.S. companies, efforts should be directed toward proposal and project evaluation, similar to those undertaken by the PACT program. While many Indian institutions may have the capabilities to provide the technical inputs required, we recommend that such reviews be undertaken by researchers who are well-qualified to take an industrial perspective, rather than merely academic viewpoints.

3. The early emulation of PACT shortly after its inception is another solid indicator of the success of the program. For example, ICICI has established a venture capital division and other tools to exploit the experience gained from PACT. The Industrial Development Bank of India, the Technology Development and Information Corporation of India, the Center for Technology Development, and other financial institutions have programs with elements that are quite similar to the PACT program. Given these other programs, as well as the earlier desire for AID to establish a broader continuing PACT-type program, it is reasonable to discuss the ways in which elements of PACT/India could be replicated in other countries.

It is believed that other countries, such as Thailand, Egypt, and some of the Eastern European countries are considering some modifications of the PACT program to determine whether a similar approach might be developed to foster their applied research and development work. The extent to which PACT can be replicated depends upon a variety of factors. India was unique in the sense of its having a well-developed educational structure and heritage, as well as a broad industrial base that could serve most of the domestic and export markets. PACT could work in India because of government policy and a well-developed private enterprise system that was receptive to innovation.

The same situation does not apply exactly to other candidate countries. And just as PACT has distinct differences from the BIRD Foundation, from which PACT developed selected strategies and operations, so also would a Thailand or Egyptian or East European PACT differ from the Indian approach. As any plans are made to develop additional PACT-type activities, one may learn much from the operations of the Indian experiment and selectively apply the lessons to another well-characterized country.

In any case, it is a basic premise that a well-conceived and executed program that is based upon sound technical, economic, and business goals will succeed.

There is no question that PACT/India has had some problems; but these have been largely resolved through the cooperative efforts of all parties involved. It is expected that a degree of experimentation and modification would be required for this initiative to be implemented in another country. However, the right combinations of government policy, banking systems, public and private investment, inter-institutional cooperation, and hands-on experience can result in technology-based economic development programs that will serve all parties well.

The success of PACT in the Indian setting can serve as a guide to major new initiatives within USAID. It is tempting to visualize a continuing initiative within USAID in the development and promotion of similarly, though custom-modified, programs in other developing countries. PACT has provided the groundwork that shows the importance and benefits that can derive from cooperative public/private sector programs. The impetus provided by seed-funding is expected to show financial reflows and the

emergence of a self-supporting activity. When carried through with an understanding of the factors that characterize individual countries, the PACT approach offers an opportunity for benefits to accrue to all parties concerned: the individual companies involved, the infrastructure that supports those companies, the local economies, and the development agencies that provide the framework within which to accomplish economic and social well-being.