

PROJECT APPRAISAL REPORT (PAR)

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1. PROJECT NO. 512-11-660-263.11	2. PAR FOR PERIOD: July '74 TO June '75	3. COUNTRY BRAZIL	4. PAR SERIAL NO. 75-9
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5. PROJECT TITLE

DEVELOPMENTAL SCIENCE AND TECHNICAL RESEARCH (CHEMISTRY)

6. PROJECT DURATION: Began FY 1969 Ends FY 1976	7. DATE LATEST PROP 4/17/70	8. DATE LATEST PIP 10/12/70	9. DATE PRIOR PAR Sept. 11, 1974
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10. U.S. FUNDING	a. Cumulative Obligation Thru Prior FY: \$ 820,105	b. Current FY Estimated Budget: \$ --	c. Estimated Budget to completion After Current FY: \$ --
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11. KEY ACTION AGENTS (Contractor, Participating Agency or Voluntary Agency)

a. NAME U.S. NATIONAL ACADEMY OF SCIENCE (NAS)	b. CONTRACT, PASA OR VOL. AG. NO. 12-637
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I. NEW ACTIONS PROPOSED AND REQUESTED AS A RESULT OF THIS EVALUATION

A. ACTION (X)			B. LIST OF ACTIONS	C. PROPOSED ACTION COMPLETION DATE
USAID	AID/W	HOST		
X		X	CNPq and NAS to emphasize, during the USAID and Host financing phase-out period, the strengthening of linkages between Brazilian and U.S. institutions in order that cooperation may be continued.	December '75
X		X	An extension through December 1976 requiring no new funding is under consideration.	October '75
		X	A CNPq/NAS evaluation of the program will be completed and submitted to USAID.	November '75
			<i>Handwritten note:</i> A CNPq/NAS evaluation of the program will be completed and submitted to USAID. (This text is repeated in the table)	

D. REPLANNING REQUIRES

REVISED OR NEW: PROP PIP PRO AG PIO/T PIO/C PIO/P

E. DATE OF MISSION REVIEW
July 28, 1975

PROJECT MANAGER: TYPED NAME, SIGNED INITIALS AND DATE

MISSION DIRECTOR: TYPED NAME, SIGNED INITIALS AND DATE

T. Piancastelli - July 3, 1975

Howard D. Lusk, AD/TO

ALG 10/29/75 (10/75)	PROJECT NO.	REPORTING PERIOD	COUNTRY	PAR SERIAL NO.
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II. PERFORMANCE OF KEY INPUTS AND ACTION AGENTS

A. INPUT OR ACTION AGENT CONTRACTOR, PARTICIPATING AGENCY OR VOLUNTARY AGENCY	B. PERFORMANCE AGAINST PLAN							C. IMPORTANCE FOR ACHIEVING PROJECT PURPOSE (X)				
	UNSATISFACTORY		SATISFACTORY			OUTSTANDING		LOW		MEDIUM		HIGH
	1	2	3	4	5	6	7	1	2	3	4	5
1. National Academy of Sciences					X							X
2.												
3.												

Comment on key factors determining rating

Contractor has a constructive professional involvement with host nationals. Senior U.S. professors involved in program through contractor are outstanding and U.S. post-doctoral fellows in Brazil during reporting period have performed well.

4. PARTICIPANT TRAINING					X							X		
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Comment on key factors determining rating

Since the beginning the CNPq minimized the use of project funds for overseas study and training preferring to use its own budget to finance such activities. For this reason, the project budget for 1975 does not contain any provisions for training in the U.S.

5. COMMODITIES			X								X		
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Comment on key factors determining rating

The CNPq and other agencies, mainly Brazilian, finances the purchase of equipment and supplies necessary for the Program. Procurement procedures have been developed by CNPq. Some delays in importation of such purchases occurred due to GOB's new importation regulations.

6. COOPERATING COUNTRY	a. PERSONNEL				X								X
	b. OTHER (Coordination & Management)			X									X

Comment on key factors determining rating

The Brazilian professors responsible for ongoing research projects and program coordinators at both USP and UFRJ are highly motivated and competent. Overall management and coordination, at the CNPq level, is expected to improve under the new CNPq administration.

7. OTHER DONORS				X					X				
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(See Next Page for Comments on Other Donors)

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II. 7. Continued: Comment on key factors determining rating of Other Donors

1. E.I. du Pont de Nemours & Co. Inc., has granted to IAS \$10,000 for two years of support of the chemistry project, seeing it as "a very worthwhile program and one of the soundest methods of transferring technological expertise" to Brazil.
2. Alfred P. Sloan Found. provided a grant to the IAS to support several key program activities in the U.S. "because of the substantial progress thus far achieved in establishing the chemistry program and because of the extraordinary efforts being taken by CNPq to assume a larger financial responsibility for the program."

III. KEY OUTPUT INDICATORS AND TARGETS

A. QUANTITATIVE INDICATORS FOR MAJOR OUTPUTS		TARGETS (Percentage/Rate/Amount)					END OF PROJECT
		CUMU- ⁷⁴ LATIVE PRIOR FY	CURRENT FY ⁷⁵		FY ⁷⁶	FY ____	
			TO DATE	TO END			
1. Research laboratories installed at UFRJ and USP in discrete areas of chemistry.	PLANNED	8	11	11	11		11
	ACTUAL PERFORMANCE	8	8				
	REPLANNED			8	10		10
2. Research projects developed by post-doctoral fellows with Brazilian associates.	PLANNED	36	40	40	40		40
	ACTUAL PERFORMANCE	36	38				
	REPLANNED			38	40		40
3. Published reports of research by U.S. fellows and Brazilian associates. <u>Number of Reports</u> <u>No. of contributing fellows</u>	PLANNED	19/6	30/11	30/11	35/13		35/13
	ACTUAL PERFORMANCE	19/6	27/6				
	REPLANNED			27/6	32/11		32/11
4. Brazilian graduate students well-trained in research methodology - cumulative (no. of Ph.D's awarded in parentheses)	PLANNED	24(5)	55/13	55/13	71/25		71/25
	ACTUAL PERFORMANCE	24(5)	68(6)				
	REPLANNED			68(6)	82(25)		82/25
B. QUALITATIVE INDICATORS FOR MAJOR OUTPUTS		COMMENT:					
1.	Interchange of scientific knowledge and information.	This is done through visits by U.S. professors to Brazil, visits by senior Brazilian professors to U.S. universities, short-training programs for Brazilians in the U.S. and a program of lectures by U.S. professors in Brazil. In 1974 eight U.S. chemists who are on the joint chemists study group made 10 trips to Brazil, 5 Braz. professors					
2.		visited U.S. universities and 2 U.S. professors were guest lecturers to Brazil.					
3.		COMMENT:					

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IV. PROJECT PURPOSE

A. 1. Statement of purpose as currently envisaged. 2. Same as in PROP? YES NO

To assist the Federal University of Rio de Janeiro (UFRJ) and the University of São Paulo (USP) in establishing advanced research capabilities in areas of chemistry that have been identified as essential for the development of Brazil.

B. 1. Conditions which will exist when above purpose is achieved.	2. Evidence to date of progress toward these conditions.
<p>1. At least 10 research laboratories fully established and well equipped in priority areas of chemistry at UFRJ and USP.</p> <p>2. Faculty at UFRJ and USP strengthened through addition of at least 20 Brazilians trained through program.</p>	<p>1. Six laboratories established and operational at USP. (The electro-analytical chemistry project has been initiated with great success). Two laboratories established and fully operational at UFRJ. Two others will be in operation yet in CY 75 (the inorganic chemistry project will be re-established with the completion of the installation of the X-Ray diffractometer, and the new biochemistry project initiated with the arrival of Dr. Matoon). Especially significant results have been achieved in Polymer chemistry at UFRJ and in electron scattering, inorganic and physical chemistry at USP. (See preliminary description in Attachment I).</p> <p>2. Six Brazilians participating in the program at USP have completed PhD's and one other will defend his PhD thesis in August 75. Of these 7, 6 have been added to the Chemistry Institute at USP. Others are being prepared for future faculty positions. The Polymer Institute continues to develop capable staff although Petrobrás has initiated a new research line and has staffed this project by hiring researchers from the Polymer program. While this could affect the rate of the growth of the project, it is recognized that one of the secondary objectives of the Program - to provide well trained chemists for Brazil's industrial needs - is being achieved.</p>

V. PROGRAMMING GOAL

A. Statement of Programming Goal

To train chemists and produce research necessary to the development of chemical sector in Brazilian economy.

B. Will the achievement of the project purpose make a significant contribution to the programming goal, given the magnitude of the national problem? Cite evidence.

Yes. This project, with its emphasis on research capabilities, supplements efforts by the USP and UFRJ supported by CNPq, FAPESP, BNDE and programs in chemistry at the two universities. The graduates of these programs are joining not only the faculties of USP and UFRJ, but also the faculties of other universities and research departments of industrial firms.

CONTINUATION SHEET - PARB.1. Conditions which will exist when above purpose is achieved:

3. Built-in capability for continuing advanced research in the priority areas, after departure of U.S. fellows.

4. Establishment of channels for continuing collaboration in advanced chemistry between the United States and Brazil.

5. Chemistry Institutes at UFRJ and USP earn good international reputations.

B.2. Evidence to Date of Progress Toward These Conditions:

3. a) At USP a total of 61 reports have been developed or are under completion for publishing in scientific and cultural journals. At UFRJ, 27 papers have been developed. Of this total of 88 papers, 50 were developed without cooperation of US fellows.

b) Progress of research considered so effective in Polymer chemistry (UFRJ), physical and inorganic chemistry (USP) that presence of U.S. fellows no longer critical to program in these areas.

These permanent links seem to be fully developed especially between Stanford, Cal Tech, Univ. of Calif. at Santa Cruz, Univ. of Michigan and the UFRJ and USP. Mutual interest and collaboration have been ensured through joint research, visits by senior U.S. chemists to Brazil and senior Brazilian chemists to the U.S. and by a program of lectures by eminent U.S. chemists. With the end of the USAID grant approaching, CNPq has declared its intention to continue financing certain project activities and has been gradually absorbing items previously covered by USAID.

5. Many of the research papers are published in international journals. Some projects have already been attracting international attention, especially the Polymer chemistry at UFRJ and Physical chemistry at USP.

PROJECT 263.11 - FAR

PROJECT TOWARDS ESTABLISHMENT OF TEN RESEARCH LABORATORIES

JUNE 30, 1975

I. CHEMISTRY INSTITUTE, UNIVERSITY OF SÃO PAULO (USP)

PROJECT	BRAZILIAN AND U.S. PROFESSORS	U.S. POSTDOCTORAL FELLOWS	GRADUATE STUDENTS (Degree Objective Completed and in Progress)	INSTALLATION AND EQUIP. OF RESEARCH FACILITIES	RESEARCH PUBL'D OR UNDER COMPLETION FOR PUB.	SUMMARY STATEMENT OF PROGRESS	RELATED ACCOMPLISHMENT
1. Electron, Atomic and Molecular Beam Scattering	Dr. Simão Mathias, USP Dr. Eduardo Peixoto, USP Dr. Russel Bonham, Indiana. Dr. Aron Kupperman, Cal. Inst. Tech.	None	5 PhD cand. 1 Scientific Initiation Student	Laboratory Installed & Equipped. The new spectrometer fabricated in Dr. Kupperman's lab. at Caltech, has been installed. A new densitometer has been installed and is operating. With the exception of space for a darkroom, the diffraction laboratory is completed.	12 reports	The quality of work in this area and facilities are excellent. The installation of the new spectrometer with the assistance of Gerardo Gerson de Souza, PhD candidate who spent 4 months in the U.S. with Dr. Kuppermann, and Mr. Wayne Flicker, a graduate student of Dr. Kuppermann who visited Dr. Peixoto's lab completes the larger	Investments in equipment for this area continue to grow through contributions from U. FAPESP, CNPq, ENDE & IDB. Approximately US\$300,000 has already been invested in equipment and accessories. A method of giving more attention to the diffusion of physical chemistry in Brazil is under discussion in Dr. Peixoto's group. Dr. Peixoto is exploring the concept of having each of his students at the University of

I. CHEMISTRY INSTITUTE, UNIVERSITY OF SÃO PAULO (USP)

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						scale of instrumentation requirements for this project. Efforts will be continued toward completion of large scale facility as well as seeking methods of preventing damage to electronic components due to power failures and water supply limitations.	São Paulo build his own independent experimental program including instruments, as part of his thesis work. Then, given approval from the Univ. of S. Paulo, upon graduation the student would relocate his instruments to the univ. that employs him. This could prove to be a way of rapidly starting research in other universities, since student would not have to waste time seeking funds and ordering equipment before starting work in the new position.

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2. Inorganic Chemistry	Dr. Ernesto Giesbrecht, USP. Dr. Henry Taube, Stanford.	Dr. John Malin Stanford (May, 70 thru June, 73). Dr. Edward R. Dockal, Pittsburg (Aug. 1973, Dec. '74)	1 PhD completed (Toma) 1 PhD cand. (Research com- pleted; will defend thesis in Aug. 75) 3 PhD cand. 1 MS completed.	Laboratory equipped and installed.	18 reports, 15 with collaboration of U.S.fellows.	Research progress has been excellent. Dr. Toma is continuing his own research while assist- ing other stu- dents in the program with the assistance of Dr. Ernesto Giesbrecht. Dr. Malin will return to Brazil mid-year for the defense of Mercedes Pereira's PhD thesis. During this time he will also give a seminar both in Rio and São Paulo.	

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3. Organic Chemistry	Dr. Nicola Petragnani, USP. Dr. Robert E. Ireland, Cal. Inst. Techn. Dr. Johnson, Stanford. Dr. J. Marshall (Northwestern Univ.)	Dr. Robert Ronald Stanford Univ. (July, 1970 thru July, 1972). Dr. Simon Campbell, Cal. Inst. of Tech. (Oct. 1969 thru June, 1972). Dr. Thomas E. Mateyer, Stanford (July 72 thru May 74). Dr. Timothy J. Brockson, Cal. Inst. Techn. (May, 1972 - continuing).	5 PhD cand. 6 MS cand. 7 MS completed.	Laboratory installed & equipped.	4 reports, 3 with collaboration U.S. fellows. One additional report is being printed with collab. U.S. fellow.	Progress has been satisfactory in this area. From the inception of the program thru the end of 75. 13 students will have completed their degree- PhD or MS.	Dr. Brockson is so pleased with the work he's developing at USP that he is considering settling permanently in São Paulo.
4. Photo-Chemistry	Dr. Vicente Guilherme Toscano, USP Dr. George S. Hammond, Univ. of Calif. at Santa Cruz	Dr. Richard Weiss, Cal. Inst. Techn. (Aug. 1971 through July, 1974). Dr. Frank H. Quina is expected to arrive in June 75.	2 PhD's complet. 3 PhD cand. 3 MS cand.	Laboratory installed & equipped.	5 reports, 2 with collaboration of U.S. fellows. Two additional reports are being printed. 1 with collaboration of U.S. fellow.	Research output has been satisfactory. Dr. Toscano travelled to the U.S. late 74 to meet with Dr. Hammond and select a U.S. fellow. Dr. Quina, who will proceed with the quality work of Dr. Weiss.	The Chemistry Inst. of USP and NAS have committed themselves to assist Dr. Weiss and former students to complete their work already started.

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							<p>The commitment is shown in two ways: (a) the N has set aside f from a grant fr the Sloan Found. to finance the visit of two of Dr. Weiss' students to Georgetown Univ for approx. 6 weeks to complete the writing of their PhD thesi. (b) the CNPq ha reserved funds : Dr. Weiss to vi Brazil and part gate in the defense of theses, sometime in the latter p of 1975.</p>

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Physical Chemistry	Dr. José M. Riveros, USP. Dr. John D. Baldeschwieler, Cal. Inst. Techn.	Dr. Patrick R. Jones, Cal. Inst. Techn. (July, 1971 thru July, 1973). Dr. Lawrence Elair (Feb. 1970 thru June, 1971)	2 PhD comp. 4 PhD cand. 1 MS completed	Laboratory installed & equipped	14 reports, 4 with collaboration of U.S. fellow. 2 additional reports are being printed.	Project has been very successful and its research publications have attracted int'l attention.	Because of his work, Dr. Riveros has been invited to participate in several int'l. scientific conferences (Canada & Sweden) Magnetic Resonance equipment has been purchased with BNDE and FAPESP funds, (US\$190,000). This equipment should arrive in S. Paulo shortly.
Electro-Analytical Chemistry	Dr. Eduardo S. de A. Neves, USP. Dr. Fred Anson, Cal. Tech.		1 PhD compl. 3 PhD cand. 1 MS compl. 3 MS cand.	Laboratory installed & completed.	5 reports, 2 with collaboration of Dr. Anson, U.S. professor.	Project started formally in 1973 with the return from Caltech of Prof. Eduardo A. Neves. It is progressing very well, with 6 papers presented in Congresses since the inception of the Program.	Laboratory material was donated primarily by OAS. Needed accessories and supplementary equipment is being ordered with USP/CNPq funds.

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Polymer Chemistry	Dr. Eloisa Mano, UFRJ. Dr. Charles Overberger, Univ. of Mich.	Dr. Robert Tarvin, State Univ. of Iowa (March '72 - Aug. '74)	7 PhD Cand. 17 MS Compl'd 15 MS cand. (4 MS cand. should present their thesis till June '74 and defend thesis till Sept. '74).	Laboratory installed & completed	19 reports 3 with collaboration U.S. fellow.	Replacement of U.S. fellow no longer needed. This area continues to be one of the most successful of the program in terms of students, research quality & international reputation. The polymer group will move to its new building in Ilha do Fundão upon its completion estimated for Dec. '75.	1) Dr. Mano was invited by the Govt. of Israel to participate in the Honorary Board (Int'l Advisory Committee) of the Third Aharon Katz Katcha Eskey Conf Jerusalem, July '74. 2) Dr. Mano participated as guest of the Spanish Research Council as president of a session in a Macromolecular Symposium - Sept 1974. 3) Two patents have been developed by this project both already registered. Some firms have already shown interest to buy the

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Photo Chemistry	Dr. Bruce Kover, UFRJ. Dr. George Hammond, Univ. of Cal. at Santa Cruz.	Mr. David Mog, Cal. Inst. of Tech. (March 1970 thru July 1973). Dr. David Nicodem, Univ. of Cal. at Sta. Cruz (May 73/and continuing)	2 MS Compl'd 3 MS Cand. 1 PhD Cand.	Laboratory installed. Equipment is simple to avoid maintenance problems. A request was made to FINEP for some more sophisticated equipment and tech. assist. for equipment	4 reports 3 with collaboration U.S. fellow. 3 more papers ought to be published before the end of 75 with collaboration U.S. fellow.	Progress in this area is satisfactory. US fellow Nicodem has been teaching both at the grad. and undergraduate level, and has given a graduate course in "Chemistry of the Environment". Dr. Nicodem intends to continue in the program through a third year and expects to continue his research projects. He also expects to begin a computer model study and take part in several more PhD theses defenses committees.	Dr. Kover spent mos. in the U.S. discussing with Prof. Hammond, U. of Cal. at Sta. Cruz basis for a research project on solar energy, which is being initiated by U.S. fellow Nicodem. A small research grant provided by the NAS from the Atlantic Richfield Co. enabled Drs. Kover and Hammond to purchase materials required for this work. FINEP will further assist the project

II. DEPARTMENT OF CHEMISTRY, FEDERAL UNIVERSITY OF RIO DE JANEIRO

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Inorganic Chemistry	Dr. Aida Spinola, UFRJ. Dr. Harry Gray, Cal. Inst. Tech. Dr. Henry Taube, Stanford Univ. Dr. Ricardo Bica de Alencastro, UFRJ.	Dr. Michael T. Flood, Cal. Inst. Tech. (Oct. 1969 thru Feb. 1973) Dr. Raymond Harrigan, Stanford Univ. (Oct. 70 thru Oct. 72). Dr. Diane Gutzerman (Aug. 70 thru July 15, 72).	1 MS compl'd 2 MS cand. (In addition Bonapace worked on 2 papers at Caltech which will be used for his thesis. Also, a grad. student Sergio Torres presently at PETROBRAS - is developing his thesis which ought to be ready by the end of the year.	Delay in installing the X-Ray Diffractors, led to problems in its computer and units were sent to the US for repair or replacement, but model was no longer under production. CNPq has just placed an order for a new computer. It ought to arrive within 90 days.	1 report by U.S. fellow Harrigan was presented at a symposium in São Paulo in 1974.	It is expected that this project will be continued upon the arrival of the computer. Bonapace spent 5 months in the US learning how to use and maintain X-Ray Diffractor. Upon arrival of computer Dr. Samson and another PhD will go to UFRJ for 2 mos (Oct./Nov.) to put equipment in full operation.	A project on Catalysis is under discussion between Dr. Bica Alencastro and Dr. Michel Boudart, Stanford using the Inorganic Chemistry Facilities.

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Bio- Chemistry	Dr. Anita Panek, UFRJ.	Dr. Matoon, John Hopkins University. (will arrive in July 75, for 2 years) Dr. J. Matoon will bring to UFRJ, under a grant with the Nat'l Inst. of Health an assistant lab. techni- cian - Richard Gottal and a PhD candidate to finish his dissertation.	-	Equipment and research facilities are good but CNPq will be purchasing additional needed equip- ment.		The initiation of this new project has been agreed upon by the joint com- mittee even though NAS participation in the Chem. program is being phased out in 1976. It is felt that the ad- vanced standing of a number of grad. students some who have completed their course work for the PhD degree (5) and a larger number who have passed the MS degree level (21) will make possible significant ac- complishment in the two remaining years of the project. The need is for as- sistance to grad. students in their research work and in an effort to get project underway rapidly, the CNPq and the NAS invited Dr. Panek to visit	Dr. Matoon's salary will be supplemented with BNDE funds.

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the U.S. early 1974, where she discussed the initiation of the project with more than 37 scientists, many of whom expressed interest in collaborating with her. Dr. Matson came to Brazil late in 1974 for an orientation visit.

ACTIONS TAKEN ON RECOMMENDATIONS OF
PREVIOUS BAR, DATED SEPTEMBER 11, 1974

Recommendation

- 1) Obtain reports from CNPq on overall support it has given to Program, including:
 - a. equipment and supplies
 - B. overseas study and training
 - c. local scholarships
 - d. financing of other activities past and planned
- 2) Request joint CNPq/NAS evaluation of program with emphasis on progress in establishing high-quality PhD programs at UFRJ and USP and accomplishments and problems with each individual project. This report will constitute the Contractor's regular annual report.

Note: Actions 1 and 2 are proposed to encourage the CNPq to take a more active coordination role.

- 3) Obtain copies of all end-of-tour reports prepared by U.S. Post-doctoral fellows.
- 4) CNPq to arrange effective means for rapid importation of equipment and supplies.

Action to Date

The CNPq has provided information but not a full comprehensive report on its overall support to the Program. Information on financing of local scholarships and data for last three years of equipment and supplies was provided. The new CNPq administrator of int'l affairs has promised USAID to endeavour to prepare such a report ASAP.

Decision has been made by CNPq and NAS to conduct separate evaluations prior to writing a joint CNPq/NAS report. CNPq has completed its evaluation and NAS' estimate date for completion is June '75. USAID/HRO has sent NAS a letter asking for their evaluation.

NAS has reports on file. Since there is no requirement in Project's documents for submission to USAID of these reports, USAID agreed that research papers of fellows, submitted as appendixes to NAS reports would suffice.

CNPq has cleared channels to import equipment and supplies.