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GEOLOGICAL SURVEY - AN IMPACT ASSESSMENT

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EXECUTIVE SUMMARY

In 1962, under project agreement 669-Q-29-2023, between the Bureau of Natural Resources and the United States Agency for International Development, the latter financed a long-range program outlining the organizational, operational and training requirements for the systematic and scientific determination of the location, characteristics and extent of Liberia's natural resources.

As a result of a field reconnaissance program carried out in May 1962, a comprehensive long range program was prepared, and approved on October 8, 1962 for implementation by the late President William V.S Tubman.

The geological portion of the program was expanded and intensified in 1965 under the title "Geologic Exploration and Resources Appraisal Program", GERA for short, and designated project number 660-51-210-071, with the following objectives:

- 1) Develop a competent geological organization by means of formal academic and in-house participant training;
- 2) Develop office and laboratory facilities, and the essential supply of field equipment, necessary to carry out and support effective field and laboratory investigations;
- 3) Conduct geophysical, geological, and mineral resources reconnaissance studies throughout Liberia; and
- 4) Prepare maps, reports, and establish files as appropriate, in order to develop sufficient data base for the Liberian Geological Survey office to carry on further geological studies, earth resources evaluation, and geological engineering studies.

The total funds allocated to the project was \$5.0 million. The project was started in May 1962 with the initial field reconnaissance, and was completed in July, 1972.

The transfer of technology between the United States and Liberia was the most important achievement of the project, during which course several mineral deposits were investigated or evaluated, which included barite, kyanite, silica sand, clay, phosphate, gold, bauxite, chromite, cassiterite, galena, rutile and monazite.

The project produced good base maps, acquired and compiled geophysical data, established laboratory facilities and provided technical equipment, all of which have been very useful in pursuing the ultimate development of Liberia's mineral resources. Apart from the evident technical benefits, some organizational, social and economic benefits were also realized from the GERA project. These include the setting up of a functional Liberian Geological Survey, instituting a series of documents with specific formats for different types of data presentation, training earth scientists and technicians both home and abroad, and suggesting the presence of hydrocarbons and other mineral deposits such as uranium, which have given government revenues through fees acquired from concessionaires.

Several lessons were learnt from the project such as; the training of administrators to handle the post-administrative functions of the survey was essential; the training of the Liberian professionals abroad should have been completed earlier in the program to enable them to more fully participate and contribute to its success; and, the program should have been gradually phased out rather than ending it abruptly which would have ensured continuity.

I N T R O D U C T I O N

BACKGROUND AND JUSTIFICATION

Following the 1962 project agreement 669-Q-29-AB-2023 with the Bureau of Natural Resources now the Ministry of Lands, Mines and Energy; the USAID financed the preparation of a long-range program outlining the organizational, operational and training requirements for the systematic and scientific determination of the location, characteristics and extent of Liberia's natural resources. The program was to be designed to obtain maps and other basic data relevant to Liberia's natural resources and essential to their economic development while assuring their effective utilization and exploitation.

As a result of this agreement, a team of three scientist, Messrs. Albert L. Nowicki, Rupert P. Wikinson and Albert E. Wiessenborn, completed a field reconnaissance program in May 1962 and prepared a comprehensive long-range program which results they entitled "Study, Mapping, Surveying and Geology Requirements in Liberia". The report was published on July 30, 1962 and after review by the Government of Liberia, was approved for implementation on October 8, 1962 by the late President William V.S. Tubman.⁽¹⁾

It was subsequently agreed by the Governments of Liberia and the United States to carry out, as Phase 1, certain aspects of the program. The activities comprising the initial phase consisted of two integrated parts:

- 1) Geological Surveying and Mapping; and
- 2) Geodetic Surveying and Topographical Mapping

It was further agreed that subsequent consideration for U.S participation in other phases of the program as outlined by Nowicki et al., would depend on the desire of the Liberian Government, the availability and training of Liberian personnel and the ability of the Liberian Government to finance the local operational cost and contribute to the facilities costs of an expanded program.

(1) Preliminary Draft Project Agreement of Geological Surveying and Topographical Mapping Project. Date unknown.

Phase 1 of the program was to last for approximately five (5) years and started in the fall of 1963. Of the total estimated U.S Government contribution of \$4,661,000 only \$437,000 was allotted to Geological Surveying and Mapping with the remaining \$4,224,000 being earmarked for the Geodetic Surveying and Topographic Mapping. It was under this general backdrop that in 1965, the geological portion of the program was expanded and intensified under the title "Geologic Exploration and Resources Appraisal, GERA for short designated project number 660-51-210-071. It is this project which will be evaluated here.

THE PROJECT

Project Objectives

To achieve the project goal of providing the Liberian Geological Survey with the institutional capability and the data base necessary for the Government of Liberia to carry out the systematic development and optimum utilization of its earth resources, the Geologic Exploration and Resources Appraisal (GERA) Program was assigned the following four objectives: ⁽²⁾

- 1) Develop a competent geological organization by means of formal academic and in-house participant training;
- 2) Develop office and laboratory facilities, and the essential supply of field equipment, necessary to carry out and support effective field and laboratory investigations;
- 3) Conduct geophysical, geological, and mineral resources reconnaissance studies throughout Liberia; and
- 4) Prepare maps, reports, and establish files as appropriate, in order to develop sufficient data base for the Liberian Geological Survey office to carry on further geological studies, earth resources evaluation, and geological engineering studies.

Reorganization and Training

This part of the project was to be jointly developed during the early stage of the program by the Project Director and Project Advisor and was

(2) Summary - Project Completion Report of the Geological Survey Appraisal program.

based upon plans for reorganizing the geological, mining and related scientific services as approved by the Government of Liberia. In carrying out the work plan, detailed field training of Liberian professionals and technical staff was stressed. Also included in the plan was a long range training program abroad, which was geared at meeting the need for additional professional personnel and resulted ultimately in the training of personnel in specialized disciplines such as mineralogy and geophysics.

Infrastructural and Logistical Development

This component entailed the setting up from virtually nothing, of the infrastructural facilities necessary to carry out the project. Laboratories (chemical, mineralogical) and reproduction (drafting, photographic) facilities had to be established and equipped to respectively handle field samples and prepare and update base maps and photographs. Field supplies, essential to the performance of effective field work were acquired, a geological store established, and proper disbursement procedures designed and instituted.

Data Acquisition

This aspect of the project was carried out primarily by personnel of the United States Geological Survey living in Liberia and their counterparts of the Liberian Geological Survey.

Reconnaissance geologic mapping was to be carried out throughout Liberia wherever accessibility allowed and to the full extent permitted by the weather, with the hope that a reconnaissance geologic map of the country could be produced by 1972. It became evident early in the project that conventional methods of geologic mapping would not have accomplished that however; therefore in 1966 a feasibility study was instituted which results showed that an airborne geophysical survey of Liberia could provide substantial help in achieving both the mineral evaluation and mapping objective of the project. As a result of the study, USAID financed an airborne magnetic and radiometric survey of the entire country which lasted from October 1967 to January 1968.⁽³⁾

(3) Development of the Liberian Geological Survey, Jones, A.E.N., Geological, Mining and Metallurgical Society of Liberia Bulletin, Volume 11, 1967.

As these geophysical data became available and as geographic base maps in the form of preliminary form-line sheets at 1:40,000 scale became gradually available, the project effort was concentrated on systematic aerial mapping for publication at 1:250,000 scale. Later when quadrangle maps at 1:125,000 scale became available in 1970, all the data were compiled and analyzed, and the remaining field work was directed to resolving conflicting information and gathering additional critical data.⁽⁴⁾ It was again apparent in 1971 that geological mapping confined mostly to vehicular accessible roads and trails would still not enable accomplishment of the project's objectives by June 1972, therefore a greater portion of field traverses was done along the major streams and rivers and geologic mapping was intensified in eastern Liberia where no systematic mapping had previously been conducted.⁽⁵⁾

Data Presentation

This phase of the project involved compiling the different types of data (magnetic, radiometric, geological, geochemical, etc.) in their appropriate formats and preparing maps and reports which would disseminate or display the information which had been collected.

These reports, maps, etc. were to provide the essential documentation for continued geologic study of specific target areas at larger scales. Additionally, they could be used in such diverse activities such as mineral and water resources evaluation, forest conservation development, power line and microwave relay systems construction, etc.

Another aspect related to data presentation was the development or introduction of an acceptable series of formats for the presentation of basic field data which were acquired from different areas and from various investigations.

Expected Outcome

It was hoped that the data and maps obtained from the project would assist the Government of Liberia in its economic development through the effective utilization of its mineral resources and thereby possibly diversifying its mineral economy from that based solely on iron ore, and reducing Liberia's dependency on continued foreign aid from donor countries, especially the United States.

(4) Project Completion Report, Chidester, A.H., U.S Geological Survey, Project No 669-51-210-071, June 1972

(5) Annual Report, Bureau of Natural Resources, 1972

It was hoped that the project would also result in the institutionalizing of a Liberian Geological Survey within the Bureau of Natural Resources. The training of earth scientists and technicians and the establishment of the necessary research facilities were essential to this development.

Target group

The project was primarily aimed at benefitting the Liberian Bureau of Natural Resources presently the Ministry of Lands, Mines and Energy, through the development of a properly staffed and equipped Liberian Geological Survey.

Duration

The project had a duration of ten years. It started in May, 1962 with the field reconnaissance by Mr. Nowicki et al. and the final field work was completed in May 1972, with the final compilation of maps and reports being completed in July 1972. To date however, for undeterminable reasons, some of the updated reports have not been completed and submitted to the Liberian Government by the United States Geological Survey, so technically the project is not complete.

Funding

The total funding of the GERA Project was \$5.0 million, most of which amount went towards salaries and operational cost of the U.S Geological Survey personnel. A clear example of this is illustrated in the Project Agreement document for the year 1969 which showed the following breakdown for the total obligated amount of \$587,000.⁽⁶⁾

- a) Services of U.S Geological Survey personnel - up to \$410,000. For that year, there were 10 full-time USGS employees and 1 part-time and 2 TDY specialist.
- b) Participant Cost - up to \$24,000. This amount went to defray the cost of four participants who were already undergoing training in the U.S..

(6) Project Agreement Papers, 1969.

c) Other Cost - up to \$153,000. Of this amount, \$146,000 was earmarked for logistic support cost (housing, utility, educational allowance, rest and recuperation, etc.), and \$7,000 for field and local operating cost for the USGS personnel. (\$5,000 of this was for field expense including air charter and per diem, and \$2,000 was for the procurement of services and commodities for the effective support of U.S financed technicians or activities).

The Liberian Government provided funds from its budget to operate the Liberian Geological Survey which included paying the salaries of the Survey's technical and supporting services staff assigned to the offices, laboratories and field operations related to the project. Government was additionally responsible for necessary equipment, maintenance supplies and supporting services and providing for the installation of equipment and maintenance and repairs of laboratory, office and field equipment and vehicles except those which USAID retained title to.

The agreement also required among other things, that the Liberian Government provide funds for field operating expenses of Liberians which included per diem for LGS staff, pay and food for laborers and for items of field equipment which could be purchased locally (this included dishes, cots for the Liberian staff, etc.).

SECTOR SETTING

The Geological Survey along with the Mining Service and the Cartographic Service (LCS), were established on January 31, 1958 by an Act of the Liberian Legislature entitled "An Act to Reorganize and Expand the Bureau of Mines and Geology of the Republic of Liberia". The Bureau subsequently became autonomous and known as the Bureau of Natural Resources and Survey headed by a Director with each of the three branches being headed by a chief.⁽⁷⁾

Immediately after being established, the Survey became primarily concerned with surveying diamond mining claims because of the tremendous backlog of claims that were to be surveyed.⁽⁸⁾ In the years that followed and up to the start of the project, the LGS carried out limited geological mapping in Eastern Liberia and

(7) Annual Report, Bureau of Natural Resources, 1958.

(8) Annual Report, Bureau of Natural Resources, 1959

engaged in the exploration and mapping of selected economic targets such as, the manganese occurrence in the Firestone Plantation and the high grade itabirite (iron) in the Geo-Fantro Range northwest of Buchanan. Its professionals were however used at times to supplement the Mining Survey by continuing to survey mining claims, periodically checking weightometers at the Liberian mining company's shipping yard, checking and examining ore minerals samples for shipment from the different mining concessions operating in Liberia, and appraising diamond shipments.⁽⁹⁾

The basic problems in carrying out the functions of Geological Survey during this time period were the absence of up-to-date aerial photographs and topographic maps to serve as base maps on which to superimpose the mapped geology. The field geologist used old photos and topographic maps with scales of 1:125,000 or larger. There existed mineral, commodity and planimetric maps of the country at a scale of 1:500,000 which were absolutely of no use to the geologist in the field.⁽¹⁰⁾

Technical equipment and laboratory facilities were generally non-existent and office space for geologists was limited to a one room office on the first floor of the present central office of the Ministry of Lands, Mines and Energy.

Prior to 1962, USAID had twice provided scholarship for technicians of the Bureau of Natural Resources and Survey. Once in 1954 they provided funds for four scholarships and again in 1957 USAID provided money for a mining engineer and a geologist to study in the United States. There is no evidence that at the time of the granting of these scholarships, there were any thoughts given to the GERA Project, although it is quite possible that because of the availability of these earth scientists, the project was eventually thought of as being feasible. Not only was there a paucity of qualified geologists prior to the project, but the middle level and technical support staff were also generally non-existent. There was therefore an urgent need to train Liberians both in-house and abroad, who would then be qualified to associate with and participate in the project.

(9) Annual Report, Bureau of Natural Resources, 1960

(10) Annual Report, Bureau of Natural Resources, 1962

In the early sixties, access to most of the country was very restricted with only a few major roads connecting Monrovia to the interior parts of the country. As a result, travel to most parts of the country was limited to foot trails, rivers navigable by small rubber boats, and small aircraft capable of landing at numerous small airstrips. The heavy vegetation cover and thick soils and weathered rock made field observations difficult and time consuming.

There also existed a somewhat limited local regard for the importance of the earth sciences to the development of the country. Iron ore was being produced at four mines (IMC, LAMCO, NIOC & BMC); however, the position (status) of the Bureau of Natural Resources on the national level was totally non-proportional to its position as guardian of the country's primary income earning sector. This is somewhat reflected in the National Budget of 1963 where only 0.39% of the total amount went to the Bureau. This situation unfortunately remains basically unchanged as only 0.84% of the 1983 National Budget has been allotted to the Ministry of Lands, Mines and Energy even though several new branches have since been added.

In 1963 the Liberian Geological Survey consumed 41% of the entire Bureau's annual budget versus the figure of 12% for the year 1983, which is somewhat misleading because the present Ministry of Lands, Mines and Energy has twice as many bureaux as in 1963.^(11,12) It does indicate also that even within the Ministry, the Geological Survey has no preferential position in terms of its budgetary allotment.

I M P A C T S

GENERAL

One of the outstanding accomplishments of the GERA project was the formulation of a strategy, in consonance with the primary objective of the project, whereby, for the first time Liberia began to systematically look for alternative minerals with an aim to possibly diversifying its mineral industry from that based solely on iron ore. In the course of the project, several mineral deposits were investigated or evaluated. These included barite, kyanite, silica sand, clay, phosphate, gold, bauxite, chromite, cassiterite, galena, rutile and monazite.

(11) Annual Budget of the Republic of Liberia, 1963

(12) Annual Budget of the Republic of Liberia, 1983

The results of the GERA project was also an important factor in encouraging the United Nations Mineral Development program to come to Liberia. That project was mainly concerned with supporting systematic geologic mapping which included evaluating mineral prospects which had previously been indentified, mainly through the GERA project, especially by the airborne geophysical program.

The project was instrumental in improving the social consciousness for the earth sciences, primarily by training earth scientist and technicians. Several persons were trained in the USA although this was primarily true for first degree geologist; the program did produce a few higher degree (M.Sc) individuals who went on to make their contributions to the Ministry.

Technical Impact

The most important impact of the GERA project was realized in the transfer of technology between the U.S and Liberia. This resulted in the systematic and scientific determination of the location, characteristics and extent of Liberia's natural resources.

The production of good base maps, the compilation of geophysical data, the establishment of laboratory facilities and provision of technical equipment, have all been very useful in pursuing the ultimate development of Liberia's mineral resources. The acquired geological and geophysical data have provided a common base for both government and private exploration companies.

Several of the products, especially maps and aerial photographs, which came out of the GERA project are being extensively utilized by many other Ministries and autonomous agencies of Government such as the Forestry Development Authority, Ministry of Agriculture, and private exploration and timber companies and private individuals.

Another important technical impact was felt in the area of documentation. The project successfully developed and instituted a series of documentation for the presentation of basic field data, thus giving easy access to references for continued research. This program was very useful and considerably improved the standardization of documents within the LGS in that information was catagorized into one of several formats such as Monthly Operational Reports, Memorandum Reports, Open File Reports, Special Papers, Bulletins and several different

types of maps at varying scales. The method is still utilized and because of the success of the Monthly Operational Reports, that report is presently a requirement for all bureaux within the Ministry of Lands, Mines and Energy.

An important technical accomplishment of the GERA project was the geochronological program which commenced in 1966, and was a co-operative effort of the Liberia Geological Survey, the Massachusetts Institute of Technology and the U.S Geological Survey at Menlo Park, California. The program determined the geochronology and correlation of Liberian rock units. Suites of rock specimens collected from major recognized Liberian rock units were analyzed for their absolute ages by radiometric methods. The results have been useful in correlating similar absolute age data from other parts of West Africa and northeastern South America, thereby providing supporting evidence for the hypothesis of continental drift by plate tectonics⁽¹³⁾

Another technical impact of the GERA project was that its participants were very instrumental in establishing and developing a Geological, Mining and Metallurgical Society of Liberia (GMMSL) which catered to all professional in the country in the general area of mineral exploration and mining. The society held yearly technical meetings where papers were presented which disseminated information about work being carried out by its members or their organization.

That the GERA program was vital to the success of that organization is evident by its general inactiveness since the GERA program ended in 1972.

Organizational Impact

A significant achievement of the GERA project was the organizational impact. The organization of the Liberian Geological Survey (LGS) was structured after that of the United States Geological Survey (U.S.G.S) with sections for a chemistry laboratory, mineralogical laboratory, a publication section equipped with drafting and reproduction facilities, a technical library, photographic laboratory (for working with aerial photographs), and sections for geology and geophysics. These sections were eventually assigned heads as in the U.S.G.S.

The new organization was very functional and resulted in a significant improvement in the work standard within the survey which was additionally reflected

(13) Annual Report, Bureau of Natural Resources, 1966.

in the survey's output. The different sections engaged in healthy competition and for the very first time since the formation of the Geological Survey, each employee had a specific task within a specific section.

The success of the organization of the LGS prompted the Bureau of Natural Resources to also structure its other two existing services (Mining and Cartographic) after their counterparts in the United States. Additionally, two more recently constituted services (Liberian Hydrological Survey and Lands and Survey) are also basically structured after their counterparts in the U.S. It must be noted however that most of the top professionals in the Ministry of Lands, Mines and Energy have received their training in the U.S., where they had the opportunity to visit at least one of those offices (e.g. the U.S. Bureau of Mines).

Social Impact

The main social impact of the project was achieved in providing foreign training for Liberian professionals and in-house training to sub-professionals at the Liberian Geological Survey. Fourteen Liberians received training abroad which ranged from short courses to B.Sc degree programs in geology.⁽⁴⁾ Most of those selected for the degree programs had to successfully pass a Geological Aptitude Test administered by the Department of Education. Two of the geologists were granted additional scholarships and acquired masters degrees in geophysics and mineralogy-petrology.

Another important social impact was that the GERA project for the first time, introduced the earth sciences as a dynamic and challenging subject to potential college and high school graduates of that era, and also offered career opportunities in that field. As a direct result of the activities involved with the project, people in general, began to realize the significance of the Liberian Geological Survey, and, that iron ore was not the only mineral which could be exploited in Liberia. This consciousness was institutionalized a few years after the project, through the establishment of a geology program leading to the awarding of a Bachelor of Science degree at the University of Liberia.

Another somewhat restricted social impact was perceived through the interactions of the Liberian professionals with their U.S counterparts, which no doubt, resulted in the exchange of both scientific and cultural ideas. Although

(4) Project Completion Report, Chidester, A.H., U.S. Geological Survey, Project No. 669-51-210-071, June 1972.

the benefits of such interactions would vary from one individual to another, it nonetheless resulted in the lasting friendship of many Liberians and Americans.

Economic Impact

Generally the economic impact of programs such as the GERA project are not immediate, primarily because of the intrinsic nature of the mineral industry which usually requires a considerable gestation period between the initial discovery of a mineral and its economic exploitation.

One immediate impact which resulted from the GERA project was in the search for offshore hydrocarbons while the project was still going on. This situation had resulted from the airborne geophysical (magnetic) work which had earlier identified several offshore basins thought to contain thick sequences of sedimentary rocks. Several oil concessions were subsequently awarded and although four wells drilled found no hydrocarbons, the Liberian Government received land rental fees from the concessionaires.

The data acquired during the GERA project have stimulated numerous interest in Liberia's mineral potentials and have resulted in the concessioning, by foreign companies, of large areas of the country. Jobs have been provided to Liberians by the ensuing exploration programs and the Liberian Government has benefitted from the sale of the GERA products (maps, reports etc.) and payments of exploration and land rental fees by the concessionaires. A notable example is the American company CIUE (Coastal Liberia Uranium Enterprises) which has, over the past five years, employed more than 150 Liberians and spent almost \$13 million on exploration. Insufficient reserves and unfavorable world market conditions combine however to make the venture unsuccessful.

A somewhat limited economic impact resulted from the money spent locally by the U.S. Geological Survey personnel and their families for such items as food, house rent, entertainment, cloths, domestic help etc. On the other hand, most of the USAID funded \$5 million went back to the Americans as salaries and operational cost. Additionally, as per the project agreement, most equipment came from the USGS or had to be purchased from the U.S., with a lot of it being returned at the completion of the project in 1972.

Policy Impact

Generally in developing countries, policy makers, mainly for economic reasons, find it difficult to adopt new policies that would accentuate the ensuing benefits of a technical project, especially when these benefits are not immediate. When once a policy is ratified, its implementation would require some financial outlay, and most times, this would weigh heavily on these countries which are perpetually undergoing an economic crisis.

This has essentially been the situation in the post-GERA project era, as there does not appear to have been any recognizable policy changes brought about explicitly by the project. It was probably felt that because there already existed an active iron ore mining industry in Liberia, governed by the existing mining policies which are satisfied in the concession agreements, those could be modified to deal with what ever mineral was later discovered (e.g. oil and uranium).

CONCLUSION AND LESSON LEARNED

CONCLUSION

On the whole, the GERA project was very successful in that it achieved most of its assigned objectives. It produced different maps and data which have been extremely useful in the continuing assessment of Liberia's mineral potential. It trained several earth scientists and went a long way to establishing, out of nothing, a Liberian Geological Survey adequately equipped, which has sustained itself and currently continues to evaluate Liberia's mineral resources. The program successfully developed and instituted a series of documentations for representing basic field data and was additionally instrumental in generating social consciousness of high school and college students for the earth science as a possible career.

LESSONS LEARNED

Timing of training

The timing of the training program should have been in such a way as to increase the input of the returning geologists. The program would have been much more successful if the majority of the trainees had been sent abroad for their B.Sc degrees in Geology in the first year. Once they returned, their contribution and period of field experience would have been greater through working with their experienced counterparts. This would have ensured effective continuity of the incompleting aspects of the program and significantly improved the quality of the manpower of the Geological Survey.

Training of Administrators is a must

An effective group of qualified administrators should have been trained to handle the administrative aspects of the Survey. This would have kept, and even guaranteed a high level of experienced geologist at the Liberian Geological Survey. Instead, the older experienced professionals were appointed to administrative positions by their superiors at the Bureau of Natural Resources, thereby making them generally useless in their areas of specialization for which

they had been trained in addition to being unavailable to assist the young inexperienced professionals who came after them.

Project was too ambitious

The duration of the GERA project was too short for the objectives which were set, mainly because field work, essential to the success of the program, was generally impossible during about five months of each year, and there existed a paucity of accessible roads, available trained earth-scientists, and technical assistants, base maps etc. This situation inadvertently resulted because the program, although approved by the Liberian Government, was basically externally planned and without adequate emphasis being given especially to the local climatic restrictions and political situation, which often delayed disbursement of Liberia's contribution to the project, thereby not always fully utilizing the Liberian professional counterparts.

Project design was faulty

Programs such as the GERA project should strive more to institutionalize systems such as the Geological Survey rather than grinding out reports, which because of the limited time involved, are often inconclusive. The goals and design of the project were such that even without full participation and involvement of the local technician, which sometimes resulted because of Government's inability to provide the requisite funds, the Americans went ahead and the actual work got done by the expatriates. This had the effect of making some of the Liberian counterparts lazy and resulted later in a complete lack of productivity after the project closed. Because Americans tend to be action-oriented and things in Third World countries tend to move more slowly, such a problem should have been foreseen and possibly avoided.

The magnitude of the task undertaken by the GERA project and the added objective of trying to institutionalize a geological survey, might better have been realized had an organization been established outside of the public sector, which could later be absorbed by the Ministry as the nucleus of its Geological Survey. This may have somewhat reduced the extreme disparity in salaries and benefits, between the American and their Liberian counterparts. It most certainly would have improved the work habits and professional standards of the

Liberians working with the program.

Program should be gradually phased-out

There should be built into such programs provisions for a more gradual phasing out during which time only a skeletal group of U.S personnel should remain or periodically consult with those continuing the program. This is important because Governments tend to view such basic work as low priority and once the expatriate leaves completely, their financial backing reduces.

A gradual phasing-out of say five years would have ensured continuity and allowed for the evaluation of some of the prospects identified during the project. An association here with the U.S Bureau of Mines would have been extremely useful in taking the trained geologist from simply a mapping and mineral identification phase to an evaluation (pre-mining) phase.

APPENDIX 1

METHODS

The method employed in carrying out the study was primarily to be based on answers from questionnaire which had been prepared and submitted to individuals who either worked with the project or have had the occasion to use its products (maps, reports etc.). The questionnaire was also sent to some of the U.S Geological Survey personnel who worked at one time for the GERA program.

Many of the answers from the Liberians were of no use to the study because among other things, some claimed that it had been too long since it ended and that they simply did not remember. The Americans unfortunately all failed to return their questionnaires and only one replied my letter stating that as a technician in the project, he felt it inappropriate in commenting on items of policy, objectives and results. Their answers would have helped as it might have provided a different picture than the one drawn by the Liberians who did remember and were most helpful in making this impact study a success.

A lengthy literature search of the files of the present Ministry of Lands, Mines and Energy resulted in very little additional information than what USAID had supplied and what could be derived from that Ministry Annual Reports.

All available data were compiled studied and synthesized in fulfilling the objectives of this study.

Research for this impact study was conducted by Dr. Nathaniel Richardson Jr. and Mr. Cyril French, both professional members of Geoservices Inc. Dr. Richardson received his first two degrees through the GERA project participant training program between 1968-73. He worked several years as a geologist and geophysicist with the Liberian Geological Survey and culminated his service to Government as Director of that organization from 1978-1980, when he resigned and established Geoservices Inc., Mr. French has an M.Sc degree in geology from France, and before joining Geoservices in 1981, worked as a geologist with the Sierra Leone Geological Survey in Freetown, Sierra Leone.

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QUESTIONNAIRE

Please read carefully the objectives and achievements of the GERA Project and answer the following questions. (Please feel free to use the back side of the paper in answering your questions).

- 1) What is your profession? _____
- 2) What is your present occupation? _____
- 3) Were you associated with the GERA Project?
 No (please go to question number 22)
 Yes

DURING WHICH YEARS _____
IN WHAT CAPACITY _____

- 4) In your opinion was the project successful in realizing the desired objectives?
 No

PLEASE Explain Reason(s) why not and go to question 5

Yes
PLEASE Explain Reason(s) why

- 5) What should have been done differently in making it more successful in realizing its objective?

- 6) Did your association with the project benefit you professionally?
 made no difference (go to question 7)
 No Yes

Please Explain:

7) Do you know why this particular project was chosen?

No (go to question 9)

Yes

Please Explain:

8) Do you know why Liberia was chosen for such a Project?

No - Go to question 9

Yes

Please Explain:

9) Why do you think the U.S Government provided the assistance? (Please Explain)

10) Has the US Government in any way benefitted from the GERA Project?

No

Yes

Please Explain:

11) Five (5) million US dollars were spent on the GERA Project which lasted from 1960-1974, do you feel that the achievements were in proportion to the amount spent?

No Yes

Please Explain:

12) Do you think the Liberian Government has utalized the project's achievements to the fullest?

No Yes

Please Explain:

What was the most important achievement(s) of the project in terms of:

13) Geology:

14) Social benefits:

15) Economic benefits:

21
~~4~~

16) On a scale of 5 (most important) to 1 (least important), rate the following in terms of their post-project impact:

- training of Liberian counterparts
- establishing facilities and providing equipment
- establishing data base
- exposure of the Liberian technicians to foreign experts
- other (please state)

Please explain your #5 choice:

17) Was there suppose to be a follow-up to the Project?

- Don't know - Go to question 18
- No - Go to question 18
- Yes (Please explain why this was never done)

18) If a follow up is being planned, what would you like to see included?

19) What other Ministry(s) or Agency(s) has benefited from the GERA Project?

- Don't know - Go to question 20
- None - Go to question 20
- 1 or more

a) Please name: _____

b) Briefly state how?

22
-5-

20) Can you identify short comings with the project?

No - Go to next question

Yes

Please explain:

21) Can you identify any problem(s) which confronted the GERA Project?

No

Yes

Please explain:

22) In the course of your work, have you had the occasion to use any product of the GERA Project?

No (go to question 25)

Yes

Please explain which and how:

23) Prior to the availability of this product, what did you use as a substitute?

24) What minor modification(s) in the objectives of the GERA Project would have rendered the products more useful to you?

25) What do you think are the basic shortcomings of such projects?