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MAGAF برنامج تقدير موارد الثروة المعدنية والبترولية والمياه الجوفية
MINERALS, PETROLEUM & GROUNDWATER ASSESSMENT PROGRAM

AID Project 263-0105

Egyptian Academy of Scientific research and Technology

Desert Research Institute

Egyptian General Petroleum Corporation

Egyptian Geological Survey and Mining Authority

Remote Sensing Center

To: Project Officer, S. Arif

From: Project Coordinator, D. T. Snow

Subject: Bimonthly Report for period March 24, 1984 to May 23, 1984

re contract NEB-0105-S-00-3035-00, ID2

Your Ref. Our Ref. Date August 22, 1984

Attached bimonthly report is submitted .

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Egyptian Geological Survey and Mining Authority

Task I Regional Mapping

EGSMA is taking advantage of Conoco Coral Co.'s geologic mapping program. As part of their concession agreement, Conoco has agreed to produce a 1:500,000 series of geologic maps of all Egypt, based on Landsat imagery. Their base maps will form a useful function in compillation of the more detailed, ground-studied geologic map series. Ideally, EGSMA should consider collaboration with Conoco so that stratigraphic nomenclature and known but unpublished geology can be made consistent with EGSMA practice. Joint publication could perhaps be negotiated.

Task II Geophysical and Geochemical Studies

A correction to my Jan-March, 1983 report: no radiometry was flown in Area IV. Someone mistakenly thought it would have no value, perhaps.

Interpretation and documentation from Aeroservice Co. is arriving regularly at GPC, though neither EGSMA nor EGPC have made facilities for storage available yet. A potential crisis can be envisioned, as 4 X 30,000 sheets pile up.

Whereas most field work has stopped for the summer, progress is being made in planning deployment of new seismic network stations around Aswan. Geophysical logging is being conducted in exploration wells at Maghara and at Ras El Behar, for coal and potash, respectively.

Task III Economic Viability and Estimation of Potential Resources

The potash project is advancing, as the first exploration hole, Ras El Behar No. 1, is being drilled, at this time in evaporites of the Zeit formation. It took months to solve the problems of brine drilling, but good penetration rates and high core recovery in soluble rocks will prove the value of cautions beginings. The target depth is 500m, using the UBC-500 drill.

The gypsum explorations at Gemssa are nearly finished. The stratigraphy encountered is not encouraging, as it has disclosed thick intervening shale beds interupting beds of incompletely hydrated gypsum. Laboratory tests are being done (mainly DTA) to analyze splits of whole beds.

A second site, at Gebel Zeit, and a third near Abu Ghusun are contemplated.

Consultant Harry Godbe is evaluating gold deposits, especially Barramiya, and has spent much of his time assisting the field parties at Umm Rus and Atud. He discovered a mistake in analysing of spectrometric assays of Barramiya ore, which essentially restores the former conclusion (1978) of 6 g/t ore vs. 2 g/t. A program of resampling is recommended by Godbe, to establish the geologic reserves in question. Since the trenches remain open at the site, the task is not as great as the original effort of 1981-1982.

At Atud, Mr. Godbe discovered a second vein parallel to the "Main" Vein, which may double the reserves and increase the economic value of the deposit even more.

Other contributions have been Godbe's evaluation of a gold-mining proposal and of operations of the Sinai Manganese Co. The important lesson for EGSMA to appreciate is that unless they have the benefit of competent mineral evaluation techniques, potential investors can gain unfair advantage over less-experienced local people.

Task IV Upgrading the Analytical Laboratories

No progress in acquiring the needed analytical tools has been made, Two trainees are in America being prepared for the X-Ray, X-Ray Fluorescence and other devices including microprobe and scanning electron microscope.

Task V Geologic Museum

No change in the status quo has been noted.

Task VI Mineral Commodity Program

Two new programs have emerged portentions for Egypt; bauxite and bentonite. In memos elsewhere, P.C. has proposed that EGSMA pursue both resources with reconnaissance explorations this coming season. The Survey is short of laborers, which fits appropriately into a shift to reconnaissance work. In both cases, the field party has to be dominantly made up of geologists, with only driver-mechanics as support. Light equipment carried in jeeps can furnich flying camps.

We don't know the best way to search for bauxite, which may occur at unconformities in any aluminous rocks, including granites, lavas, clay shales, marls, even kaolinitic sandstones, Nearly-appropriate climatic conditions are known to have existed in the Cretaceous, as evidenced by extension kaolinization in the Nubia of Sinai and Kalabsha

and in the Aptian-Albian of Saudi Arabia, where pisolitic bauxite developed across an angular unconformity on clastic rocks. In Egypt, vast areas of appropriate rocks exist. One approach would be to chase the Albian-Aptian time-line in the field, seeking paleosols that might be scanned by spectrometric methods for high alumina content, as well as by visual clues such as red coloration. Another approach would be to traverse all argilloceous Nubia sequences, seeking paleosols as we have seen, concentrating perhaps on the kaolin-rich horizons, since it only takes a few million years of appropriate climate to leach the silica from such rocks. Meanwhile, airborne remote-sensing techniques should be investigated. Consultation can speed the search, utilizing Dr. Lozej or Dr. Johnson, preferably the former, who discovered the Az Zabira, S.A. deposit.

The importance of bauxite to our captive Egyptian aluminium industry cannot be less than

The second project I have promoted is to locate numerous sources of bentonite clay, which can be tested in search for one or more deposits that can be beneficiated to replace the $40 million-worth of bentonite imported annually for drilling mud and foundry use.

The most recent prospect was suggested by the setting of a deposit discovered by accident at km 60 on the desert road to Alexandria. Upon a recent field inspection, it was seen to be a horizontal 1-m bed with 2m overburden, situated in a flat topographic basin, bordered by low bedrock hills.

Reportedly, laboratories of three companies, including Baroid, Inc., have expressed interest in the deposit. It is unknown whether the bentonite bed is part of the bedrock sequence, i.e. underlies the hills, or is part of a basin-fill sequence of younger age, that would be found under the flats but not the hills. If the latter can be proven by a trench excavation project, then all such basins in some indefinite region, perhaps measuring a hundred km in dimensions, are candidates for bentonite discovery.

Dr. Attia of NRC will analyze the physical-mineralogical character of the km 60 bentonite, and is committed to a local trenching program in collaboration with the EGSMA. I suggest that the regional implications described above should be the EGSMA priority task, which they may follow by conducting trench explorations throughout a large, indefinite area of the W.D., guided by aerial photographic interpretation of the Pleistocene-Recent geomorphology. I suggest that basins closer to Alexandria be

favored, since that part would serve the Egyptian drilling market, as well as foreign markets, more economically than would a discovery near Cairo.

Task VII Publication and Documentation Center

Dissemination of mineral information remains an important part of the program, still largely ineffectual. Formal publication, such as Annal No. 13, moves slowly because the editorial staff is practically non-existent. New papers from EGSMA are slow in coming, since there seems little reward for publication. Returning experts, a fter receiving US training in specialty areas, have not yet been made to report their findings to their colleagues or the mineral profession as a whole. These are rectifyable deficiencies, just as the assembly of existing date in information packages can be underaken once the form and organization is approved by the Board of Directors.

Desert Research Institute

Task I Groundwater Exploration

The work of Drs. Misak, Atwa, Tanner and their parties of geologists, hydrologists, geochemists and geophysicists is progressing rapidly with basic data acquisition in the Red Sea Hills Area I, including some 20 main wadis and many tributaries, mostly draining Eastward. They have completed a canvass of 74 water points, mostly wells, plus a few springs. Water samples have been taken for analysis. Pumping tests have begun. Their contract with EGSMA for drilling has started with a test well in Wadi Igla, downstream of the tin project area. The area is so vast that only geophysical and geological observations will be done in all wadis; more detailed hydrology will be generic in nature, i.e. a small number of wadis can be studied more thoroughly to typify all wadis. Any subsequent mining venture will have to include hydrologic investigations to assess specific resources for infrastructure or process needs.

Task II Data Organization and Analysis

DRI has requistioned a list of text books and documents they find lacking.

No plans have been announced for up-grading their system of groundwater data holdings, which is recommended for future manipulation of the exploration data from Area I surveys.

Remote Sensing Center

Task I Data Organization and Analysis

Renovation of existing spaces and occupation by RSC of the entire 7th floor of the Academy building has begun, whereas the computer room has remained intact, There will be plenty of time for such work as the Wimvex and ERIM contracts have only been finalized in April.

Task II Production of Atlas

The delays have continued since last reported, so that completion of the Atlas may be as much as a year late.

Although additional sources of ground control data are being found, it should be understood that the full coverage of Egypt with ground controlled Landsat scenes cannot be done without obtaining details of ground control available from military, academic and industrial sources. If a survey operation is required, perhaps with a satnav device, much advance planning and financial planning is needed, soon. I consider it unrealistic to ignore this problem.

Task III Remote Sensing Workshops

No change except postponement.

Task IV Aerial Photography

In spite of urgency on the part of RSC, to utilize its camera and aircraft which are still under warrantee, there is no present prospect of flying the mission until EGSMA, the client in a sense, determines a need for such a photographic mission.

Meanwhile, Dr. Lepley is sponsoring a special-purpose enhanced-color photo mission in support of ore-deposit exploration in the Red Sea Hills. This might be flown with the RSC aircraft.

Egyptian General Petroleum Corporation

a. Aeromagnetic study in the Eastern Desert

The data compillation and map production for all four areas is progressing at Aeroservice Co., according to periodic reports. Fortunately, the delivery rate is not as high as the completion rate, because there is no evidence that either EGPC or EGSMA have made sufficient preparations for storage of maps or tapes. Dr. Nachla at GPC is inundated with copies for distribution that can't be handled by the two agencies. The problem will get worse if storage facilities are not build promptly.

During Dr. William Hinze' consulting visit to Cairo May 19-25, he and Dr. Meshref reviewed a preliminary basement interpretation map of Area IA in the E.D. The salient conclusion was that a 15,000-ft basin does not exist, but rather, several 10,000-ft basins of limited petroleum potential may. The project to drill a stratigraphic test well is therefore shelved unless a computer modelling effort at GUPCO suggests otherwise.

Alternative projects being favored by EGPC include aeromagnetic surveys in other areas having petroleum potential, and to speed the development of data-handling capability in EGPC.

b. Seismic Study in the Eastern Desert

h. Stratigraphic Study (drilling) in the Eastern Desert

Only if the results of GUPCO's modelling of the AM data from Area IA prove more favorable than presently expected will these two projects be reconsidered. It appears that the regional northerly dip was a factor in ESSO's concession selection, since their acreage covers the deepest basins. The early results of the AM study may have been useful to ESSO in delineating the most favorable areas.

c. Seismic Data Storage System and Data Library

Ten geoscientists are slated for training in data-base management and exploration data storage. Four have completed English-language training at AUC, three of whom received scores of 70 or more, preparatory to a U.S. training assignment at Georgia Tech (?). The third, and then four more, will follow for further language work. The first four scheduled for P-2 at Al Ahram are to begin July 4, and four more will follow in December.

Of the ten, all but four are experienced geologists, thus it was decided not to utilize the GPC training course, but rather, to acquaint the new-comers in-house. The two organizations have communicated about their respective roles, which will remain

independent for the time being.

Already the EGPC staff is writing its own files, with EGPC computer center help, and utilizing some of Standardata's abbreviations. Much of the well data log will be held as recoverable text.

They can use the computer center's facsimile plotter for all present statistical and graphical needs, but recognize an eventual need for a digitizer and plotter, to store geophysical logs of wells, and for maps. These will be requisitioned later, when their needs are known more precisely.

A decision has been reached to staff the EGPC data group from local sources. A newspaper advertisement yielded none qualified, but a candidate from the GUPCO computer department is being considered and a host-country contract is being written with Mr. Abdel Ali for payment by AID under MPGAP. Computer peripherals may be provided as they become necessary. Failing to come to acceptable terms with Hassan El Shazly, it is admirable to find EGPC moving ahead smartly under the leadership of Mr. Alaa Abd el Azim. AID can provide consultation help, as needed.

d. Source Rocks/Oil Migration in the Western Desert

e. Sedimentary/Petrographic Study in the W.D. and G.O.S.

No plans have been made to implement these projects, if the supervision problem is permanent, it may be well to revise the agreement to eleminate these two.

f. Estimation of Existing and Potential Oil and Gas Resources in the Gulf of Suez

Robertson Research Co. has been awarded the project, but oil-company funding is not yet assured.

g. R. & D. Feasibility Study of Tertiary Enhanced Oil Recovery

With the decision to go ahead in this area, GPC has outlined a statement of work and of the project for Bakr Field. It would involve digital simulation of three reservoirs and prediction of performance under alternative EOR proceedures, so that feasibility may be determined. About half a billion barrels might be produced; that is the main reason for selecting Bakr.

i. Training Equipment, Ras Gharib Training Center

The committee to process proposals has delayed its actions while determining the responsiveness of one party offering, indirectly, the services of a manufacturer. The IFB will follow shortly upon determination of the list of responsive bidders.

Project Coordinator Activities

Rather than limit MPGAP to such minerals as potash, gypsum and gold, the P.C. has continued to promote project efforts in any and all minerals that could generate investor interest, to either replace imports or to produce exports. Considerable effort devoted to the literature on industrial minerals has broadened the scope of EGSMA possibilities, and trained people are now on the staff to investigate, document and advertise many of the potential commodities that exist in abundance in Egypt. EGSMA is in a position to make some substancial discoveries and definitions of saleable industrial minerals. The continued metals-market recession makes such a program imperative.

We learned recently of discovery of bauxite in Saudi Arabia. Similar geology in Egypt suggests likelihood of discovery here. While in Jeddah in January, I inquired at the USGS and viewed several open-file reports, some of which I have now obtained and studied. I have talked to two available consultants with Saudi Arabian bauxite experience who would help us learn the best exploration methods, including remote and proximal sensing techniques, namely spectrometry. Landsat can also be used, as they found in Arabia. Now we are scheduled to hear a proposal by Riofinex, who offers to train the Survey in exploration methods. I have encouraged EGSMA to assign a reconnaissance party for the coming field season, to scout the Paleozoic and Mesognic rocks of the E.D. and W.D. for aluminous paleosols.

Bentonite, imported for drilling mud and foundry purposes to the sum of about $40 million/year has long been sought in the Fayoum area and studied by NRC. A new discovery of clay, reportedly of good quality, is in a basin near km 60 to Alexandria. EGSMA is collaborating on a trench exploration program with NRC. Equally important would be a reconnaissance of similar shallow basins, some nearer to Cairo, using the backhoe to expose the deposits. This can be done quickly this year, if it can be organized. Several companies have expressed interest in mining bentonite, not just for the captive market, but also for export.

Barite is an even greater prospect, since imports are about $65 million/year, and the El Gedida deposit exceeds that amount several-fold, in terms of ground exposed by iron-ore stripping. I suggest that EGSMA collaborate with the Iron and Steel Co., who must possess reports that should be publicized by MPGAP methods. The company must be tired of waiting for someone to exploit the deposit. DRI's water evaluation in Baharia Oasis will bear on the beneficiation planning.

P.C. has been instrumental in kindling interest and activities in two other areas contributory to minerals exploration : 1) Field geochemical techniques need to become

routine in all regional and local exploration programs where statistical (grid-sampling) techniques have been married to laboratory measurements only. Equipment has been ordered by Mr. I. Shalaby, and if commodity procurement is freed soon, kits will be ordered for use this coming season. An expert will be brought here (substitute for a less-desired TDY) to instruct and assist in program design. 2) Exploration of vast desert tracts lightly covered with sand have not yet been explored for metallic or non-metallic resources — the E. Oweinat area is an example, but far greater areas of Precambrian rock in the W.D. and E.D. also exist as essentially unexplored terrane. The SIR imagery virtually strips the sand away, disclosing great structural detail below, while also identifying Pleisteocene and Recent stream-courses and alluvium. Thus I have proposed regional geochemical reconnaissence work to point to future mineral prospecting areas. The AID-supplied backhoe would facilitate penetration of the sand cover, when needed, and to expose weathered bedrocks.

In the petroleum sector, P.C. has spent the majority of his time lately with GPC and EGPC personnel.

The committee to select a bidder for the rig-floor simulator to be installed at the Ras Gharib Training Center has met frequently during this reporting period. Provided the budget can be stretched, a very useful facility will be produced in GPC's new building. Other oil companies are expected to use it also.

Once a decision was made fund a feasibility study for EOR at Bakr Field, a series of meetings were held to initiate the bidding procedure. Pre-qualification was determined to be essential to minimize the evaluation of numerous technical proposals. A limited number will be invited soon. The budget is also unrealistic for this job, and I expect to negotiate changes.

Planning for establishment of a computer-assisted exploration data file at EGPC has involved the USGS, P.I. of Littleton, Colorado, GPC and GUPCO. A search for a qualified instructor-leader has been underway for months. The program will be run wholly within EGPC, so AID's role will seemingly be limited to providing salary for the principle and to purchase computer equipment, such as a large-format plotter, when need develops.

At the MPGAP Semi-Annual Meeting held May 21, 1984, the P.C. summarized problems and progress encountered the first year by each agency, and constructive criticism was solicited from the audience, who had opportunity during the afternoon panel meetings.

Problem Areas

In spite of many efforts by EGSMA, so solution to the problem of editorial staffing has been found. Vital as that function is, it may have to be abandonned at this time, putting Mr. Stout to work in editing and organizing the mineral information packages, and in compiling mineral commodity data for publication. Newsletter releases are not getting timely response to requests for copy.

The impediments to release of mineral reports and data at EGSMA have apparently been removed, upon ministerial approval of EGSMA's decision. The contents of packages have been determined and working groups will be appointed. Problems can be solved..

Failure to fill training slots on schedule remains a problem, possibly becoming more severe as qualified EGSMA people are used up. So English-language training on a broader scale is needed, and program changes will have to be made to utilize poorer candidates in apprenticeships or local programs in Egypt.

Contractor Performance

The training program and TDY expert handling has been running as smoothely as can be expected.

Reporting is generally slow to be completed.

As the Project Coordinator moves into greater petroleum participation, the Resident Director Lepley will have to become more directly involved with the EGSMA field operations, the people running the gold, gypsum, potash and other programs, and to act as a catalyst for further and newer exploration efforts, such as in industrial minerals. I recognize an institutional need for help in marketing and contract matters, as these are areas of further contractor concentration.