Management contracts in mine rehabilitation: the case of Ghana's State Gold Mining Corporation

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Ghana's *State Gold Mining Corporation* (SGMC) developed the concept of employing a management contract for the rehabilitation of its operations in Ghana as a means of ensuring accountability and responsibility in that effort. SGMC rejected the idea of hiring a consultant for the rehabilitation work, as a firm hired simply to perform a study has no responsibility for implementing recommendations; and, therefore, no obligation to develop workable, practical programs. A management contractor, on the other hand, must be able to achieve results and be ready to accept liability for not performing. A management contractor is directly responsible for all operatons; (s)he is the manager, planner organizer, director, leader, and controller, responsible for staffing and for co-ordinating individual efforts toward accomplishing corporate goals.

After Ghana's launching of the *Economic Recovery Program* (ERP) in 1983, the State Gold Mining Corporation received a World Bank loan to rehabilitate its mines to raise production. SGMC then entered into a management contract with a mining constortium to undertake the rehabilitation work, feeling that it needed advice on how both to plan and implement this program. In addition, it was felt that interaction between Ghanaian managers and the contractor's management personnel would offer a training opportunity to the local staff and workforce.

This article will present the advantages and disadvantages to this approach based on SGMC experiences and observation. Section one presents a brief history of SGMC, with a discussion of its organizational structure and condition before the rehabilitation. Section two discusses the aim and objectives of the rehabilitation program, and the role the management contractor was expected to play. Section three delineates the extent to which these goals were achieved, and discusses problems and shortcomings. In the last section, there is a review of these problems and assessment of the success of the management contract concept, with discussion of amending the program to attain success over the longer term.

History and organization of the State Gold Mining Corporation

The State Gold Mining Corporation, established in 1961, is wholly owned by the Government of Ghana. It has four mine units: Tarkwa Goldfields Ltd., Prestea Goldfields Ltd., Dunkwa Goldfields Ltd., and Konongo Goldfields. SGMC presently operates three gold mines — underground operations at Tarkwa and Prestea and surface alluvial dredging operations at Dunkwa. It also is responsible for the Konongo Mine, which is permanently shut down, but maintained on a custodial basis. SGMC mining operations are supported by a Technical Headquarters at Tarkwa, a Head Office in Accra, a Port Agency at Takoradi (for handling of imports) and an Overseas Office in London for procurement services abroad.

General policy directives are issued by a Board of Directors through the Chief Executive. The Chief Executive is assisted by three Executive Directors — of Administration, Finance and Operations. The Director of Operations is responsible for mine planning, ore reserve control, technical and production activities. These responsibilities are carried out with the assistance of technical Head Office personnel — a Group Mining Engineer, Metallurgist, Electrical and Mechanical Engineers and a Geologist. The Director of Operations also has direct responsibility for General Mines Managers.

The Director of Administration, through the Chief of Personnel and Administration at each mine unit and at the Head Office, is responsible for training, personnel and general administration, as well as control over estates, welfare and security.

State Gold Mining Corporation Accra

The Director of Finance, through a Management Accountant at the Head Office and Chief Accountants at each mining location, exercises treasury, general financial administration and control functions.

Production trends and problems

Ghana's mining sector is one of the key export sectors of the economy. It employs 26 000 people. In 1986, it produced foreign exchange earnings of roughly 130 MUSD (excluding illegal mining and smuggling). This makes the mining sector Ghana's second largest foreign exchange earner, accounting for roughly 20% of foreign exchange earnings. The main product of the industry is gold, which represents 85% of the value of mineral exports. Ghana also exports Manganese ore, diamonds and bauxite.

Ghana's mining history is an interesting one. For many centuries, Ghana was a major source of world gold production. With development of South Africa's enormous capacity, Ghana lost its importance in world gold production. Output increased steadily, nonetheless, peaking at close to one million troy ounces a year in the early 1960's. Since then, Ghana's gold production has been declining, hitting a low of around 275 000 ounces in 1983. Production of other minerals has declined as well; bauxite production peaked in the early 1970s, then declined sharply; manganese ore production started falling from late-1960s highs; and diamond production has been declining since 1973 (see Table 1).

Causes of mineral production decline

The decline in Ghana's mining sector resulted from, primarily, a fixed price for gold until the early 1970s; overvalued local currency (the Cedi); a severe foreign exchange shortage; few technically trained managers; exhaustion of many existing ore bodies; and what was perceived by many outside investors as a hostile investment climate.

As a result, mine equipment deteriorated, production fell, and many mines closed. No significant new mines have been developed in Ghana in 40 years, although not for lack of a rich underlying resource potential. For instance, the State Gold Mining Corporation curtailed exploration and underground development during this period, as it was unable to retain adequate foreign exchange earnings. It also delayed capital expenditures, causing deteriorating of equipment and operating conditions. Production, therefore, was impossible to sustain; annual output from the three operations reduced from about 159 000 thousand ounces of gold in 1975 to 35 000 ounces in 1985.

Economic Recovery Program and Rehabilitation of SGMC mines

Against this background, the Government began in 1983 a comprehensive *Economic Recovery Program* (ERP) that exphasized the rehabilitation of industries associated with export earnings. Over the past four years, the ERP has resulted in the inflow of resources into the mining sector, primarily for rehabilitating some of the mines and associated road and rail infrastructure. Support has come from the World Bank and other bilateral donors, who have made foreign exchange available to purchase new equipment, spare parts and supplies for the mining companies.

Within Ghana's gold mining industry, the Ashanti Goldfields Corporation was able to begin a 161 MUSD expansion program. SGMC began an extensive rehabilitation program intended to provide the necessary equipment, spares and technical support to bring about a fourfold increase in gold production from 1985 through 1990.

The SGMC rehabilitation program

The program's aim is to raise SGMC production from 1986 through 1988 from about 35 000 ounces (1985 production) to more than 100 000 ounces a year. For this effort, the IDA is providing 30 MUSD from credits related to the Export Rehabilitation Program; the Canadian Government has made a 5 MUSD grant, and the Netherlands Government has given 4 MUSD. Funding is, therefore, available for procurement of equipment, spare parts, technical training and operations management.

Aims and objectives of the SGMC rehabilitation program

The management contractor versus the consultant

The departure of most foreign management and technical personnel was a factor in the decline of Ghana's gold production. Severe economic conditions created frustration among local experts, as did the mine workers' high absenteeism. Poor management and low productivity characterized the industry.

SGMC's weak institutional capabilities resulted in an agreement between the Ghanaian government and the World Bank for a large-scale injection of contracted management and technical personnel from an international mining consortium. This arrangement enabled the contractor to control implementation of the rehabilitation program totally, in contrast with the role of a consultant, who generally operates within a defined scope of duties.

Responsibilities of the contractor

The management contractor's scope of responsibilities included the following:

Management of Operations, including planning, budgeting, cost control, production supervision and personnel administration of all SGMC project operations. This encompassed the Tarkwa and Prestea mines; alluvial dredging operations and Dunkwa; and administrative operations at Accra and elsewhere. The contractor was to assume these functions in accordance with a timetable established when the budget for the first 180 days of the project was approved.

Geological Services, including the design and supervision of drilling programs; interpretation of drill-hole data; calculation of ore reserves; and day-to-day ore grade control in the mines.

Mining Services, including planning; engineering; systems design; equipment specification and selection; and supervision of installation.

Metallurgical Services, including testing supervision; systems design; equipment specification and selection; and supervision of installation.

Administrative Services, including accounting and financial control; procurement, including perchasing, contract preparation, inspection, expediting and logistics; personnel and office administration; communications; and security. The contractor also was charged to assist SGMC and provide advice in formulation of sales policy and implementation of revised marketing programs.

Training, including design and supervision of training programs for (but not limited to) technicians and managers.

Management of Rehabilitation Projects, including project management; oversight of sub-contractors; and execution of major rehabilitation projects — planning, estimating, engineering work, procurement, scheduling and construction management.

Financing Assistance, including assistance to SGMC in preparing documentation required by financial institutions; and identification of new funding sources.

The contractor was required to provide the following reports to the SGMC Board:

Operational and technical reports

(a) Monthly mine and production reports

(b) Monthly metallurgical planning and milling reports

(c) Quarterly geological program reports, including ore reserves and ore grade control reports

Administrative and accounting reports

(a) Monthly and cumulative (year-to-date) accounting and financial reports, including budgetary and cost control reports, operating statements, profit and loss statements and balance sheets.

(b) Monthly procurement and status reports

(c) Quarterly capital expenditure reports

Quarterly training program reports

Comprehensive annual reports on all project operations

Direction of services

Following is the text of agreements that were put into place to protect SGMC's interests and as a means of monitoring contractor performance:

— The SGMC Board of Directors is responsible for overall policy direction of SGMC.

— The SGMC Board of Directors shall, either at its own initiative or on contractor recommendation, amend SGMC's policies, rules and regulations to permit the successful carrying out of the rehabilitation program and to permit the contractor to exercise its responsibility as project manager, pursuant to the contract agreement.

— The SGMC Board of Directors shall appoint a Technical Committee and a Procurement Committee, each of which shall include in its membership a representative of the contractor. The SGMC Board of Directors may appoint other committees as required to deal with particular aspects of the services, including, but not limited to, an ore grade and reserves committee.

— The SGMC Board of Directors may delegate to the Technical Committee, the Procurement Committee, or to any other body or individual, subject to the management contract, the power to grant all necessary approvals which the contractor may be required to obtain from SGMC pursuant to the management Agreement. In addition, the SGMC Board of Directors shall ensure that the contractor's personnel occupying management and supervisory positions in SGMC's mine units and other operations have the full authority associated with such positions, pursuant to applicable law ans SGMC's own internal regulations.

— Subject to the Management Agreement, the contractor shall plan, manage and supervise SGMC's project operations. Without limiting the generality of the foregoing, and subject to applicable law, policies, rules and regulations adopted, and the requirements for approval of certain actions by SGMC, the Contractor shall have responsibility for:

(a) assignment of duties and determination of terms and conditions of employment of the contractor's personnel;

(b) assisting SGMC in the selection of SGMC counterpart personnel;

(c) management of SGMC personnel, including hiring and firing, promotion and lay-off; provided, however, that SGMC's personnel shall in no way be construed as employees of the contractor;

(d) providing training programs and undertaking the training and certification of SGMC personnel on completion of training;

(e) planning, designing and implementing a rehabilitation program for SGMC's mines;

(f) maintaining safe operating conditions in SGMC's facilities;

(g) planning and implementating short- and long-term production schedules;

(h) planning and implementing programs for exploration and development of gold ore reserves;

(i) collection and analysis of ore reserve, production and operating data, and

(j) planning and implementing SGMC's overall procurement program, including the provision of capital equipment, and contract and consultancy services.

The contractor shall obtain prior approval of SGMC for the following:

(a) mining plans, work programs, and budget (capital and operating)

(b) expenditure in excess of amounts provided in annual budgets

(c) training, localization and technology-transfer programs and budgets

(d) disclosure of confidential information about SGMC's operations to third parties.

New organizational chart

A new organizational chart for SGMC was drawn up that showed all its operations under the contractor, including supervision of all personnel except the Chief Executive, the three Executive Directors, and their direct support staff.

Contractor monitoring by the Board is carried out by three committees. Other existing SGMC management personnel were to operate alongside the contractor's personnel in the role of their deputies.

Selection of the management contractor

Once the scope of the contractor's work had been clearly defined, rigorous selection criteria were developed to choose a single consortium from 26 mining companies from around the world.

Selection criteria included: background of project personnel (40 marks); work program (30 marks); training program (20 marks) and experience in developing countries (10 marks). SGMC, with the assistance of consultants from the *United Nations Department of Technical Co-operation for Development* (UNDTCD), then selected a Canadian mining consortium — made up of Cominco Engineering Services, Mining Corporation of Canada and SNC, Inc. — operating under the joint-venture name of *Canada-Ghana Mining Group* (CGM) for a contract from August 14, 1985 through August 13, 1988 (extendable for another two years).

Contract and rehabilitation program achievements

By May 1987, and after eighteen months of the project, a review showed the following accomplishments and problem areas.

Financing

As part of Ghana's export recovery program, SGMC was allocated World Bank (IDA) funds as shown below to finance the rehabilitation and expansion of mining operations at Tarkwa, Presentea and Dunkwa.

Development credits	SDR's
Equipment materialand spare parts	19 410 000
Vehicles	900 000
SubTotal	**20 310 000**
Technical assistance credits	
Management training etc.	7 770 000
Total	**28 080 000**

These funds were supplemented by a 5 MUSD grant from the Canadian Government (CIDA), which increased total Technical Assistance credits. The amount of technical assistance funding was fixed by the contract at 13.3 MUSD (7.7 MUSD SDR's, plus 5 MUSD) for the first three years. No ceiling, however, was fixed for the funding for equipment and supplies. It was clear from the outset that additional financing would be required to complete the project.

The first non-Ghanaian staff arrived in October 1985. The number currently on site is 31 Canadians and 10 Malaysians.

Progress to date

The project team has concentrated in two areas during its first eighteen months on site:

(a) arresting the steady decline in gold production by importing repair and operating supplies, along with supervision and short-range planning to ensure continuance of operations.

(b) specifying organizational requirements, major equipment repairs and capital goods needed to restore operations to their fullest possible production level; drawing up long-range plans, including funding requirements.

The Management Agreement had stressed the importance of re-organization, management development and training of Ghanaian staff; however, those elements have been deferred in favor of the two tasks outlined above.

The lack of foreign funds and consequent deferral of maintenance and equipment replacement hastened the drop in production rates. To reverse that decline, it was clear that the original contractor scope of work would have to be expanded, in terms of physical requirements and the timing of production improvements.

A considerable portion of the IDA funding has been utilized to supply the mines with operating supplies and spare parts. Because of the size and complexity of the underground mines and dredging operations, the supply requirements range from quantities of nuts and bolts to air and water piping, underground track, drilling steel mills, reagents and explosives. In addition, the infrastructure requires specialized repair parts for pumps, rock drills, conveyer systems and dredges. All must be provided in large quantities to operations located in remote areas of the nation. These expenditures have consumed much of the allocated 20 MUSD SDR's.

Other significant expenditures have been for replacement of mine hoisting ropes (about 500 kUSD), underground ore haulage and and rock drilling equipment, and transport vehicles. A major engineering assessment has been concluded to assess mine hoisting plant and milling equipment, in addition to a feasibility study of the Dunkwa operations. Fifteen-year mine plans and financial analyses are complete for all three operations.

The major organizational change has been in the procurement area to improve methods of acquiring foreign goods. Major efforts were undertaken to enlarge, strengthen and train employees at the three mine sites, as well as in Accra and London, to ensure that a suitably experienced procurement staff was in place that was capable of dealing with the volume of required purchases. Two million dollars worth of foreign orders now can be processed and made ready for disbursements each month.

Gold production, at 40 000 ounces in 1980, was almost 15% higher than in 1985; however, by the end of the first year, it had reached a rate of more than 4 000 ounces a month, or 37% greater than the 1985 average monthly rate.

Major steps forward have been made in mine planning and scheduling, including at Tarkwa, where the introduction of new mining methods made possible greater tonnages per miner shift. At both underground mines, development work to open additional faces has increased, and tonnages for transport to milling plants are on the rise. At the Dunkwa dredging operations, short-range repairs have been completed on the four older dredges and, in conjunction with installation of a new dredge, production has more than doubled since 1985.

Future progress

Continued improvements depend on an uninterrupted supply of material, along with rehabilitation of plant and equipment and establishment of an organizational structure capable of promoting larger operations in the future. While the rate of production increase has been slower than expected, the creation of a viable corporation will be achieved. This development is made more certain by the strengthening of international gold prices.

Foreign funding remains the key. The contractor team has completed a lengthy series of production and financial studies at World Bank request that demonstrate that expected revenues will warrant future investment. These studies have been a six-month effort on the part of senior management, diverting them from their operating duties. It should perhaps have been completed at an earlier stage by the Corporation's engineering consultants in 1984, since it would have demonstrated the need for considerably more funding than the 28.08 million SDR's committed. However, now that funding needs have been identified, the completion of the rehabilitation project can be assured once the financial requirements have been met.

Problems associated with the rehabilitation program

Production objectives

Production performance in 1986 (the first year of the management contract) was close to 15% over the previous year; however, that still represents about 80% of the achievable target. The contract agreement shows the following production performance targets:

(Troy ounces)	Revised production targets	Minimum targets	Actual production
Year 1 (1986)	50 420	42 000	39 996
Year 2 (1987)	69 989	59 500	
Year 3 (1988)	80 747	87 500	
Year 4 (1989)	102 590	96 250	
Year 5 (1990)	126 822	103 250	

Cedi cash shortfalls

SGMC operations were hindered by Cedi cash problems for much of 1986 and previous years. As a result, SGMC owes a total of Cedi 1,441 million. With this debt problem, it has been impossible for SGMC to do business with its creditors, and most transactions have to be handled on a cash basis. In 1986, the Corporation made a presentation to the government to cover an estimated cash shortfall of 420 million Cedis, as its bankers would not negotiate for financing because of the loans outstanding. The government agreed to provide funding in its 1986 budget to cover SGMC's deficit; however, by the end of the year only 100 million Cedis had been received. Low production levels in the beginning of the year meant that mining operations had to cut back on procurement of some essential items, such as fuel and lubricants, timber and repair materials, as well as funding for salaries and wages, overtime and production bonuses. As a result, production levels were further restricted. Unlike many Ghanaian mines, SGMC did not have the resources to pay revised 1986 government wage scale for its employees, which led to unrest in the first eight months of 1986 and culminated in a threatened walkout by employees in August. Worker dissatisfaction further held back production.

In the latter part of 1986, a sustained gold price of 400 USD an ounce, establishment of a new exchange rate (150 Cedis/USD), and an increased monthly production rate contributed to a lessening of the Cedi cash availablity problem.

Required development and working stopes

The Tarkwa and Prestea mines are mature, with deep and extensive workings, hoisting, tramming, ventilation, pumping, compressed air and water supply networks. These elements need to be upgraded if higher production levels are to be attained; in addition, aging equipment must be replaced or rehabilitated. Sustained production improvements will require development of underground mines and stope preparations to increase the number of working locations. At the beginning of 1987, Tarkwa had about 25 operating stopes, while Prestea had about 40 with several more in preparation at both underground mines. SGMC and the contractor had to make a concerted effort, beginning in early 1987, to catch up and exceed mine development, stope preparation and production if the rehabilitation program is to succeed. By mid-year, Tarkwa and Prestea had increased their total number of operating stopes.

Technical competence

The contractor's personnel have demonstrated a good understanding of technical elements of the mining operation, and have already made improvements in a number of operational areas, such as underground ventilation flow; air pressure for pneumatic hand-held air drills in stoping operations; and by the introduction of new underground mining methods that have boosted productivity.

Slow mobilization

During 1986, the contractor's personnel have been slow to organize some areas of responsibility. These areas include the 1986 budget, the Five-Year Work Plan, the Training Program for the SGMC workforce, and, to a lesser extent, the development of new project areas (such as the Pepe Deposit, which is currently a few months behind schedule).

The submission of Administration, Accounting and Training Reports, required by the Project Management Agreement, has been slow in coming. It was only after considerable pressure from the SGMC Board and the World Bank that the proposed labor retrenchment program was produced.

Training

A primary objective of the management services arrangement is the training of all levels of Ghanaian personnel so that they will be able to take over full management of the mining operations by the end of the contract period.

Rather than appointing a full-time Training Manager, as envisaged by the SGMC Board, the contractor chose to incorporate training as part of the duties of its Manager of Administration. It was not until October-November 1986, and after pressure from the SGMC Board, that the contractor appointed a full-time Training Manager, who began work in January 1987. There was no comprehensive, formal training carried out during 1986. Some technical know-how was passed between contractor personnel and Ghanaians on the job, however, particularly at Dunkwa and on the general management level, although this was not part of a planned program. With the appointment of a full-time Training Manager, it is expected that this essential aspect of the management services arrangement will be addressed.

Quality of personnel

Most contractor personnel who have come to Ghana are reasonable and responsible. Many show enthusiasm, while others still must adapt to working well within the local environment. It is especially important that personnel who come to work in the Tarkwa and Prestea mines be physically fit, as these operations are deeper and hotter (relatively) than those in North America. For these and other reasons (primarily budgetary), it is important that the Board have final approval on all contractor personnel.

At the senior staff and project leadership levels, adaptation to the Ghanaian environment is reasonable, but could be strengthened. The mixing and exchange of ideas has been cordial, but there could be greater awareness.

Pay structure

The contractor's remuneration structure does not create a commitment to the success of the project beyond an individual's personal pride and reputation. Contractor personnel are paid monthly, and are given a location premium and a completion bonus independent of target achievement. Therefore, the Consortium has lost the opportunity to receive production achievement and profitability bonuses, which could form the basis of remuneration. This would be in addition to an overhead rate, which also is calculated independent of target achievement.

Training of local personnel

SGMC employees responded to the announcement of the management contract arrangement with high expectations about the nature of the assistance the contractor would provide. Many workers subsequently appeared to have relaxed their efforts and to have lost some of their original team spirit, primarily because improvements to their welfare came slower than expected. In addition, the social profile of some contractor employees created apathy and a sense of economic inequity among Ghanaians.

Supervision of contractor personnel

Lack of adequate supervision of contractor personnel was an additional factor that contributed to delays in achieving goals. The Project Manager was hindered in this by his location, and his consequent inability to meet regularly with key project personnel to review production plans and directly supervise operations. In addition, the contractor's personnel, despite being chosen for their technical skills, have been preoccupied with administrative problems.

Summary and recommendations

No management concept is without its pitfalls. This article has attempted to describe Ghana's mining industry and its attempt to carry out a rehabilitation program through implementation of a carefully considered management contract. Throughout the article, has been demonstrated that, despite the technical qualifications of the contractor's personnel, operational problems have impeded the achievement of expected results. One outstanding question is whether SGMC and the contractor had overestimated the expected results and underestimated the impediments.

In retrospect, it is evident that procurement of imported goods and the mobilization of personnel took up a large portion of the efforts. Again, looking back, the following program should have been implemented in stages:

Modified plan of action

1. (RTZ) Engineering Consultants should have had, in addition to the terms of the 15-year rehabilitation program, implementation plans and procurement packages. This would have presented the total framework for the SGMC rehabilitation.

2. There should have been an initial mobilization of resources sufficient to sustain a predetermined production rate.

3. Only when the two preceding conditions had been met should the contractor's personnel have been brought in. This, then, would have been the contract start date, with its term counted from this time.

Remuneration of personnel

The remuneration structure should have been modified to link compensation to results. Ghanaian managers performing almost equal work should have been paid sufficiently to ensure a reasonable social status against that of their contractor counterparts, which would have given them self-assurance in performing their work.

Managerial arrangements

Although the contractor was selected on the basis of technical capability, the contract called for performance of all managerial functions, including time-consuming administrative tasks. These tasks are substantial for a company with 8 600 employees. As a means of changing the contractor focus, a program has been developed that would permit SGMC management to take control of administrative functions in conjunction with the contractor, with the joint goal of improving production. This would free the contractor to devote more time to technical management of the project.

Contract duration

The rehabilitation project will require a long-term implementation plan, beyond the stated three years. Primarily, this is the result of procurement lead times; most of the capital rehabilitation items have not yet arrived. In addition, rehabilitation of the three SGMC mining operations and associated infrastructure is a task larger than merely increasing production levels; it is the building of institutions. SGMC has not yet decided whether to extend the management contract for two more years. That decision

Table 1
Mineral production in Ghana

	1959-60	1969-70	1980-81	1983	1985	1986 Est.
Ashanti Goldfields (oz gold)	341 999	500 969	255 634	236 527	264 308	255 000(a)
State Gold Mining Corp. (oz gold)	573 318	213 746	94 237	40 399	34 914	40 000
Ghana Consolidate Diamonds (cts)	1 138 655	2 355 797	1 016 580	336 612	631 801	680 000
Ghana Bauxite Company (t)	197 938	259 993	176 155	70 235	180 286	220 000
Ghana Nat. Manganese Co. (t)(b)	577 648	354 726	260 409	175 288	357 270	360 000

(a) Ashanti suffered a strike in 1986 which cut production.
(b) tonnes of washed ore.
Source:
Ghana Chamber of Mines; G.O. Kesse, The Mineral and Rock Resources of Ghana, Rotterdam Boston, A.A.Balkema, 1985 .

will depend primarily on the availability of funding.

Note:

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