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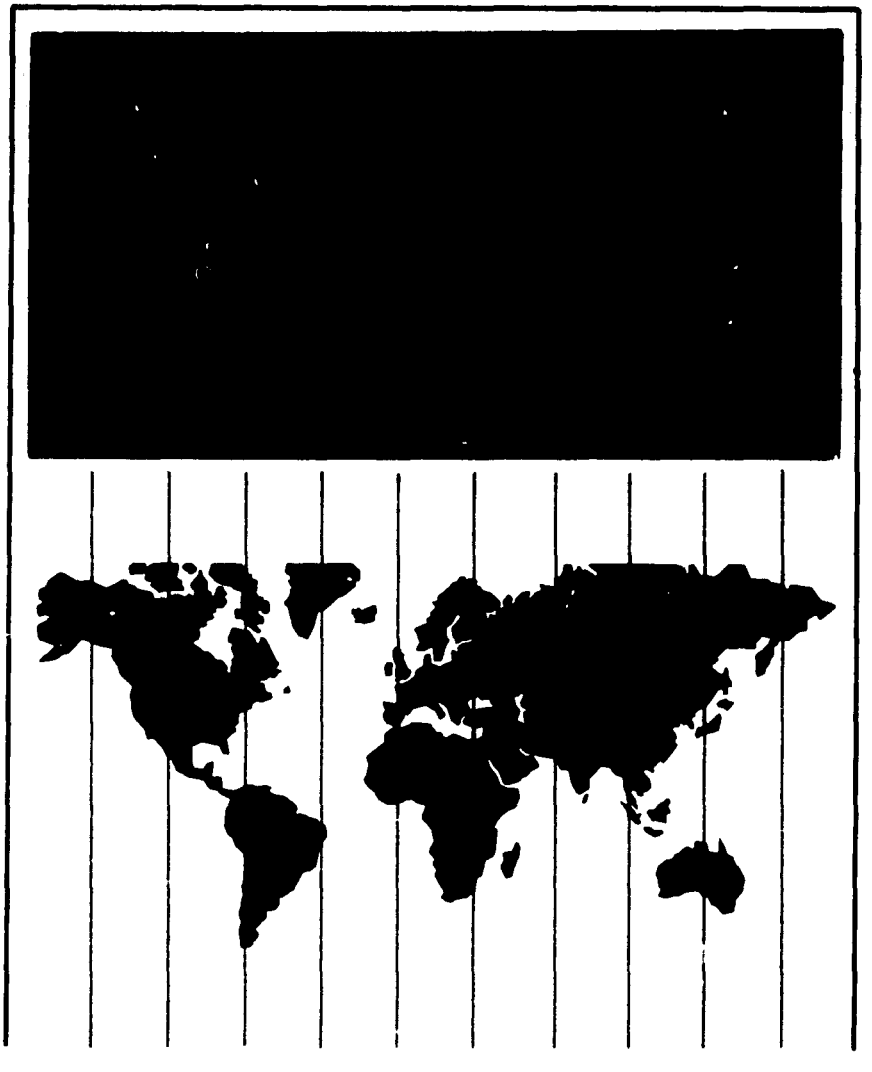
UNITED STATES
AGENCY FOR INTERNATIONAL DEVELOPMENT

THE INSPECTOR GENERAL



Regional Inspector General for Audit
CAIRO

AN AUDIT OF
THE PVC PIPE DRAINAGE PROJECT
AID LOAN AGREEMENT NO.263-K-034

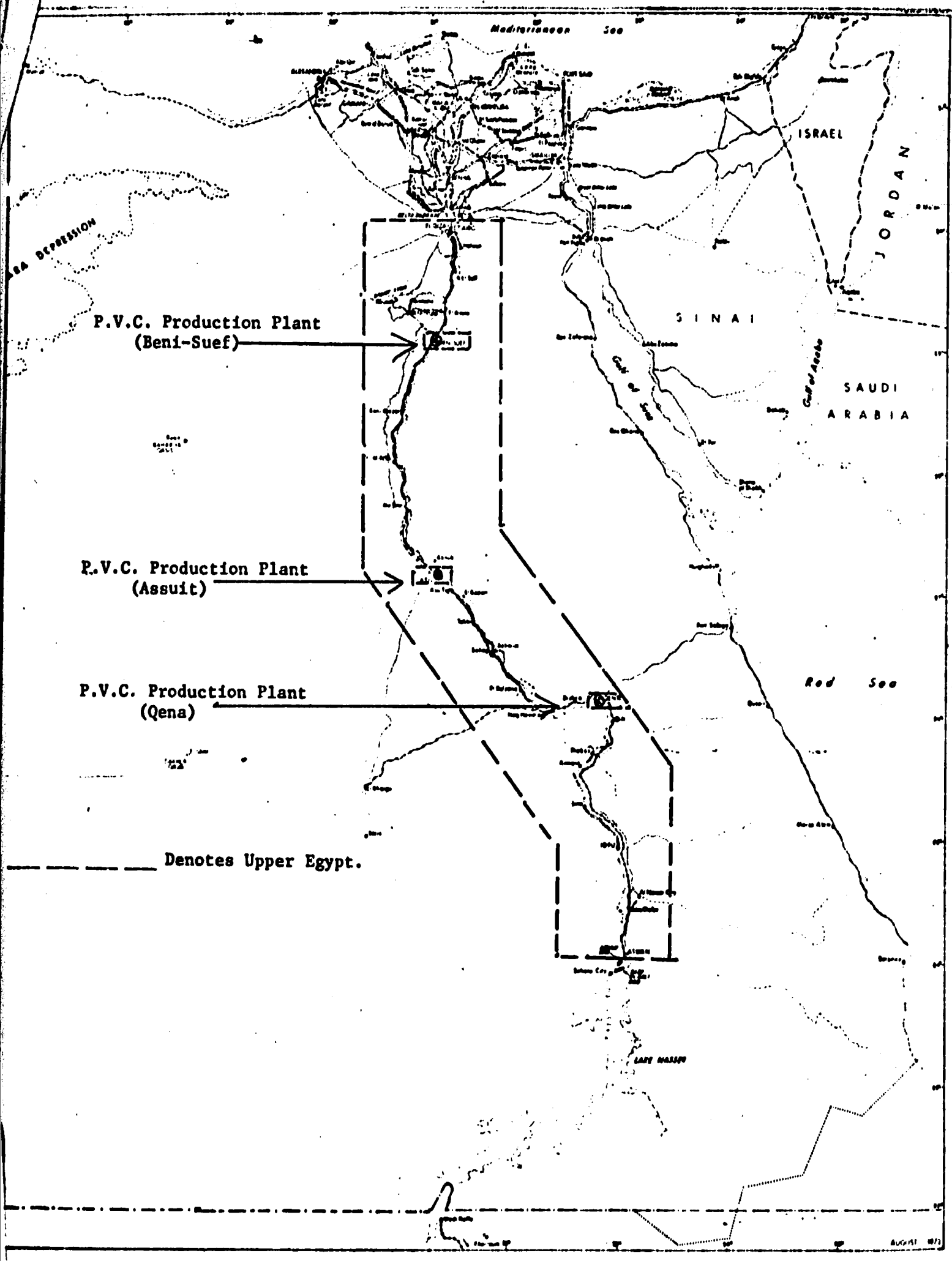
Audit Report No.6-263-82-1

October 22, 1981

The project is part of a World Bank sponsored agricultural drainage program to provide a drainage system for 520,000 acres of agricultural land located in the southern region of Egypt. The World Bank and AID have agreed to provide foreign exchange in the amounts of $50 million and $31 million, respectively. The GOE has agreed to contribute the equivalent of $202 million in local currency.

AID-financed pipe manufacturing plants were virtually idle because the pipe installation elements of the program (non-AID) were behind schedule and not capable of absorbing production. About 1500 miles of pipe had been produced and stockpiled. Both the pipe and raw materials for pipe (PVC resin) were deteriorating from exposure to the weather. Also the plants had experienced major equipment breakdowns, AID-financed forklifts and a vehicle were not being used in accordance with the terms of the agreements, and PVC dust from the manufacturing process was a potential health problem.

We have made eight recommendations for corrective action.


Mediterranean Sea
ISRAEL
JORDAN
SINAI
SAUDI
ARABIA
Gulf of Aqaba
Red Sea
P.V.C. Production Plant
(Beni-Suef)
P.V.C. Production Plant
(Assuit)
P.V.C. Production Plant
(Qena)
Denotes Upper Egypt.

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EXECUTIVE SUMMARY

Introduction

The PVC Pipe Drainage Project is part of an agricultural drainage effort covering 520,000 acres of land located in Upper (Southern) Egypt. The Government of Egypt (GOE) initiated this activity, entitled "Upper Egypt Drainage II", during 1976 under the direction of the Egyptian Public Authority for Drainage Projects (EPADP). The World Bank and the Agency for International Development (AID) provided $81 million in foreign exchange to support the activity. The AID funded portion--$31 million--consists of the provision of equipment, materials and technical assistance required to establish three local manufacturing facilities to produce polyvinyl chloride (PVC) plastic corrugated perforated pipe. The end product, PVC pipe, connects to cement collector pipe and forms the drainage network.

The three PVC manufacturing plants have been constructed. The facilities are strategically located in the towns of Beni Suef, Assuit and Qena to provide PVC pipe to seven governorates and two adjacent areas of Upper Egypt.

As of March 31, 1981 loan disbursements totalled $12.6 million (40.6 percent) of the $31 million obligated.

Audit Purpose and Scope

This is the first audit of the PVC Pipe Drainage Project; it is a full scope audit and accordingly encompassed examinations of financial transactions, accounts, and reports, compliance with applicable laws and regulations, efficiency and economy in the use of resources, and whether or not desired results were effectively achieved. We reviewed project documentation at USAID/Egypt and at EPADP, visited the project sites, observed AID-financed operations, reviewed project commodities, and held discussions with USAID, EPADP, and contract officials.

Project implementation was behind schedule. (pp. 7 to 9)

The project was planned to start in 1977 and be complete by 1981. As of April 30, 1981, however, the drainage network covered only 2.6 percent of the targeted project area. Due to delays in the production and installation of cement collector pipe, PVC plant production had outstripped need causing stockpiles of 147 miles of pipe at Qena, 504 miles at Assuit and 898 miles at Beni Suef.

Project implementation plans are outdated. (pp.9 to 14)

The project implementation plan is geared to completion in 1981; but, EPADP has revised the project targets and the implementation schedule. EPADP has reduced the targeted requirement for PVC pipe by 28 percent and extended the program completion date to 1984.

Also, the World Bank did not coordinate with, solicit, or use USAID/Egypt personnel in carrying out comprehensive evaluations of the program during 1979 and 1980. As a result, EPADP, the World Bank and the USAID do not have a common understanding of (i) what the program implementation problems are, (ii) what has to be done to correct the problems, and (iii) which of the three parties is responsible for taking corrective action.

EPADP management of AID-financed resources needs to be improved. (pp.16 to 19)

AID-financed resources were not used in accordance with the project agreement:

- At least $157,000 worth of AID-financed PVC resin, the raw material for PVC pipe, was contaminated in storage at the Qena plant

- At the time of our visits, nine AID-financed forklifts valued at $132,395 had not been used on the project. One forklift had been diverted to use on nonproject activities; the remaining eight forklifts had, collectively, moved less than 20 kilometers (12 1/2 miles).

- An AID-financed automobile was used for nonproject purposes; it had been appropriated by the Vice Minister of Irrigation for non-project use. The vehicle did not have proper GOE license plates and there was no log of vehicle usage.

Also, EPADP was slow to comply with loan requirements:

- Installation of the required cost accounting system was delayed for four years.

- Required audited fiscal reports had not yet been submitted to USAID/Egypt.

PVC plant performance. (pp. 19 to 22)

The sandy climate had affected production machinery; plant maintenance and repairs were not adequate. Of six production lines (two at each plant), five were experiencing major equipment breakdowns at the time of our visits.

The air in hopper and granulator rooms at the PVC plants was heavy with PVC dust. The project engineering consultant (STV, Inc.) recommended that workers assigned to the granulator rooms wear goggles. The recommendation had not been implemented at the time of our audit visit. During the audit exit conference with EPADP, the Chairman issued an order to purchase both masks and goggles for issuance to granulator room and hopper room workers.

The shelf-lives of PVC resin and PVC drainage pipe have not been determined for the hot, desert conditions existing in Upper (Southern) Egypt. We observed that PVC resin and pipe in inventory had begun to harden, crack and deteriorate.

Conclusions

At the time of our audit the AID-financed PVC plants were effectively idle and both raw materials and finished PVC pipe were deteriorating from exposure to the weather. Until problems with the non-AID elements of the program are resolved, the AID investment of $12.6 million will continue "on hold," and the balance of the loan ($18.4 million) will move very slowly through the pipeline. Furthermore, EPADP management of AID-financed inventory and equipment needs to be improved.

Recommendations

This report contains 8 recommendations for USAID/Egypt action. The recommendations are included in related report sections and are listed in Appendix I.

INTRODUCTION

Background

The PVC Pipe Drainage Project is part of a comprehensive agricultural drainage effort entitled "Upper Egypt Drainage II" initiated by the Government of Egypt (GOE) under the direction of the Egyptian Public Authority for Drainage Projects (EPADP) with financial assistance provided by the World Bank and the Agency for International Development (AID). The AID funded portion--$31 million--consists of the provision of equipment, materials and technical assistance required to establish three local manufacturing facilities that produce polyvinyl chloride (PVC) plastic corrugated perforated pipe.

Since the commissioning of the Aswan High Dam in 1965 and a resultant shift in practice by Egyptian farmers from basin to perennial irrigation, waterlogging and salinity have become major, physical limiting factors to crop production in many agricultural areas of Egypt. Prior to controlled flow of the River Nile, annual floods helped wash away excess salts from the land resulting in a rich soil content particularly suitable for agriculture; the water table would gradually reduce following the floods to two meters or more below the soil's surface. With widespread and increasing use of perennial irrigation methods, groundwater levels have been rising; the existing drainage system has not absorbed the additional irrigation water; and, seepage from new irrigation canals and from higher fields has contributed to higher groundwater levels. As a consequence, significant amounts of agricultural land have become waterlogged and salt levels have become more concentrated. Resultant agricultural yields had deteriorated as much as 30 percent as of 1976.

Country Goal

The Government of Egypt (GOE) recognized, prior to the commissioning of the Aswan High Dam, that it needed to improve the existing drainage system. In 1960 the GOE launched a 30-year program to improve drainage within the existing six million feddans* (about 6.24 million acres) of irrigated land. Some 2.08 million acres of this irrigated land is located in Upper (Southern) Egypt. However, due to financial and administrative restraints that ocurred between 1960 and 1970, only 520 thousand and 83.2 thousand acres were drained in the Delta and in the Upper Egypt regions, respectively. Implementation was further delayed during the period 1970 to 1974 by both the political atmosphere and acute local currency shortages.

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* One feddan equals 1.04 acres

In 1975, the World Bank successfully encouraged the GOE to accelerate the drainage program. Subsequent significant and highly visible yield increases (from 15 to 35 percent) caused farmers to urge the GOE to increase the pace of implementation. When the GOE signed Loan No. 263-K-034 with the Agency for International Development (AID) in 1976 in the amount of $31 million, drainage of an additional 353.6 thousand and 10.4 thousand acres in the Nile Delta and in Upper Egypt, respectively, had been completed.

The GOE is to complete drainage for the entire 6.24 million acres of land by 1985.

Overall Program Description

Targeted drainage activity is divided into five geographic regions: Upper Egypt, North Middle Delta, South Middle Delta, East Delta and West Delta. The World Bank is providing $155 million of $186 million in foreign exchange costs for four programs in Egypt designed to provide drainage for about 2.24 million acres. The programs are:

	$s Obligated	Planned Coverage (acres)
Nile Delta I	$26 million	988,000
Upper Egypt I	$36 million	312,000
Upper Egypt II	$81 million*	520,000
Nile Delta II	$43 million	416,000

* Note: Includes USAID/Egypt loan of $31 million.

Essentially, the programs are to provide (a) remodeled (existing) drains--both open and buried, (b) new drains, and (c) a network of pipes to collect excess water and salts resultant from irrigation, and funnel the excesses into surrounding canals and waterways and the Nile.

The World Bank's "Upper Egypt II" program includes the $31 million AID input. The AID activity is limited to supply and erection of three poly-vinyl chloride (PVC) drainage pipe production plants; and providing related training, raw materials and mobile plant support equipment for PVC drainage pipe production. World Bank management extends to all other facets of the program, including installation of PVC drainage pipe, to provide a drainage system for a 520,000 acre area in Upper Egypt (Exhibit A). The program is a coordinated effort by the GOE, World Bank, and AID to (a) deepen and widen about 750 miles of existing open drains, (b) create about 220 miles of new open drains, (c) construct one pumping station, (d) reclaim about 7,500 acres of salt-damaged land, (e) provide and install about 3,750 miles of cement collector pipe, and (f) provide and connect to the cement collector pipe a network of about 31,250 miles of PVC drainage pipe.

The AID Role

The United States Agency for International Development (AID) loan financed the foreign exchange costs to erect and operate three PVC drainage pipe manufacturing plants and import about 17,600 tons of PVC resin. The resin is the basic raw material for PVC pipe.

The AID Project, No. 263-0019, was signed on June 15, 1976. AID Loan No. 263-K-034, effective July 29, 1976, obligated $31 million to finance the project. Monies were provided from Security Supporting Assistance Funds authorized under Section 532 of the Foreign Assistance Act (FAA) of 1961, as amended. Disbursements of the AID loan as of March 31, 1981 were $12.5 million. In addition to loan expenditures, the project engineering consultant (STV, Inc.) provided project related services under three contracts funded from other AID projects. These contracts totalled $220,701 and LE43,033. At our request, STV costs will be audited by the cognizant audit entity, the Defense Contract Audit Agency, early in calendar year 1982. Schedule B-1 of Exhibit B shows the scope of STV's contracts.

The project purpose is to:

> "Halt deterioration of fertility and increase land productivity and total production of food crops and cotton in the project area."

The three drainage pipe production plants are strategically located to provide pipe to seven governorates and two adjacent areas in Upper Egypt. The plants are to provide an estimated 31,250 miles of PVC drainage pipe for an area that encompasses 33 geographically separate tracts of land (catchment areas) covering 520,000 acres situated along the entire length of the River Nile from Cairo to Aswan.

PVC drainage pipe is lightweight, flexible, corrugated, perforated, and roughly three inches in diameter. The pipe is made of white PVC compound (resin) from a formula devised by Cincinnati Milacron, the construction services contractor. PVC drainage pipe is cut at 100 meter (about 328 feet) intervals and coiled. (Also see Exhibit C).

In use, PVC drainage pipe is connected to cement collector pipe, 10 to 20 inches in diameter. The PVC drainage pipe connections to the cement collector pipe form the drainage system network.

Responsible GOE Entity

Prior to 1973, two GOE Authorities were responsible for drainage works; one in lower and one in Upper Egypt. In 1973, the two were merged to create the Egyptian Public Authority for Drainage Projects (EPADP) with responsibility for country-wide drainage works. EPADP is an organizational unit of the Ministry of Irrigation; it employs about 4,300 individuals, and, is responsible for field investigation, planning, design, procurement, construction, budgeting and project accounting. The EPADP headquarters is located in Dokki (a subdivision of Cairo) Egypt. Offices of seven Directors General administer regional operations in the seven governorates and two adjacent areas of project concern. Exhibit D illustrates the current EPADP organization.

Purpose and Scope

The purpose of the audit of the PVC Drainage Pipe Project is to review and assess:

- whether the project is soundly conceived, well-planned, and geared to serve a meaningful purpose,
- the extent of management by and coordination between donor, advisory and service entities involved in the overall project,
- efficiencies and economies in the use of AID-financed resources,
- compliance with applicable agreements, laws, regulations, policies and procedures,
- financial transactions, accounts, reports and systems,
- whether desired results were obtained and effectively achieved, and
- the degree to which the activity contributed to Egypt's economic and social development.

For fiscal transactions the audit covered the period from June 15, 1976 (inception) through March 31, 1981; program-related activities were reviewed from inception to report issuance.* The auditors visited the the three PVC plants located in Beni Suef, Assuit and Qena; three of

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* Cost reimbursements to STV, Inc. were not audited because STV's accounting records are maintained at the company's headquarters in the United States. At our request, the Defense Contract Audit Agency has scheduled an audit of these cost reimbursements in 1982.

seven governorates of Upper Egypt; two World Bank-sponsored cement pipe production stations; and, three project areas where installation of either cement pipe or PVC drainage pipe was in progress. The auditors reviewed EPADP organization, management, reporting and accounting practices at headquarters and regional levels, and USAID/Egypt project monitoring. World Bank evaluation reports provided pertinent information relative to the overall drainage effort. The audit also covered contract services provided by: STV, Inc., the project engineering consultant; Cincinnati Milacron, the construction services contractor; Diamond Shamrock, the PVC resin supplier; and Allis-Chalmers, the forklift supplier. As of March 31, 1981 vehicles purchased from General Motors had not arrived.

We issued two Records of Audit Finding (RAF) during the audit that delineated conditions found in the program and project areas. The USAID/Egypt promptly initiated action to address these interim reports of audit findings. (See page 14 of this report.)

STATEMENT OF FINDINGS AND RECOMMENDATIONS

The stated purpose of the AID project is to:

> "Halt deterioration of fertility and increase land productivity and total production of food crops and cotton in the project area."

The overall situation has, however, regressed. Continued use of perennial irrigation methods by farmers on targeted areas where drainage was to have been completed by 1981 has aggravated the extent of waterlogging and soil salinity. Instead of the 15 to 35 percent increase in agricultural yields envisioned, crop yields have declined even from the 30 percent drop estimated during 1976.

EPADP, the World Bank and USAID/Egypt have not effectively coordinated program inputs: World Bank-financed equipment needed to install cement collector pipe has not yet been provided and AID-financed PVC drainage pipe cannot be installed and connected until the cement collector pipe is in place. Beyond this, EPADP management of the program needs improvement.

Program implementation is far behind schedule. Major activity factors are: (a) EPADP and World Bank-managed cement collector pipe has not been produced at planned levels, (b) Egyptian public sector contractors under contract to EPADP are far behind schedule on installation of the drainage system, and (c) EPADP procurement of World Bank-financed installation equipment has been seriously delayed. As a result, AID provided pipe manufacturing plants were idle or working far below capacity. Anticipated program results have not been achieved. The Agency has also been the subject of criticism by the General Accounting Office (GAO)* because highly visible stockpiles of PVC drainage pipe now lay uninstalled and deteriorating.

Due to the slow pace of program implementation, the AID project paper is now outdated. Of particular import; evaluations called for in the project paper have not been carried out and World Bank representatives have not cooperated in coordinating comprehensive program reviews.

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* GAO Report No. ID-81-19 dated March 16, 1981, US Assistance to Egyptian Agriculture: Slow Progress After Five Years, pp. 41 - 42.

Program implementation and evaluations were not synchronized and resulted in less than planned accomplishments

1. Program Accomplishments

As of April 30, 1981, over four years after the project was signed, the drainage network covered 13,515 acres representing 2.6 percent of the 520,000 acres targeted. Slow implementation is directly attributable to inadquate cement collector pipe production and lack of major installation equipment. As a result, the AID-funded portion of the program; i.e., PVC drainage pipe production, has been sharply curtailed and anticipated disbursements of the unexpended balance of the loan, primarily for the procurement of PVC resin, have been postponed. At March 31, 1981, AID loan disbursements were only $12.6 million (40.6 percent) of the $31 million obligated.

AID's project paper assumed that; (a) there would be sufficient equipment available to complete the excavation and remodeling of open and main drains within the first three years; (b) laying of pipe drains would commence in the first year (1977); (c) construction of a pumping station would begin in the second year; (d) pumps would be installed during the third year; and (e) reclamation of saline land by gypsum application and leaching would begin in the third year in areas where the drainage system had been completed. The calendar year targets for completion of the drainage system were:

Calendar Year	No. of Acres targeted
1977	10,400
1978	72,800
1979	145,600
1980	145,600
1981	145,600
Total	520,000

AID also estimated that the first of the PVC pipe plants would have to be operational by October 1977 and that the remaining two plants would have to be operational one year later in order to provide sufficient amounts of PVC pipe for timely installation of the drainage system.

However, the first of the PVC plants did not begin operations until April 26, 1980; about two and one-half years behind schedule. The second plant began limited production on July 2, 1980; and the third plant started production on February 21, 1981.

The delayed start-up of the AID-financed PVC pipe plants, however, did not hinder project progress because cement collector pipe (a) has yet to be produced in some governorates, and (b) has yet to be installed in others. To illustrate:

A. PVC pipe produced at the Qena plant was planned for installation over roughly 65,416 acres of land within the Qena governorate plus 34,320 acres in the Esna and Kom Ombo areas. Installation of the drainage work was to begin in 1977, however, the World Bank-financed cement collector pipe production site located in Naga Hamadi (about 50 miles north of Qena) had developed no plans, or production schedules. The first of two pieces of specialized heavy equipment needed to install collector pipe did not arrive until September 1980. The second did not arrive until March 1981. Although two PVC pipe installation units were located at the Qena field site, none had been used--one was out of order at the time of the audit visit. As a result, for the targeted area in the Qena governorate only 15.6 miles of cement collector pipe had been installed; not one piece of PVC drainage pipe had been connected.

B. The Assuit PVC plant production area included 73,216 acres in the Assuit governorate plus the El-Minia and Souhag governorates comprising 109,304 and 67,800 acres, respectively. According to managers at the cement collector pipe production station located in Abu-Teeg Masara (37.5 miles north of Assuit), the station had produced about 42 percent of the collector pipe needed for the above areas. However, for the Assuit governorate, the drainage network (i.e., cement collector and PVC drainage pipe) had been installed on only 2,288 (3 percent) of the 73,216 acres targeted. Installation had been done manually because installation equipment did not arrive until March 1981. As of the audit field review during mid-April 1981 supplier technicians were making final assembly adjustments to the installation equipment.

C. PVC pipe production at the Beni Suef plant was for about 96,720 acres in the Beni Suef governorate, plus 72,800 acres in the Giza governorate and Fayoum area. At the end of April 1981 cement collector and PVC drainage pipe had been installed on only 4,472 (2.6 percent) acres of the above targeted acres. Supplier technicians had not yet made final assembly adjustments to installation equipment that had arrived in late March 1981.

As a result of delays in the production and installation of cement collector pipe, PVC drainage pipe production outstripped current installation requirements causing stockpiling at the three plants. About 147 miles of PVC drainage pipe was stockpiled at the Qena plant; 504 miles at the Assuit plant; and 898 miles at the Beni Suef plant (see Exhibit E). Adequate storage facilities to protect the PVC pipe from sun and sand were not provided because stockpiles were not anticipated. PVC plant production was virtually stopped as of the second quarter of 1981. AID-financed raw materials were not being consumed as scheduled.

The production of World Bank-financed cement collector pipe meanwhile continued at a slow pace: 340.1 miles (9.1 percent) of the estimated 3,750 miles needed to meet project requirements had been produced.

2. Program Planning

USAID/Egypt plans for implementation of the PVC drainage pipe project are set forth in the AID Project Paper. However, EPADP in coordination with its six Egyptian public sector contractors has established revised criteria and completion dates for the program. The EPADP revised plan calls for a reduction in PVC drainage pipe requirements by 28 percent and extends the project completion date by at least three years. The revised EPADP plan has a direct bearing on the amount and timing of AID disbursements for PVC plant operations, primarily the procurement of PVC resin, and on the life of production equipment. EPADP plan revisions were made because of delays in EPADP-managed drainage construction.

About three and one half years after the project agreement was signed, in late 1979, EPADP awarded contracts to six Egyptian public sector contractors to install drainage works for the targeted 520,000 acres in Upper Egypt. (EPADP officials would have preferred foreign contractors but none responded to an international tender issued by EPADP.) As with previous public sector contractors, EPADP had limited control of contractor activities because of the contract terms required in public sector contracts. For example, the contracts permit EPADP to penalize the contractors only for work unfinished at contract termination. (The contracts also authorize advances of 20 to 25 percent. These advances, equivalent to millions of dollars, create further disincentive for contractors to perform.)

EPADP relied on the public sector contractors to (a) determine start-finish dates, (b) develop implementation programs, and (c) establish equipment requirements. These contractor prepared plans were approved by EPADP in early 1980, shortly after contract awards in late 1979, and have been used to develop revised implementation schedules and new target dates for program completion. At the time of our audit, EPADP's targeted completion date of the drainage program was July 1984. But there was little coordination with USAID/Egypt project management to revise PVC drainage pipe requirements to fit the revised implementation schedule.

USAID/Egypt apparently had little knowledge of EPADP's plan to extend the project from 1981 to 1984. During September 1980, the project officer wrote:

"...Lack of collector pipe continues to be the number one problem to implementation, EPADP continues to dismiss this problem by saying that everything will be all right 'when the contractors finish their workshops and get other collector pipe facilities working.' USAID was shown a series of bar charts purporting to show by district the revised schedule of implementation broken into total feddans of collector pipe manufactured and feddans of collector pipe layed. These charts are not a coherent detailed program of (sic) schedule for the integrated production and installation. All they seem to indicate is that some PVC laterals may start installation in first quarter 1981 and that the project might be completed by the end of 1983. No actual work done is indicated on the charts for work completed to date, nor are interim goals set forth. For what they are worth, EPADP promised to supply USAID with copies of these charts 'in the near future'."

About six months after the above USAID analysis, the Chairman of EPADP provided the auditors with a revised implementation plan for the Upper Egypt II program in the form of a computer printout developed with the assistance of the Dutch government. At the time, the USAID/Egypt project officer had not been furnished a copy of the revised plan.

In EPADP's revised plan requirements for PVC pipe have been revised downward by 28 percent; instead of the 31,250 miles originally envisioned, current EPADP estimates call for 22,593 miles. EPADP has also reduced the estimated program area from 520,000 to 517,000 acres. As a result, the $18.4 million of project funds to be used previously for purchases of PVC resin and PVC plant operations may not be needed.

3. World Bank Participation in Program Evaluation

The project evaluation plan called for World Bank participation with the USAID/Egypt in carrying out comprehensive reviews of the program; however, World Bank representatives have not cooperated. As a result, EPADP, the World Bank and USAID/Egypt have not taken timely action to correct program deficiencies. In some cases, responsible parties were unaware of conditions in need of correction.

The AID project paper provided a coordinated World Bank-USAID/Egypt evaluation plan including evaluation of overall project impact, annual comprehensive reviews, and day-to-day monitoring.

"D. Evaluation Plan

3.12 With regard to the overall project, A.I.D. will seek to determine, in conjunction with World Bank evaluation efforts, whether the provision of drainage facilities in the project area affected agricultural production, to what extent it did so, and whether it was accomplished within the projected cost and according to schedule. The World Bank and the GOE have agreed on the use of consultants, funded under a previous World Bank drainage project, to monitor and evaluate the program for at least three years. An interim evaluation of the progress made and any problems encountered will be undertaken after drainage facilities have been installed in 10,000 feddans, i.e., at the end of 1977.

"3.13 Evaluation of the A.I.D. project will be confined to a periodic review of the operation of the PVC plants, their cost of operation and the success of the training program. In addition to day-to-day monitoring, a comprehensive review is planned annually early in each calendar year unless circumstances call for a different or more frequent timing." (Underscoring added.)

Note: "10,000 feddans" equals about 10,400 acres.

The World Bank reviewed the program once in 1979 and again in 1980. The latter assessment, published June 13, 1980, concluded that "anticipated completion" of the program had deteriorated from a moderate to a major problem due to the absence of construction planning and less than adequate performance under public sector contracts. However, USAID/Egypt managers have been unable to obtain information needed to monitor the AID segment of the program; i.e., the PVC drainage pipe project. To illustrate:

A. USAID/Egypt officials met with World Bank officials on September 8, 1980. The discussion was recorded as follows (WB represents World Bank):

"...WB realizes that the present critical activity is centered on production and installation of collector pipe so that PVC laterals can be utilized. WB noted that EPADP has no effective project control system or phasing of the work. WB is seeking to establish with EPADP a simple control system to coordinate its contractor's activities with EPADP management.

"A World Bank representative suggested that a possible path toward solution of the problems of the project would be for USAID to discuss EPADP's low performance record with the Minister of Irrigation or 'even beyond the Ministerial level'.

"Comment: The presently perceived basic problems of the Project are in the WB-phase of the Project and it would seem that WB should undertake the discussion of its failures, rather than leave AID make these representations. Nevertheless, since the full success of the purposes of the AID portion of the Project depends upon the WB phase being operational, there may be some merit in AID bringing these matters to Ministerial attention or beyond."

B. A World Bank summary report on the Upper Egypt II program dated November 17, 1980 (two months after the September meeting with USAID/Egypt) concluded that field drainage had been completed for 24,960 acres of the 520,000 acres targeted. The World Bank placed blame for the shortfall on AID stating that there was "a two-year delay in furnishing and erecting AID-financed PVC plant and equipment." USAID/Egypt notified AID/Washington of its surprise at the World Bank conclusion. In a subsequent meeting (November 15, 1980), however, USAID/Egypt officials were advised by a World Bank official that project delays had resulted because World Bank financed cement collector pipe producing factories had not developed and submitted their schedules to EPADP.

C. During March and April 1981, two World Bank representatives visited Egypt concerning the program. The USAID project officer attempted to contact these officials. One did not return his telephone messages, the second returned the project officer's call after a five day lapse and after working hours. He said that his departure from Egypt would be less than 24 hours later. The USAID/Egypt project officer concluded that:

"...A good opportunity to discuss work progress on the World Bank's side of the project was missed."

"...The second opportunity to discuss the integrated project was lost.", and finally

"It would appear that the World Bank representatives are not anxious to share project discussions with AID."

Thus, instead of effective and close coordination there is a widening gap between the evaluations of the World Bank and AID.

D. The evaluation plan provided that AID carry out annual comprehensive reviews of the project and monitor the project on a day-to-day basis. AID had not made a comprehensive review of the project since its inception. USAID/Egypt project files did, however, document numerous site visits to the PVC plants. The project officer or other USAID employees made the trips, recorded findings, and furnished conclusions as deemed appropriate. But, there was little evidence of corrective action on recommendations made as a result of these site visits. For example:

(1.) STV, Inc., the U.S. consultant to the project, made 15 recommendations and suggestions to EPADP and USAID/Egypt in July; and repeated these recommendations and suggestions in September and again during October 1980 when a 16th recommendation was added. EPADP officials concluded that all but one of the recommendations and suggestions should be implemented. The Directors General of the three PVC plants were instructed to implement the recommendations and report an estimated date of completion. As of December 31, 1980 the three Directors General had not responded. STV repeated these 16 recommendations and suggestions in its final report dated January 16, 1981. The same problems giving rise to these recommendations were reported in subsequent USAID/Egypt trip reports.

During the audit field visits, beginning in March 1981, we found that none of the recommendations and suggestions had been implemented. To illustrate, STV recommended the erection of plaques (official AID clasped hands emblem) as required by the Loan Agreement and Implementation Letters. This had not been done at the time of the audit.

Another recommendation was that empty bags stored on top of the office structure inside the plants be removed. This practice created a fire hazard and also blocked the air passages needed for cross ventilation within the plants. No corrective actions had been made at any of the plants as of the audit review.

(2.) The USAID did not evaluate the training program as required by the evaluation plan (page 11). During their site visits in 1981, USAID personnel found that PVC plant engineers and technicians needed more training to effectively maintain and repair plant equipment. Two trip reports covering all three PVC plants reported the same need for training.

Cincinnati Milacron (CM)--the principal U.S. supplier of equipment--was required in its contract with EPADP to train Egyptian engineers and technicians in the operation and maintenance of all machinery and equipment. Cincinnati Milacron provided training for four EPADP participants in the United States for about 30 days.

The effectiveness of this training was questionable. At the time of our audit, one of the participants worked at EPADP headquarters where there were no PVC plants. The factory manager in Qena--a participant--told us that he was trained to operate only the extruder. He was critical of the short training period and said he had trouble communicating with the CM guaranty engineer. The CM engineer acknowledged the communication problem during our visit. In Assuit we met a third participant--an engineer who could not communicate with the audit team in English. In Beni Suef, the plant manager's assessment of training furnished the fourth participant was that the participant was not trained to operate or maintain all production functions, the training period was too short and preceded plant erection in Egypt, and the participant's English capability was limited. The Beni Suef plant manager further pointed out that the Cincinnati Milacron training manual is in error because it describes operations and maintenance for a type of "chiller" that is not part of the equipment of the three PVC plants.

(3.) We found that site reports did not include some of the problems we subsequently observed during the audit. For example, a USAID/Egypt representative visited the Qena plant shortly before the audit field review. As discussed on page 16, we found hundreds of tons of PVC resin stored under conditions that resulted in contamination due to vandalism, unsatisfactory storage, overexposure, and non-existent security. About $156,000 of this inventory could not be used. This condition was not included in the trip report.

Conclusions and Recommendations

USAID/Egypt operating managers stated that top USAID/Egypt management has been kept informed of corrective measures needed for the project through monthly staff meetings and during numerous staff sessions; however, many of these exchanges are not documented in the project files.

The overall EPADP program which included both World Bank and AID-financed activities was being implemented at a much slower pace than originally planned. The AID-financed portion of the program, i.e., construction of the three PVC pipe plants, was completed about three years behind schedule. However, EPADP activities financed by the World Bank not AID were holding up project implementation at the time of our audit.

World Bank and AID inputs were not synchronized: over 1,500 miles of AID-financed PVC drainage pipe were in inventory with little prospect of timely installation. The World Bank-financed equipment needed to install cement collector and PVC pipe was just arriving; and, cement collector pipe production stations had produced less than 10 percent of requirements.

World Bank evaluations of the program have not reported the causes for less than satisfactory program progress; AID has not evaluated the AID project although an evaluation was to be carried out according to the Project Paper.

USAID/Egypt should become a more forceful party in this multi-donor effort in order to ensure effective and efficient use of resources provided by the United States. To get action on problems we reported during the audit, the USAID proposed to the Minister of Irrigation and the Chairman of EPADP that a tripartite committee be formed. The committee, composed of two responsible individuals each from EPADP, the Ministry of Irrigation and USAID/Egypt would:

- Make field trips to the PVC plants and to targeted drainage areas to observe conditions affecting project progress,

- Independently verify the conditions reported by audit,

- Institute corrective actions and prepare recommendations for follow-up action, and

- Submit a formal report on committee findings and propose positive jurisdictional corrective actions to be undertaken.

EPADP responded to the USAID/Egypt proposal by letter received on September 2, 1981 agreeing with USAID/Egypt that the tripartite committee should be established. In our opinion, the proposed committee represents a realistic approach to accelerating the pace of program implementation. However, to fully coordinate program implementation, we believe the World Bank should be part of the committee.

Recommendation No. 1

The USAID/Egypt request that the Egyptian Public Authority for Drainage Projects (EPADP) invite a representative(s) of the World Bank to participate in the tripartite committee review of the PVC drainage pipe plants and of the drainage program in the targeted area consisting of 520,000 acres of land located in Upper Egypt.

In our draft audit report we further recommended that the USAID/Egypt establish a target date (preferably within 90 days) for the tripartite committee to initiate its review. The committee initiated the review by proceeding to Qena on October 19, 1981; therefore, the recommendation has been deleted.

The USAID/Egypt needs to reschedule AID-financed inputs to fit EPADP revised plans. EPADP managers extended program completion from 1981 to 1984 and, reduced a ticipated requirements for PVC drainage pipe by 28 percent. However, USAID/Egypt plans contained in the project paper have not been revised and are still geared to completion of the program in 1981, 100 percent of originally planned PVC pipe requirements; and a loan terminal disbursement date of December 31, 1981. We believe the USAID should replan the project.

Recommendation No. 2

USAID/Egypt (a) review EPADP's revised benchmarks and targets for the overall Upper Egypt II drainage program, and (b) revise the amount and timing of AID inputs to fit the new program schedule.

EPADP management of AID-financed resources needs to be improved

1. General

Overall organization, management and supervision of drainage activity is highly decentralized. The EPADP headquarters, located in Cairo, has assigned Directors General to cover each of the various governorates of Egypt. The Directors General have broad authority over activities within their respective governorates; EPADP headquarters requires very little periodic progress or performance reporting. In turn, Directors General make few demands for assistance from EPADP headquarters.

Consequently, we found a number of conditions requiring EPADP headquarters attention.

2. Storage practices

Each of the three PVC plants received sufficient PVC resin for a planned one year's operations. In Beni Suef and Assuit PVC resin was properly stored to minimize contamination; i.e., inside the walled areas. In fact, at one of the two plants resin was stored inside the production facility itself.

At the Qena PVC plant, however, we found that some of the PVC resin inventory was stored outside the plant confines in an insecure area. As a result, pallets of PVC resin had been overturned and trampled and a "dugout" had been constructed using pallets and paper bags from the PVC resin inventory (see Exhibit F). Contaminated PVC resin was commingled with usable bags of PVC resin. Due to the disarray of the stocks, we could not inventory the PVC resin at Qena; however, we verified that at least 7.2 tons of PVC resin (valued at $8,898) located in the insecure area was contaminated.

In addition to the inventory located in the insecure area, stores of PVC resin inside the plant area included 119.2 tons of contamined resin valued at $147,312. Thus, an inventory of at least 126.4 tons of PVC resin valued at $156,210 could not be used due to contamination. Immediate corrective measures are needed at the Qena PVC plant to avoid further losses.

Recommendation No. 3

USAID/Egypt instruct EPADP to (a) separate contaminated and noncontaminated bags of AID-financed PVC resin located at the Qena PVC plant, (b) obtain a status report of cumulative amounts lost due to contamination, and (c) arrange for proper storage of PVC resin at the Qena plant.

3. EPADP Accounting and Fiscal Reporting

The AID Loan Agreement required EPADP to institute a mutually satisfactory cost accounting system by December 11, 1976. EPADP installed the required cost accounting system effective July 1, 1980. Actual day-to-day operation of the system began November 1, 1980, about four years later.

Conclusions and Recommendation

Completion of the required audit, including a reconciliation of EPADP project accounts to AID records is needed to assure that EPADP's accounting system conforms to the requirements of the loan and grant agreements.

Recommendation No. 4

USAID/Egypt make arrangements with EPADP for completion of the audit of project accounts, including a reconciliation to AID records, and obtain the audit report required by the loan agreement.

4. AID-financed Forklifts

AID financing included $132,395 for the foreign exchange costs of nine Allis-Chalmers gasoline powered forklifts. Three forklifts each were distributed to the three PVC plants. At all of the PVC plants the forklifts were unused:

- In Qena only one of the three forklifts had been used at all. The odometer had recorded less than 10 kilometers. Another was missing a tire. The third appeared not to have been moved since delivery.

- Two of three AID-financed forklifts at the Assuit plant had no mileage recorded; the third AID-financed forklift had been transferred to the EPADP headquarters in Cairo in exchange for a diesel powered, non-AID-financed, forklift. The diesel powered forklift is being used.

- The odometer readings for the three AID-financed forklifts located at the Beni Suef plant were 00000, 00000 and 00004.

Plant personnel unanimously stated that the forklifts were not being used because gasoline was too expensive.

Conclusions and Recommendation

The Loan requires the GOE and EPADP to provide promptly as needed all Egyptian currency required for the punctual and effective carrying-out, maintenance, repair, and operation of the project. The AID project paper financing plan shows that the GOE is to provide Egyptian currency equivalent to $202.0 million for the project. It is AID policy that commodities financed by AID be used for purposes intended, unless otherwise agreed to by AID in writing.

Recommendation No. 5

USAID/Egypt (a) review the status of the nine AID-financed forklifts, and (b) take action to have EPADP use the nine forklifts or arrange for disposition in accordance with the loan and AID requirements.

5. Questionable Use of an AID-financed Vehicle

An AID-financed Volare Sedan costing $7,272 was shipped from the United States in July 1979. It arrived in Egypt in August and was released from Customs during December 1979. In January 1980 the U.S. consultant for the project informed USAID/Egypt that the vehicle was not being used on the project. In April 1980 the U.S. consultant alleged to USAID that the Vice Minister of Irrigation had appropriated the vehicle for his personal use.

In April 1980 the USAID/Egypt project officer concluded that regardless of who was using the vehicle it was not on the Project; the EPADP project manager and consultants had to make their on-site visits to Beni Suef, Assuit and Qena by other means of transportation.

In June 1980 EPADP told USAID/Egypt that the vehicle was being used for purposes of inspecting the AID-financed PVC factories by the EPADP Chairman and Undersecretaries; and that the vehicle was housed at EPADP headquarters.

In September 1980, the USAID/Egypt project officer suggested that USAID/Egypt inspect the vehicle for mechanical condition and usage. USAID/Egypt files do not document whether or not the on-site inspection took place. Officials we talked to in Beni Suef, Assuit and Qena could not recall seeing the Volare Sedan at the PVC plants.

On May 28, 1981, we inspected the vehicle at EPADP headquarters. EPADP had not maintained a log of vehicle usage because, according to EPADP, the assigned user, i.e., the Chairman was exempt from such practice. Although the vehicle had been in Egypt over 16 months at the time of our audit, it was being operated with temporary license plates issued by Alexandria Customs. In Egypt, vehicles bearing government license plates are subject to unannounced checks by the police to ensure that the transportation provided is in the government's interest; trip tickets are required and must be presented to police authorities when these unannounced checks occur.

The AID Loan required that:

> "(a) Goods and services financed under the Loan shall be used exclusively for the Project, except as A.I.D. may otherwise agree in writing..."

Recommendation No. 6

USAID/Egypt should (a) require EPADP to establish a log of usage for the AID-financed Plymouth Volare (b) periodically review the log to ensure that the vehicle is being used for the purposes intended, and (c) require EPADP to obtain permanent GOE license tags for the vehicle.

PVC plant performance and operations

1. Supplier non-compliance

Diamond Shamrock furnished eight shipments of PVC resin amounting to 6,480 tons valued at $8,008,140. Some 563 tons of this resin valued at over $694,000 was contaminated upon delivery in Egypt. EPADP reimbursed Diamond Shamrock an amount of $7,027,142 and withheld $980,998 until the disposition of the contaminated deliveries could be determined.

The U.S. supplier did not meet packing requirements. According to its contract with EPADP, Diamond Shamrock was required to ship the PVC resin in double-ply 50 pound paper bags on pallets covered with a double layer of plastic. In addition the bags were to be palletized in telescopic boxes.

Diamond Shamrock did not ship the palletized resin in telescopic boxes. Paper bags were punctured or torn during shipment and delivery resulting in contamination of 563 tons of PVC resin. Subsequent to our audit EPADP filed an insurance claim for PVC resin losses. The claim was being negotiated between Diamond Shamrock and the insurance company.

2. Production Breakdowns

The PVC plants have experienced major production breakdowns. The sandy climate has affected production machinery and plant maintenance and repairs have been inadequate.

At Assuit, extruder equipment for both production lines required major repair or replacement. A spare extruder unit had been damaged during shipment; could not be used; and had not been replaced. At Beni Suef one production line was down due to worn bearings in a gear box. Also the plant could not operate due to a shortage of punching knives. In Qena one of the production lines had not operated beyond the testing and acceptance stage due to a faulty circuit board. The Qena plant, operating one line for about a month as of the audit review, had not produced beyond 30 percent of capacity.

In sum, of six production lines, five were experiencing major equipment breakdown at the time of our visits.

The rate of breakage of punching knives adversely affected production at all plants. Punching knives are required to punch holes in PVC pipe. Each perforator unit requires 24 punching knives that are manufactured in groups of four. Based on specifications furnished EPADP by the U.S. supplier, the life of punching knives was 2,880 production hours. According to EPADP, the average life of the knives has been only 480 production hours. As a result EPADP did not have enough spare punching knives. Cost was also a consideration: at $30 for one group, or $180 for the required set of six, and an actual replacement rate six times the planned rate; unplanned costs for this one item alone amount to $50,000.

Conclusions

Frequent and major breakdowns of plant equipment have reduced production capacity. The World Bank-financed portion of the program has begun to mobilize and there should be an increase in requirements for PVC pipe. EPADP and USAID/Egypt in coordination with the U.S. supplier need to correct plant equipment breakdowns, and train individuals in maintenance and repair. During the audit, USAID/Egypt and Cincinnati Milacron initiated action to determine causes for plant equipment breakdowns and a Cincinnati Milacron expert came to Egypt during September 1981 to implement corrective measures; therefore, no recommendation is included in this report.

3. Potential Health Hazards

There is a potential health hazard for workers assigned to the hopper and granulator rooms at the PVC production sites. In two reports the consultant, STV, Inc., recommended that PVC plant workers use goggles when assigned to the granulator room. This recommendation had not been implemented at the time of our audit.

Plant workers assigned to dump PVC resin into hoppers may also be subjected to health hazards. The hopper for each plant was located in a small area where ventilation was an open roof and a doorway. At Qena (the only plant in operation during the field review) we observed that the room was thick with PVC dust; it had settled on the hair, face and clothing of workers assigned to the room. It was obvious that the workers were inhaling PVC dust.

Conclusions and Recommendation

We believe the consultant's recommendation that goggles should be used to protect workers from the PVC dust resulting from the molding and extrusion process should be implemented. During our exit conference with EPADP officials, the Chairman agreed, and issued an order to purchase the necessary masks and goggles for issuance to granulator room and hopper room workers.

> **Recommendation No. 7**
>
> USAID/Egypt follow up with EPADP to assure that goggles and masks are provided and used by PVC plant workers assigned to the hopper and granulator rooms.

4. Shelf-Life

According to EPADP records 5,340 tons of PVC resin was delivered to the three PVC plants. It was anticipated that this amount would satisfy requirements for about one year. Actual requirements were much lower; only 1,203 tons had been used by March 31, 1981.

The remaining 4,137 ton inventory had been subject to damage from direct sunlight. Most of the PVC resin located at the Beni Suef and Assuit sites had been covered with canvas which offered some protection from direct sunlight; but little protection from heat. At the Qena plant, most of the PVC resin was unprotected. During our field visits, we saw paper bags of PVC resin that had deteriorated to a point where the resin was exposed and contaminated. Also, PVC resin, especially in the bags forming the top layers of the stocks, had begun to harden.

In addition to the PVC resin, the three plants had about 1,500 miles of PVC drainage pipe in inventory at the time of our audit. According to Diamond Shamrock on April 30, 1980 PVC drainage pipe had a two year shelf life; but, later, on Nov.18, 1980, Diamond Shamrock's estimate was reduced to one year. We observed that the pipe had begun to harden, crack and deteriorate--some after about three months in inventory. In our opinion, the shelf life of PVC pipe is less than one year in the harsh climatic conditions of Upper Egypt.

Conclusions and Recommendation

The contract between EPADP and Diamond Shamrock provided that PVC compound remain in usable condition for up to three months after delivery. However, at the current rate of consumption three years may elapse before the PVC resin is fully utilized. The approximate life of this compound under hot, desert conditions of Upper Egypt should be determined. Based on that determination the USAID can then determine what has to be done to reasonably protect the existing inventory of pipe and PVC resin until it is used. Estimated shelf lives of pipe and resin will also be useful to EPADP and USAID/Egypt for procurement, inventory management, and monitoring purposes.

Recommendation No. 8

USAID/Egypt (a) determine the estimated shelf-lives of PVC resin and PVC drainage pipe stored in Upper (Southern) Egypt, and (b) assist EPADP to provide storage facilities adequate to protect AID-financed PVC resin and PVC drainage pipe.

THE UPPER EGYPT II PROGRAM
Areas Targeted to Receive the Drainage System

Governorate	Location (Catchment Area)	Area in Acres	
Giza-Fayoum	Shahat	12,480	
	Masanda North.	10,400	
	Rahawy North.	10,400	
	Rahawy South.	10,400	
	Roos I	5,200	
	Roos II	4,160	
	Gureff	5,200	
	Tohbar-Agameen	6,240	
	Hosan	2,080	
	El-Ameria	6,240	
			72,800
Beni-Suef	Ehnassia	55,120	
	Masanda South	20,800	
	Koshesba	20,800	
			96,720
El Menia	Kabkab	39,520	
	Abu Raheb	10,920	
	South Menshat Dahab	30,784	
	Beni Mazar	28,080	
			109,304
Assuit	Abu Cabal West	20,956	
	West El Kosia	11,960	
	Abu Teeg-Masara	31,460	
	El Badari	8,840	
			73,216
Souhag	Souhag	22,880	
	Akhmim	26,000	
	El Baliana	8,320	
	Nag Tamam	10,400	
			67,600
Qena	Nag Hammadi	14,976	
	Hegaza	6,240	
	Hammad	35,360	
	El Rawey	8,840	
			65,416
Esna-Kom Ombo	Komer	5,200	
	Dampbik	11,232	
	South El Sebaeya	7,488	
	Kom Ombo West	10,400	
			34,320
Total			519,376 1/

1/ The 624 acre difference from 520,000 acres quoted in the report due to rounding - one feddan = 1.04 acres.

The PVC Pipe Drainage Project
Letters of Commitment, Letters of Credit, and Expenditures at March 31, 1981

Letter of Commitment (L/COM)	Letter of Credit (L/C)	Supplier	Value of L/COMs Opened	Value of L/Cs Issued	Expended 2/
263-K-3401			$ 5,350,634		
	60028	Cincinnati Milacron		$ 4,729,632	$ 2,617,063
	60388	Cincinnati Milacron		483,193	-0-
	60401	Cincinnati Milacron		120,467	108,420
263-K-3402			683,400		
	61058	Allis Chalmers		132,395	132,395
	61112	STV, Inc. 1/		11,100	3,612
	61537	General Motors		125,027	125,027
	61851	Cincinnati Milacron		215,762	-0-
263-K-3403			8,035,000		
	60387	Diamond Shamrock		8,008,140	7,027,142
263-K-3404 (DRA)	(DRA)	STV, Inc. 1/	112,255	112,255	111,815
		TOTAL	$14,181,289	$13,937,971	$10,125,474
	(Percentage of $31 million loan)		(45.7)	(45.0)	(32.7)

1/ See Schedule B-1 for total project related funding for services performed by STV, Inc.

2/ Per EPADP Records.

The PVC Pipe Drainage Project
Loan No. 263-K-034
Contracts with STV, Inc.

Contract No:	AID/otr-C-1452	AID/NE-C-1508	Unnumbered	Unnumbered
Type :	AID/W-Direct	AID/W-Direct	B/G	B/G
Amount				
$:	85,447	43.649	91,605	112,255
LE :	21,500	8,738	12,795	27,270
Date Signed:	2-10-77	5-9-78	6-9-79	10-1-79
Period :	2-8-77 thru 10-15-77	5-9-78 thru 9-15-78	9-15-78 thru 12-16-79	10-1-79 thru 1-1-81
Scope :	To assist EPADP to plan and establish manufacturing facilities for the timely production of drainage pipe in quantities required for accelerated field installation.	To assist EPADP in bid evaluations, notice of award, contract preparation, negotiations with supplier and execution of contract.	To assist EPADP in bid evluations, notice of award, contract preparation, negotiations with suppliers and execution of contract.	To provide services during the procurement, installation start-up, and operational phases of the project.
Project(s) :	263-0005 263-0013	263-0005 263-0025	263-0005 263-0042	263-0019*

* The applicable project for loan 263-K-034 activities.

The PVC Drainage Pipe Project
Project No. 263-0019; Loan No. 263-K-034
Components of a PVC Production Line

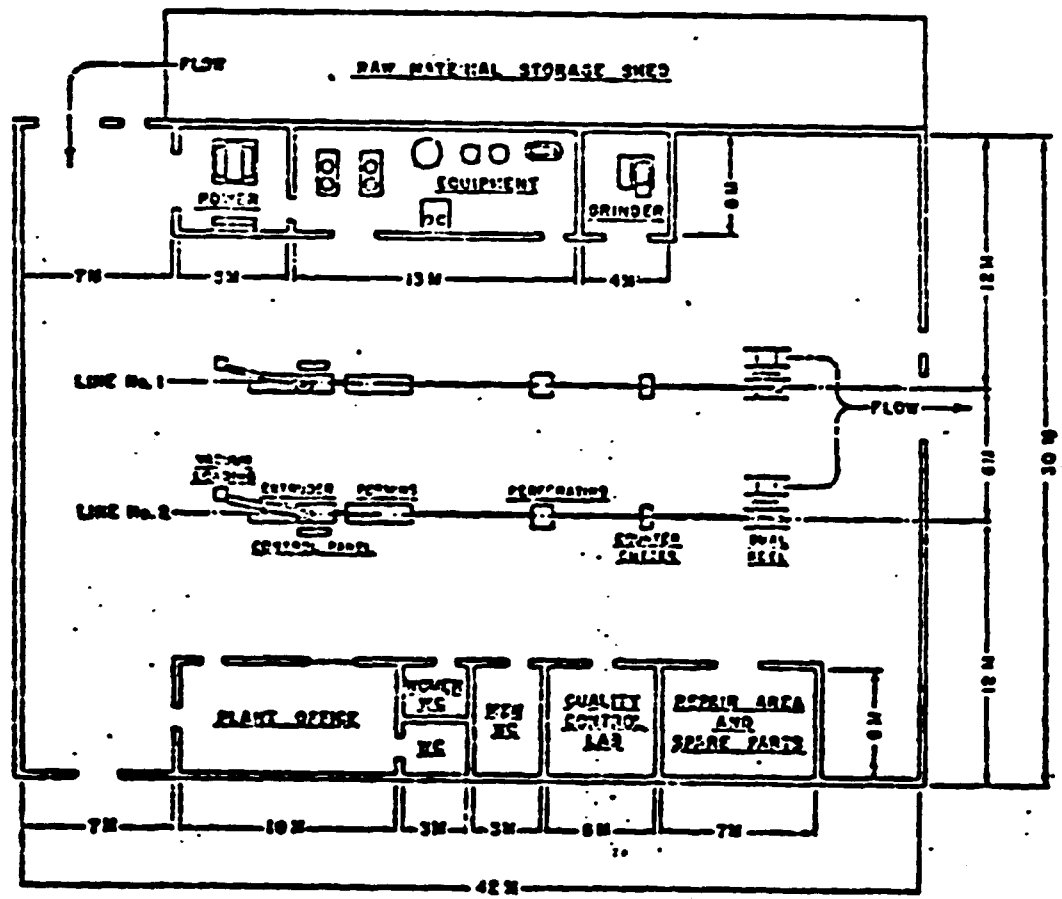
In finished form PVC drainage pipe is a lightweight, flexible, corrugated, perforated, plastic cylinder that is roughly three inches in diamter. The drainage pipe is made of white PVC compound (resin) from a basic formulation provided by Cincinnati Milacron, the principal supplier of capital equipment. Each PVC plant houses two production lines and the individual production lines are composed of:

- Vacuum Loader - funnels PVC resin to extruders,
- Extruder - processes rigid PVC dry blend into PVC pipe,
- Corrugator - a "haul-off and forming unit" that pulls PVC pipe from the extruder, forms corrugations, and cools the pipe,
- Perforator - punches holes in the valleys of corrugations at uniform intervals along the length of the pipe and in four to six rows around the pipe circumference,
- Counter - automatically measures preselected length of pipe coils and actuates an operator alert alarm,
- Pipe Coiler - coils the corrugated pipe,
- Air Compressor - provides air for equipment operations and control,
- Chiller - provides cooling water for the production equipment,
- Sump Pump - recirculates cooling water,
- Granulator - grinds scrap PVC pipe for recycling,
- Motors,
- Chilled Water Tank - receives and holds water from the sump, and
- Process Water Filter/Softener - removes dirt and sediment from water needed for processing.

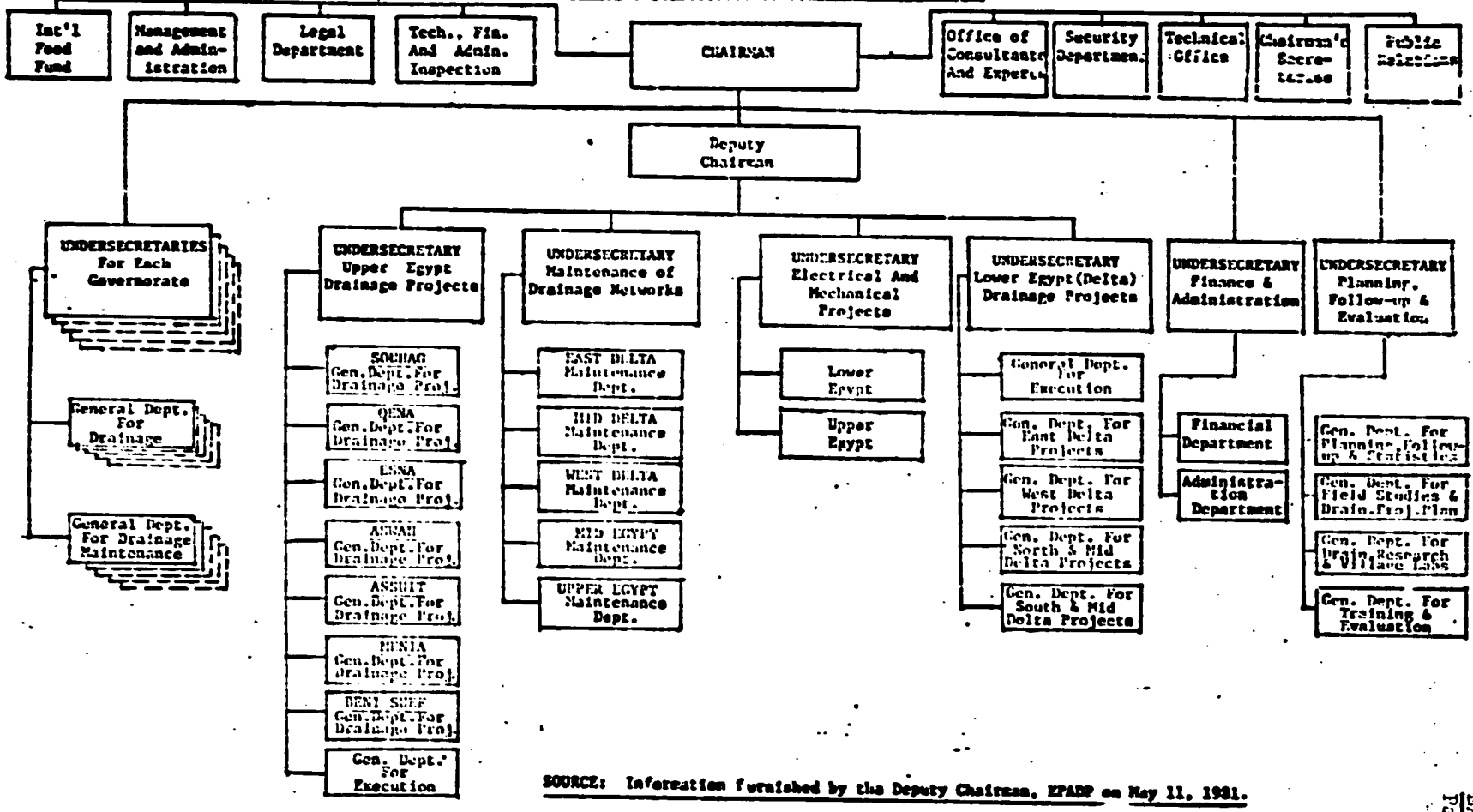
The finished PVC drainage pipe is cut and coiled in 100 meter (about 328 foot) intervals at an established production rate of about 14 meters (45.9 feet) per minute.

PLANT ARRANGEMENT

TWO PRODUCTION LINES



ORGANIZATION
OF THE
EGYPTIAN PUBLIC AUTHORITY FOR DRAINAGE PROJECTS (EPADP)



SOURCE: Information furnished by the Deputy Chairman, EPADP on May 11, 1981.

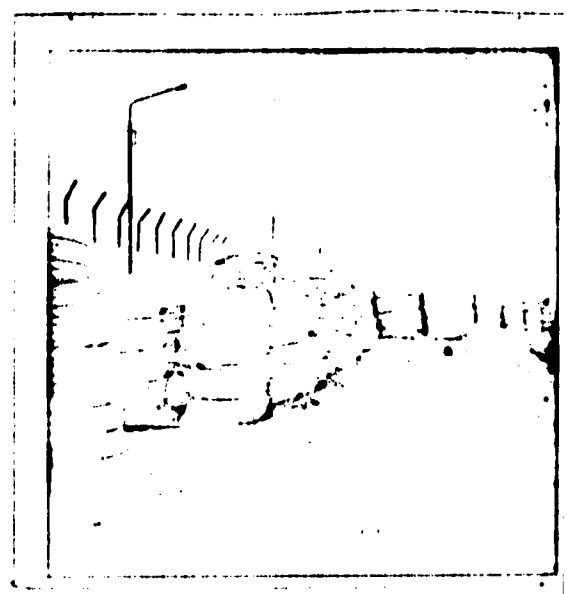
EXHIBIT D
Page 1 of 1

----BENI-SUEF

----ASSUIT

Over 1,500 miles of AID-financed PVC drainage lay idle and deteriorating.

QENA----



Storage practices at the PVC plant

located in Qena need to be corrected.

LIST OF REPORT RECOMMENDATIONS

Page

Recommendation No. 1 — 15

The USAID/Egypt request that the Egyptian Public Authority for Drainage Projects (EPADP) invite a representative(s) of the World Bank to participate in the tripartite committee review of the PVC drainage pipe plants and of the drainage program in the targeted area consisting of 520,000 acres of land located in Upper Egypt.

Recommendation No. 2 — 15

USAID/Egypt (a) review EPADP's revised benchmarks and targets for the overall Upper Egypt II drainage program, and (b) revise the amount and timing of AID inputs to fit the new program schedule.

Recommendation No. 3 — 16

USAID/Egypt instruct EPADP to (a) separate contaminated and noncontaminated bags of AID-financed PVC resin located at the Qena PVC plant, (b) obtain a status report of cumulative amounts lost due to contamination, and (c) arrange for proper storage of PVC resin at the Qena plant.

Recommendation No. 4 — 17

USAID/Egypt make arrangements with EPADP for completion of the audit of project accounts, including a reconciliation to AID records, and obtain the audit report required by the loan agreement.

	Page
Recommendation No. 5	18
USAID/Egypt (a) review the status of the nine AID-financed forklifts, and (b) take action to have EPADP use the nine forklifts or arrange for disposition in accordance with the loan and AID requirements.	
Recommendation No. 6	19
USAID/Egypt should (a) require EPADP to establish a log of usage for the AID-financed Plymouth Volaire, (b) periodically review the log to ensure that the vehicle is being used for the purposes intended, and (c) require EPADP to obtain permanent GOE license tags for the vehicle.	
Recommendation No. 7	21
USAID/Egypt follow up with EPADP to assure that goggles and masks are provided and used by PVC plant workers assigned to the hopper and granulator rooms.	
Recommendation No. 8	22
USAID/Egypt (a) determine the estimated shelf-lives of PVC resin and PVC drainage pipe stored in Upper (Southern) Egypt, and (b) assist EPADP to provide storage facilities adequate to protect AID-financed PVC resin and PVC drainage pipe.	

LIST OF REPORT RECIPIENTS

USAID/EGYPT

Director	5
Regional Inspector General for Investigations & Inspections (RIG/II/C)	1

AID/WASHINGTON

AID Deputy Administrator	1
Assistant Administrator/Bureau for Near East (AA/NE)	5
Office of Egypt/Israel Affairs--Egypt Desk (NE/EI)	1
Bureau for Near East (Audit Liaison Office)	1
Bureau for Program and Management Services (AA/SER/SA)	6
Bureau for Program and Policy Coordination/Office of Evaluation (PPC/E)	1
Legislative and Public Affairs Office of IDCA	1
Office of Development Information and Utilization (DS/DIU)	4
Office of the General Counsel (GC)	1
Office of Financial Management (FM/ASD)	1
Office of Legislative Affairs (LEG)	1
Office of the Inspector General (IG)	1
Office of Policy, Plans and Programs (IG/PPP)	1
Office of Investigations and Inspections (IG/II/W)	1
Executive Management Staff (IG/EMS)	12

REGIONAL INSPECTORS GENERAL FOR AUDIT

RIG/A/Karachi	1
RIG/A/Karachi--New Delhi	1
RIG/A/Manila	1
RIG/A/Nairobi	1
RIG/A/La Paz Residency	1
RIG/A/Panama	1
RIG/A/Washington	1