REPORT
TO
THE CONGRESS OF THE UNITED STATES

EXAMINATION
OF THE
SPANISH BASE CONSTRUCTION PROGRAM
OF THE
DEPARTMENTS OF THE AIR FORCE AND THE NAVY

BY

THE COMPTROLLER GENERAL OF THE UNITED STATES

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON 25

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January 31, 1958

Honorable Sam Rayburn
Speaker of the House of Representatives

Dear Mr. Speaker:

Enclosed is our report on the examination of the Spanish Base Construction Program of the Departments of the Air Force and the Navy as of June 30, 1957.

The Spanish Base Construction Program represents the first construction undertaken by the United States in Spain. We found that numerous changes in plans have resulted in increased costs, in construction delays, and, in one instance, in the construction of facilities for which there was no apparent military need. However, the administration of the physical construction generally was proceeding satisfactorily.

A copy of this report is being sent today to the President of the Senate.

Sincerely yours,

Joseph Campbell

Comptroller General
of the United States

Enclosure

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REPORT ON EXAMINATION
OF THE
SPANISH BASE CONSTRUCTION PROGRAM
OF THE
DEPARTMENTS OF THE AIR FORCE AND THE NAVY

The General Accounting Office has made an examination of the Spanish Base Construction Program (SBCP) as of June 30, 1957. The review was made pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

INTRODUCTION

This is our first report on the status of the Spanish Base Construction Program. This program represents the first construction undertaken by the United States in Spain. At June 30, 1957, the date of this report, the Departments concerned estimated that the construction program was about 75 percent complete. As the program progresses we intend to continue our evaluations with specific reference to the significant factors discussed in this report and to make such further reports as may be warranted by the conditions found in our examination.

As a result of the desires of the Government of the United States and of Spain to assist each other in their common defense, the Governments conducted, over a period of several years, a series of military and diplomatic discussions toward this end. The discussions and negotiations led to mutual agreement and on September 26, 1953, the Governments of the United States and of

Spain signed three agreements: a Mutual Defense Assistance Agreement under which the United States furnishes military weapons and material for the Spanish forces and trains them in their care and use; an Economic Aid Agreement under which the United States furnishes economic and technical assistance for the improvement of the Spanish economy; and a Defense Agreement under which the United States is authorized to construct military bases in Spain for the joint use of Spanish and American forces. The last agreement runs for 10 years from date of signing, with an option for renewal for 2 additional 5-year periods.

Various United States organizations have been established to carry out the responsibilities assumed by the United States under the three agreements. Other reports of the General Accounting Office have covered the administration of the military aid and economic and technical assistance programs administered by the Military Assistance Advisory Group (MAAG) and United States Operations Mission (USOM) in Spain. This report deals with the operations of the military construction program in Spain under the Defense Agreement.

The construction program is administered jointly by the Departments of the Air Force and the Navy. The specific responsibilities of the two Departments are outlined in an agreement dated March 15, 1954, between the Secretary of the Air Force and the Secretary of the Navy. The Secretary of the Air Force was designated Executive Agent for the entire program and maintains close liaison with Spanish military authorities through the Chief, Joint United States Military Group (JUSMG), who acts as his representative in

Spain. The Chief of the Bureau of Yards and Docks, Department of the Navy, was designated Construction Agent and Contracting Officer with responsibility for technical supervision of construction. These functions are carried out by the Officer in Charge of Construction (OICC), a direct representative in Spain of the Chief of the Bureau of Yards and Docks. Each of the two departments is responsible, with respect to its facilities in the over-all program, for developing plans, obtaining congressional authorizations and appropriations, and reviewing progress of the program.

At June 30, 1957, there were under construction four air bases, a naval air station and related facilities, two naval fuel storage and magazine facilities, and several aircraft warning sites. Construction of facilities at one additional existing Spanish air base was scheduled to begin in late 1957. Based on authorized programs and estimates of future work, the projected probable cost of the construction program is about $438,538,000. A map showing the location of the principal bases and facilities comprising the Spanish Base Construction Program is attached as the appendix.

SCOPE OF EXAMINATION

Our examination of the Spanish Base Construction Program included a review of the laws and agreements which authorize the program and affect its scope and administration; the planning for base sites and for facility requirements for the bases; and the management controls related to the award of contracts, compliance with specifications, procurement of material, and progress of construction and inspection, exercised in administration of the program. As a part of our examination, we reviewed procedures and practices and examined selected transactions at all the major construction sites, at the Madrid headquarters for the program, and in appropriate organizational units of the Departments of the Air Force and of the Navy in Washington.

SUMMARY OF FINDINGS

The Spanish Base Construction Program represents the first construction undertaken by the United States in Spain. Original plans for the locations of bases and for the facilities to be constructed on those bases have undergone numerous and substantial changes, reflecting in part changing military plans and in part decisions affecting Spanish-American relations. These changes in plans have resulted in increased construction costs, in construction delays, and in one instance the construction of facilities that had no apparent military need.

The annual programs developed and presented to the Congress have been generally on a piecemeal basis and have resulted in piecemeal financing and uneconomical contracting practices which increased construction costs. We are recommending a change in basic policy affecting offshore military construction projects in general, looking to complete disclosure of program plans and status and to a method of contracting in economical construction units without regard to the year when authorized.

We believe that the administration of physical construction of the military bases is progressing effectively and efficiently, with certain relatively minor exceptions, despite changing service plans and unusual and adverse conditions.

The more important of our observations follow.

1. Decision to continue San Pablo in program was apparently based on other than military considerations. The decision to approve San Pablo as a base site and to request Spain to acquire the necessary land was made on the basis of tentative plans as to the

mission of the base. The acquisition of the land by Spain influenced the subsequent decision to continue San Pablo in the construction program. The decision to continue San Pablo, which came after the principal sponsor had stated that the base was not required for its mission, was largely influenced by the opinion that rejection of the site at that stage would have had an adverse effect on Spanish-American relations. The land acquisitions withdrew from the Spanish economy about 800 acres of land, much of it covered with valuable olive groves. A good portion of the acreage is apparently excess to construction needs. Most of the olive groves remain untouched.

We believe that, as a consequence of the land acquisition, facilities were planned for San Pablo for which there was no operational need or if needed could have been provided by expansion of similar facilities at other sites at lesser cost. (See pp. 11 and 15.)

2. Runway at Torrejon does not meet revised Air Force criteria. Our review disclosed that the runway constructed at Torrejon Air Base does not meet the present Air Force design criteria for channelized B-47 traffic and that the OICC's evaluation of the runway shows that the runway is suitable under these conditions for emergency traffic only. Further, there are no present plans for strengthening the runway to accommodate full operational traffic. The Air Force takes the position that the decision was sound in light of its experience with runways at other bases. (See p. 21.)

3. Planning for facilities required at sites. Generally, planning for facilities required for individual bases in Spain has followed an orderly pattern and has permitted a business-like approach to actual construction work. However, our review disclosed instances where decisions were made either because of considerations other than military need or because of inadequate advance planning. These instances resulted in increased construction costs and in construction of facilities for which there was no apparent need. (See p. 15.)

4. Creation of air traffic control problem. The selection of the Torrejon site, close to the international airport at Barajas, has created a traffic control problem which will require central control of both airports and will curtail the operational value of either or both airfields under instrument flight weather conditions. There are conflicting opinions as to the severity of the problem. (See p. 12.)

5. Administration of physical construction. With relatively minor exceptions the administration of physical construction of the bases is progressing effectively and efficiently despite unusual and adverse conditions which hamper orderly conduct of operations. Among these conditions are such things as changes of construction scope and specifications by the services, piecemeal programing and the resulting piecemeal financing practices of the services, differences in Spanish construction methods and labor skills, complex Spanish labor laws and decrees, and unfamiliar national customs. We did note, however, that the manner in which certain contracts had been negotiated, awarded, and amended increased costs and resulted in construction delays. (See p. 27.)

6. Increased costs of construction. Construction costs incurred or estimated to be incurred to complete the bases are substantially greater than originally expected. Many factors which could not have been reasonably foreseen and which are beyond the control of the administrators of the SBCP have contributed to increased costs. The more significant factors include (1) industry-wide wage rate increases decreed by the Spanish Government in all industries, (2) greater proportions of materials purchased in high-cost countries than was anticipated, (3) unfamiliarity of Spanish construction industry with American construction methods and the use of our equipment, and (4) changes in scope and specifications of planned construction work. (See p. 32.)

7. Effects of piecemeal programing. Even though it was anticipated that the Spanish Base Construction Program would require at least 4 years for completion, it has been managed in many respects as a series of single-year undertakings. The annual programs developed and presented to Congress have been generally on a piecemeal basis. This piecemeal method of developing and presenting the program and the budget has resulted in similar piecemeal financing and uneconomical contracting practices which increased construction costs.

We are recommending a change in basic policy affecting offshore military construction projects in general, looking to complete disclosure of program plans and status and to a method of contracting in economical construction units without regard to the year when authorized. (See p. 24.)

8. Status of program authorizations and funding. At June 30, 1957, the projected probable cost of the program, based upon current authorizations and estimates of future work, was $438,538,000. Funds in either dollars or pesetas have been made available, or are expected to be made available, from sources already authorized, in the total amount of $410,699,000, indicating that funds totaling $27,839,000 will be needed to completely finance the program. (See p. 36.)

9. Status of physical construction. Physical construction of the bases has reached the stage at which emergency operations are now feasible. The runways, taxiways, and aprons, which are the key facilities from both an operational and construction viewpoint, have been virtually completed. A petroleum pipeline, running from Rota in the southwestern section of Spain to Zaragoza in the northeastern section, has also been completed. Because of changes in plans, however, the runway at Moron will be widened and the runway at Rota will be lengthened, thereby curtailing use of these facilities during the additional construction period. (See p. 40.)

PLANNING OF PROGRAM

Our review of the planning involved in selection of construction sites and in the determination of facilities required to be constructed disclosed numerous revisions of the original plans. Some of these revisions were of major scope and caused significant increases in costs and delays in progress of construction. The Air Force and the Navy decided, as a matter of policy, that the Spanish Base Construction Program would not be conducted on a "crash" basis and that construction work would be based on fully developed programs, plans, and specifications prepared in an orderly manner.

We do not know to what extent the revisions in SBCP plans reflect inadequate planning and to what extent they reflect factors beyond the control of the planners, such as unforeseeable changes in over-all military plans, political considerations to maintain good Spanish-American relations, and similar considerations.

Our comments on selection of construction sites and planning for construction follow.

SELECTION OF SITES

In 1951, while negotiations with Spain were in progress, a joint military team was established to survey Spanish ports, airfields, and related facilities to determine their usability and the extent of improvements necessary to satisfy United States Air Force and Navy requirements in Spain. The team made a selection of tentative sites for the construction of new air and naval facilities or for the improvement of existing facilities and reported its findings on November 28, 1951. The selection included

nine air base sites and several small auxiliary sites for the Air Force. For naval requirements, one site was selected for an off-loading harbor facility and flyaway strip and another site nearby was selected for a naval air station. Naval storage facilities were planned at two principal and several minor locations.

Of the nine air base sites selected for the Air Force, two are under construction basically as originally planned, two are under construction with substantially altered missions, and one is scheduled for construction work to be begun in the near future. The remaining four sites have been rejected for various reasons and the missions contemplated for the sites have been reassigned to the air bases under construction.

The two sites selected for Navy air and waterfront facilities were abandoned in favor of one combined installation at an alternative site which is presently under construction. The two sites originally selected for Navy storage facilities are under construction.

Our comments on the selection of the sites at Rota (Navy) and at Torrejon and San Pablo (Air Force), which are the most significant bases in terms of cost of construction or altered missions, follow.

San Pablo

The decision to approve San Pablo as a base site and to request Spain to acquire the necessary land was made on the basis of tentative plans as to the mission of the base. The acquisition of the land influenced the subsequent decision to continue San Pablo in the construction program. The decision to continue San Pablo,

which came after the principal sponsor, Air Material Command (AMC), had stated that the base was not required for its mission, was largely influenced by the opinion that rejection of the site at that stage would have had an adverse effect on Spanish-American relations. The land acquisitions withdrew from the Spanish economy about 800 acres of land, much of it covered with valuable olive groves. A good portion of the olive groves remain untouched and the land is apparently excess to construction needs.

We believe that, as a consequence of the land acquisition, facilities were planned for San Pablo for which there was no operational need or which could have been provided by expansion of similar facilities at other sites at less cost. (See p. 15.)

Torrejon

The selection of the Torrejon site, close to the International Airport at Barajas, has created a traffic control problem which will require central control of both airports and will curtail the operational value of either or both airfields under instrument flight weather conditions. There are conflicting opinions as to the severity of the problem.

The Civil Aviation Assistance Group of the United States Civil Aeronautics Administration working with the United States Operations Mission to Spain referred to the Barajas and Torrejon airports as "*** two airports but, from a traffic standpoint, a one-airport operation with bisecting runways during instrument weather conditions. Hence, the volume of instrument traffic that can be accepted into the two airports during instrument flight

rules weather conditions will be less than the capacity of a single airport with similar navigation aids."

JUSMG officials agree that a traffic control problem exists. However, they maintain that it is not serious and that peacetime military and civilian flights can be conducted within an acceptable degree of safety with no undue delays in arrivals or departures since military flights can be planned to arrive and depart at times other than those of peak commercial traffic. In time of war, all commercial traffic is expected to be suspended.

JUSMG informed us that Torrejon was selected as a site largely on the initiative of Spanish authorities who wanted a base near the national capital for air defense purposes and as a "show place" for at least one jet fighter squadron. The Spanish desired also that the base be located on Government-owned land to reduce cost. Of the five Spanish air bases in the vicinity of Madrid, Torrejon appeared to be the most desirable to the Air Force. Other sites to the north and south of Madrid had been carefully investigated. However, because of technical reasons, higher construction and land acquisition costs, and their distances from Madrid, these were not acceptable.

Torrejon also had certain other advantages to the Air Force. The existing strip could be extended with good glide angles in either direction. The base was close enough to Madrid to permit day-to-day contact between Spanish governmental authorities and the Area Headquarters for Spain which at that time was intended to be located on the base. Even with the traffic problem, known and

considered from the first, USAF deemed Torrejon the most logical choice in the Madrid area.

Rota

The selection of Rota as a site for a combined air and waterfront facility for the Navy represented a revision of an earlier plan for a two-site facility. However, the change in plans did not result in any significant excess costs since no detailed design work had been performed and no contractual commitments had been made prior to the change.

The original two locations were selected to satisfy a Navy requirement for a site or sites, located outside but within a reasonable distance of the Straits of Gibraltar, for an advance naval air facility and a location for off-loading aircraft from ship to airfield. The joint military team considered several sites and recommended two sites in the Cadiz area which would satisfy all requirements--one site for off-loading facilities and a flyaway strip and another site for a naval air station. In December 1953, after considerable additional study of naval requirements, the naval Commander in Chief for the North Atlantic and Mediterranean areas recommended to the Chief of Naval Operations that, because of strategic, logistic, economic, and other factors, a single site at Rota was preferable to the two sites tentatively selected by the team. The Chief of Naval Operations referred the recommendation to the Joint Chiefs of Staff and, after obtaining approval of that group, presented the change in plans to interested congressional committees. Congressional approval for the change was obtained in May 1954, before any design or construction work had been undertaken.

PLANNING FOR FACILITIES REQUIRED AT SITES

Generally, planning for facilities required for individual bases in Spain has followed an orderly pattern and has permitted a business-like approach to actual construction work. However, our review disclosed instances where decisions were made either because of considerations other than military need or because of inadequate advance planning. These instances resulted in increased construction costs and in construction of facilities for which there is no apparent need. Our comments on the more important of these instances follow.

General facilities, San Pablo

The circumstances surrounding the decision to construct an air base at San Pablo indicate that considerations other than military need may have been overriding. We believe that one of the motivating reasons for retention of San Pablo in the Spanish Base Construction Program was the feeling that at least some facility must be placed there because the Spanish Government, at the request of the United States Air Force, had acquired about 800 acres of valuable farm land for use in constructing the base. Considerable diversity of opinion existed in the Air Force as to what facilities, if any, should be built at San Pablo, and facilities have been constructed for which there is no indicated need in the revised program.

The mission of San Pablo Air Base was revised in major respects before any significant construction work had been performed or significant costs had been incurred. Coordination of the construction program with the revised mission requirements of AMC

and the Strategic Air Command (SAC), which were limited to a petroleum, oil and lubricants (POL) facility near this location, would have resulted in an estimated savings of 5.9 million dollars in the total cost of the Spanish bases on the basis of the following facts and assumptions:

1. Line items which would not have been constructed either at San Pablo or at another location:	
a. Estimated cost incurred to date on items now deleted from the program (chiefly design costs)	$ 686,000
b. Parking apron and airfield drainage	1,498,000
c. Support facilities	824,000
Total	3,008,000
2. Line items which could have been located at another site by expansion of similar facilities already programed at those sites:	
a. Airmen's dorms and mess (25% savings)	374,000
b. Utilities (75% savings)	2,319,000
c. Hospital (25% savings)	231,000
Total	2,924,000
Total estimated savings	$5,932,000

The original plan for San Pablo, in September 1954, contemplated construction of an Air Material Command supply depot; headquarters for petroleum, oil and lubricants; facilities for aircraft repair and maintenance; and other related supporting facilities. In June 1955 a concept of direct distribution of supplies, from the zone of the interior to consuming overseas installations, was under consideration, which in its execution would substantially

reduce the planned mission of the AMC supply depot. Concurrent with this development, AMC proposed to the SAC that the proposed reduced depot facility be transferred to Torrejon Air Base and that San Pablo be developed as a SAC operational air base. SAC agreed with the placing of depot facilities at Torrejon but stated that San Pablo was not needed as an operational base since the requirement for a medium bomber base originally planned for this part of Spain had been shifted to Zaragoza where a fighter base was already under construction.

AMC then proposed to the Air Force Chief of Staff that the facilities programed for San Pablo, with the exception of the fuel storage to support SAC tanker utilization, be relocated at other bases. The Air Staff, Headquarters, USAF, recommended disapproval of AMC's proposal, and on June 24, 1955, Headquarters, USAF, notified the Chief, JUSMG, that AMC's proposal had been rejected and that AMC had been directed to submit its reduced requirements for San Pablo rather than locate those reduced requirements elsewhere.

At this point in time (June 1955) no contracts for construction at San Pablo had been awarded other than for off-base POL storage tanks for which excavation work had been started. Had the Air Force deleted San Pablo from the program at this time, savings in construction costs would have been about 5.9 million dollars.

From June 1955 until about March 1956 planning and construction continued under the reduced concept. In the period between April and October 1956 the programing of San Pablo facilities again came under review by the Air Force and numerous meetings and discussions were held by representatives of AMC, Military Air

Transport Service, Headquarters, USAF, and JUSMG. The Chief, JUSMG, supported retention of San Pablo because of the key facilities programed, such as the hospital, AMC depot, POL headquarters, and community support activities. Also, he pointed out that the land acquired by the Spanish for the base was very valuable and that continued deferring of the base could lead to political repercussions.

In September 1956 the Assistant Deputy Chief of Staff, Operations, Headquarters, USAF, informed the Chief, JUSMG, that "Operations" had reexamined the entire Spanish Base Construction Program and was proposing that construction at San Pablo be limited to the minimum facilities necessary to support POL pipeline maintenance and Global Communications (Globecom) units and that the air freight terminal be relocated at Torrejon Air Base. It was stated also that from an operating standpoint an AMC depot was not needed, but political implications were not fully examined.

In October 1956 the Chief, JUSMG, submitted a memorandum to the Assistant Chief of Staff and the Special Assistant for Operations setting forth requirements to develop a logistical support base at San Pablo costing approximately 13.7 million dollars. The Department of the Air Force and the 16th Air Force reduced the proposed program to include POL pipeline maintenance units, Globecom unit, southern area hospital, base support personnel, and facilities for emergency recovery. Plans for the one AMC warehouse and one small hangar were then dropped from the construction program. This revised plan was programed to cost an estimated 8.7 million dollars.

Interviews with individuals concerned with the design and construction of facilities being developed for San Pablo and other bases lead us to believe that all the facilities programed for San Pablo under the latest revision could have been located at other sites now under construction without interfering to a material extent with the programed missions of the facilities at the alternate sites. Savings of approximately $3,000,000 could have been realized by the relocation of these facilities in the fall of 1956. Also, savings would have been realized in future operating expenses.

In connection with the change in concept of the San Pablo mission, the prime contractor recommended to the OICC on October 2, 1956, that the concrete work on the parking apron be deferred until the development of the base plan was more clearly defined. The OICC instructed the prime contractor to continue the work to timely completion because the OICC felt that termination would be uneconomical.

Under the present base concept, there does not seem to be any requirement for the parking apron.

Runway, Moron

The failure to change the construction plans for the Moron Air Base on a timely basis resulted in an undetermined amount of excess costs for the widening of the runway and curtailed operational use of the base during the period when the widening was accomplished.

The planned mission of the Moron Air Base included runway accommodations for heavy bombers. However, the width of the runway

(200 feet) as planned and originally constructed is adequate for medium bombers and for B-36 heavy bombers, but it is inadequate for the B-52 which was adopted as the heavy operational bomber about 1953 to replace the obsolete B-36.

The contract for the original 200-foot runway was let in May 1955. The runway and the lighting were usably completed in January 1957 and May 1957, respectively. In February 1956, during the construction period, JUSMG was directed to proceed with the final design for a 300-foot wide heavy duty pavement. For the next 15 months there was considerable indecision in the Air Force with respect to the runway at Moron. Finally, in May 1957, Headquarters, USAF, directed JUSMG to widen the runway with 50-foot, 25,000-pound load-bearing strips on each side and to move the lights to the outside edges of the pavement. This work was contracted in July and completed in December 1957.

Runway, Rota

The runway constructed at Rota Naval Air Station during the period of March 30, 1955, to the fall of 1956, although designed in accordance with the then existing standards, has been determined by the Navy to be inadequate on the basis of subsequently established standards for construction of runways. The current standards were established by the Navy in July 1956. However, the study on which the standards were based was completed by a private engineering firm in July 1955, a year earlier, at which time construction work on the runway was in its preliminary stages and could have been suspended pending the revision of standards.

To conform with the revised standard, it will be necessary to reinforce the runway and to extend it from the original length of 8,000 feet to about 12,100 feet. The Navy has recommended that, "in order to conserve drastically limited military construction funds," the 4,100-foot extension be constructed in accordance with the newly established criteria but that the existing 8,000-foot runway remain as constructed.

The Department of the Navy informed us that "The runway when completed will consist of 5,100 ft. of Portland Cement concrete pavement and 7,000 ft. of asphaltic concrete pavement. The portion of the runway constructed of asphaltic concrete will be in the center, /part of original construction of 8,000 ft./ an area that is normally subjected to less loading than the ends. *** It is probable that asphalt of the quality placed on the runway at Rota will be satisfactory with proper maintenance depending upon the rate of employment of aircraft with tires inflated to 400 pounds per square inch. It is considered that until planes providing loading conditions comparable to the new criteria are produced and employed at this Base, it is unsound to spend additional funds to provide corrective measures for conditions that may never materialize. Thus, the limitation of funds was not the controlling factor in this determination."

Runway, Torrejon

Our review disclosed that the runway constructed at Torrejon Air Base does not meet the present Air Force design criteria for channelized traffic for B-47's and that OICC's evaluation shows that the runway is suitable under these conditions for emergency

traffic only. Further, there are no present plans for strengthening the runway to accommodate full operational traffic.

Tests and evaluations of the runway and taxiway paving were made upon completion of the paving early in 1957. The evaluation report states that the channelization of B-47 traffic under planned operational procedures will reduce the capabilities of the pavement from the standards for full operations to standards for emergency operations.

The design criteria furnished by the Air Force and used by the OICC as a basis for construction of the runway did not give consideration to the additional stresses and strains to which the pavement would be subjected by reason of channelized traffic. The research data which disclosed the effects of channelized traffic had not been developed until after the runway had been designed and a substantial portion of the runway had been constructed. Action could therefore have been taken to modify the completed portion and to complete construction of the remaining portion on the basis of the newly developed criteria. However, the OICC, in concurrence with the Air Force representative of JUSMG, decided to complete construction in accordance with the original design criteria.

The Air Force takes the position that, "The policy established by the Assistant Chief of Staff, Installations, was that B-47 runways which were completed or under construction prior to the establishment of channelized traffic criteria would be constructed as designed due to the high cost involved. It was determined that strengthening to support channelized traffic would be

accomplished if and when distress or failure appeared under this traffic condition. This decision was made due to the fact that neither pavement designs nor evaluations are an exact science and in the final analysis only sustained operations can prove the adequacy of the pavement. In this connection, it is pointed out that some runways, constructed under the old 100,000 lb. single-leg load criteria, at Air Force bases have been supporting B-47 operations for several years without showing serious signs of distress due to channelization."

EFFECTS OF PIECEMEAL PROGRAMING

Even though it was anticipated that the Spanish Base Construction Program would require at least 4 years for completion, it has been managed in many respects as a series of single-year undertakings. The programs developed and presented to the Congress for obtaining annual authorizations and appropriations have been generally on a piecemeal basis. We found that neither Department has presented to the Congress, at any one time, its entire SBCP as a complete package in terms of (1) the facilities already constructed or authorized and the facilities required currently and in the future for completion of the bases, (2) the related costs incurred and estimated to be incurred and, (3) the phasing of the program for construction and financing.

The piecemeal method of developing and presenting the program and budget has resulted in similar piecemeal financing and contracting.

We are unable to state what the over-all savings might have been had authority been available to place complete basic facilities under contract at one time. The following examples, however, illustrate the increased costs that have resulted from piecemeal programing and the resulting piecemeal financing.

1. Petroleum products (POL) terminal storage tanks with a capacity of 2,819,500 barrels were authorized in the fiscal year 1954 program and constructed at an average cost of $2.27 per barrel of storage under a subcontract awarded in 1955. Additional tanks with a capacity of 1,563,000 barrels were authorized in fiscal year 1955

and a contract was awarded in 1956 at an average cost of $3.58 per barrel of storage. A saving of about 2 million dollars might have been realized in the construction of these tanks if the known total requirements had been programed so that they could have been included in the first contract.

2. At Rota, the runway and a portion of the parking apron were authorized in the reprograming of the fiscal year 1953 program and contracted for in 1955. The balance of the apron was authorized in the fiscal year 1955 program. In July 1956 a supplemental agreement was entered into with the airfield paving subcontractor for the construction of the balance of the parking apron. The negotiated prices obtained exceeded the basic contract price for similar work by about one third.

3. Ammunition storage igloos were constructed at Moron with funds available in 1954-55. This was only a portion of the known requirements for ammunition storage. Additional igloos will be constructed with 1958 funds, but it is expected that they will be constructed at a substantial increase in cost.

4. In the contract for fiscal year 1954 airfield paving at Moron, the unit price for stockpiled coarse aggregate was 80 pesetas ($1.74) per cubic meter, and concrete pavement was placed for 224 pesetas ($4.87) per cubic meter. However, for the 1956 paving program at Moron, the unit price for stockpiled coarse aggregate from the same contractor (only local source) had increased to 153 pesetas ($3.33)per cubic meter, and that for placing concrete of equal thickness by the same contractor had increased to 466 pesetas ($10.13) per cubic meter.

Recommendation

We recommend that future program presentations and budget justifications for offshore military construction be made on the basis of the total program with a full disclosure of accomplishments to date and current and future requirements for facilities, related costs incurred and estimated to be incurred, and phasing of the program for construction and financing. Appropriate revision of such presentations and authorizations could be made each year in consonance with progress of the program, cost experience, changes in mission, and similar factors affecting the program in order to provide full disclosure of the program and furnish data necessary for a complete program evaluation by the Congress, the Bureau of the Budget, and the Department of Defense.

If this method of program development and presentation were followed, authorization could be sought for the entire program, but appropriations would be requested only as needed; that is, only for payment of those line items or portions of line items necessary for the current year. This would enable the services to let construction contracts for units or groups of units at one time with greater economy than is possible with the piecemeal contracting now followed. The contracts would be written to show that funds had been appropriated for the work to be completed that year, and the remaining authorized portion of the work to be completed in future years would be subject to appropriations being made therefor by the Congress in its annual review.

ADMINISTRATION OF PHYSICAL CONSTRUCTION

With certain relatively minor exceptions, the physical construction of the bases generally was being performed on an effective and efficient basis despite unusual and adverse conditions which hamper orderly conduct of operations. Among these conditions are such things as the differences in Spanish construction methods and labor skills, complex Spanish labor laws and decrees, unfamiliar national customs, funding practices of the Air Force and the Navy, and changes of construction scope and specifications by the Air Force and the Navy. We did note, however, that the manner in which certain contracts had been negotiated and awarded resulted in increased costs and in construction delays.

Construction work is being performed under cost-plus-fixed-fee contracts (CPFF) with two joint ventures of American firms. Brown-Raymond-Walsh venture (BRW) manages the construction work; Architect-Engineers Spanish Bases venture (AESB) provides the architectural and engineering services. The contract with AESB was subsequently converted to a lump-sum contract as described below. Actual construction work is performed almost entirely by Spanish firms or Spanish-American joint ventures under subcontracts with BRW, the prime contractor for construction.

DISADVANTAGEOUS CONVERSION OF AESB CONTRACT FROM CPFF TO LUMP SUM

The contract for architectural and engineering services awarded to AESB as of October 20, 1953, was converted from a CPFF basis to a lump-sum basis on October 1, 1956. We believe that the

conversion may have resulted in a greater cost (about 242 thousand dollars) than would have been incurred under the original terms of the contract.

At the time of the conversion, approximately 86 percent of the work covered by the contract had been performed and about 14.7 million dollars of costs had been incurred. The cost of the work remaining to be performed was estimated by the contractor to be about 1.9 million dollars.

The contractor's proposal for the lump-sum contract was made in the amount of $2,443,177 supported by a cost breakdown of $1,943,177 to which $500,000 had been added to cover contingencies and profit. The Bureau of Yards and Docks, Department of the Navy, proposed a lump-sum price of $2,200,000. The amount agreed upon after negotiation was $2,350,000. This amount included, in effect, $406,823 to cover contingencies and profit, representing about 20 percent of the cost estimated by the contractor. The fee for the remaining work under the original terms of the contract would have been about 165 thousand dollars or about 242 thousand dollars less than the amount allowed in the lump-sum contract price for contingencies and profit.

Since the date of conversion of the contract, change orders have been issued which at June 30, 1957, had added about 396 thousand dollars to the contract.

One of the major considerations in conversion of a contract from a CPFF to a lump-sum basis is that the ordering agency has refined its plans to the extent that both parties can agree on the

specific work to be done and both parties have a basis for preparing reasonable cost estimates and negotiating an equitable lump-sum price. In this instance, it does not appear that the work contemplated in the converted contract was susceptible to a determination of a reasonable cost estimate as evidenced by the inclusion in the lump-sum price of a substantial amount for contingencies.

PREMATURE AWARD OF CONTRACT FOR PIPELINE

Additional costs were incurred and construction work was delayed because of poorly coordinated actions of AESB and the OICC in the award of a contract for pipeline construction.

The subcontractor, whose contract was approved in April 1955, was requested in the latter part of May 1955 to defer procurement of pipe-coating material pending revision of specifications. By that time, however, the subcontractor had placed orders for the material, had chartered a ship for transportation, and had made other commitments based on the original specifications. As a result, the subcontractor has claimed about 500 thousand dollars for costs incurred by reason of delay in construction and termination of contracts with his suppliers.

At the time of contract award to the subcontractor in April 1955, it was known to AESB that the specifications in the contract were not firm. On February 24, 1955, a consulting engineer suggested to AESB that a coal-tar pipe-coating material rather than an asphaltic-bitumen material be used in the pipeline. AESB agreed and stated on March 3, 1955, that the specifications would

be changed accordingly. Meanwhile, on February 25, 1955, specifications calling for either coal-tar or asphaltic-bitumen material had been released to prospective bidders. It was not until May 26, 1957, after the contract had been awarded on the basis of asphaltic-bitumen material, that AESB informed OICC of the change in specification and urged him to take immediate action to defer procurement.

Claims of the subcontractor include cancellation costs of ship charter ($28,817), labor costs during period of delay in construction ($38,000), and additional costs incurred because the delay extended his construction work into a period of bad weather ($436,000). The OICC has allowed the claim of $28,817 for ship-charter cancellation costs but has denied the claims based on construction delay.

The delay under this contract had an adverse effect on costs and progress of work in other areas of construction. For example, it became necessary to extend the contract period for radiographic inspection of pipeline welds and to provide additional handling and storage for about 6,000 tons of pipe at Cadiz.

NEGOTIATION PROCEDURES INFLUENCED BY FUNDS AVAILABLE

We noted an instance where negotiations to reduce the bid price, considered by the OICC to be too high, were dropped and the contract was awarded without further attempt to negotiate a more favorable price when it became known to the OICC that funds to cover the amount of the bid had been made available to him.

The responses to the first solicitation of bids for construction of facilities at Moron were rejected as being too high. The lowest bid in response to a second solicitation (26 million pesetas) was also considered too high in relation to the Brown-Raymond-Walsh cost estimate (21 million pesetas). The excess of bid price over cost estimate (5 million pesetas) represents about $109,000.

The OICC instructed the prime contractor to negotiate with the low bidder to effect a reduction in price. The prime contractor and the low bidder agreed to have their respective cost-estimating staffs meet for the purpose of identifying the areas of differences in their cost statements. However, two days later, before the cost-estimating staffs had had an opportunity to make their studies, the OICC authorized the prime contractor to award the contract in accordance with the bid price stating that he had received fund directives in sufficient amounts to cover the cost. The contract was awarded without further negotiations.

INCREASED COSTS OF CONSTRUCTION

Construction costs incurred or estimated to be incurred to complete the bases are substantially greater than the original estimates. Many factors which could not have been reasonably foreseen and which are beyond the control of the administrators of the SBCP have contributed to these increased costs. The more significant factors include (1) a wage-rate increase in all industries by decree of the Spanish Government, (2) greater proportion of materials purchased in the United States (about 67 percent through June 30, 1957) than was originally anticipated and lesser purchase in Spain which is considered a low-cost country, (3) unfamiliarity of the Spanish construction industry with American methods and the use of our equipment, and (4) changes in scope and specifications of planned construction work.

WAGE-RATE INCREASE BY SPANISH DECREE

The Spanish Government decree increasing labor rates was an important factor in increasing construction costs. In November 1956 the Spanish Government increased minimum wages by 55 percent in the construction industry. In addition, while basic hourly rates paid construction labor have remained comparable with Spanish industry, the construction prime contractor has had to offer liberal bonus and other fringe benefits because of the temporary nature of the employment.

The initial estimates of SBCP costs were based on national average costs in the United States as of November 1951. Because Spain was considered to be a low-cost labor country, Air Force

estimates of costs and authorization requests were made on the basis of 80 percent of the 1951 United States prices; Navy estimates were on the basis of 100 percent. It was not until fiscal years 1955 and 1956, however, that construction contracts were awarded for the facilities. The awarded contracts revealed that these factors were too low and that costs were approximately 120 percent of United States costs.

GREAT PORTION OF PURCHASES IN UNITED STATES

Changes in the sources from which materials are being procured also increased costs. In addition, world-wide prices of construction materials have increased by over 10 percent during the construction period. When the program was initially planned, it was contemplated that all the construction materials readily obtainable would be procured in Spain. However, only about 4 percent of these materials have been obtainable in Spain; the remainder have been imported principally from the United States (about 67 percent), resulting in considerably increased transportation and material costs. Also, because the Spanish Government has insisted that the United States retain physical control of all materials procured tax-free or imported duty-free, the prime contractor has been required to establish and operate warehousing facilities not originally contemplated. At present, the prime contractor maintains physical custody of this material until issued to the subcontractor for incorporation in the construction work.

UNFAMILIARITY OF SPANISH INDUSTRY
WITH AMERICAN METHODS AND EQUIPMENT

Because the Spanish construction industry is not familiar with American heavy equipment nor with the United States specifications, it has been necessary to bring high salaried technical personnel from the United States to train Spanish personnel and, in some instances, to perform the actual work. In the case of architectural and engineering services, it was necessary to increase the number of United States personnel from 25 originally contemplated as being required to 250 actually required. Increased staffing of inspection personnel of the prime contractor was also found to be necessary to assist and train personnel of subcontractors.

CHANGES IN PLANS

The originally planned missions and facility requirements for the bases which comprise the SBCP have undergone significant revisions during the progress of the program. Some of the revisions represented additions to the original plans and to original cost estimates. Other revisions represented alternative plans after construction work had begun and costs had been incurred under the original plans. These factors have contributed to increased costs.

We have discussed some of the more significant revisions in plans on page 10 (Planning of Program). Other revisions of plans and specifications which have tended to increase costs include:

1. Water supply. It was contemplated that water would be supplied by on-base wells. In most instances it has been found

necessary to draw water from rivers and to construct water purification and distribution systems at additional cost.

2. Power supply. It was contemplated that power would be obtained from Spanish commercial sources and that power equipment required to be constructed would be limited to stand-by power units and power converters. This was not found to be feasible, and it became necessary to construct power stations at increased cost.

STATUS OF PROGRAM

The scope and size of the Spanish Base Construction Program are determined principally through the enactment of military construction authorization acts and military construction appropriations. Other legislation, not always requiring direct appropriations, has added additional scope to the work.

PROJECTED PROBABLE COST OF PROGRAM

At June 30, 1957, the projected probable cost of the program, based upon authorizations through the fiscal year 1958 program and estimates of future work, was $438,538,000 as shown in the following tabulation.

	Total	Air Force	Navy
	(000 omitted)		
Military construction authorizations	$370,557	$249,844	$120,713
Military construction design costs	6,622	6,000	622
Community facilities	9,271	6,773	2,498
Allocation of general authority for family housing in foreign countries	19,482	15,149	4,333
Total authorizations to date	405,932	277,766	128,166
Estimated future authorization required to complete bases	32,606[a]	10,000	22,606
Total probable projected costs	$438,538	$287,766	$150,772

[a]These amounts are not based on firm planning information but were the best estimates available when secured and are subject to considerable change.

In addition to the above, an undetermined amount of support will be required for the procurement of equipment for the bases. Amounts of 1.4 million dollars for the Navy and 34.6 million dollars for the Air Force have been identified for this purpose. Of the latter amount, approximately 20 million dollars is for the

purchase and installation of communication equipment by the Compania Telefonica Nacional de Espana (CTNE) under a long-term contract. CTNE is to repay this cost over the life of the contract through credits to the Air Force against monthly charges for communications. The Air Force informed us that the balance of approximately 15 million dollars for equipment costs is very low and that the development of a more meaningful estimate was an extremely difficult and time-consuming task because of the dispersal of the procurement function.

SOURCES OF FINANCING

Funds to finance the program come from many sources including (1) dollar appropriations for base and off-base military construction, (2) dollar funds from appropriations other than for military construction, which are available for procurement of collateral equipment required for facilities constructed, and (3) pesetas generated by economic and technical aid programs and available, in lieu of dollar appropriations, for military construction, for construction or leasing of family housing, and for construction of community facilities. About $410,699,000 has been or is expected to be made available from authorized sources leaving a balance of $27,839,000 needed to complete the program as shown by the following table.

	Total	Air Force	Navy
	(000 omitted)		
Projected probable cost of construction program	$438,538	$287,766	$150,772
Sources of funds:			
Allocations to date from military construction appropriations	269,229	181,788	87,441
Pesetas provided in lieu of military construction appropriations	112,717	77,774	34,943
Pesetas provided for family housing	19,482	15,149	4,333
Pesetas provided for community facilities	9,271	6,773	2,498
Total funds expected to be available	410,699	281,484	129,215
Indicated additional financing required	$ 27,839	$ 6,282	$ 21,557

Note: In fiscal year 1958 the Navy requested military construction funds of 5.2 million dollars; the Air Force requested none. Information is not readily available as to what funds, if any, may have been requested for equipment and facilities for Spain under other appropriations.

As shown in the preceding tabulation, a considerable portion of the construction costs of the Spanish bases is being financed with pesetas generated from several sources, thereby reducing the amount of dollars needed to be appropriated for military construction by the United States Congress. The origin of these pesetas is as follows:

1. Pesetas provided in lieu of military construction appropriations. The Economic Aid Agreement between the United States and Spain, signed on September 23, 1953, provides that a portion of the local currency generated in Spain unde the Economic Aid program will be made available to the United States for use either in

constructing the bases or in maintaining them after they are built. At June 30, 1957, approximately 3,697 million pesetas, at a dollar equivalent of 82.9 million, had been generated and made available for the military construction program. An additional 1,362 million pesetas is expected to be generated by activities of the Economic Aid program in fiscal year 1957, bringing to a total of 5,059 million pesetas, or a dollar equivalent of 112.7 million, for use in the construction program at June 30, 1957. Construction costs totaling $50,828,000 have been paid from these pesetas.

2. Pesetas to be provided for family housing. Section 407 of Public Law 765, Eighty-third Congress, authorized the Secretary of Defense, subject to the approval of the Director of the Bureau of the Budget, to construct, or acquire by lease or otherwise, family housing, in addition to family housing otherwise authorized to be constructed or acquired by the Department of Defense in foreign countries, up to the value of $25,000,000 through use of foreign currencies in accordance with the provisions of the Agricultural Trade Development and Assistance Act of 1954. These monies are required to be repaid to the Commodity Credit Corporation from appropriations otherwise available for the payment of quarters allowances for military personnel. At June 30, 1957, a total of $19,482,000 had been authorized for use in Spain under this authority.

3. Pesetas to be provided for community facilities. The Mutual Security Appropriation Act, 1955, authorizes the United States to use pesetas equivalent to approximately $11,000,000 derived from sales of surplus agricultural products in Spain. The

purposes for which the pesetas are to be used are not specified in the act. Present Service plans are to use this authority to construct community facilities. At June 30, 1957, a total of $9,271,000 had been authorized to the Air Force and the Navy under this authority.

STATUS OF PHYSICAL CONSTRUCTION

Construction of the air bases has reached the stage at which emergency operations are now feasible. The runways, taxiways, and aprons, which are the key facilities from both an operational and a construction viewpoint, have been virtually completed. A petroleum pipeline, running from Rota in the southwestern section of Spain to Zaragoza in the northeastern section, has also been completed. Because of changes in plans, however, the runway at Moron will be widened and the runway at Rota will be lengthened, thereby curtailing use of these facilities during the additional construction period.

At the beginning of the construction program, the Air Force estimated that about 4 years would be required to complete the bases. Actual construction began in September 1954, one year after signing of the agreements with Spain. Thus, the projected time of completion is the fall of 1958.

The Chief of JUSMG and the OICC expect that, with the exception of certain key harbor facilities at Rota, the original estimated completion date for the major facilities will be met, since over-all construction is now estimated to be about three-quarters complete. Certain of the smaller facilities, such as the magazine facilities at El Ferrol and Cartagena, will be completed early in

1959. The Reus airstrip and the fuel storage facilities at El Ferrol and Cartagena will not be completed until 1959 or 1960.

Firm completion dates were not established for the individual bases, although beneficial occupancy dates (BOD's) were established for each line item constructed. Dates of operational capability, such as emergency, limited, and full operations, are based on the beneficial occupancy dates.

There were insufficient experience data available when the initial beneficial occupancy dates were estimated to establish firm target dates. As a consequence, beneficial occupancy dates established for many line items have slipped considerably. During the early stages of construction, the slippage did not have serious effect. As construction progresses, the beneficial occupancy dates take on more importance, since operational plans and personnel and material build-up in Spain are predicated on the beneficial occupancy dates. Requisitions for personnel must be placed 6 months in advance of the required arrival date. Requisitions for material and equipment are placed a year in advance with final notice to either ship or delay shipment required to be given 5 months before the required on-site date.

The slippage in the beneficial occupancy dates is caused by many factors. These included the change in mission at San Pablo; changes in scope at San Pablo, Moron, and Rota; change in specifications for the pipeline; delay in developing the final design for runways at Torrejon which also affected runways at other bases; and unfamiliarity of Spanish labor with American construction equipment and methods of construction. Bad weather during the winter of 1955-56 also contributed to construction delays.

The initial estimates as to the volume of design and construction work that could be accomplished in a stated period of time were optimistic. The estimates were based on design and construction experience in the United States and were incorporated as conditions in the lump-sum contracts awarded to the Spanish construction firms. As a result, a number of the subcontractors could not meet contract completion dates. Insofar as we could determine, JUSMG, the OICC, and the prime contractors have exerted every effort to expedite completion of the construction program. In order to avoid disruption of Spanish-American contractor relationships, terminations of contracts for default and recourse to performance bonds have been avoided. In a few instances, where subcontractors would be normally dropped for failing to meet contract commitments, subcontractors have been allowed to remain on the job and have, in effect, been penalized by not being allowed to take on additional work.

A brief description of the status of construction at August 22, 1957, of each major project follows.

Rota

It is intended that Rota provide facilities for a naval air station, fuel depot, and ordnance activity. The estimated cost of the work authorized for construction at August 22, 1957, was about 93.1 million dollars.

The airfield pavement and some troop housing including family units were completed at the time of our examination. There are plans, however, to extend the runway. Use of the runway will be curtailed during the first half of 1958 while the additional work

is being performed. Most of the remaining facilities at the air station and the magazine items are scheduled for completion by about mid-1958. Construction of the POL pier is scheduled for usable completion by May 1958. The marginal wharf, breakwater, and dredging operations are behind schedule and are expected to be completed in the latter part of 1959.

Torrejon

It is intended that Torrejon provide facilities for Strategic Air Command medium bombers or reconnaissance aircraft and air tankers, day fighters, rescue aircraft, and Military Air Transport Service (MATS) aircraft. At August 22, 1957, the estimated cost of the work under construction was about 67.7 million dollars.

The runway, taxiway, apron, on-base POL tankage, and fuel hydrants are substantially complete. Troop housing for about 400 airmen is available and units of the 16th Air Force moved to Torrejon in September 1957. Construction of the remainder of the barracks and the off-base family housing is behind schedule and is not expected to be fully completed until the last half of 1958. All line items programed through fiscal year 1957 are expected to be completed by December 1958.

Zaragoza

It is intended that Zaragoza provide facilities for SAC medium bombers, refueling tankers, and fighter and fighter interceptor aircraft. The air base consists of two sections, Sanjurjo and Valenzuela. Sanjurjo, which was an existing Spanish civil airport, had a runway which was overlaid and strengthened. A new runway was constructed on the Valenzuela portion of the air base. At

August 22, 1957, the estimated cost of the work under construction was about 38.1 million dollars.

The runways, taxiways, aprons (portion at Valenzuela), and aviation fuel tanks are completed. Troop housing and messing facilities on the base are completed, but the off-base family housing project is behind schedule and is not expected to be fully completed before the last half of 1958. All line items programed through fiscal year 1957 are expected to be substantially completed by mid-1958.

Moron

It is intended that Moron provide facilities for SAC bomber reconnaissance and/or refueling aircraft and fighter interceptor aircraft. The estimated cost of the line items under construction at August 22, 1957, was 36.6 million dollars.

The runway, taxiways, POL storage, and some fuel hydrants were virtually completed at the time of our examination. The runway, however, is being widened and is not expected to be fully completed until the first half of 1958. The parking apron was under construction at the time of our examination and was expected to be completed about December 1957. All other line items programed through June 30, 1957, are expected to be completed by about August 1958. Family housing units being built in Sevilla, about 25 miles from the base, are expected to be completed during the first half of 1958.

San Pablo

It is intended that San Pablo provide support for other Air Force units in Spain. A concrete apron had been contracted for

before the decision was made to eliminate the AMC depot operation scheduled for San Pablo. Other than some fuel storage tanks and interim communications facilities, the majority of the line items at San Pablo are scheduled for completion by September 1958. The estimated cost of line items programed was 8.5 million dollars at August 22, 1957.

El Ferrol and Cartagena

Fuel storage and naval magazine facilities will be constructed at both El Ferrol and Cartagena. The magazine items are expected to be completed early in 1959, and the fuel storage facilities are expected to be completed about 1 year later.

At El Ferrol the subcontractor's price based on the original design was considered to be excessive. All the fuel annex line items were then redesigned to make use of the full capacity of existing tunnels for storage and new prices were negotiated with the subcontractor. The original design for storage of liquid fuels in the tunnels at El Ferrol did not contemplate storage of liquid to the tunnel crowns. Subsequent to the completion of the original design and award of the subcontract, this design feature was reconsidered. It was determined that substantial time and money could be saved by storing liquid to the crown. The change basically reduced the amount of tunnel excavation required. In April 1956, it was decided to change the design. At that time, the subcontractor was given the excavation requirements in order that he could keep his forces beneficially engaged until the final designs could be delivered. The design changes were completed on January 4, 1957. The amount of savings was estimated at approximately

$5[illegible],000. The OICC advises that the estimated saving in time has not been realized because of the dilatory activity of the subcontractor in carrying out his work.

At August 22, 1957, the estimated cost of work authorized for construction was 13.9 million dollars at El Ferrol and 11.3 million dollars at Cartagena.

Petroleum, oils and lubricants, pipeline

The POL pipeline was completed and final tests were being conducted at the time of our examination. Additional bulk storage facilities were expected to be completed by August 1958. The estimated cost of the construction programed through August 22, 1957, was about 45.5 million dollars.

Generally, the pipeline construction appears to have pro-[illegible]essed satisfactorily. However, the change in specifications for pipeline-coating material delayed the start of construction for about 2 months. Because of the additional costs incurred by reason of the change in specifications, the subcontractor has filed a number of claims as detailed in another section of this report. (See p. 29.)

APPENDIX

PRINCIPAL BASES AND FACILITIES COMPRISING THE SPANISH BASE CONSTRUCTION PROGRAM

(Reprint from special Spain issue of U.S. Navy Civil Engineer Corps bulletin, July 1957)