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Need To Evaluate The Continued Application Of Contractor Quality Control To Civil Works Construction

B-118634

Corps of Engineers (Civil Functions)
Department of the Army

B-118634

UNITED STATES
GENERAL ACCOUNTING OFFICE

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JUNE 27, 1972



UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

RESOURCES AND ECONOMIC
DEVELOPMENT DIVISION

B-118634

Dear Mr. Secretary:

This is our report on the need to evaluate the continued application of contractor quality control to civil works construction. Our findings, conclusions, and recommendations are summarized in the digest of the report.

Copies of this report are being sent to the Chairmen of the House and Senate Committees on Government Operations and the House and Senate Committees on Appropriations and to the Director, Office of Management and Budget.

Sincerely yours,

Henry Eschwege

Director, Resources and
Economic Development
Division

The Honorable
The Secretary of Defense

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ABBREVIATIONS

| | |
|------|-------------------------------------------|
| AGC | Associated General Contractors of America |
| ASPR | Armed Services Procurement Regulation |
| CQC | contractor quality control |
| DOD | Department of Defense |
| GAO | General Accounting Office |
| GSA | General Services Administration |

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D I G E S T

WHY THE REVIEW WAS MADE

To comply with the Armed Services Procurement Regulations, the Corps of Engineers established a contractor quality control (CQC) program in 1966. This program required construction contractors to assume greater responsibility for inspecting and testing their work.

Traditionally, the Corps relied chiefly on its own supervision, inspection, and testing to determine the quality of construction of major civil works projects, such as earth and concrete dams and navigation locks. Federal investment in such projects is extensive, and project failure could mean catastrophic loss of life and property.

The CQC program caused considerable controversy within the Corps and the construction industry. Opponents voiced concern over the possible increase in cost from duplicate inspection and the possible lack of objectivity by contractor inspectors and said that the program should not be applied to construction contracts. (See pp. 5 and 6.)

GAO undertook this review to determine whether CQC was being applied successfully to civil works construction projects.

FINDINGS AND CONCLUSIONS

GAO examined into the application of the CQC program on civil works projects and concluded that the program, as implemented by the Corps, was not effectively achieving its objectives of improved quality construction at less cost. The CQC program was designed to make contractors more responsible for their own work by requiring that they maintain an adequate inspection system and perform necessary inspections to ensure compliance with contract requirements. The Corps, however, generally continued to inspect, as it always had, and maintained inspection organizations and testing facilities which duplicated those required of the contractors.

This duplication of effort resulted from a reluctance on the part of Corps field office officials to rely on the CQC program and a belief that contractor inspectors were not sufficiently independent and objective to ensure that the work would be completed in accordance with contract requirements. (See pp. 10 to 14.)

An inspection of the CQC program during fiscal year 1970 by the Corps Engineer Inspector General showed generally that the anticipated program

benefits were not being realized. This inspection covered nine of the Corps' 37 district offices. (See p. 7.)

In instructions issued to Corps inspectors, the Chief of Engineers indicated that problems with earthwork construction and structural steel welding at some Corps projects resulted from placing increased reliance on the CQC program. The instructions required increased surveillance on major civil works construction projects. (See p. 8.)

Except for the Department of Defense, other Federal agencies have not applied a CQC program to their construction activities. The General Services Administration and the Bureau of Reclamation of the Department of the Interior advised GAO that they would be reluctant to adopt the program and indicated their concern as to whether contractor-employed inspectors would be sufficiently objective to protect the Government's interest. (See p. 15.)

Organizations such as the Associated General Contractors and the Reclamation Board of the State of California expressed their views that CQC was not as readily adaptable to construction as to other procurement activities. (See pp. 15 to 17.)

Because of the problems noted in the implementation of the CQC program, GAO believes that an evaluation should be made to determine the extent to which the program should be applied to civil works construction and the extent to which the Federal inspection role should be modified to achieve quality construction at less cost.

RECOMMENDATIONS OR SUGGESTIONS

GAO recommends that the Secretary of Defense require that a comprehensive study be undertaken to evaluate the effectiveness of the CQC program as applied by the Corps to civil works construction. In determining the general suitability of the program to civil works construction, the study should consider what the role of the Government inspector should be and whether or not the program should be applied on a more selective basis.

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CHAPTER 1

APPLICABILITY OF CQC TO CIVIL WORKS CONSTRUCTION

The responsibilities of the Corps of Engineers include both civil and military functions within the Department of the Army. The Corps' civil works program includes construction, regulation, and maintenance of navigation, flood control, and multiple-purpose projects. The cost of construction, operation, and maintenance for the civil works program has averaged about \$1.4 billion annually during the past 5 years.

In 1966 the Corps adopted a contractor quality control (CQC) program which required construction contractors to assume responsibility for some of the inspection and testing that was formerly done by the Corps.

The application of CQC to civil works construction activities represents a significant departure from traditional procedures employed by the Corps and other Federal agencies to provide assurance that the construction quality specified in contracts is obtained.

On the basis of our review, we conclude that the CQC program, as implemented by the Corps, did not effectively achieve its objectives of improved quality construction and a reduction in inspection costs.

Contractors on five Corps projects included about \$1.6 million in their bids for CQC activities required by the construction contracts. We examined the manner in which the CQC program was applied on three of these projects and found that Corps field office officials were reluctant to rely on the program and maintained inspection organizations and testing facilities which duplicated those required of the contractors because they believed that contractor inspectors were not sufficiently independent and objective to ensure that the work would be completed in accordance with contract requirements.

Other major Federal construction agencies which have not adopted a CQC program have raised questions regarding

its merit and have taken the position that inspection and testing must be performed by the responsible Federal agency to protect the Government's interest. Their view has been that contractor inspectors cannot be expected to maintain an independent and objective attitude since they are paid by, and report to, the contractor.

CIRCUMSTANCES LEADING TO
CORPS' ADOPTION OF CQC

Prior to 1966 the Corps relied principally on its own supervision, inspection, and testing to ensure the quality of construction of major civil works projects, such as earth and concrete dams and navigation locks, where the Federal investment was extensive and where project failure could mean catastrophic loss of life and property. Corps records show that this traditional practice usually provided (1) supervision and detailed inspection coverage during construction, or "preventative" rather than only "corrective" inspection, and (2) complete field quality control testing by the project laboratory. The records indicate that this practice resulted in a high degree of quality assurance.

In 1954 the Department of Defense (DOD) issued a directive requiring CQC on certain supply and development contracts, and this directive was incorporated into DOD's Armed Services Procurement Regulation (ASPR). In 1961 the ASPR requirement was broadened to include construction contracts. The requirement, which was to be included in all fixed-price construction contracts over \$10,000, stated:

"The Contractor shall (i) maintain an adequate inspection system and perform such inspections as will assure that the work performed under the contract conforms to contract requirements, and (ii) maintain and make available to the Government adequate records of such inspections."

DOD officials advised us that certain long-range benefits were anticipated as a result of the ASPR clause, including better quality construction, eventual reduction of inspection by Government agencies, and better communication and working atmosphere between the agency and the contractor.

In developing the CQC requirement, the ASPR Committee consulted with the General Services Administration (GSA) because GSA had the responsibility of developing Federal Procurement Regulations for civil agencies' procurement activities, including construction contract requirements and provisions.

GSA declined to include the CQC requirement in the Federal Procurement Regulations. It took a "wait and see" attitude, stating that it wanted the benefit of DOD's experience with the requirement before adopting it. The Federal Procurement Regulations do not require that construction contracts contain a clause requiring inspection by the contractor.

Initial opposition to CQC

From November 1961 to December 1966, no formal guidance was issued within the Corps to implement the ASPR requirement for CQC. During this 5-year period considerable controversy regarding the requirement took place within the Corps and the construction industry.

Within the Corps, opinion was divided between the Military Construction and the Civil Works Directorates. In a 1965 memo, the Corps' Military Construction Directorate stated that it could reduce supervision and administration costs without reducing the quality of the finished product by careful supervision of the contractor's inspection system. The Directorate also stated that, if the contractor were made more responsible for the quality of its own work, the number of claims for correction of deficiencies would be reduced.

In contrast, the Civil Works Directorate took the position that the majority of its work--particularly items such as dams, locks, and spillways--was of such a nature that Government inspection of all construction phases was mandatory. It was characteristic of these structures that, once a portion had been completed, it would be very difficult to inspect or test the structure at a later time. Further, failure of structures of this type could be disastrous. For these reasons the Civil Works Directorate contended that each step of construction, from foundation preparation through laboratory testing to construction of the component parts,

must be under the direct surveillance of Government inspectors. The Directorate agreed that some quality control of materials and operations by the contractor was necessary in carrying out its responsibility but stated that it would be wasteful duplication to require the contractor to maintain a separate inspection staff on work which required daily Government inspection.

The Associated General Contractors of America (AGC) advised the Chief of Engineers of its objections to the contractor inspection requirement because (1) the requirement would increase costs to the Government through duplicate inspection and (2) a separate contractor inspection staff was not conducive to job harmony because no employee should be asked to make a decision, particularly in borderline instances, when his company stood to lose both time and money as a result of an adverse decision. AGC stated:

"The Contractor has always been responsible under the terms of the contract for the quality of his work and for conformity with the plans and specifications. The 'Contractor Inspection' requirement is not going to change anything in this respect or produce higher quality work. *** If the contractor inspection clause is aimed at those few contractors who may be inclined to 'cut corners' to the detriment of the work, we cannot see that this requirement will bring about any cessation of such practices. The only cure for this is more alert Government inspection."

AGC also tried to convince the ASPR Committee that the clause should not be applied to construction contracts, but they were unsuccessful.

In a June 1966 meeting, the Chief of Engineers directed that a regulation covering both military and civil works construction be prepared to implement the ASPR clause. The stated goal of the engineering regulation (ER 1180-1-6, Dec. 1, 1966) was to improve the quality of construction by requiring construction contractors to assume greater responsibility for inspection and testing of their work. The regulation stated that the long-range result might be fewer Government inspection positions, which could be filled by better qualified people at higher grades.

EVALUATION OF CQC PROGRAM BY
THE CORPS INSPECTOR GENERAL

Corps regulations state that CQC should make the contractor more aware of his responsibilities and should result in two principal benefits to the Government--improved quality of construction and a reduction in the number of Corps inspectors needed to protect the Government's interests.

During fiscal year 1970 the Engineer Inspector General conducted a study of CQC because inspections indicated that the program was not functioning properly. The study covered nine of the Corps' 37 districts in the continental United States. Several of the questions asked by the Inspector General appear particularly pertinent to an evaluation of the program's value.

1. Do the districts feel that construction quality actually is increased by the CQC program?
2. Do the districts feel that less Government inspection will be required as a result of CQC?
3. Do (contractor) reports include records of inspections and tests performed with results and notations on corrective action, where needed?

Specific responses to the questions were not made by two districts. One reported only limited application of CQC, and the other reported that CQC had been effective in general. The comments in the reports for the remaining seven are summarized, as follows:

- Improvement in quality due to CQC: four reported none, one reported little evidence of improvement, and two reported some improvement but less than desired.
- Possibility of reduced Government inspection as a result of CQC: three reported less inspection could not be permitted, three indicated reduction might occur eventually, and one stated reduction could result when a separate CQC organization was fully implemented.

--Completeness of contractor inspection reports: three indicated that reports received were inadequate, three indicated reports were adequate, and one stated that improvement was needed.

Thus, the majority of the reports indicated that the CQC program had not resulted in improved quality of construction or a reduction in Government inspection and that the reporting of inspection results by the contractor needed improvement.

CORPS INSTRUCTIONS REGARDING
APPLICABILITY OF CQC PROGRAM

Corps instructions regarding the CQC program indicated that only limited reliance could be placed on CQC for ensuring construction quality and emphasized the need for increased surveillance on major civil works construction projects by Corps inspectors.

In May 1970 the Corps Chief of Engineers issued instructions that required continuous Government inspection of all operations relating to earthwork construction because of problems which had occurred at several earth dams under construction. He stated that emphasis on CQC practices and concern with Government costs might have resulted in a substantial and hazardous reduction in Government inspection practices at some projects. He stated also that the instruction

"*** also applied in principle to many other civil works operations, with special emphasis on those projects where potential loss of life or property is involved. *** A safe project, built in compliance with the plans and specifications, is the paramount objective of our construction operations and only adequate Government inspection can furnish assurance that this objective has been reached."
(Underscoring supplied.)

In September 1970 the Chief of Engineers issued an instruction which emphasized the requirement for Government inspection of structural steel elements fabricated by welding.

The stated reason for this instruction was the safeguarding of the Government's interests by ensuring that defective work or materials would not be incorporated in the construction. The instruction also stated that recent instances of defective welding had been attributed to reduced visual inspection by Government inspectors in the shop and in the field and that the contract requirement for inspection by the contractor did not relieve the Corps Contracting Officer from performing necessary and adequate inspections.

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GAO'S REVIEW OF CQC PROGRAM
FOR SELECTED PROJECTS

To examine into the effectiveness of the CQC program, we reviewed its implementation on five selected major civil works construction projects in the Corps' North Pacific Division, for which the contractor was required to establish quality control organizations for inspecting and testing all work phases. In addition to obtaining general information on the projects, we visited three of them to review program implementation in more detail.

Contractor officials for each of the five projects advised us of the approximate amounts, as shown in the following table, that they had included in their bids to cover the costs of implementing the CQC requirements in the contracts.

| <u>Contractor</u> | <u>Approximate contract price</u> | <u>Approximate amount for CQC</u> |
|-------------------|-----------------------------------|-----------------------------------|
| A | \$ 15,224,000 | \$ 200,000 |
| B | 9,120,000 | 90,000 |
| C | 17,498,000 | 438,000 |
| D | 13,318,000 | 88,000 |
| E | <u>105,203,000</u> | <u>816,000</u> |
| Total | <u>\$160,363,000</u> | <u>\$1,632,000</u> |

Our detailed review of the three projects showed that there was a duplication of inspecting and testing activities by the Corps and the contractors, particularly in those areas where the acceptability of the construction was based primarily on engineering judgment rather than laboratory testing or other more objective determinations. Corps field office officials were reluctant to rely on the judgment of contractor inspectors. They advised us that the quality of construction would probably be reduced if greater reliance were placed on CQC. Although it was the general consensus of field officials that laboratory testing activities were more amenable to CQC than construction inspection activities, we found that duplicate Corps and contractor testing laboratories were provided at each of the three sites.

Our findings at each project are discussed below.

The Dalles Dam Powerhouse

The contract for this project required the contractor to provide a quality control organization including, but not limited to, three registered professional engineers (an electrical, a mechanical, and a civil or structural engineer) or the equivalent. The contract included a listing of the minimum inspection and testing to be performed by the contractor on each item of work.

At the time of our visit to the project, the contractor had filled the civil and mechanical engineer positions and had employed the services of a laboratory technician from a commercial testing laboratory to conduct required tests of soils and concrete. The work had not progressed to the point where the electrical engineer's services were required. The Corps had a staff of 10 field inspectors, including one laboratory technician, and had requested two additional inspectors. Both the Corps and contractor laboratories were equipped with identical equipment except that the Corps laboratory had equipment for making strength tests of concrete samples.

Corps officials at the site stated that they would need the same number of inspectors, except for an additional laboratory technician, if CQC were not required and that the Corps inspectors were doing essentially the same type of inspection and testing that they had done without CQC. They stated that there was a duplication of Corps and contractor inspection on the project but that greater reliance could not be placed on CQC because the CQC personnel were not fully independent. In their opinion, the acceptability of many construction items involved engineering judgment rather than being susceptible to measurement in specific terms. They considered CQC more appropriate for items suitable for laboratory testing activities because acceptability of such items was not subject to judgment.

Contractor employees stated that the Corps essentially was duplicating the inspection and testing done by CQC personnel. They added that the Corps was reluctant to rely on the contractor's inspections.

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Lost Creek Fish Hatchery

CQC personnel requirements for this project were an electrical engineer, a mechanical engineer, and a civil or structural engineer plus a full-time CQC program manager and a laboratory technician. In addition to providing a testing laboratory for its own use, the contractor was required to construct a laboratory for use by the Government.

At the time of our review, the contractor had employed a full-time CQC program manager, a laboratory technician, and an inspector for concrete form work. The Corps had a staff of four field inspectors including one laboratory technician. The duplication of laboratory facilities was eliminated in December 1970 when the contract was modified eliminating the requirement that the contractor provide his own laboratory and permitting the contractor to share in the use of the Government's laboratory.

Corps officials at the site agreed that some duplication existed in inspection activities but stated that some reliance was being placed on CQC due to a shortage of Corps inspectors. They advised us that from one to three additional Corps inspectors would be needed if CQC were not required.

Corps officials took the position that additional reliance could not be placed on CQC because the CQC personnel were not fully independent. They stated that the contractor's primary interest was production.

Project correspondence files indicated that the contractor's CQC efforts had not been completely effective and that Corps inspectors continued to note contract deficiencies, such as excessive grout leaks, rough finishes, defective joints, and abrupt irregularities.

The contractor's project manager advised us that he was opposed to the idea of CQC and stated that he felt that the costs to the Government would exceed the benefits. In his opinion, the Corps should do all inspection and testing because (1) the contractor does not want the responsibility and (2) the Corps already is staffed for this purpose whereas most contractors are not and experienced CQC personnel are difficult to find.

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Dworshak Dam Powerhouse

The Powerhouse contract required the contractor to provide a quality control organization consisting of (1) not less than one full-time employee whose sole responsibility was to ensure compliance with the contract plans and specifications and (2) other quality control personnel as might be necessary at the Powerhouse site and in suppliers' mills and the contractor's or subcontractors' shops.

At the time of our review, the contractor had three men employed full-time on CQC, one of whom had overall responsibility for the program. The Corps had a staff of seven inspectors assigned to the Powerhouse project, including a general engineer with overall responsibility, a supervisory civil engineer, three full-time construction inspectors, and two part-time electrical inspectors.

Under the contract both the Corps and the contractor were to have laboratories at the site for soil and concrete testing. The contractor proposed that the Corps do all testing for the Powerhouse contract because the Corps was doing all the testing on the main dam contract. This would eliminate the potential duplication of concrete test laboratories, personnel, and equipment. The Corps agreed to the contractor's proposal.

Corps inspectors stated that there was a duplication of inspecting by the Corps and the contractor. In many cases Corps and CQC personnel worked together, inspecting the work and measuring quantities of material incorporated into the structure.

Corps officials contend that they must inspect as usual to adequately protect the Government's interests. Although laboratory testing activities were generally subject to CQC because test results were objectively determined, many construction activities must be inspected as performed and their acceptability was often subject to judgment. Corps officials expressed a general reluctance to rely on the judgment of CQC personnel because they were paid by the contractor and reported to the contractor's project manager. A contractor's project manager was primarily concerned with production and not quality control.

Contractor officials at the site stated that there was an almost complete duplication of inspection by Corps and CQC personnel. They stated that the Corps was inspecting as it had done in the past and did not rely on CQC. Although the officials stated that they were production oriented, they added that they also must be concerned with quality control because, if the work was defective, it would require correction at the contractor's expense. They indicated that CQC had enabled them to identify and correct deficiencies prior to Corps inspection and that most deficiencies cited by the Corps were insignificant and purely judgmental matters.

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VIEWS OF OTHER FEDERAL AND
NON-FEDERAL AGENCIES ON CQC

Except for DOD, Federal agencies responsible for the administration of major construction programs have not applied a CQC program to their construction activities. The Corps and the Naval Facilities Engineering Command are the designated construction agencies of DOD. As such, they are responsible for the award and administration of construction contracts for the Army, the Navy, and other DOD organizations, in accordance with ASPR requirements.

Officials of GSA and the Bureau of Reclamation of the Department of the Interior advised us that they would be reluctant to implement a CQC program because of concern over the objectivity of contractor-employed inspectors.

GSA officials stated that, in addition to the question of objectivity, there was a question of whether the costs associated with administration of the program and duplication of testing would exceed the value associated with increased quality of the work. They stated that GSA had no plans to adopt a CQC program.

The Bureau's Chief Engineer advised us that it was Bureau policy to require that construction inspection be performed by the Government. The Bureau had no plans to require inspection by the contractors.

An official of AGC advised us that AGC was opposed to the Corps' adoption of the CQC program for a number of reasons, including: (1) CQC was a procurement-oriented program and not readily adaptable to construction, (2) the Corps was not specific regarding program goals or the contractor's role, (3) it was unreasonable to expect the contractor to build more quality into a project than was specified in the contract, and (4) by requiring specific tests with specially trained men to perform them, the Corps was involving itself in the management of the contractor's organization. He stated that these problems still existed and that the AGC did not endorse the program.

The Reclamation Board of the State of California, which was established in 1911 to develop and implement a plan for

the control of floods along the Sacramento and San Joaquin Rivers in cooperation with the Corps of Engineers, objected to the contractor self-inspection policy in an April 1970 letter to the Corps' Sacramento District Engineer. The letter stated in part:

"There is much evidence that it originated in the Space Program, which generally involved contracts wherein the specifications were geared to two major categories--quality of materials and performance. In other words, prior to acceptance of the completed product, both the materials and the performance could be checked out in as much detail as desired. This type of situation lent itself somewhat to the policy of quality control by the contractor through the various intermediate stages of construction, as the contractor realized that the owner could reject or accept the completed product on the basis of performance and could even sample and test most of the materials in the completed product.

"There are other types of construction, however, in which it simply is not feasible nor practical to inspect the completed product in all aspects. Examples of these would be a concrete structure, a roadway embankment or a levee. This was realized many years ago by both State and federal agencies and finally resulted in adding another ingredient to the requirements for quality of materials and performance, namely the method by which a contractor will work to achieve the end result. In other words, hard experience has dictated that in certain areas, the desired final product can only be attained with certain specified techniques using certain specified equipment.

"In summary, the new policy is almost certain to result in poorer quality of work, a decrease in uniformity and little or no savings in cost. I would recommend not only abandonment of the present federal policy of self inspection, but renewed efforts to obtain the staff and funds necessary to provide inspection coverage for every hour that

each contractor works on all levee and channel contracts."

Federal Construction Council report

The Federal Construction Council, a standing committee of the Building Research Advisory Board, serves as a planning, coordinating, and operating body to encourage continuing cooperation among Federal agencies in advancing the science and technology of Federal Government building and construction activities.

A 1968 report of the Federal Construction Council on Supervision and Inspection of Federal Construction concluded that (1) the needs and interests of the Government are best served when regular Government employees of the construction agency supervise and inspect Government construction projects and (2) agencies should assume complete control over testing either by conducting tests in their own facilities or by retaining outside professional testing services. Regarding the latter point, the report stated that any contractual requirements that provide for material testing and quality control should be discontinued because the practice puts a contractor in a position to exert influence--even inadvertently--on the tester and on such factors as selection and preparation of samples which can have considerable effect on test results.

CHAPTER 2

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

Many construction activities, especially those common to Corps civil works construction, differ markedly from manufacturing activities. Manufactured items, such as supplies, materials, and equipment, can be spot checked and tested for breakdowns in contractor control; and, most importantly, defective items can often be replaced with minimal loss to the Government. However, it is characteristic of such structures as dams and locks and other civil works construction that, once a phase or portion has been completed, it cannot be inspected or tested at a later time except with great difficulty, and often the acceptability of certain construction work can only be determined at the time it is performed.

Officials of Federal and non-Federal organizations with whom we discussed the applicability of CQC to Federal construction generally contended that the interests of the Government were best served when the responsibility for inspection and testing of construction was met by the responsible Federal construction agency. Most of the people we interviewed were of the opinion that contractor-hired inspectors could be expected to maintain the objectivity and independence necessary to ensure full protection of the Government's interest.

From our review of selected projects and a Corps study of the CQC program, we concluded that the program did not effectively achieve its objectives of improved quality construction and a reduction in inspection costs. We believe therefore that the CQC program, as currently implemented by the Corps, should be evaluated to determine its general suitability to civil works construction and/or to what extent its application can be modified to ensure a more effective means of achieving quality construction at less cost.

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RECOMMENDATION TO THE SECRETARY OF DEFENSE

We recommend that a comprehensive study be undertaken to evaluate the effectiveness of the CQC program as applied by the Corps to civil works construction. In determining the general suitability of the program to civil works construction, the study should consider what the role of the Government inspector should be and whether or not the program should be applied on a more selective basis.

CHAPTER 3

SCOPE OF REVIEW

We conducted a review of the CQC program on civil works construction projects of the Corps of Engineers, primarily at the following locations:

Office of the Chief of Engineers, Washington, D.C.
North Pacific Division, Portland, Oregon
Portland District, Portland, Oregon
Walla Walla District, Walla Walla, Washington
Seattle District, Seattle, Washington

We also visited selected civil works construction project sites in the North Pacific Division and the Southwestern Division.

We examined documentation relating to development of the ASPR clause on CQC and the history of the Corps' efforts to implement the clause. We reviewed Corps regulations, instructions, correspondence, inspection reports, and other documents regarding CQC; and contracts, documents, correspondence, and reports relating to selected Corps' civil works construction projects.

We interviewed DOD officials, Corps officials responsible for administering the program and Corps inspection and testing personnel at the selected projects; and contractor officials and contractor project personnel. We also interviewed officials of the Naval Facilities Engineering Command, General Services Administration, Veterans Administration, Atomic Energy Commission, Bureau of Reclamation of the Department of the Interior, and the Associated General Contractors of America.