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Quality Manual

Level 1 - POLICY

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No changes can be made to this document without the agreement of the authorizing signatory and must be approved by the authorizing signatory before implementation.

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Table of Contents

Section	Subject	Page
1.0	Introduction	4
2.0	Administration of the ED ISO 9001 Quality Manual	4
3.0	Hierarchy of Quality	5
4.0	Quality System Requirements	5
4.1	Management Responsibility	5
4.2	Quality Systems	6
4.3	Contract Review	8
4.4	Design Control	8
4.5	Document and Data Control	11
4.6	Purchasing	13
4.7	Control of Customer-Supplied Product	14
4.8	Product Identification and Traceability	14
4.9	Process Control	14
4.10	Inspection and Testing	14
4.11	Control of Inspection, Measuring, and Test Equipment	16
4.12	Inspection and Test Status	17
4.13	Control of Nonconforming Product	17
4.14	Corrective and Preventive Action	17
4.15	Handling, Storage, Packaging, Preservation, and Delivery	18
4.16	Quality Records	18
4.17	Internal Quality Audits	19
4.18	Training	19
4.19	Servicing	19
4.20	Statistical Techniques	19

Appendix 1 Glossary of Acronyms
Appendix 2 Letters of Appointments to ISO Management Team
Appendix 3 Quality Hierarchy
Appendix 4 Quality Policy Statement
Appendix 5 Engineering Division Management Organization
Appendix 6 Engineering Policy on Acquisition of Engineering Products, Structure, and Professionalism

1.0 INTRODUCTION

The U.S. Army Corps of Engineers (USACE), Louisville District is multifunctional and is responsible for executing both civil works and military programs. The District's Engineering Division (ED) provides full professional engineering, architectural, and environmental services for the planning, design, remediation, and engineering support for commercial, industrial, and water resources projects.

The District has established and is dedicated to continuing its excellent reputation for quality performance and pursuit of customer satisfaction. We totally support and aspire to the ideals expressed in the following vision statement:

USACE VISION STATEMENT

"The world's premier engineering organization.
Trained and ready to provide support anytime, anyplace.
A full spectrum Engineer Force of high quality,
dedicated soldiers and civilians."

- *A vital part of the Army;*
- *The Engineer team of choice -- responding to our Nation's needs in peace and war;*
- *A values-based organization -- Respected, Responsive and Reliable.*

Changing today to meet tomorrow's challenges!

In answer to the ever-continuing need to improve customer satisfaction, to grow in overall quality of performance, and to better posture ED to carry out the "USACE Vision," ED management has decided to establish a quality management system that complies with the internationally recognized standard ISO 9000. ED will achieve and maintain registration to ISO 9001, 1994.

2.0 ADMINISTRATION OF THE ED QUALITY OPERATING SYSTEM (QOS)

QUALITY MANUAL

This quality manual defines ED's policies and objectives regarding the application of the principles of controlled quality to ensure that all services rendered by ED are of the required quality and comply fully with the customer's stated requirements and expectations. The Quality System, as documented and implemented, is intended to comply fully with the requirements of ISO 9001 as applicable to ED's operations. The content of this quality manual and of supporting documents is applicable to all ED employees and shall be observed and implemented by all personnel as applicable to their activities. No deviation is permitted without the express permission of the Management Representative.

The ED Management Representative, Joe M. Keith, is vested with full responsibility for the proper and timely implementation of the Quality System, together with the appropriate level of authority for ensuring its continuing effectiveness. This manual, as well as the entire ED QOS, will be reviewed annually as a minimum. Changes to this manual must be approved in accordance with EQP-5-01, *Procedure for the Preparation and Administration of Procedures* and documented in the authorization approval and amendment record (Page 2). Control of this manual is maintained on the Engineering Division Information System (EDIS) under the ED QOS Quality Manual. Revisions are accomplished in accordance with EQP-5-01, *Procedure for the Preparation and Administration of Procedures.* The current issue number, revision number, and date are shown on Page 2 of this manual and on the Master List of Procedures also found on the EDIS, ED Quality Operating System.

3.0 HIERARCHY OF QUALITY

The chart found at Appendix 3 depicts the quality hierarchy adopted by the U.S. Army Corps of Engineers, Louisville District, Engineering Division.

4.0 QUALITY SYSTEM REQUIREMENTS

4.1 Management Responsibility

4.1.1 Quality Policy

ED's quality policy is contained in the Quality Policy Statement (Appendix 4). Specific quality objectives are contained in the Business Plan, which can be found on EDIS under ED Quality Operating System, Business Plan. Both documents are displayed throughout ED. Understanding and implementing the ED quality policy are accomplished through the publication of the documented Quality System, communication on quality matters by ED's management staff, and the induction routines employed in the introduction of new employees.

4.1.2 Organization

4.1.2.1 Responsibility and Authority

The Management organization chart, Appendix 5, defines lines of responsibility of all management personnel. ED's management personnel include the Chief, Assistant Chief, Branch Chiefs, and Section Chiefs. Division, Branch, and Section mission and function statements are found on the District LAN under the SABER menu, District Applications, Local Regulations. These are reviewed and revised as needed by the appropriate Branch or Section Chief no less frequently than every 2 years. Authority levels of ED staff are addressed in an Authority Matrix found on EDIS under ED Quality Operating System, Authority/ Responsibilities.

4.1.2.2 Resources

All ED personnel are trained to the degree necessary or possess the skills necessary to ensure that E&D products conform to stated project requirements. Staff expertise includes skills necessary to perform quality assurance (QA) and quality control (QC) activities, and an understanding of the ISO standards and of the ED QOS. Management policy for the qualifications (education, experience, and examination) of engineer and technician staff is presented in the attached *Engineering Policy on Acquisition of Engineering Products, Structure, and Professionalism* (Appendix 6). Management ensures that fiscal and staffing resources are adequate to perform QA and QC activities for all products. Management ensures that adequate equipment (PC, CD-ROM, CADD, etc.) is available to comply with ED QOS. All permanent ED personnel have an Individual Development Plan (IDP), and required training is identified on the employee's IDP.

4.1.2.3 Management Representative

ED's Management Representative for all quality matters, both in-house and external, is Assistant Chief, ED. The Chief Quality Officer serves as the Program Manager for the ED QOS and is also available to answer questions and address quality policy. The memoranda of record appointing the QOS Management Team are found at Appendix 2.

4.1.3 Management Review

The effectiveness of the quality system is formally reviewed by the QOS Management Team chaired by the Management Representative. The objective of the review is to examine demonstrated irregularities in the operation of the quality system itself and its contents. The Management Team maintains an ongoing analysis of corrective and preventive actions taken during the year and noncompliances identified by audit, appraisals by outside bodies, customer complaints, and nonconformances. Formal reviews shall be conducted annually as a minimum and shall be conducted in accordance with EQP-1-01, *Management Review*.

4.2 Quality Systems

4.2.1 General

ED has established and maintains a documented quality system so that its products conform to specified requirements. The documented quality system includes this quality manual and addresses the relevant requirements of the standards and Army, USACE, District, and Engineering Division policies with respect to all twenty (20) ISO 9001 elements. This quality manual makes reference to quality system procedures and outlines the structure of the quality system. The quality system procedures in turn point to work instructions, other required documentation, project quality control plans, and relevant federal legislation, Army/ Engineering regulations, technical manuals, and guide specifications.

An overall quality hierarchy is shown on Appendix 3. The formally documented portion (ED QOS) is structured as shown. Level 1 defines policy, demonstrates scope and commitment of management, and governs the implementation of Level 2 (*Engineering Quality Procedures*). Level 2 describes the "who," "what," "when," and "where." Level 3 in turn covers the "how to" (work instructions), and Level 4 is the documentation required to prove that Levels 1, 2, and 3 are being accomplished. All Level 1 and 2 documents and all internally generated Level 3 documents are formally controlled, updated, and reissued in accordance with EQP-5-01. The QOS documentation is electronically maintained (see Element 4.5, *Document and Data Control).*

4.2.2 Quality System Procedures

Procedures for all products/services performed by ED are contained in the EDIS under the ED Quality Operating System, Master List of Procedures. EQP-5-01, *Procedure for the Preparation and Administration of Procedures,* describes the development requirements, the control procedure, and the rules for maintenance of procedures.

4.2.3 Quality Planning

The process used by ED to accomplish quality planning involves several different actions and related documents. The foundational document is always the contract between ED and its customer. The contract will always include coverage of the following four (4) areas:

1. Project Scope (the scope of ED's effort)
2. Schedule(s)
3. Budget
4. Quality Expectations

Contract requirements are covered in EQP-3-01, *Contract Review*. The preferred method of contract development is to utilize the Project Management Plan (PMP) or the Project Study Plan (PSP) if either has been developed. If neither a PMP nor PSP has been developed for the project (DL responsibility), then a contract is developed by the PE/A, which covers the four areas described above.

The second facet of the quality planning process is the development of a project specific quality control plan (QCP), which is considered to be an addendum to the PMP/PSP. This plan will present the various QC activities planned for the subject project, identify the review team members, identify review assignments, budgets, schedules, provide QC certifications, and identify design team members. QCPs are developed in accordance with USACE regulation, Engineering Division policy, and project-specific requirements outlined in the PMP. The QCP does not need to repeat information contained in the PMP/PSP. When engineering products are developed by A/E firms, the A/E firm must develop its own QCP, and ED will develop a corresponding quality assurance plan (QAP), which addresses those activities taken to ensure the overall effectiveness of the A/Es quality control process. Procedures covering the requirements of this element are found in EQP-4-01, *Design Process for Civil Works Projects,*

EQP-4-02, *Design Process for Military Projects*, WI-13-01-01, *Quality Management Plan For Louisville District Engineering Division, and* WI-4-02-02, *Quality Control Plan (Generic).*

4.3 Contract Review

4.3.1 General

ED maintains procedural instructions to govern contract review as described below.

4.3.2 Review

Each inquiry or request to supply services is reviewed by appropriate branch and section Chiefs as outlined in EQP-3-01, *Contract Review*.

4.3.3 Amendment to Contract

In the event that ED or the customer should seek to vary the contract conditions or requirements, revisions will be made to the project scope and agreed upon with the customer as covered by EQP-3-01, *Contract Review*. Design projects shall be reviewed periodically as outlined in EQP-3-02, *Project Review*.

4.3.4 Records

Formal records of all contract review activities are maintained as outlined in EQP-3-01, *Contract Review* and EQP-3-02, *Project Review*.

4.4 Design Control

4.4.1 General

To ensure that specified requirements are met, ED maintains procedural documentation to control and verify the design and development functions for all its deliverables.

4.4.2 Design and Development Planning

When a request for ED services is received, the following design and development planning process will be implemented. A Design and Development Planning Meeting (DPPM) will be convened by ED management (Chief ED, Asst. Chief ED, Branch Chiefs). At this meeting a selection will be made for the PE/A, the ITR/QAT leader, the other disciplines required to complete each team, and will identify the ED representative for attendance at the Acquisition Strategy Meeting (ASM). The remaining team members (design and ITR/QAT) will be determined within a one week period through coordination between the PE/A and the appropriate ED management representatives.

Following the ASM, a contract will be developed and signed by the PE/A and ED's customer in which the elements described in para. 4.2.3 shall be clearly defined. As discussed in para. 4.2.3, the PMP or PSP will serve as the contract if either document has been developed. When a PMP or PSP serves as the contract, this document will represent the backbone of the Design and Development Plan.

Following completion of the contract, a QCP/QAP will then be developed by the PE/A covering the elements described in para. 4.2.3. The completed plan shall be shared with each team member (design team, ITR/QAT). It is ED's objective to utilize PROMIS to the extent possible to document schedules, commitments, budgets, team identities, and project status. Until the time that PROMIS is truly functional, DDPM minutes are being input into EDCOMMON/QUALITY/DDPM utilizing a file name of the following typical format: JB98-113 (representing request (job) #113 during FY 98).

Design development documents are continually updated as the design evolves. Specific guidance controlling these aspects is governed by EQP-4-01, *Design Process for Civil Works Projects*; EQP-4-02, *Design Process for Military Projects;* EQP-4-03, *Cost Engineering Process;* EQP-4-04, *Value Engineering and* WI-13-01-01, *Quality Management Plan for Louisville District Engineering Division.*

4.4.3 Organizational and Technical Interfaces

The organizational and technical interfaces having input to the process are identified within the project management plan (PMP) or the project study plan (PSP) and the QCP. As required by these plans, regular meetings ensure that all necessary information is reviewed. Minutes of these meetings are maintained, including all meetings with the client. Specific activities are covered by EQP-4-01, *Design Process for Civil Works Projects*; EQP-4-02, *Design Process for Military Projects*; EQP-3-01, *Contract Review*; EQP-4-03, *Cost Engineering Process;* EQP-4-04, *Value Engineering*, WI-13-01-01, *Quality Management Plan for Louisville District Engineering and Planning Divisions and* WI-4-02-03, *Quality Control Process In-House Designs.*

4.4.4 Design Input

All design input is documented within the activity, and includes relevant statutory and regulatory requirements. The review process ensures that such inputs are adequate for the requirements of the design process. Any incomplete or ambiguous requirements are identified in the minutes of review meetings and resolved with the appropriate parties before the design activities proceed. Contract review is considered an essential part of this activity. Specific activities are covered by EQP-4-01, *Design Process for Civil Works Projects;* EQP-4-02, *Design Process for Military Projects;* EQP-6-01, *Purchasing of Services;* EQP-3-01, *Contract Review;* EQP-3-02, *Project Review; and* WI-4-02-03, *Quality Control Process In-House Designs.*

4.4.5 Design Output

The output from each stage of the design process is documented as part of the design review activity and is stated in terms of measurable requirements. The design output will comply with input requirements; specify acceptable criteria; and identify any areas requiring special considerations such as operating, storage, handling, maintenance, and disposal requirements. These considerations are passed on through the document titled "Engineering Considerations and Instruction to the Field." All such activities are conducted in accordance with EQP-4-01, *Design Process for Civil Works Projects*; EQP-4-02, *Design Process for Military Projects;* EQP-4-03, *Cost Engineering Process and* WI-4-02-03*; Quality Control Process In-House Designs.*

4.4.6 Design Review

The QCP for each project identifies appropriate review stages for that project, and meetings involving all relevant personnel are held as required to ensure that the design and development activity is proceeding in an appropriate manner. Records of all such activities are maintained. All such activities are conducted in accordance with EQP-4-01, *Design Process for Civil Works Projects;* EQP-4-02, *Design Process for Military Projects;* EQP-4-03, *Cost Engineering Process;* EQP-4-04, *Value Engineering;* EQP-13-01, *Control and Correction of Nonconforming Product and* WI-4-02-03, *Quality Control Process In-House Designs.*

4.4.7 Design Verification

Each stage of the development activity is subject to verification activities, which form part of the design review. Design verification is performed in accordance with the QCP and to ensure compliance with all applicable criteria. The required activities of this element are covered in EQP-4-01, *Design Process for Civil Works Projects*; EQP-4-02, *Design Process for Military Projects*; EQP-4-03, *Cost Engineering Process;* EQP-13-01, *Control and Correction of Nonconforming Product and* WI-4-02-03, *Quality Control Process In-House Designs.*

The verification process may include any or all of the following:

- Performing alternative calculations
- Comparing new design against a similar proven design
- Conducting model studies

4.4.8 Design Validation

For construction projects at the final design stage or at the conclusion of the design activity, but prior to construction advertisement, a plan-in-hand site inspection shall be conducted. The results of this validation process are compared to the original design input requirements to ensure that the output from the design process meets the original intent of the customer. Required activities of this element are covered in EQP-4-01, *Design Process for Civil Works*

Projects, EQP-4-02, *Design Process for Military Projects and* WI-4-02-03, *Quality Control Process In-House Designs.*

4.4.9 Design Change

Design change control is exercised from that stage of any project when the original designer of the product releases the design to other team members for evaluation or integration. The documentation procedure for design changes is as required by the EQP-4-01, *Design Process for Civil Works Projects*; EQP-4-02, *Design Process for Military Projects;* EQP-4-03, *Cost Engineering Process; and* WI-4-02-03, *Quality Control Process In-House Designs.* All deliverables regardless of the stage of design (10%, preliminary, 30%, 60%, final, etc.) shall clearly depict the stage of design on the documents. All design documents (design analysis and drawings) shall contain the name/signature of the designer, checker, and the Project Engineer/ Architect (PE/A).

4.5 Document and Data Control

4.5.1 General

The Quality Manual, Procedures (EQPs), Army Regulations (ARs), Engineering Regulations (ERs), Engineering Technical Letters (ETLs), Engineering Circulars (ECs), industry standards, Louisville District (LRL) Policies, Work Instructions (WI), reference standards, service manuals, guide specifications, and project plans and specifications are all subject to document control procedures. The Management Team is authorized to issue or reissue the Quality Manual, Procedures, or any other controlled documents developed by the Branch/Section Chiefs. Interim or handwritten changes of any controlled document (internally generated) shall not be considered official. Official versions of these documents shall only be those available from the EDIS, ED QOS source or the hard copy original maintained in the Chief Quality Officer's files. The electronic Quality System files are backed up through the normal District Lan backup procedures. These procedures allow for daily backup with off-site storage once a month and are retained for 1 year. Access to the electronic QOS files are controlled by ED-M-M through write permissions to the various directories utilized for these files.

4.5.2 Document Approval and Issue

All procedures are authorized by the Management Team and approved by the appropriate Management Team representative in accordance with EQP-5-01, *Procedure for the Preparation and Administration of Procedures.* All other controlled documents developed by ED are reviewed, approved, and issued under the supervision of Branch/Section Chiefs of ED. Currency of controlled documents is maintained by Engineering Division, Management Support Section (ED-M-M), Central Files. Documents on the LAN are controlled electronically, and guidance from higher authority is maintained by hard copy in Central Files. Obsolete hard copy documents are removed from Central File shelves. All personnel have access to pertinent documents through EDIS or through ED-M-M, Central Files. Outdated versions of the Quality

Manual, EQPs, and any internally generated Work Instruction are retained for reference purposes.

Procedures governing this element are covered by the following:

EQP-5-02	*Management of Regulations*
EQP-5-03	*Control of Plans, Specification, and Design Analysis*
EQP-5-04	*Control of Operation and Maintenance Manuals*
EQP-5-05	*Control of Dam Safety Plan*
EQP-5-06	*Control of ORL and OCE Guide Specifications*
EQP-5-07	*Procedure for Management of Computer Software Used in Design of Military and Civil Works Projects*

4.5.3 Document Changes

Anyone in ED may suggest changes to the EQP documents, but only the Management Team may authorize and approve changes to the procedures in accordance with EQP-5-01, *Procedure for Preparation and Administration of Procedures.* Changes to other internally generated controlled documents (WIs) will be accomplished in a similar manner except that authority and approval is delegated to the relevant Branch Chief. Maintenance and distribution of other internally generated WIs shall also be handled in identical manner with EQP-5-01.

4.6 Purchasing

4.6.1 General

As described below, ED maintains documented procedures to ensure that purchased products conform to specified requirements.

4.6.2 Evaluation of Subcontractors

All subcontractors for all design-related services are selected through an evaluation process to determine the most qualified firms based on ability and other quality-related factors. Appropriate levels of control over the subcontractor are fully described in the subcontractor's QCP, ED's QAP, and the contract scope of services. The requirements of this element are covered by EQP-6-01, *Purchasing of Services.*

4.6.3 Purchasing Data

The contracts for services detail fully the product or service required, including references to standards and codes where applicable. All such documents are reviewed for completeness of specified requirements prior to issue. EQP-6-01, *Purchasing of Services,* addresses these requirements.

4.6.4 Verification of Purchased Product

Verification of services purchased are described in paragraph 4.4, *Design Control*. EQP-6-01, *Purchasing of Services*, and EQP-13-01, *Control and Correction of Nonconforming Product*, address this requirement.

4.6.4.1 Supplier Verification at Subcontractor's Premises

ED verification shall be accomplished in accordance with the project QAP. Many times this may be performed at the subcontractor's premises.

4.6.4.2 Customer Verification of Subcontracted Product

The customer is always permitted to verify the product at ED's premises or at the subcontractor's premises. The customer is not allowed, however, to modify the contract by directly dealing with the subcontractor. A contract change will always be the responsibility of the PE/A. Although the customer is permitted to conduct verifications, as deemed appropriate, ED maintains full responsibility to ensure that an acceptable product is provided. This responsibility can never be assumed to pass to the customer. Irrespective of any prior customer verifications, the customer maintains the right to subsequently reject any product deemed as nonconforming to its properly defined requirements established in 4.3, *Contract Review*.

4.7 Control of Customer-Supplied Product

The control, verification, storage, and maintenance of customer-supplied products shall be accomplished in accordance with EQP-7-01, *Control of Customer-Supplied Product*. Instructions for dealing with lost or damaged customer-supplied product are also covered in that procedure.

4.8 Product Identification and Traceability

The identification and traceability of work in process and finished product is accomplished in accordance with EQP-4-01, *Design Process for Civil Works Projects*; EQP-4-02, *Design Process for Military Projects;* and EQP-05-03, *Control of Plans, Specifications, and Design Analyses*.

4.9 Process Control

All ED activities are governed by documented procedures. The work is controlled by means of documented instructions and records of work performed are maintained. ED provides continuous monitoring and control of process parameters to ensure that specified requirements are met. ED has also established a standard of professional accountability expected of design personnel. Design processes are carried out in a manner that can be fully verified by subsequent inspection or testing. Also see paragraph 4.4, *Design Control.* Activities of this element are governed by EQP-4-01, *Design Process for Civil Works Projects*, and EQP-4-02, *Design*

Process for Military Projects. For purposes of this element, "installation" would be better interpreted as "delivery," and "servicing" would be equivalent to providing E&D assistance during construction activities.

4.10 Inspection and Testing

4.10.1 General

Since the primary responsibility of Engineering Division is design development, the design review and verification provisions of paragraph 4.4, *Design Control*, and paragraph 4.13, *Control of Nonconforming Products*, cover this requirement. Specific procedures that address this element are EQP-4-01, *Design Process for Civil Works Projects;* EQP-4-02, *Design Process for Military Projects;* and EQP-13-01, *Control and Correction of Nonconforming Product*. The QCP developed for each project specifically details inspection, testing, and records requirements. The QCP will require revision any time a change occurs which affects the design team, ITR or scheduled events as presented in the QCP.

4.10.2 Receiving Inspection and Testing

It is ED policy to inspect and verify conformance with specified requirements before an incoming product is used. In determining the amount and nature of receiving inspection, consideration will be given to the amount of control exercised at the subcontractor's premises and the recorded evidence of conformance provided. In the event of disaster, natural emergency, or some other urgency, thorough inspection or verification may be waived or postponed; however, the incoming product will be positively identified and recorded (to facilitate subsequent inspection and conformance verification).

The requirements of this element are addressed by EQP-4-01, *Design Process for Civil Works Projects;* EQP-4-02, *Design Process for Military Projects;* and EQP-13-01, *Control and Correction of Nonconforming Product*.

4.10.3 In-Process Inspection and Testing

All work is reviewed in accordance with the EQP-4-01, *Design Process for Civil Works Projects*; EQP-4-02, *Design Process for Military Projects;* and EQP-13-01, *Control and Correction of Nonconforming Product.* The reviews occur at the appropriate milestone points as documented in Appendix A of the A/E contract. The inspection requirements of this element are addressed in element 4.4, *Design Control*; paragraph 4.6.4; and element 4.13, *Control and Correction of Nonconforming Products*. Procedures for handling early release of products are covered in EQP-10-01.

4.10.4 Final Inspection and Testing

All work is reviewed for conformity at contract completion. Inspection requirements of this element are addressed in elements 4.4, *Design Control*, and 4.13, *Control of Nonconforming*

Products. The signatures of the Chiefs of ED and CD (or their authorized representatives) on the Biddability, Constructability, Operability and Environmental Review (BCOE) certification and the signatures contained on the Independent Technical Review (ITR) certification confirm compliance with all requirements of the QCP. Specific procedures addressing this element are EQP-4-01, *Design Process for Civil Works Projects;* EQP-4-02, *Design Process for Military Projects*; and EQP-13-01, *Control and Correction of Nonconforming Product*. Procedures for handling early release of products are covered in EQP 10-01.

4.10.5 Inspection and Test Records

Records of all review comments and their resolutions are maintained. The records must clearly indicate whether the product has passed or failed the defined acceptance criteria. Records are either kept in hard copy or electronically through the use of ARMS. Minutes are produced for all review conferences and follow-up actions required are documented. Procedures for control 0f these records are covered by EQP-4-01, *Design Process for Civil Works Projects;* EQP-4-02, *Design Process for Military Projects;* EQP-16-01, *Management of Project Folders;* EQP-16-02, *Management of As-Built Drawings;* and EQP-16-03, *Control of Survey Records.*

The release of nonconforming products shall not occur except as noted in paragraph 4.13.2 and is addressed by EQP-13-01.

4.11 Control of Inspection, Measuring, and Test Equipment

4.11.1 General

ED maintains procedures to control, calibrate, and maintain inspection, measuring, and test equipment (including test software) used during the design development process. All equipment receiving control is identified, and records are kept to demonstrate item identity, frequency of calibration, standards to be used, calibrations carried out, remedial actions, and state of accuracy prior to and after calibration. All such equipment is used in a manner that ensures that the measurement uncertainty is known and is consistent with the required measurement capability. The documented procedures also establish the extent and frequency of checks and specify the maintenance of records as evidence of control. All records are available to the customer.

4.11.2 Control Procedures

Control and calibration of instrumentation and calibration standards are in accordance with the requirements of EQP-11-01, *Calibration of Equipment.*

4.12 Inspection and Test Status

All deliverables produced by ED are identified as to the stage of design (30%, 60%, 90%, etc.) and contain identification of PE/A, designer and checkers. Final documents ready for

advertisement shall contain appropriate title blocks, signature blocks, and signatures in accordance with EQP-4-01, *Design Process for Civil Works Projects*, and EQP-4-02, *Design Process for Military Projects*. The requirements of EQP-5-03, *Control of Plans, Specifications, and Design Analyses, and* WI-04-02-04, *Louisville District Engineering Division, Policy For Engineer of Record and Design Responsibility,* also address this element.

4.13 Control of Nonconforming Product

4.13.1 General

Within ED, nonconforming products are generally limited to elements of the design process. These can occur as design errors, incorrect data collection, erroneous assumptions, use of inappropriate criteria, or incorrect project scoping. ED has incorporated procedures to identify, document, evaluate, and control such occurrences to ensure that faulty designs and other products never reach the customer. Documentation in the form of comments highlighting nonconformities are provided to all relevant parties.

4.13.2 Review and Disposition of Nonconforming Products

The requirements of this element are covered by EQP-13-01, *Control and Correction of Nonconforming Product* to ensure that such products are identified and corrected before being allowed to proceed. If a decision is made to accept a nonconforming product, this decision shall be reported for the concession of the customer, and a description of the nonconformity shall be recorded to denote the actual condition.

4.14 Corrective and Preventive Action

4.14.1 General

ED maintains several systems aimed at correcting the causes of nonconformities. Those systems include Lessons Learned, EIRS Bulletins, and the Automated Review Management System (ARMS). In addition, ED's design development procedures require several actions to prevent nonconformities. Those procedures are covered by EQP-4-01, *Design Process for Civil Works Projects*; and EQP-4-02, *Design Process for Military Projects.*

4.14.2 Corrective Action

The processes identified in EQP-13-01, *Control and Correction of Nonconforming Product,* will be implemented for development of all ED deliverables. These procedures encompass numerous areas of concern, including customer concerns, identification of corrective action, follow-up to confirm that corrective action was taken, and continual oversight of quality control procedures ensuring appropriateness and compliance with these procedures.

4.14.3 Preventive Action

ED maintains documented procedures that require development of a QAP to ensure that the QCP is appropriate, that audit oversight of the QCP occurs, that potential problem areas are identified, and that these findings are documented and disseminated to all appropriate personnel. For development of all ED deliverables, ED shall implement the processes identified in EQP-14-02, *Lessons Learned Program;* EQP-14-03, *Architect/Engineer Responsibility Management Program, and* EQP-14-04, *Preventive Action.*

4.15 Handling, Storage, Packaging, Preservation, and Delivery

ED maintains documented procedures to control handling, storage, packaging, preservation, and delivery of all ED products. These requirements are covered under elements 4.5, *Document Control*, and 4.16, *Quality Records.* Specific procedures addressing this element are:

EQP-5-01	*Procedure for the Preparation and Administration of Procedures*
EQP-5-02	*Management of Regulations*
EQP-5-03	*Control of Plans, Specifications, and Design Analysis*
EQP-5-04	*Control of Operation and Maintenance Manuals*
EQP-16-01	*Management of Project Folders*
EQP-16-02	*Management of As-Built Drawings*
EQP-16-03	*Control of Survey Records*
EQP-16-04	*Management of Records (General)*

4.16 Quality Records

ED maintains documented procedures to identify, collect, index, file, maintain, store, and make available quality records. Records are always available for the customer's review. Requirements of this element are covered by the following procedures:

EQP-16-01	*Management of Project Folders*
EQP-16-02	*Management of As-Built Drawings*
EQP-16-03	*Control of Survey Records*
EQP-16-04	*Management of Records (General)*

4.17 Internal Quality Audits

To verify that quality activities and related results comply with planned arrangements and to determine the effectiveness of the quality system, ED maintains a documented procedure for conducting internal audits. This procedure specifies the schedule and ensures that independent personnel conduct the audit, results are recorded, timely corrective action is taken, and appropriate follow-up audits are conducted to verify compliance. Detailed procedures are contained in EQP-17-01, *Internal Quality Audits.*

4.18 Training

ED Management is responsible for ensuring that the qualifications of employees under their supervision are appropriate for all tasks affecting quality. IDPs are established on an ongoing basis and are updated at least annually. ED personnel are scheduled to take part in a variety of quality related education and training programs. Training records are maintained by management. Training procedures are described in EQP-18-01, *Training.*

4.19 Servicing

ED maintains procedures for providing post-design services appropriate to the needs of our customers (e.g., reservoir regulation, dam safety, and bridge safety programs). Requirements of this element are addressed by the following procedures:

EQP-19-01 *Periodic Inspections*
EQP-19-02 *Annual and Special Inspections of Reservoir and Navigation Projects*
EQP-19-03 *Instrumentation Data Review*
EQP-19-04 *Dam Safety Training for Operations Division*
EQP-19-05 *Bridge Inspections and Inventory System*
EQP-19-07 *Reservoir Regulation*

4.20 Statistical Techniques

ED performs statistical techniques to monitor customer satisfaction, provide overall performance indicators and assess trends. Requirements are covered by EQP-20-01, *Statistical Techniques*.

APPENDIX 1
GLOSSARY OF ACRONYMS

A/E	- Architect Engineer
AR	- Army Regulation
ASM	- Acquisition Strategy Meeting
BCOE	- Biddability, Constructability, Operability, and Environmental
E&D	- Engineering and Design
EC	- Engineering Circular
ED	- Engineering Division
ED-M	- Engineering Division, Management Branch
ED-M-M	- Engineering Division, Management Branch, Management Support Section
EDIS	- Engineering Division Information System
EQM	- Engineering Quality Manual
EQP	- Engineer Quality Procedure
ER	- Engineering Regulation
ETL	- Engineer Technical Letter
FAR	- Federal Acquisition Regulation
HR	- Human Resources
HTRW	- Hazardous, Toxic, Radiological Waste
IDP	- Individual Development Plan
ISO	- International Organization for Standardization
ITR	- Independent Technical Review
LAN	- Local Area Network
MR	- Management Representative
LRL	- Great Lakes and Ohio River Division, Louisville District
PE/A	- Project Engineer/Architect
PM	- Project Manager
PMP	- Project Management Plan
PROMIS	- Program Management Information System
PSP	- Project Study Plan
QA	- Quality Assurance
QC	- Quality Control
QAP	- Quality Assurance Plan
QCP	- Quality Control Plan
QOS	- Quality Operating System
UST	- Underground Storage Tank

APPENDIX 2

Letters of Appointments to the

Engineering Division

Quality Operating System Management Team

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
P.O. BOX 59
LOUISVILLE, KENTUCKY 40201-0059

CEORL-ED

1 November 1995

MEMORANDUM FOR RECORD

SUBJECT: Letter of Appointments

1. In accordance with the ISO 9001 standards, element 4.1.2.1, Mr. Joe M. Keith, Assistant Chief, Engineering Division and Chief, Hydrology & Hydraulics Branch has been appointed as the Management Representative for the ISO 9001 registration process. By this appointment, he has the responsibility and authority for establishing and maintaining the quality system and reporting on the system to executive management for reviews on system performance and opportunities for improvement. He is also the liaison with parties outside Engineering Division on matters relating to our quality system.

2. In addition, the following Management Team, which will serve as the steering group for the registration process, has been established:

Phil Hasselwander
Pat Lankswert
Dan Long
Bruce Murray
John Sirles
Tom Williams
Gene Sommerville (Project Manager)

Primary functions of the team will be to provide support, review, and approval on all major project actions. The Management Team will be chaired by Mr. Keith.

PHILIP H. HASSELWANDER, P.E.
Chief, Engineering Division

CF:
All ED Employees
All Division & Office Chiefs
Colonel Grieco

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, LOUISVILLE
CORPS OF ENGINEERS
P.O. BOX 59
LOUISVILLE, KENTUCKY 40201-0059

CELRL-ED 14 July 1998

MEMORANDUM FOR Quality Operating System (QOS) Management Team

SUBJECT: QOS Management Team Appointments

1. Reference Memorandum for Record (MFR) dated 1 November 1995, Subject: ISO 9000 Management Team Appointments.

2. As we have evolved in the development of our QOS and revised our structure within ED, we need to revise our QOS Management Team. This memo reaffirms and establishes the team consisting of the Chief; Assistant, Chief; Branch Chiefs; Chief, ED-M-M, and the Quality Officer of ED as a permanent team which gives oversight and direction to our quality system.

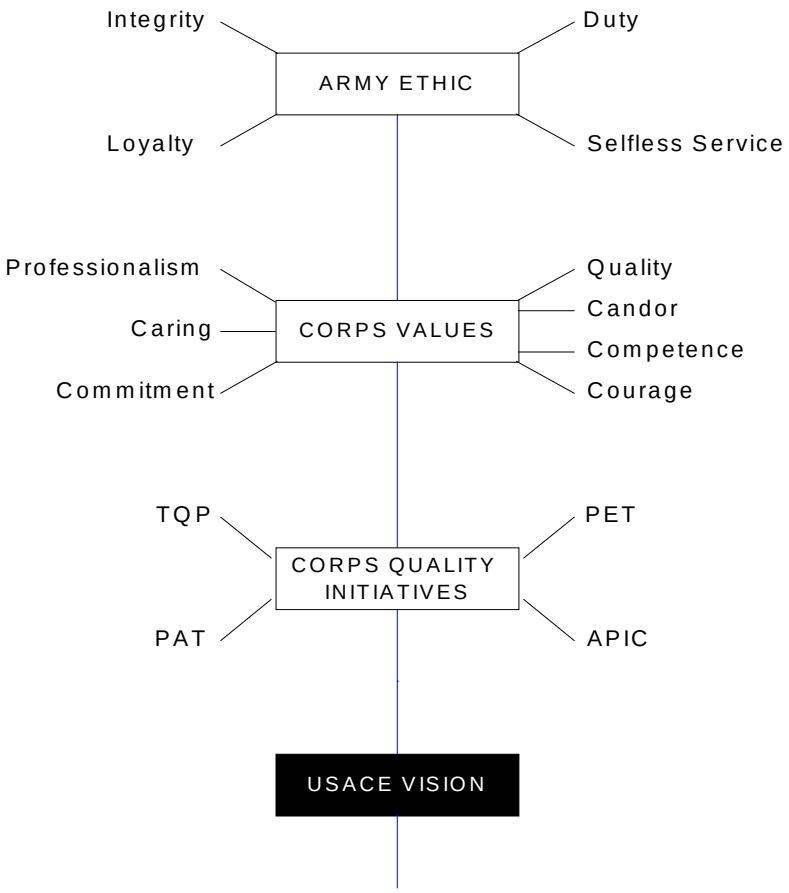
PHILIP H. HASSELWANDER, P.E.
Chief, Engineering Division

CF:
All ED Employees
All Division & Office Chiefs

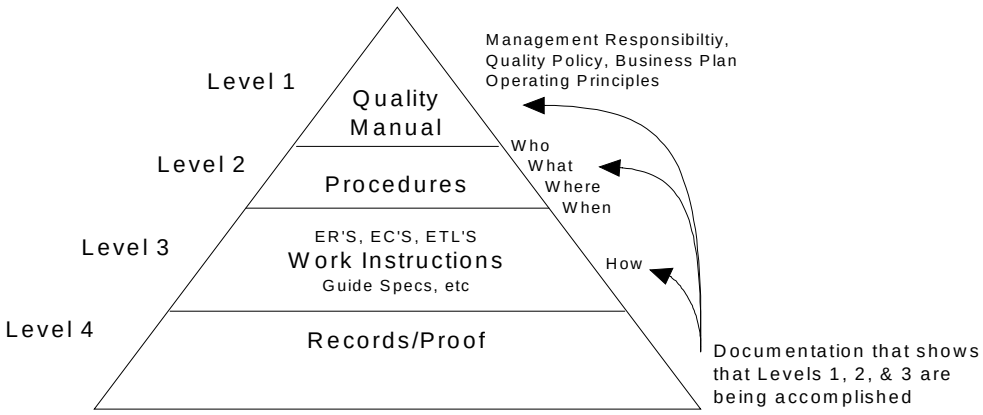
APPENDIX 3

Quality Hierarchy

QUALITY HIERARCHY



ED QUALITY OPERATIING SYSTEM



APPENDIX 4

Quality Policy Statement

QUALITY POLICY STATEMENT
2 October 1995
Revised 17 March 1999

We, in Engineering Division management are committed to meet or exceed our customer's expectations and deliver quality E&D product on time and within budget. We are dedicated to continuous improvement in our processes and stress accountability. We strive to do the right thing and the job correctly the first time. We pledge to:

- *Honor our commitments.*
- *Work as a partner with our customers to establish design/project requirements, scope of services, and cost and schedule expectations which are mutually acceptable.*
- *Ethically adhere to the systems and procedures on which we stand while maintaining an attitude which is conducive to customer defined quality achievement.*
- *Recognize our failures and communicate them to our customers for timely resolutions.*
- *Provide the very best work environment and provide training opportunities to maintain competence, state-of-the-art capabilities, and competitiveness.*
- *Maintain ISO 9001 Registration.*
- *Continually pursue our Engineering Division Principles.*
- *Strive for continued improvement.*

Bruce C. Murray, P.E., P.G.

Joe M. Keith, P.E.

Gene A. Sommerville, P.E.

Marilyn W. Lewis, P.E.

Daniel G. Long, P.E.

Byron K. McClellan, P.E.

Thomas W. Williams, P.E.

George E. Flickner, P.E.

Boyd K. McClellan, P.E.

Rosemary Gilbertson, P.E.

Gary R. Meden, P.E.

Larry M. Cozine, R.A.

Holly A. Gittings, P.E.

Robert A. Biel, P.E.

Stephen G. Durrett, P.E.

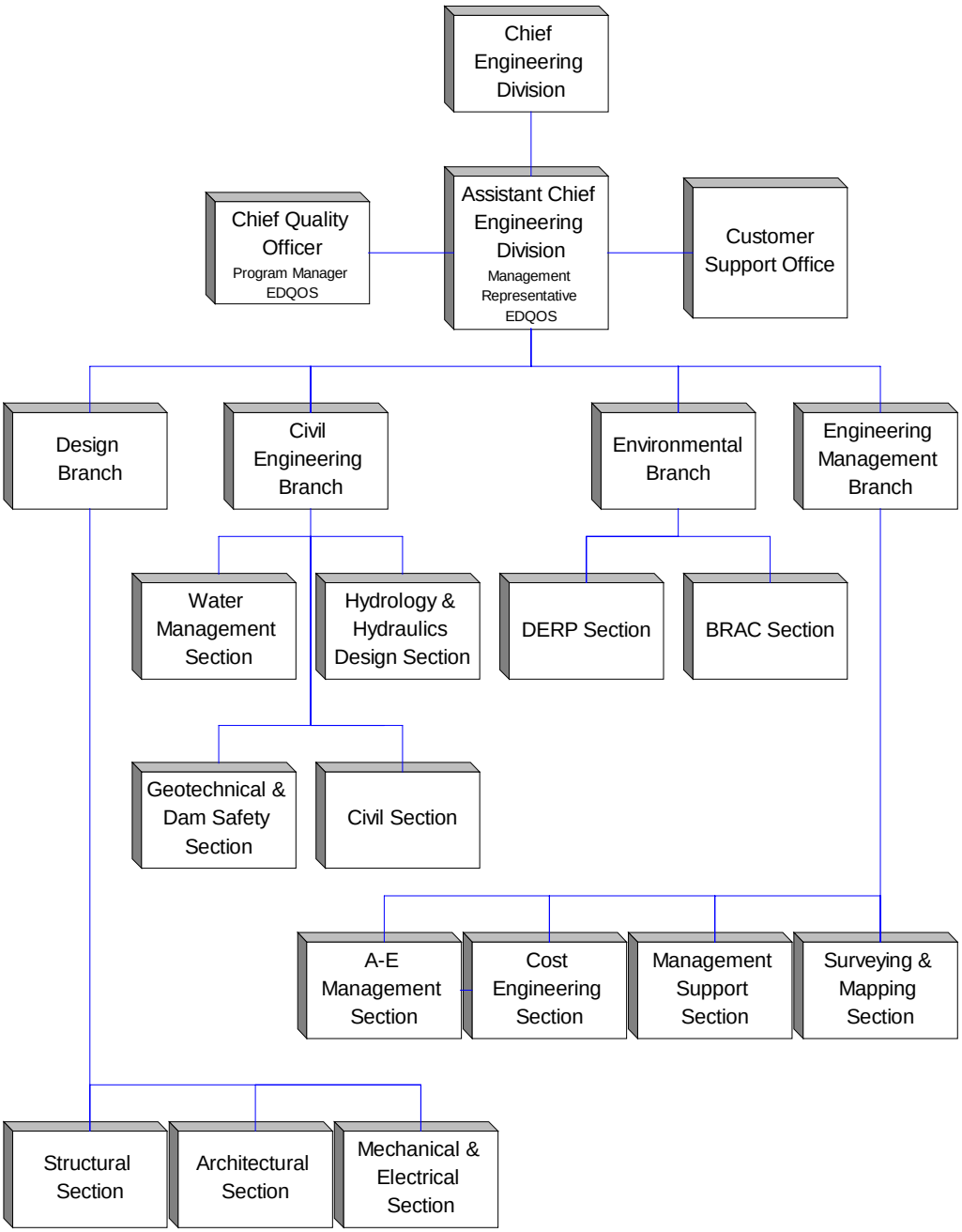
Ronald W. Kiser, P.E.

James J. Skinner, P.E.

APPENDIX 5

Engineer Division Management Organization

ENGINEERING DIVISION ORGANIZATION CHART



APPENDIX 6

Engineering Policy on Acquisition of Engineering Products, Structure, and Professionalism

The Engineering Division (ED) of the Louisville District Corps of Engineers provides full professional engineering, architectural, and environmental services for the planning, design, remediation, and engineering support of military and civil works commercial, industrial, and water resources projects. We accomplish a large portion of our work through (architect-engineer) AE firms having registered professionals as a basic requirement for AE leadership and designing effort. The remaining portion of our work is completed using in-house (IH) personnel applying the same professional requirements as we ask of the AE firms providing services.

We actively encourage professional registration. Our goal is to use only registered professionals as design team leaders (PE/A), as appropriate, depending upon the magnitude of potential assignments and commensurate with the level of risks involved. Professional registration is that level of competency defined by states which authorizes individuals to practice engineering, architecture, interior design, etc. through state or nationally recognized licensing procedures.

The three elements necessary for licensing professionals are education, experience, and examination. One element cannot be substituted for the other even though they follow in sequential order. An accredited degree is the minimum educational requirement, followed by several years of training under the direct supervision of a register professional. After the scholastic and pragmatic experience requirements are met, examination is allowed. After passing examination, state or national licensing is granted.

Engineer technicians are assigned to assist professional engineers/architects in accomplishing the work of the organization. Technicians are discipline-specific colleagues working with design professionals. They do not perform professional engineer/architect duties. The qualification requirements for engineering technician positions are different from those for professional engineer/architect positions. This does not mean that the employees performing technician duties cannot also have professional credentials, i.e., education, experience, and certification.

The qualification requirements published in the Office of Personnel Management (OPM) Qualifications Handbook state the minimum criteria for engineering technician positions. It is not mandatory to have college education to qualify for engineering technician positions. It is permissible to substitute certain amounts of college education for experience up to specified grade levels. It is also permissible to combine education with experience to qualify for certain positions.

Engineering Division leadership, however, wants to go beyond the minimum criteria for its engineering technician workforce. We want to “professionalize” it by setting up

supplemental criteria for advancement in the engineering technician disciplines. Our goal is to employ engineering technicians who have gone beyond the minimum experience requirements and have acquired college-level education plus demonstrate competency in more than one discipline.

An accredited two-year program in engineering disciplines leading to an "associate" degree is recommended as the minimum education requirement for those seeking to advance. Many of our technicians currently have this educational requirement and all should strive to obtain it. An ABET/EAC - accredited four-year program in engineering technology is considered the next step in education. Graduates from these programs who wish to be recognized as engineers are encouraged to earn their bachelor's degree in engineering and seek to become licensed engineers. The engineering technology programs should be recognized as preparing persons to work "in support of engineering activities" (as stated by Accreditation Board for Engineering and Technology) and not as a substitute program for the bachelor's degree in engineering. Technicians are also encouraged to seek professional recognition by obtaining NICET certification.

What does this mean for the current/future engineering technician workforce in ED where personnel issues (hiring, promotions, classifications) are concerned? How has ED leadership decided to do business? In the area of position classification, the journeyman level for a professional engineer/architect is GS-11 with the senior (most complex projects, etc.) level being GS-12 and there are a limited number of "technical experts" (non-supervisory) at the GS-13 level. The journeyman level of technicians is considered to be at the GS-9 level with the senior level at GS-11. There appears to be a "transition" or "overlap" between professional engineers/architects and technicians at the GS-11 level. As mentioned above, the leadership roles for technical design products are generally provided by registered engineers and architects. This is a minimum requirement by States and we will strive to operate in this manner.

Because of the nature of their work, professional engineer/architect positions and engineering technician positions are not classified under the same Office of Personnel Management (OPM) standards. Their grade structures and the criteria for classifying such different positions at certain grade levels are different. Professional engineer/architect positions are classified based upon the professional engineer/architect duties and level of responsibilities assigned to them. Engineering technician positions are classified based upon the technician ("support") duties and level of responsibilities assigned to them. Engineering technicians are not expected to perform professional engineer/architect duties and will not be assigned such work. The highest level of engineering technician work in ED is considered to be at the GS-11 level. Higher level "engineering" duties are considered to be professional engineer/architect work and will be assigned only to professional engineers/architects. Only in rare instances and under very unusual circumstances may there be technician duties (work) above the GS-11 level.

Currently, advancement through the various grade levels of engineering technician positions is based partly upon accumulation of specialized experience. We have never required education above the high school level nor professional certification for promotions on these

jobs. We have, however, encouraged technicians to pursue self-development through continuing education, cross-training assignments, and professional certification.

For the future, ED leadership will be emphasizing the importance of professional self-development for our engineering technician staff. Selections for promotion to GS-9 and GS-11 positions will be based not only on possessing the Knowledge's, Skills, and Abilities (KSA's) for the particular job being filled but also considering the depth and breadth of the personal, professional self-development demonstrated by the candidates. We will be looking for employees who can show that they have done more than simply accumulate months of experience at one grade level for advancement to a higher grade level.

When we hire applicants for first-time employment in engineering technician positions, we will strive to hire people with the desired college-level education. We will also make more use of the Student Career Employment Program (Student Trainees) and the Upward Mobility Program to fill entry-level technician positions. Individual Development Plans (IDP) for selectees who do not have the desired level of education will be written to include completion of college-level courses in accredited associate degree programs. Advancement to intervening and/or target grades will depend upon successful completion of all requirements in the IDP.

We encourage not only engineering technician employees, but also those in non-engineering related positions, who feel they have reached a 'ceiling' on their jobs to obtain the education, experience, licenses, certifications, etc., necessary to advance in grade or change disciplines. While this will not guarantee job placement, it will make employees more competitive when the opportunity arises, and prepared to meet the challenges of the changing work environment.

PHILIP H. HASSELWANDER, P.E.
Chief, Engineering Division

JOE M. KEITH, P.E.
Assistant Chief, Engineering Division

DANIEL G. LONG, P.E.
Chief, Cost Engineering Branch

BYRON K. McCLELLAN, P.E.
Chief, Design Branch

JOHN E. SIRLES, P.E.
Chief, Engineering Management Branch

BRUCE C. MURRAY, P.E.
Chief, Geotechnical & Environmental Engr Br