

INTERN EXPERIENCE AT
MEL, Incorporated
Baton Rouge, Louisiana

An Intern Report

by

James Oliver Morgan, P.E.

Submitted to the College of Engineering
of Texas A&M University
In partial fulfillment of the requirement for the degree of

DOCTOR OF ENGINEERING

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Major Subject: Mechanical Engineering

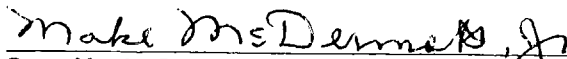
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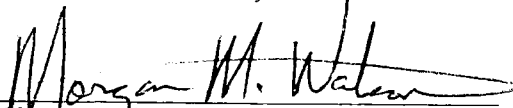
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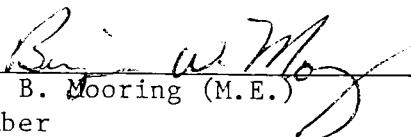
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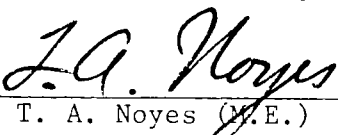
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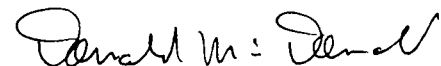
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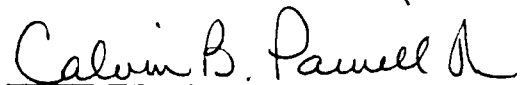

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ABSTRACT

Intern Experience at

MEL, Inc. (May 1984)

James O. Morgan, P.E., B.S.M.E., Prairie View A&M University

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As a requirement of the Doctor of Engineering program, the author spent a one year internship at MEL, Inc., an engineering consulting firm located in Baton Rouge, Louisiana. During this period, he was responsible for the following assignments:

1. specifying the appropriate computer to implement an existing financial management system,
2. developing a "Project Management Quality Control Manual" which contains guidelines and checklists for the management and administration of a project from conception through completion,
3. designing the mechanical systems on a lift span bridge to be constructed over Bayou Grand Cailloeu in Terrebonne Parish, Louisiana ,
4. serving as project manager on three projects,
5. developing computer programs for billing clients and keeping drafting time records, and

6. participating in contract negotiations, fee proposal preparation, and Management Committee meetings.

These assignments exposed the author to a broad spectrum of both technical and managerial problems and practices. The internship experience proved to be a valuable part of his overall education.

ACKNOWLEDGEMENTS

It is with great pride that I acknowledge those persons who contributed to my academic education:

To Dr. Make McDermott, Jr., P.E., Chairman of my Advisory Committee for his valuable advice, support and understanding, and friendship during my stay at Texas A&M University.

I am also grateful to Dr. Ben Mooring, Mr. Ted Noyes, and Mr. S. H. Lowy, members of my Advisory Committee without whose participation and cooperation, this degree would not have been possible.

A very warm and heartfelt thanks goes to Mr. Morgan M. Watson, P.E. and the entire staff at MEL, Inc. for affording me the opportunity to complete this phase of my education during a time when the economy made it next to impossible to find a suitable internship.

Most importantly, I wish to thank my wife, Thelma, and my children, Nichelle and Russell, for the many sacrifices they have so willingly, and sometimes not so willingly, made so that I might pursue a graduate degree.

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CHAPTER I

INTRODUCTION

This report is a description of the author's one year internship at MEL, Inc. where he served as Project Control Manager. He was responsible for contract administration, computer operations, project planning and control. He also served as project manager on three engineering projects.

The objectives of the Doctor of Engineering program are to prepare individuals for professional engineering activities in business, industry, and in the public sector. The specific objectives of this internship are as follows:

OBJECTIVE I - ORIENTATION

Observe the overall organization of MEL, Inc. and the interaction between consultants and clients in order to understand how the various functions of the firm are utilized to produce the desired results. Place special emphasis on those components of business in the author's area of interest so as to broaden his knowledge.

OBJECTIVE II - Development

Take every opportunity to develop interpersonal, technical and managerial skills by:

- A. Studying and practicing the managerial techniques used by MEL, Inc.

- B. Participating in discussions involving philosophy of management while remaining alert to glean additional information and experience from routine daily activities.
- C. Improving technical expertise by participating in and supervising the preparation of the plans for one or more mechanical engineering projects.
- D. Improving leadership skills by coordinating the activities of the professionals representing various disciplines required on assigned projects, and supervising the project team through completion of the project.
- E. Improving administrative abilities by:
Serving as MEL's Contract Administrator which requires assisting in contract negotiations, reviewing contract documents for thoroughness and accuracy, making sure that all parties comply with contract provisions, and resolving contract disputes and audit issues.
- F. Assisting the principals in the preparation of fee proposals for new projects.

OBJECTIVE III - CONTRIBUTION

Making an identifiable contribution to MEL, Inc. by:

- A. Implementing a computerized financial management system that integrates financial management principles, standardized accounting procedures, project control reports, compensation guideline data, and historical data on projects.

- B. Developing a project management quality control system and documenting the procedure in a manual.
- C. Planning, developing, and managing the mechanical portion of a major engineering project.

This report is intended to establish that the objectives of the internship have been met through a description of the author's activities during the one year period. Chapter II gives some insight on MEL and its operations. Chapter III elaborates on each of the author's assignments and related technical and managerial activities. Chapter IV summarizes the report and relates the author's activities to his specific objectives. Chapter V concludes the report and briefly re-states the internship accomplishments.

CHAPTER II

THE FIRM

OVERVIEW

MEL, Inc. is a minority-owned multidisciplinary consulting engineering firm. Since the firm was founded in 1972, it has expanded from ten (10) part-time engineers to a full-time organization of three (3) principals and in excess of eighty (80) technical, professional and management staff persons.

With over eleven (11) years of operational experience, MEL is equipped to offer its clients a comprehensive range of engineering design and related services. MEL has experience in all aspects of engineering from initial consultation and study, through all phases of design, as well as construction supervision and inspection.

Major disciplines in which MEL, Inc. offers consulting services are as follows:

CIVIL AND STRUCTURAL ENGINEERING

Urban and Rural Highways

Elevated Highway and Expressway Systems

Bridges (Fixed and Movable)

Flood Control and Navigation Structures

Industrial and Commercial Buildings

Sidewalk and Street Improvements

Port Facilities

Industrial, Commercial and Residential Development

Airport Runways

Parks and Recreational Facilities

Parking Facilities

Water and Sewerage Treatment Facilities and Systems

Pumping Stations (Sewerage, Drainage and Waste Water)

Surveying (Topographic, Hydrographic and Cadastral)

Transportation Location Studies

Hydrological Studies

MECHANICAL ENGINEERING

HVAC Systems

Plumbing and Process Piping

Heavy Machinery

Dust Collectors

Materials Handling Services (Conveyors)

Heat Transfer Systems

Solar Energy Systems

Energy Management

ENVIRONMENTAL SCIENCES

Water, Air and Noise Abatement

Environmental Impact Studies

Hazardous and Industrial Waste Analysis

Water Quality Evaluations

Coastal Zone Management Studies

CONSTRUCTION ENGINEERING SERVICES

Value Engineering

Review Shop, Working and Erection Drawings

Field Surveys

Residential Inspection

Construction Contract Administration

Coordination of Testing Program

PLANNING AND TECHNICAL ASSISTANCE

Public Participation Programs

Site Development Planning

Project Funding Applications (Government and Private)

Project Administration

Master Plan Studies

Technical Assistance

Business and Management Assistance

The market area for services of the kind provided is nationwide; however, the majority of MEL's sales are derived within the State of Louisiana. Customers are largely institutional, consisting of agencies within local, state and federal governmental organizations. Other sales are minor, being derived from commercial and industrial services or non-governmental institutions.

ORGANIZATION AND MANAGEMENT

MEL's organizational structure was designed with emphasis on definite divisions of responsibilities. The current organizational

chart See Figure 1) depicts where paramount responsibilities and authority are placed in MEL's management structure. Principal individuals who function in key management roles are as follows:

MORGAN M. WATSON, (M.S.M.E.), P.E., President

Mr. Watson serves as the Chief Administrative Officer with ultimate responsibility for all activities. He meets this responsibility primarily through 1) project scheduling, cost and quality control and technical review. He is also responsible for identifying and pursuing new business opportunities. Mr. Watson's areas of technical specialization include HVAC, energy conservation, alternative fuels and solar energy utilization. He also serves as Principal-in-Charge on Projects involving Mechanical Engineering and Planning.

PRESS L. ROBINSON, (Ph.D), Executive Vice-President

As the Chief Fiscal Officer Dr. Robinson is responsible for all business and financial affairs. He also applies extensive expertise gained and as a Research Chemist and Professor of Chemistry in his role as Principal-in-Charge of Environmental projects.

THOMAS F. PHILLIPS, (M.S.C.E.), P.E., MANAGER OF OPERATIONS

Mr. Phillips joined MEL, Inc. as Manager of Operations after spending sixteen (16) years as Civil/Structural Engineer with the New Orleans District, Corps of Engineers. He is responsible for the coordination of day-to-day engineering activities (including quality control), management of construction projects and the design of major structures. He is also responsible for coordinating branch

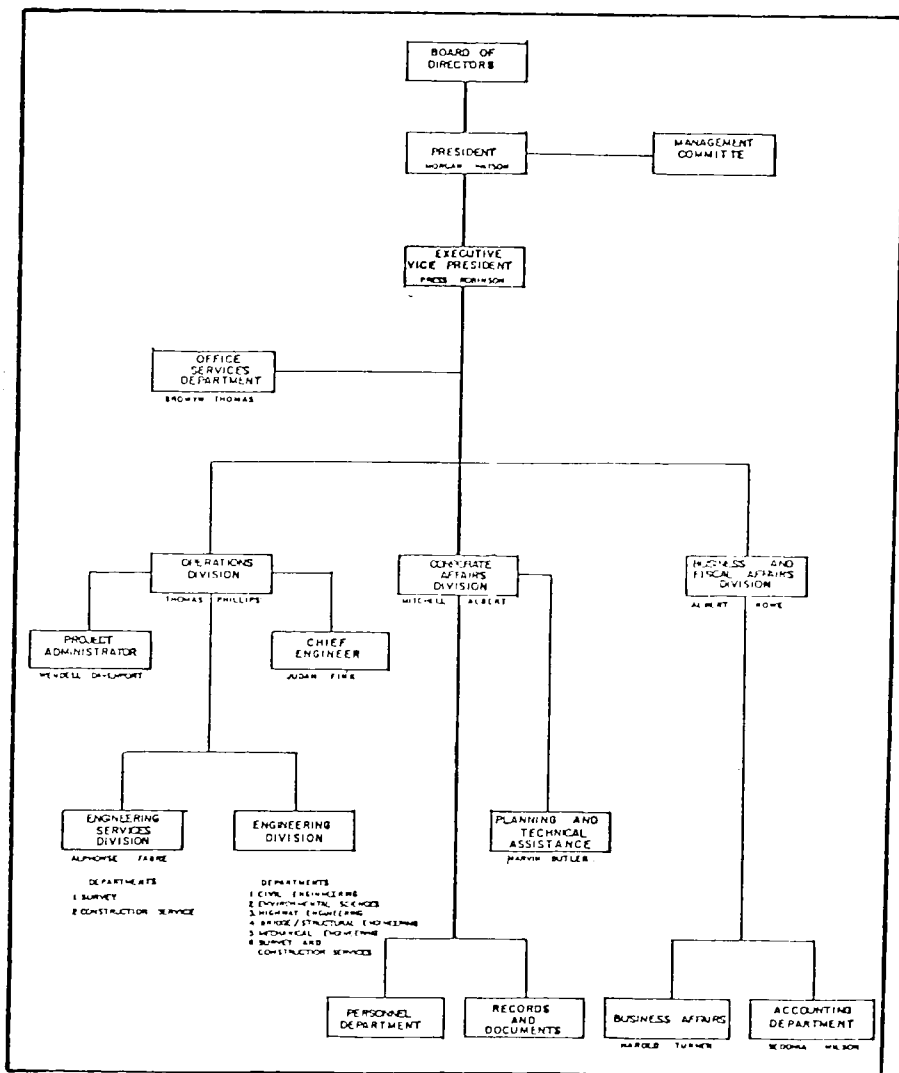


FIGURE 1
Organizational Chart

offices in Baton Rouge, New Orleans, and the Shreveport, Louisiana project office. Mr. Phillips serves as Principal-in-Charge of Civil Engineering and Surveying projects.

MITCHELL ALBERT, JR., (M.S.), MANAGER OF CORPORATE AFFAIRS

Mr. Albert acquired more than ten (10) years of administrative expertise as a business development executive plus sixteen (16) years as Professor of Business Management, prior to his employment with MEL. His credentials in financial management, production control and planning are well established. As Manager of Corporate Affairs, he is responsible for the day-to-day management of personnel, business and office services, and records and documents functions. He also supervises the Planning and Technical Assistance Department.

ALBERT B. ROWE, (B.S.), MANAGER OF BUSINESS AND FISCAL AFFAIRS

Mr. Rowe's responsibility is for general cost accounting and payroll. His expertise has been invaluable in financial management and control of various projects. He formerly served as Chief Accountant for the Los Angeles County School Board Lunch Program for ten (10) years.

ALPHONSE L. FABRE, JR., (M.S.C.E.) P.E., R.L.S., MANAGER OF ENGINEERING SERVICES BRANCH

As Manager of Engineering Services, Mr. Fabre is responsible for technical and administrative operations of the New Orleans branch office from which surveying and construction supervision activities are performed. He gained administrative and management

experience during his fifteen (15) years with the New Orleans District Corps of Engineers. While with the Corps, he was responsible for the overall administration of the district's quality assurance construction inspection program, and the initiation, administration and management of all architect/engineering contracts for construction, inspection and surveying services.

WENDELL D. DAVENPORT, (B.S.C.E.), P.E., MANAGER OF ENGINEERING BRANCH

With over thirty (30) years of administrative and professional project experience with highways, expressways, streets, bridges, public utilities and building structures. Mr. Davenport is a strong asset to MEL. He is responsible for the day-to-day technical and administrative operations of the Baton Rouge office, which performs all engineering, planning and environmental services activities performed.

JUDAH S. FINK, (M.S.C.E.), P.E., CHIEF ENGINEER

As Chief Engineer, Mr. Fink has technical responsibility for all projects. He has over forty-five (45) years of experience in the design and supervision of various bridges, highways, dams, industrial plants and miscellaneous structures. Mr. Fink is a member of Services Core of Retired Executives (SCORE), and has provided assistance to MEL, Inc. in the areas of project management and financial planning.

MARVIN V. BUTLER, (M.S.), DIRECTOR OF PLANNING AND TECHNICAL ASSISTANCE

Mr. Butler has acquired more than fourteen (14) years of management and administrative experience in the field of housing, planning and community development. Prior to joining MEL, his professional experience included work in state agencies and local government. His expertise with local governments is well documented. As Director of Planning and Technical Assistance. He is responsible for marketing, implementing community development projects, planning and development, grant procurement and local government relations.

CHAPTER III

INTERNSHIP PARTICIPATION

The present chapter deals primarily with the author's direct participation in the on-going activities at MEL, Inc. The assignments are presented in the order in which they occurred. At times there were several activities going on simultaneously. The Management Committee meetings which occurred monthly are listed last.

The author started his internship with MEL, Inc. on June 1, 1983. At this time, MEL, Inc. was heavily involved in planning and re-organizing to meet its growth projections. The primary concerns were as follows:

1. Upgrading its physical facilities by the acquisition of additional office space, upgrading its word processing equipment and the acquisition of a computer to meet its increased technical and administrative requirements.
2. Restructuring its management redefining managerial responsibilities to accommodate the increase in projects and personnel.
3. Providing a system of project administration that would maintain MEL's quality standards while keeping track of all finances as they relate to each project.

The author began the internship by evaluating MEL's computer needs for implementing a financial management system. Shortly after, he was heavily involved with improving the project management

system, and developing and implementing a project management quality control procedure. This task was the largest single effort by the author during the internship. During the remaining period of the internship, the author continued to contribute in the areas of computer hardware and software for project management and design. Meanwhile, he was exposed to management and contract negotiation procedures. This was done mostly through the preparation of fee proposals for contracts to be negotiated, and by participating in the negotiations and management committee meetings.

COMPUTER NEEDS FOR IMPLEMENTATION OF FINANCIAL MANAGEMENT SYSTEM

At the beginning of the author's internship, MEL had a contract with Harper and Shuman in Cambridge, Massachusetts who had developed a comprehensive computer based Corporate and project Financial Management System (CFMS) that utilizes input data taken directly from the employee's time sheet.

MEL was in the process of converting the format of their regular time sheet to comply with the input format required by Harper and Shuman. This data was being sent by mail to Harper and Shuman once a month where it was processed and computer print-out was returned to MEL. An in-house computer that would either time-share with the Harper and Shuman mainframe or run the CFMS software in-house would cut down on the turn-around time and provide MEL with the capabilities of running other application software.

The utilization of the CFMS package requires the installation of: 1. microcomputer(s) at MEL which could be used as an intelligent terminal capable of communicating with the Harper and Shuman mainframe, or 2. a mini-computer, compatible with the CFMS software which would enable MEL to bring the system in-house. Harper and Shuman identified the Radio Shack TRS-80 Model II, the Apple III, the IBM Personal Computer (PC), and Intertec Superbrain, as microcomputers for which software was available for time sharing with CFMS software. Likewise, they identified the VAX 730 system by Digital Equipment Corporation as the only minicomputer for which CFMS software had been written for in-house use. Additionally, Harper and Shuman stated that, among the microcomputers, the software for the IBM PC was more reliable for time sharing than that for the Radio Shack or Apple III. This was due to the fact that they first developed the time sharing software for the IBM PC and have had more time to debug this software.

MEL, Inc. also had technical needs that required computer aided analysis in HVAC, coordinate geometry, surveying, bridge design and structural analysis. For these areas of engineering analysis most of the software for the IBM PC runs on CP/M-86 (a 16 bit operating system) and CP/M-80 (an 8 bit operating system). However, the MS-DOS operating system utilized by the IBM PC has defeated CP/M-86 in the marketplace battle for single user, single task operating systems on 8088/8086 micros. Thus, in the future, far more software will be written to run on MS-DOS than on CP/M-86.

Trane, a manufacturer of HVAC equipment, has written a three-level trace program for HVAC load calculations, duct and

equipment sizing, and coil sizing. Trane's programs will run on the Radio Shack TRS-80, IBM PC, and Apple III. Trane had an agreement with IBM whereby the purchaser of an IBM PC can get up to a 15 percent discount on the computer hardware if the purchaser agrees to purchase the software from Trane.

Table 1 shows the purchase cost over a three year period for the IBM PC, purchased from IBM, Radio Shack TRS-80 Model 16, Apple III, and IBM PC purchased through Trane. The Intertect Superbrain was not considered because there was no sales or service support in the Baton Rouge area.

The computers listed above were evaluated on the basis of cost and software availability. The IBM PC was recommended to satisfy MEL's computer needs primarily because of the availability of applications software needed by MEL. The IBM would also cost slightly less over three (3) years if purchased from Trane. Thus, the author recommended that MEL obtain an IBM PC from Trane and purchase the necessary software.

MEL can save the additional expenditure of \$750 per month (CFMS time-sharing cost shown in Table 1) for the general administration and utilization of Harper and Shuman personnel and software by acquiring a VAX 730 computer system. This would provide MEL with a stand-alone, in-house computer system that utilizes the Harper and Shuman Interactive Management Information System software. Therefore, it was further recommended that MEL purchase the VAX 730 within the next three years. In addition to bringing the Harper and Shuman software in-house, the purchase of the VAX 730 would provide MEL with capabilities of handling larger engineering analysis

TABLE 1

PRICE ANALYSIS

ITEM	IBM PC	TRS-80	APPLE	TRANE
Hardware	\$5324	\$6932	\$5323	\$ 4425
Phone Line	80	80	80	80
CFMS Software	750	750	750	750
Trane/COGO Software	1375	1375	1375	1375
TOTAL	\$7479	\$9087	\$7468	\$ 6580

MAINTENANCE

Hardware	\$450	\$425	\$450	\$ 450
Phone Line	40	40	40	40
CFMS	150	150	150	150
Connect Time	360	360	360	360
TOTAL/YR	\$1000	\$1360	\$975	\$1000

TOTAL/ 3 YEARS	\$10,479	\$13,167	\$10,393	\$9,580
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programs and provide the computing power needed to drive computer aided design and graphic stations.

The author believes that this combination will provide MEL, Inc. with the administrative, management, technical, and graphical capabilities that are "state of the art."

There were three (3) courses in the author's academic program that contributed directly to his preparation for this assignment. Namely, Acct. 640 - Accounting Concepts and Procedures, Fin 635 - Financial Management for Engineers I, and IEn 666 - Cost Estimating, Engineering Economy and Planning.

PROJECT MANAGEMENT SYSTEM

The performance of most architectural and engineering design requires the efforts of more than one individual. A number of people may be, simultaneously, working on a project over an extended period of time. Therefore, it is usually advisable to develop a team approach for accomplishing the work, with a Project Manager serving as team leader. The team approach offers a degree of continuity, awareness of the status of a project, and a formal mechanism for exchange of information and coordination among team members, whether they be in-house personnel or outside consultants.

When the author came on board, MEL was expanding both in personnel and projects. At that time there were only four persons functioning as project managers; Mr. Thomas F. Phillips, Manager of Operations, Mr. Judah Fink, Chief Engineer, Mr. Wendell Davenport, Engineering Branch Manager, and Mr. Alphonse Fabre, New Orleans Branch Manager. Due to expansion and growth in personnel and projects, MEL need to delegate the project management

responsibility to other personnel in order to free their key personnel to assist in marketing efforts. So the author was required to:

1. evaluate the procedure being practiced,
2. consult with the principals in order to obtain project philosophy,
3. develop and document a project management procedure so that MEL could maintain the quality of its projects while extending project management responsibilities to other deserving personnel.

The following is a summary of the project management procedure presented:

Project management begins as soon as MEL is awarded a project. A project number is assigned at the time of the "Notice to Proceed." The Chief Engineer, in consultation with the Branch Manager(s), selects the Project Manager with (1) scope of the project, (2) location of the project, (3) client preference, and (4) workload being the primary factors influencing the decision.

Figure 2 shows that the project organization for a typical branch is a matrix. The matrix organizational form is an attempt to combine the advantages of the pure technical structure (rows of the matrix) and the project administrative structure (columns of the matrix). It is ideally suited to a company, such as MEL, which is "project driven." Each Project Manager reports directly to the Chief Engineer on all technical matters. The Chief Engineer has total responsibility and accountability for all the projects.

PROJECT ORGANIZATION CHART FOR A TYPICAL BRANCH

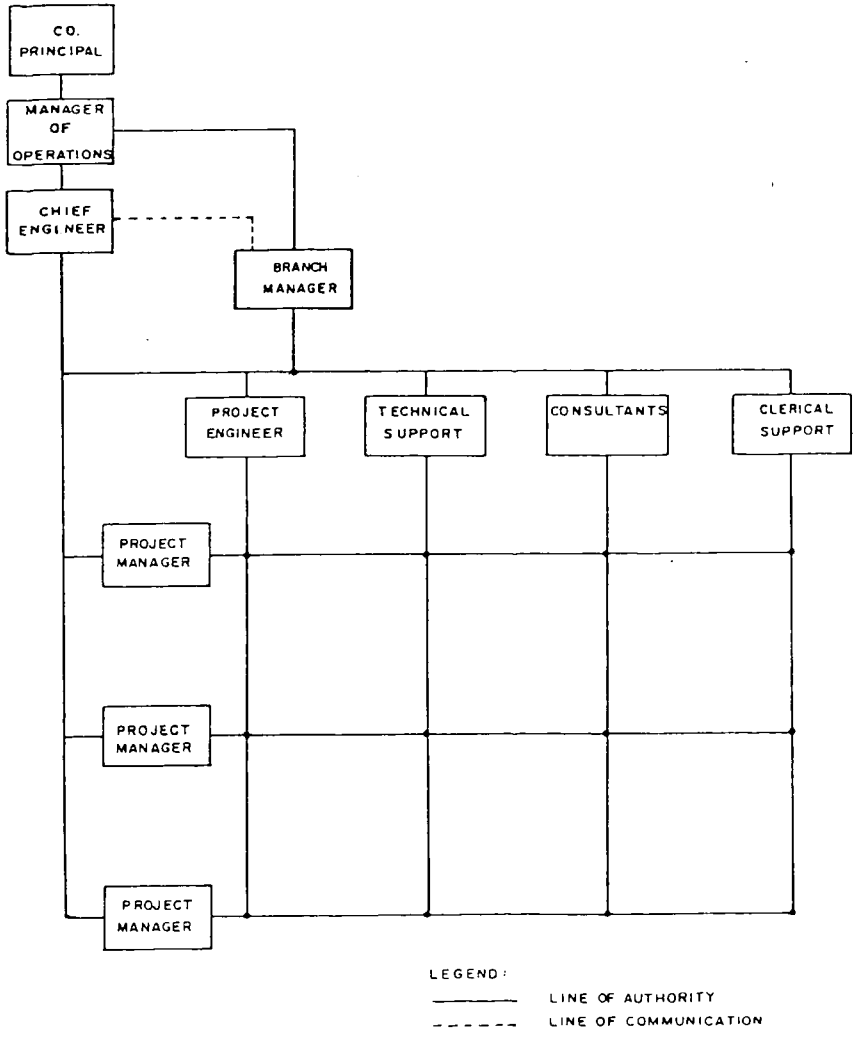


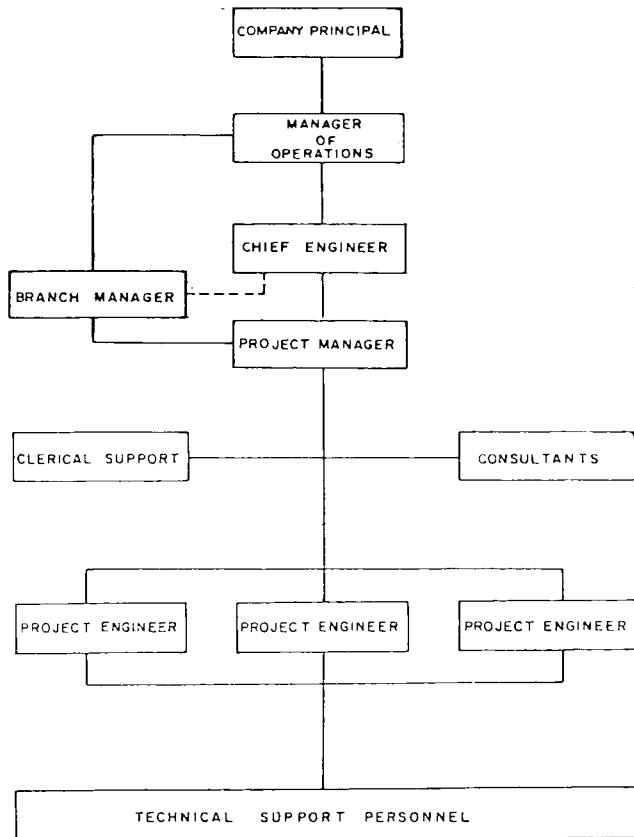
FIGURE 2
Typical Branch Chart

The project team is the basic unit that performs the administrative and technical functions on each project. Figure 3 shows the organization chart for a typical project team. Responsibility for the overall administration coordination of each project is assigned to a Project Manager, but detailed technical design responsibility is assigned to the project engineers, who coordinate the activities of the various draftsmen and other technicians assigned to the project. Consultants and specialists are utilized as needed, reporting directly to the Project Manager. The Project Manager reports to the Branch Manager and Chief Engineer on administrative and technical matters respectively. The Chief Engineer reports to the Manager of Operations on all project matters. The Project Manager must be a Registered Professional Engineer except for projects that do not require the seal of a registered engineer.

The size of the project team depends upon the size and type of project. On a small project, for example, the Project Manager and Project Engineer could be the same person, depending on the personnel and specialities required. The aim is to make the project team as small as is practical to perform the work required in a professional and timely manner. The project team (including consultants) is selected by the Branch Manager and Chief Engineer as soon as possible. This enables key personnel to attend the program preparation meetings with the client.

Wherever possible, the selection of engineers, draftsmen, other support personnel, and consultants, will be based on their experience on similar types of projects. As much as possible, the

ORGANIZATION CHART FOR A TYPICAL PROJECT TEAM



LEGEND:
 ——— LINE OF AUTHORITY
 - - - - LINE OF COMMUNICATION

FIGURE 3

Typical Project Team

same team members are kept throughout the project. Technical support personnel for each project are assigned at the discretion of the Branch Manager, and all members of the project team may be assigned to more than one project.

The technical and administrative efficiency of the Project Manager is the key to the success of the project team approach. He is responsible for productivity on his project from the standpoint of quality and quantity. He consults with the Branch Manager and Chief Engineer at all times.

Data is gathered from the time sheets and entered into the computer for cost accounting purposes. The Project Manager is expected to maintain records of engineering cost on his projects and compare his records with the computed cost.

TYPICAL PROJECT SEQUENCE

Projects performed by MEL utilize the following sequence:

1. A job becomes an active project as soon as the "Notice to Proceed" is received from the client, at which time a project number is assigned. The Project Manager, who will be responsible for the project, is selected at the time the fee proposal is prepared.
2. Every project must have a written work program prepared immediately after the signing of an agreement. This program will form the basis for all engineering work to be performed and shall be approved by the client. The responsibility for the development of this written project program rests with the project manager who has consulted

with the client to determine the design requirements and other pertinent facts and features of the project. The work program includes the following items:

- a. Function of the project when completed
- b. Location of the project
- c. Design criteria to be used
- d. Engineering requirements (project scope)
- e. Technical guidelines to be used
- f. Project schedules
- g. Client contact(s)
- h. Fee for professional services
- i. Billing procedure
- j. Schedule of subsequent meetings
- k. Schedule of technical reviews

3. The project team is then selected by the Branch Manager and the Chief Engineer.
4. Once all personnel who will work on the project have been selected, but prior to beginning work, the Chief Engineer calls a pre-work conference with all persons (including consultants) who will work on the project. The scope of the project, the design philosophy, time schedule, man-hour projection and costs, as well as the duties and responsibilities of each person, are discussed. In discussing the project budget, 1) MEL's guidelines are follows:

5. During the design phase, the following planning and control activities take place:

- a. The Chief Engineer reviews each project on a monthly basis with the Project Managers. During these meeting, the progress of the project is discussed along with the budget, schedule, design philosophy and any technical problems that are encountered.
- b. The Chief Engineer must approve all changes in scope initiated by the client, and notifies him, in writing, of any changes that affect the contract. Changes in scope are documented in writing. A letter is written to the client informing him that his request constitutes a change in scope and fees must be adjusted accordingly.
- c. The Chief Engineer meets regularly with the client to discuss the project status.
- d. The project team meets as needed, but at least once monthly, and prior to the submission of billings, drawings, etc. In order to make sure that all aspects of the project are coordinated and submittals are of good and consistent quality, all submittals to the client are made through the Chief Engineer.
- e. The Project Manager must keep good records of all communications pertaining to the project. Records of all correspondence are kept in the project file along with any minutes of meetings, submittals, calculations, shop drawings, etc. Any submittals to the client,

consultant, or any other person or agency, are accompanied by a written letter of transmittal from the project manager. Also, in-house submittals must be documented in writing.

- f. All formal correspondence generated by the Project Managers is reviewed by the Branch Manager and/or the Chief Engineer before leaving the office. If neither of the above is available and it is urgent for the correspondence to be dispatched, it must be reviewed by the Manager of Operations or one of MEL's principals. Under no circumstances is correspondence dispatched without review. Minutes of all meetings with the client and with the project team are sent to the Branch Manager and the Chief Engineer.
- g. After completion of each phase of a project, that phase is reviewed by the project team, including the Chief Engineer. Once the final phase is completed, an independent review team reviews the project's final plans and specifications and/or other documents. The project team responds to comments made as a result of the review, which is conducted under the supervision of the Manager of Operations prior to final submission to the client.
- h. The project is submitted to the client on or ahead of schedule.

6. Prior to project close-out and final billing to the client, the Branch Manager performs a final check of the contract and project files to make sure that all provisions of the contract have been adhered to.
7. Once the project is closed out, the project file is submitted to the Manager of Operations, who is responsible for storing files on completed projects.

The above Project Management Procedure is a part of the Quality Control Project Management Manual written by the author (see Appendix A). It has been implemented on all new projects. By the start of the next fiscal year, September 1985, it is expected that all projects will follow this format.

Engineering Management Control Systems, IEn - 663 is the one course in the author's academic preparation that stood out and made a valuable contribution in the above assignment.

MOVABLE BRIDGE DESIGN

The movable bridge is a type of bridge which is used exclusively at navigable stream crossings to satisfy requirements imposed by a unique group of environmental circumstances. The geometric requirements, for vertical clearances of marine traffic, for the safe movement of vehicular traffic and for a tie-in of the bridge and its approach structure with the existing roads adjacent to the bridge, are critical.

Three months into the author's internship, MEL entered into a contract with the Louisiana Highway Department to do the preliminary mechanical, electrical, civil and structural design, and the final

mechanical and electrical design for the Combon Bridge, a movable lift type bridge over Bayou Grand Caillou in Terrebonne Parish, Louisiana.

The state specified that the bridge should have a movable span of seventy-five feet and have a span width of thirty-eight feet. In addition, it shall be a vertical lift bridge, which means the entire span rises through a specified distance in order to allow marine traffic to flow. The vertical travel distance for the bridge was specified to be 69.66 feet.

The author served as Project Manager on the seventy-five foot movable span Combon Bridge and was responsible for the design and selection of the mechanical equipment. The mechanical equipment required was that necessary to actually operate the movement of the bridge. On the Combon Bridge all the equipment is operated from a central location, the "operators house." The moving parts of the bridge and their supporting members were designed or sized in accordance with the Louisiana State and Federal Highway codes and specifications.

The weight of the 189,000 pound bridge span will be fully counterweighted so that the machinery must handle ice and wind loads but not the span load. Four span motors of 7.5 horsepower each were chosen as the prime movers based on an unbalanced load of 13,000 (7) pounds, a speed of 37.8 feet per minute, and an efficiency of 60%. Brakes of 160 foot-pounds torque capacity shall be attached at each motor shaft and will bring the span to a complete stop in 10 seconds

from a velocity (speed) of 37.8 feet per minute in its most unbalanced condition (both wind and ice load with span traveling down).

At the time of this writing, all of the preliminary plans have been completed. The "plan in hand" meeting was held on March 8, 1984. This meeting was attended by all parties (local and state officials, proposed contractors, engineering consultants, environmental groups, etc.) to review the preliminary plans and to evaluate the effects on their respective area of interest, and to make any desired changes before the development of the final plans.

The author found System Engineering 620 - Preliminary System Design to be most useful in the completion of this project due to its application to real problems.

MANAGEMENT OF PROJECTS

The author served as Project Manager on three projects. One project involved copying data files for Southern University's Student Retention Center. The other two required the closing of two Facilities Plan and Environmental Assessment projects for the closing of two Facilities Plan and Environmental Assessment projects for St. Joseph and Clayton, Louisiana, respectively.

As Project Manager on Southern University's Student Retention Center the author was required to copy information onto 5.25 inch, double density, double sided, floppy disks (IBM Personal Computer Compatible) from Southern University's IBM 4341 Main-Frame Computer.

The author was influential in the decision to accept the project and was Project Manager from the projects inception. The fee on this project was \$4,854.00.

The transfer of data on the IBM PC disk drive to the mainframe, IBM 4341, has been successful. A software package, Smartterm 100, was purchased from Persoft Inc. in Minneapolis, Minnesota to run on the IBM PC. A line from the IBM 4341 which was previously connected to an existing dumb terminal (Lear Siegler) was connected to the RS-232 port on the IBM PC. Then the Persoft software was executed and data stored on the IBM 4341 was unloaded thru the multiplexer and Modem and phone lines to the IBM PC and stored on floppy disk. The reverse process copying data from the IBM PC to the 4341 was also achieved using the appropriate commands in Smartterm 100. The Student Retention Center was satisfied with the ability to use their PC to communicate with the University's IBM 4341 mainframe.

In addition, the author served as Project Manager for a Facility Plan and Environmental Assessment for a proposed municipal sewage system for St. Joseph, Louisiana and a similar project for Clayton, Louisiana. On the St. Joseph and Clayton projects, the original Project Managers were no longer with MEL. The author was given the responsibility to close out both projects. For the Clayton project, it was necessary for the author to make a presentation of the results to the City Council members at their March 6, 1984 council meeting. The fee on these projects totaled \$66,168.00.

No one particular course aided in these assignments, rather the author attributes the successful completion of these assignments to his overall academic preparation.

SOFTWARE DEVELOPMENT

The author developed two software programs for MEL's in-house use. The first program was for billing MEL's clients for time spent by the field survey crews. The program prompts the user for specific input; such as the number of employees, the billing month, the beginning date of the pay period, the last date of the pay period, and the classification of the employee. The program then prompts the user for the regular time worked, overtime and shift work and if the employee was a driver of one of MEL's trucks. The output of the program is a table with five columns headed; hours, overtime, truck, classification and shift differential. Under each column, the appropriate data is printed for each employee. There is a final section of the program that converts the data into dollars plus MEL's overhead profit. It shows the total amount due MEL for each classification of employee.

The second program was to record drafting time spent on various sheet and projects for use in project control cost estimating, planning, and scheduling. This program prompts the user for the draftsman's employee number, the project number, the sheet number, and the hours spent on the drafting sheet. When the user is finished for the day, the program processes the data and prints a table that allows management to tell, at a glance, how many hours were spent on a job, what drafting sheet was used, the total

drafting time spent on any sheet and by whom. The print-out can be updated periodically by starting with the last period total, then inserting the current data.

Three courses, Theory of Finite Element Analysis - MM 647 Synthesis of Mechanisms - ME 689, and Application of Energy Management - ME 689, were very useful to the author due to their extensive use of programs for analysis and application.

CONTRACT NEGOTIATIONS AND FEE PROPOSALS

In general, engineering and architectural firms are selected for projects by the client. They do not submit bids for projects. The selected firm is required to submit a fee proposal, which is used as a basis for the final contract negotiations.

The author prepared three fee proposals for contracts with the Army Corps of Engineers and participated in the contract negotiations. These fee proposals were: 1) Survey and Survey Support for Surveying and Mapping, 2) Construction Supervision, Inspection and Related Services, and 3) Survey and Survey Support Services for Inspection of Structures. See Appendix B for the Resume of Negotiations for "Survey and Survey and Support Services for Inspection of Structures" and "Construction Supervisions, Inspection and Related Services."

During this assignment the author found Management 643 - Legal Relations to be a valuable asset.

MANAGEMENT COMMITTEE MEETINGS

MEL's Management Committee consists of 1) the President, 2) the Executive Vice-President, 3) the Manager of Operations, 4) the Manager of Business and Finance, 5) the Manager of Corporate Affairs, 6) the Office Service Department Manager, and 7) the Chief Engineer.

Regularly scheduled meetings of this committee are held once a month. A status report on current activities is presented by each division manager. The author was also required to make a presentation at these meetings reporting the status of his internship activities. It was during these committee meetings that the requests were made for the author to develop the two software programs discussed in the previous section of the report.

The involvement in management committee meetings at MEL proved to be enlightening, interesting and educational, giving the author a thorough understanding of how management decisions are made and implemented.

Chapter IV

SUMMARY

This chapter is a summary of the author's intern activities and their relationship to the internship objectives. One objective may be addressed by several activities; therefore, rather than restate the objective several times, all of the objectives will be listed below for easy reference and then referred to by number. The discussion will include the following: 1) Computer Needs for Implementation of Financial Management System, 2) Project Management System, 3) Movable Bridge Design, 4) Management of Projects, 5) Software Development, 6) Contract Negotiations and Fee Proposals, and 7) Management Committee meetings.

The specific objectives of the internship are as follows:

OBJECTIVE I - ORIENTATION

Observe the overall organization of MEL, Inc. and the interaction between consultants and clients in order to understand how the various functions of MEL are utilized to produce the desired results. Place special emphasis on those components of business in the author's area of interest so as to broaden his knowledge.

OBJECTIVE II - DEVELOPMENT

Take every opportunity to develop interpersonal, technical and managerial skills by:

- A. Studying and practicing the managerial techniques used by MEL, Inc.
- B. Participating in discussions involving philosophy of management while remaining alert to glean additional information and experience from routine daily activities.
- C. Improving technical expertise by participating in and supervising the preparation of the plans for one or more mechanical engineering projects.
- D. Improving leadership skills by coordinating the activities of the professionals representing various disciplines required on assigned projects, and supervising the project team through completion of the project.

E. Improving administrative abilities by:

Serving as MEL's Contract Administrator which requires assisting in contract negotiations, reviewing contract documents for thoroughness and accuracy, making sure that all parties comply with contract provisions, and resolving contract disputes and audit issues.

F. Assisting the Principals in the preparation of fee proposals for all new projects.

OBJECTIVE III - CONTRIBUTION

Making an identifiable contribution to MEL, Inc. by:

- A. Implementing a computerized financial management system that integrates financial management principles, standardized accounting procedures, project control reports, compensation guideline data, and historical data on projects.
- B. Developing a system for Project Management Quality Control, documenting this system in a Manual, and implementing the system.
- C. Planning, developing, and managing the mechanical portion of a major engineering project.

COMPUTER NEEDS FOR IMPLEMENTATION OF FINANCIAL MANAGEMENT SYSTEM.

MEL had administrative needs for an integral, accounting and financial management system that were met by the purchase of an IBM PC and a contract with Harper and Shuman. The author's implementation of this financial system satisfied Objective III-A.

PROJECT MANAGEMENT SYSTEM

In order to develop a project quality control system, it was necessary to determine the management priorities and to coordinate the proposed procedures with MEL's current activities and personnel. In accomplishing this assignment, Objectives I, II-A, II-B, and III-B were fulfilled.

MOVABLE BRIDGE DESIGN

The author served as Project Engineer for the mechanical design phase of a movable bridge over Bayou Grand Caillou in Terrebonne Parish, Louisiana. He was responsible for coordination and supervision of the mechanical design on this major project. This assignment satisfied Objective II-C and III-C.

MANAGEMENT OF PROJECTS

While serving as project manager on three projects it was necessary to coordinate all the activities of the project, direct MEL's personnel working on the project, and interface with the client as per the written contract. This assignment fulfilled Objective II-A and II-D.

SOFTWARE DEVELOPMENT

The development of the software fulfilled Objective III in general. It enabled MEL to keep accurate cost records on a variety of projects and it reduced the monthly preparation time for billing MEL's clients.

CONTRACT NEGOTIATIONS AND FEE PROPOSALS

During the early contract negotiations the author learned what contract guidelines and audit issues were to be adhered to in later negotiations. The preparation of the fee proposals gave a thorough understanding of the audit issues. His participation in these activities fulfilled Objectives I, II-A, II-D, and II-F.

MANAGEMENT COMMITTEE MEETINGS

The regular management committee meetings were an invaluable part of the internship. They provided the author knowledge and direction about management philosophy and how many top management decisions were made. The author's participation in these meetings fulfilled Objectives I, II-A, and II-B.

CHAPTER V

CONCLUSION

The internship experience was enriching and educational. It allowed the author to contribute to the internship firm and, at the same time, improve his personal skills through interactions with laymen, engineers, managers and clients. The author strongly believes that the internship fulfilled his own objectives as well as those set forth for the Doctor of Engineering program and would recommend a similar assignment for another engineer interested in the innerworkings of an engineering consulting firm.

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APPENDIX A
PROJECT MANAGEMENT QUALITY CONTROL MANUAL

TO: All Personnel
FROM: Morgan Watson, President
DATE: March, 1984

The contents of this Quality control manual is intended to enhance MEL's professional practices.

Since the firm was founded in 1972, MEL has been soundly staffed and operated by professionals with proven experience and expertise in their respective disciplines. The quality of work produced by the firm has enabled it to expand from ten (10) part-time engineers to a full-time organization of three (3) principals and in excess of eighty (80) technical, professional and management staff persons.

We are always conscious of our client's needs and will continue to perform beyond their expectations. Our current contracts and commitments guarantee stability and continuity in staffing levels.

MEL's emphasis is always on providing services, that exceed the requirements of the Owner within the schedule allowed and the budget set.

The following Quality Control Guidelines details MEL's philosophy.

Very truly yours,

Morgan M. Watson, President

MMW/las

CONTENTS

- General Management Considerations for Quality Control
- Section A - Pre-Proposal Project Scope Evaluation
- Section B - Proper Contractual Agreements
- Section C - Project Manager & Design Team System
- Section D - Written Project Program
- Section E - Design Budget and Time Schedule
- Section F - Project Phases and Reviews
- Section G - Project Scheduling and Control
- Section H - Checking Procedures
- Section I - Construction Contract Administration
- Section J - Completed Project Evaluation
- Appendix A - Quality Control Audit Procedure
- Appendix B - Company Practices which reduce the risk of suits and claims Professional Liability.

GENERAL MANAGEMENT CONSIDERATION FOR QUALITY CONTROL

General: The following are general statements which are the underpinning of any quality control program. From planning to project completion, the emphasis must be on quality control.

I. Planning

Planning is the beginning. Quality in work is not an accident. The end result of such a program is a plan which guides the firm toward the delivery of quality professional services and a profitable operation.

II. Organizing

Organize to determine, specify and structure tasks which will accomplish the desired objective--quality services. The clear assignment of responsibility and assumption of authority by those in each position in the firm, is the beginning of the implementation of the quality control program. The establishment of performance standards, policies and procedures by which tasks are to be performed, must be stated with clarity.

III. Staffing

The careful selection and training of personnel to perform the specified tasks is essential.

IV. Directing

Directing is the responsibility of management--firm and project--to coordinate performance of each and every task to make the quality control programs function as planned, organized and staffed.

V. Controlling

Controlling is a top management responsibility. It is monitoring and measuring to assure that the "actual" results are consistent with the "planned" results. A critical element is the implementation of immediate corrective action when results are not in compliance with the planned predetermined program objectives.

VI. Coordination

The success of a quality control program depends on coordination among parties involved or individual projects. Professional associates--in-house or outside consultants--must be included in the decision-making process during design and construction. Good communication and well-structured coordination are essentials to a successful project.

VII. Recordation and Retention

All discussions with all parties--clients, outside consultants, contractors--shall be recorded in objective detail and those records retained in the project profile.

DESCRIPTION OF SERVICES

The market area for services of the kind provided by MEL is nationwide, however, the major portion of MEL's sales are derived within the State of Louisiana. Customers are largely institutional consisting of agencies with Local, State or Federal governmental organizations. Other sales are minor, being derived from commercial and industrial services or non-governmental institutions. The majority of engineering services provided are in Mechanical, Civil Engineering, and Surveying. However, the capability exists for providing services in the peripheral areas of Environmental Sciences, Planning, and through its associates, Electrical Engineering and Architecture.

Management and leadership for MEL are provided by officers and managers with proven experience in their respective areas. In order to make full use of this expertise, the Company's single-tiered organizational structure fig. 1 was designed with emphasis on definite divisions of responsibilities where paramount authority is placed in the Company's management structure.

The ultimate responsibilities for Quality Control are those of the top production management personnel. (Manager of operations, Chief Engineer, Branch Managers). Their responsibilities are outlined in the following Position Descriptions.

POSITION DESCRIPTION

TITLE: Manager of Operations

REPORTS TO: Vice President

GENERAL REQUIREMENTS

The Company's Chief Technical and Professional Officer, responsible for all production activities, including developing standards, and quality control.

PERFORMANCE RESPONSIBILITIES

- Has administrative and professional responsibility for all branch operations.
- Responsible for the professional quality of all production work performed by the Company.
- Develop all production standards including Standard Operating Procedures for each type of project performed by the Company.
- Supervises and enforces all quality control activities by making sure that all completed project engineering work is independently reviewed, that it satisfies the "scope of work" negotiated with the client and that it conforms to the client's standards.
- Reviews the "Engineering Job Progress Report" submitted by the Branch Manager, and reports status of projects to the Vice President.
- Negotiates critical and controversial issues with top level personnel and officers of other organizations and companies.
- Assists the President in marketing, contract negotiations and contract administration when requested to do so.
- Reviews all billings to clients for whom MEL is performing work, making sure that all billings are correct and collectable.
- Other duties as necessary.
- Maintains a technical file (calculations, plans, specifications, etc.) on all closed-out projects.

PROFESSIONAL GROWTH AND ETHICS

Has responsibility for his own professional growth and development; for staying current with new and improved engineering ideas and techniques; and for attending appropriate professional meetings, seminars, conferences, expositions, etc.

RECOMMENDED QUALIFICATIONS

A registered professional engineer having a minimum of fifteen (15) years experience as a practicing engineer at the Project Manager or higher level. Previous administrative experience required.

TERMS OF EMPLOYMENT

A salaried exempt employee.

SALARY CLASSIFICATION

EXEC. - V

POSITION DESCRIPTION

TITLE: Chief Engineer

REPORTS TO: Manager of Operations

GENERAL REQUIREMENTS

The Company's Chief Technical Officer, responsible for all engineering activities, including developing engineering standards, and quality control.

PERFORMANCE RESPONSIBILITIES

- Responsible for the professional quality of all engineering work performed by the Company.
- Assist preparation of fee proposals.
- Develops all engineering standards including Standard Operating Procedures for each type of engineering project performed by the Company.
- Make sure that all completed engineering work is independently reviewed, that it satisfies the "scope of work" negotiated with the client, and that it conforms to the clients standards.
- In consultation with the Branch Managers, selects the Project Manager on all engineering projects.
- Insures that a technical file is maintained (calculations, plans, specifications, etc.) on all projects.
- Reviews the "Engineering Job Progress Report" submitted by the Project Manager, and reports engineering status of projects to the Manager of operations
- Responsible for the preparation of the following monthly reports for the Manager of Operation.
 1. Projected Billing Schedule
 2. Engineering Job Progress Report
- Submits to the Manager of Operations, information on the status of all projects, particularly of all changes in the original project work program and scope.
- Other duties as necessary.

PROFESSIONAL GROWTH AND ETHICS

-Assumes responsibility for his own professional growth and development; for keeping current with the literature, new and improved engineering techniques; and for attending appropriate professional meetings, seminars, expositions, etc.

RECOMMENDED QUALIFICATIONS

-A registered professional engineer having a minimum of twelve (12) years experience as a practicing engineer at the Project Manager's level or above. Must also have previous administrative experience.

TERMS OF EMPLOYMENT

-A salaried exempt employee.

SALARY CLASSIFICATION

-EXEC. - IV

POSITION DESCRIPTION

TITLE: Branch Manager

REPORTS TO: Manager of Operations

GENERAL REQUIREMENTS

Has responsibility for all the day-to-day operations of a Branch Office of the Company.

PERFORMANCE RESPONSIBILITIES

- Oversees the administrative operations of the particular branch.
- With the Chief Engineer supervises the preparation of project work programs (scope, schedule, budget, etc.), enforces the "Project Management Guidelines," and insures the efficient, competent, and timely completion of all projects performed by the Branch.
- Submits to the Manager of Operations information on all activities in the Branch, forwards to him copies of correspondence, plans, specifications, cost estimates, and other data during the various phases of projects under his supervision.
- Supervises all Branch employees, including performing employee evaluation, and administering salary, employment, and termination procedures.
- Maintains an ever-ready, high awareness level of the status for all projects in his Branch by monitoring, on a regular basis, the activities of Project Managers under his supervision.
- Anticipates and fulfills manpower requirements of the branch
- Supervises the preparation of billings to clients for whom work has been performed.
- Maintains technical data files, books, catalogs and standards pertinent to the Branch disciplines, and ensures that personnel keeps abreast of latest technical information.
- Retains responsibility for and authority over branch personnel when they are assigned outside the branch.
- Other duties as required.

PROFESSIONAL GROWTH AND ETHICS

-Assumes responsibility for his own professional growth and development; for keeping current with the literature, new and improved engineering techniques; and for attending appropriate professional meetings, seminars, expositions, etc.

RECOMMENDED QUALIFICATIONS

-A registered professional engineer having a minimum of twelve (12) years experience as a practicing engineer at the Project Manager's level or above. Must also have previous administrative experience.

TERMS OF EMPLOYMENT

-A salaried exempt employee.

SALARY CLASSIFICATION

-EXEC. - IV

MEMORANDUM

TO: All Personnel

FROM: Press L. Robinson
Vice-President

DATE: December 9, 1983

SUBJECT: Company Practices Which Reduce the Risks of Suits and Professional Liability Claims.

Listed below are practices that MEL, Incorporated expects every employee to adhere to in his/her daily work. These practices will considerably reduce claims due to employee errors and/or omissions.

1. Always use a glossary with specifications. Check for the use of words with more than one meaning.
2. Show dimensions, quantities, or capacities on drawings in one place only.
3. Specify that the contractor is to locate underground utilities and that drawings show approximate locations only.
4. Discuss the relative merits of design, etc. with the client, contractor, etc. Plan regularly scheduled meetings with employees, clients and contractors. Document all meetings and summarize what took place.
5. Refrain from giving oral interpretations of drawings and/or specifications, especially at bid time.
6. All office discussions involving design shall be documented by a brief memorandum, with a copy to the project file.
7. Written guidelines shall be established for telephone answering personnel, and these should be reviewed with them periodically.
8. Develop an indoctrination manual for personnel handling field problems, especially construction review. Whenever reference is made to construction, use (if possible) the term "construction review or observation" rather than inspection or supervision. The legal definition of the latter two terms carries more responsibility than we are being paid to perform.
9. Enforce the use of telephone and conversation logs and project memoranda (periodically written project progress reports showing cumulative work performed).

10. Each project shall have a "Project Review Committee" which should function at specific review points during the life of the project.
11. Supervisors shall document, in writing, judgemental errors and/or success of their employees and stress high quality judgement at all times. Supervisors shall work with personnel to develop and discuss evaluation techniques and goals.
12. Always reduce all agreements to writing.
13. Periodically review personnel and hiring policies.
14. Develop design standards for each type of work performed by the company. That is, what goes on a drawing, how, when, how much detail, etc.
15. Document to the client the limitations of all designs and studies. Recommend that each design and/or study be as complete as possible and warn of potential problems which may result from lack of completeness. Projects with inadequate fundings frequently lead to professional liability claims and/or loss of profit.
16. Do not accept projects for which we do not have the expertise to perform.
17. Review cards, brochures and qualification statements for up-to-date capabilities.
18. Do not bid on design projects.
19. Watch out for the following in contracts:
 - a) Hold harmless and indemnity provisions
 - b) Warranties and guarantees
 - c) Defense and indemnity provisions
 - d) Certification clauses
 - e) Certificates of performance
20. Carefully explain to the client the difference between a bid quotation and a cost estimate.
21. Be very careful and realistic when making cost and schedule estimates. Include a well conceived factor of safety.
22. Employees are discouraged from moonlighting. There is a risk to both the employer and employee.
23. Use the specifications and reports checklists when writing all specifications and reports.

24. Develop and use design manuals and design checklists.
25. During downtime, have engineers and drafters prepare standard details showing preferred methods of assembly or arrangement.
26. Record in a log book and date stamp all incoming shop drawings. Use a shop drawing checklist.
27. Shop drawing stamp shall be approved by the Company.
28. As a routine matter, include provisions in the general specifications requiring the contractor or owner to purchase "All-Risk" Builders' Risk insurance coverage and include the design professional as an additional insured.

Summary

IN SUMMARY, A QUALITY CONTROL PROGRAM IS EFFECTIVE ONLY IF MANAGEMENT IS COMMITTED TO IT. ACHIEVEMENT OF QUALITY CONTROL IS FIRST AND LAST A MANAGEMENT ATTITUDE WHICH IS GIVEN SUBSTANCE IN THE APPLICATION OF ESTABLISHED PROCEDURES.

SECTION A

PRE-PROPOSAL PROJECT SCOPE EVALUATION

General: The essence of a successful project is proper client selection. Our practice depends upon our ability to bring our talents and accomplishments to the attention of prospective clients before there is any apparent need for design services. We all know that by the established methods, the client really selects us, the design professional. He may come to us on a referral basis; he may ask us to submit a resume of our professional qualifications as well as a brochure describing some of our recent projects; he may visit some of our existing work; or, in a few cases, ask that we participate in a design competition to qualify or be selected for his job. On almost every job, the client will make the comparisons and be the selector. It is equally important for us, the professional, to exercise a reasonable degree of selectivity with respect to our clients.

The process of selective evaluation of clients we refer to as Pre-Proposal Project Scope Evaluation. Upon notification from a prospective client that we are being considered as the Architect or Engineer for his project, the following tasks should be completed prior to submitting a proposal or entering into an agreement.

I. Client Selection

A. Know the Integrity and Financial Capacities of Clients

1. Eliminate "problem clients," basing your opinion on past experience or knowledge of fellow professionals.
2. Do not depend wholly on information from other professionals. The Client-A/E relationships can sometimes be an emotional experience. One combination of personalities may be better suited than another.
3. Determine client's financial responsibility and integrity.
4. Be aware of potential re-use of plans and specifications recognizing inherent unknowns to professional liability exposure.

II. Analysis of project Characteristics

- A. Is financing adequate for scope and quality of project that client desires?
- B. When will funding for design fees be available?
 - 1. Give consideration to likelihood of delays caused by environmental, ecological, zoning, social or community groups.
 - 2. All hearings, public or private, shall be expensed as a multiple of direct cost.
- C. Verify your ability to perform, including at least:
 - 1. Licensing
 - 2. Personnel
 - a. Knowledge
 - b. Experience
 - c. Current Workload
- D. Be aware of dangers in re-use of plans and specifications.

III. Project Pre-Scheduling

- A. Outline of estimated work effort of each architectural and engineering discipline.
 - 1. Prime professional should not commit to schedule or budget limitations prior to coordination with consultants.
- B. Analyze project.
 - 1. List basic information required to perform each phase of the project.
 - 2. Designate priority of services by discipline.

SECTION B

PROPER CONTRACTUAL AGREEMENTS

General: One would think that, after more than 65 years of published writings on the subject of proper contract documents, all design professionals would recognize the need for, and make constructive use of, available guides. Unfortunately they do not, and the lack of a clear, written understanding between the client and the design professional as to their relations and obligations lead to misunderstanding and dissatisfaction which, in turn, often lead to litigation. William Stanley Parker, FAIA, writing in the Second Edition of The Handbook of Architectural Practice, 1923, expressed his concern in the following terms:

"The strange timidity that Architects display informing clients of their charges, and their willingness to go forward without any understanding whatever, are discreditable to them as men of affairs. Such conduct leads to misunderstandings, disputes and litigation."

While Mr. Parker was writing for the attention of Architects, the same was and is true of Engineers. Much of the litigation currently facing Design Professionals stems from their failure to employ contract agreements which fairly and accurately express the scope of services to be performed.

I. The Well-Written Contract

- A. It expresses with clarity services to be performed, the responsibility of all parties, and compensation.
- B. It is the first, and often the best, defense against a professional liability claim.
 1. The vast majority of claims brought against design professionals are predicated on an allegation that the professional breached a duty owed the client.
 2. These claims are refuted when it can be shown by the contract that there was no duty owed, hence no duty breached.

II. Availability of Standard Contract Forms

- A. The Engineer's Joint Contract Documents Committee has developed a complete range of standard forms including those for use between Engineer and Owner, Engineer and Consultant, Engineer and Project Manager. MEL, Inc has a similar set of documents appropriate for use by its personnel.

1. These forms accurately reflect the proper professional relationship including rights, responsibilities and privileges of each party.
 2. Use of these forms, along with frank and open discussion of their terms at the outset, substantially reduces misconceptions and misunderstandings which are the root of many liability claims.
- B. Architecture and Engineering professional groups have developed standard General Conditions.
1. These are carefully integrated with the Owner-Engineer/Architect agreement.
 2. The compatibility of these documents are essential. They clearly delineate the duties and responsibilities of the respective parties and eliminate conflicting lines of authority.
- C. These standard agreements are under constant review and periodic revisions reflecting changing circumstances in the industry and the courts. It is of utmost importance that current editions be used.

III. Nonstandard Contract Forms

- A. In circumstances where the prospective client has devised his own form.
1. Use the standard form as a basis for comparison to avoid, or at least recognize, provisions which impose duties, responsibilities and potential risks which exceed those deemed customary and normal.
 2. The coordination of the Owner-Engineer/Architect agreement and the General conditions remains absolutely essential.

IV. Contract Alerts

- A. For nonstandard forms of agreement seek competent legal and insurance counsel prior to signing.
- B. Look to the plain meaning of terms used. If they do not say what you intend, or if you do not understand their meaning or intent, do not sign the agreement.

- C. Be especially alert to contract terms which demand perfection or absoluteness. The law demands only that you exercise reasonable care, skill and diligence in rendering professional services unless you have by contract obligated yourself to a higher standard. Some common examples that create potential liability are:
1. "Assure Compliance" - to make certain, which is a guarantee of perfection
 2. "Insure Compliance" - same as above
 3. "Complete drawings and specifications"--drawings and specifications are neither intended to be, nor can they reasonably be expected to be, "complete." What is intended is that they be in sufficient detail to enable the Contractor to make an informed bid and to carry out the construction work to complete the project as contemplated.
 4. "Guarantee" or "Warranty"--anything that states or implies a guarantee or warranty of performance is to be avoided.
 5. "Supervision"--is responsibility of the Contractor. Design professionals should avoid the term "supervision" as descriptive of their construction phase services. It should not only be avoided in contracts but in all communications with respect to the project including the specifications.
 6. "Control"--as applied to the Engineer/Architect relationship with the Contractor is improper. The design professional has no contractual relationship with the Contractor and for this reason words like "control," "direct" or "require" when describing the A/E's relationship with the contractor should be avoided.
 7. "Certification"--by the Engineer/Architect is appropriate in many instances, e.g., Certificate of Substantial Completion. The wording of the certificate is to be viewed with careful scrutiny to assure you are not certifying to a level that exceeds the accepted standard of care of performance or to a function outside your area of responsibility.

- D. Responsible members of the design team--in-house and outside consultants--must be familiar with the terms of the Owner-Engineer/Architect agreement and the General and Supplemental Conditions of the Construction Contract. These documents frequently contain solutions to project problems. Understanding of and adhering to these provisions are essential.

- E. Two highly recommended sources of comprehensive reviews of contract documents are:
1. Commentary on Contract Documents by John R. Clark, Esq., NSPE Document No. 1910-9 (1981 Edition). (Available from NSPE/PEPP, ACEC, ASCE).
 2. Architects' Handbook of Professional Practice, Volumes One and Two. (Available from AIA).

SECTION C

PROJECT MANAGER & DESIGN TEAM SYSTEM

General: Because the performance of most Architectural and Engineering design requires the efforts of more than one individual and since a number of people may be working on a project simultaneously over an extended period of time, it is usually advisable to develop a team approach for accomplishing the work, with a Project Manager as team leader. The team approach offers a degree of continuity, awareness of the status of a project and a formal mechanism for exchange of information and coordination among team members, whether they be in-house or outside consultants.

I. Management considerations

- A. A Project Manager and a representative of each applicable design discipline constitute the design team.
- B. It is likely that an individual may simultaneously perform in more than one function on more than one design team.
- C. It is the responsibility of management to determine that proper assignments have been made to accomplish each required activity for each project.

II. Team Selection

- A. Identify key services to be provided on a project and select team members who are experienced and qualified in those particular areas.
- B. The average experience on a project team is a valuable measure of the overall team ability.
 - 1. Compute "Experience Quotient."

$$\text{E.Q.} = \frac{\text{Total Years of Experience (applicable to project)}}{\text{Number of Team Members}}$$
 - 2. As a general rule, if the E.Q. is less than five (5), consideration should be given to provide closer supervision and/or checking of that project.
- C. Experienced personnel should be assigned as lead personnel.
- D. Inexperienced personnel should be carefully assigned and work only under supervision of experienced personnel.

III. Team Composition

The following listed positions are typical for a large project:

- A. Project Manager
- B. Project Architect or Project Engineer
- C. Design Architects or Design Engineers
- D. Technicians
- E. Draftsmen

IV. PROJECT MANAGEMENT GUIDELINES

A. Project Organization and Administration

Project management begins as soon MEL is awarded the project. A project number is assigned at the time of the Notice to Proceed. The Chief Engineer in consultation with the Branch Manager(s) selects the Project Manager with (1) scope of the project, (2) location of the project, (3) client preference, and (4) workload, being the primary factors influencing the decision. Fig. 1 shows that the project organization for a typical branch is a matrix operation. The matrix organizational form is an attempt to combine the advantages of the pure technical structure and the administrative structure. It is ideally suited for companies, such as MEL, which is "project driven".

Each project manager reports directly to the chief engineer on all project matters. The Chief Engineer has total responsibility and accountability for all projects in the firm.

The project team will be the basic unit that performs the administrative and technical functions on each project. Figure 2 shows the organization chart for a typical project team. Responsibility for the overall administration and coordination of each project is assigned to a Project Manager, with detailed technical design responsibility being assigned to the project engineers, who coordinate the activities of the various drafters and other technicians assigned to the project. Consultants and specialists are utilized as needed, reporting directly to the Project Manager. The Project Manager reports to the Branch Manager and Chief Engineer on administrative and technical matters respectively. The Branch Manager and Chief Engineer report to the Manager of Operations on all project matters. The Project Manager shall be a Registered Professional Engineer except for projects that do not require the seal of a registered engineer.

The size of the project team depends upon the size and type of project. On a small project, for example, the Project Manager and Project Engineer could be the same person, depending on the personnel and specialities required. The aim is to make the project team as small as is practical to perform the work on the project in a professional and timely manner. The project team (including consultants) should be selected by the Branch Manager and Chief Engineer as soon as possible, this will enable the key people to attend the program preparation meetings with the client.

Wherever possible, the selection of engineers, drafters, other support personnel, and consultants, will be based on their experience on similar types of projects, and as much as possible the same team members will be kept throughout the project. Technical support personnel for each project are assigned at the discretion of the

Branch Manager, and all members of the project team may be assigned to more than one project.

The technical and administrative efficiency of the Project Manager is the key to the success of the project team approach. He is responsible for productivity on his project from the standpoint of quality and quantity. He shall consult with the Branch Manager and Chief Engineer at all times.

All communication with the client will be channeled through the Chief Engineer and it is only with his approval that direct contact with the client may be made by personnel assigned to the project. In general, the Chief Engineer will arrange and attend any desired meetings between MEL personnel and the client.

All personnel assigned to the project shall submit their time sheets to the Project Manager for review of time charged to the project. He then submits the time sheet to the Branch Manager. Any changes in scope of the project, or any revision in man-hour estimates for the project (either increase or decrease) shall be approved by the Manager of Operations. The Project Manager will update the project schedule to reflect any approved changes in scope and man-hours.

The cost accounting on the project is done by computer. The Project Manager is expected to maintain engineering cost control on his projects and should compare his records with the computed cost. The Project Manager obtains this information from the Branch Manager.

B. Typical Project Sequence

All projects performed by MEL shall follow the following sequence:

1. A job becomes a project as soon as it is awarded to the firm and a project number is assigned. The Project Manager, who will be responsible for the project, is selected at the time that a fee proposal is prepared.
2. Every project shall have a written work program (scope and schedule) prepared by MEL and approved by the client. The program sets forth all pertinent factors and features of the project and must necessarily start with the client since he is the only one acquainted with the overall requirements of the project. The Chief Engineer should meet with the client as soon after ward of the project as possible to refine the scope and define the schedule for the project. The program must be written and include the following items:
 - a. Function of the project when completed
 - b. Location of the project

- c. Design criteria to be used
 - d. Engineering requirements (project scope)
 - e. Technical guidelines to be used
 - f. Project schedules

 - g. Client contact
 - h. Fee for professional services (Direct labor manhours and dollars plus indirect dollars)
 - i. Billing procedure
 - j. Schedule of subsequent meetings (Inhouse and with client)
 - k. Schedule of technical reviews
3. The project team is then selected by the Branch Manager and Chief Engineer.

 4. Once all personnel who will work on the project have been selected, the Chief Engineer calls a pre-work conference with all persons (including consultants) who will work on the project prior to beginning work. The scope of the project, the design philosophy, time schedule, man-hour projection and cost, as well as the duties and responsibilities of each person will be discussed. In discussing the project budget, MEL's guidelines shall be followed. Use MEL, Inc's "Quality Control Audit Procedure" checklist throughout the project (See Appendix A).

 5. Once the program is prepared, the Project Manager documents the program. The agreed upon fee is put in writing and a letter is sent to the client from the Chief Engineer requesting verification by signing and returning a copy of the letter. Receipt of this signed verification from the client means that any changes in the program must be documented along with our changes in fee required. Any telephone conversations held with the client are to be recorded and placed in the project file. This is particularly important on Federal Projects. All written communication shall be filed in the project file.

 6. During the design phase the following shall take place:
 - a. The Chief Engineer reviews each project on a regular basis with the Project Managers. During this meeting the progress of the project is discussed along with the budget, schedule, design philosophy and any technical problems that are encountered.

- b. The Chief Engineer shall be cognizant of all changes in scope by the client, and should notify him in writing of any changes that will affect the contract.
- c. The Chief Engineer shall meet regularly with the client to discuss the project status.
- d. The project team should meet as needed, but at least once monthly, prior to the submission of billings, drawings, etc. In order to make sure that all aspects of the project are coordinated and that all submittals are of good quality, all submittals to the client must be thru the Chief Engineer.
- e. The Project Manager must keep good records of all communications pertaining to the project. Records of all correspondence should be kept in the project file along with any minutes of meetings, submittals, calculations, shop drawings, etc., Any submittals to the client, consultant, or any other person or agency, shall be accompanied by a written letter of transmittal. Inhouse submittals shall also be documented in writing.
- f. All formal correspondence generated by Project Managers shall be reviewed by the Branch Manager or the Chief Engineer before leaving the office. If neither of the above is available and it's urgent for the correspondence to be dispatched, it shall be reviewed by the Manager of Operations or a Company Principal; however, in no circumstances shall correspondence be dispatched without review by one of the above. Minutes of all meetings with the client and with the project team shall be sent to the Branch Manager and the Chief Engineer.
- g. After completion of a phase of the project, but prior to submission to the client, the project shall be reviewed by the team, including the Project Manager, and then by the Chief Engineer. An independent review team, (that didn't work on the project) shall review the project's final plans and specifications and/or other documents. The project team shall react to comments made as a result of the review, which is performed under the supervision of the Manager of Operations.
- h. All vital information shall be reviewed, and the scope of work shall be re-checked to make sure that the final submittal to the client is in keeping with the agreed upon scope and all work is of a professional quality.

- i. The project shall be submitted (along with a letter) to the client on or ahead of schedule.
6. During the construction phase, the Manager of Operations insures that regular inspections are made (as required by the contract) and that field reports are submitted to the client. Copies of all such field reports shall be placed in the project files.
7. Prior to project close-out and final billing to the client, the Branch Manager shall perform a final check of the contract and project files to make sure that all provisions of the contract have been adhered to.
8. Once the project is closed out, the project file is submitted to the Manager of Operations, who is responsible for storing files on completed projects.

The following are Performance responsibilities, recommended qualifications, and position classification of MEL personnel having an effect on the quality control of projects.

POSITION DESCRIPTION

TITLE: Project Manager

REPORTS TO: Chief Engineer

GENERAL REQUIREMENTS

- Plans, develops, and manages one or more projects in accordance with the Company's "Project Management Guidelines.:
- Assists marketing in the preparation of fee proposals for new work.
- Coordinates the various disciplines required on assigned projects, and supervises the project team through completion of the project.
- Has direct responsibility for keeping projects on schedule and at Company's desired quality control levels.
- Prepares the billings to the clients on all projects for which he is responsible.
- Interfaces directly with the clients on technical and contractual matters relating to the projects.
- Assists in contract negotiations when requested to do so.
- Represents the Company in meetings with clients.
- Assists with marketing activities as required.
- Other duties as assigned.

PROFESSIONAL GROWTH AND ETHICS

Each project manager is expected to seek additional growth and development, and will be encouraged to attend appropriate educational activities.

RECOMMENDED QUALIFICATIONS

A registered professional engineer with a minimum of five (5) years of practical experience in the field of registration. In areas where registration is not required, must possess the education and experience required by the project.

TERM OF EMPLOYMENT

A salaried exempt employee.

SALARY CLASSIFICATION

E - 4 or EXEC. III

POSITION DESCRIPTION

TITLE: Project Engineer

REPORTS TO: Project Manager

GENERAL REQUIREMENT

The Project Engineer has the responsibility of carrying out the design work on a project for a specific discipline.

PERFORMANCE RESPONSIBILITIES

- Establishes the design parameters together with the Project Manager.
- Is responsible for quality control for the design function.
- Provides guidance to other members of that design discipline.
- Is responsible for the final check of work product.
- Assures that the company's design policies, procedures, and standards are followed.
- Is responsible for the preparation of the technical specifications.
- Is responsible for the processing of shop drawings.
- Shall analyze and respond to alternate designs.
- Shall respond to questions during construction and make field visits.
- Is responsible for keeping the work on schedule.

PROFESSIONAL GROWTH AND ETHICS

Each Project Engineer is expected to seek additional growth and development, and will be encouraged to attend appropriate educational activities.

TERMS OF EMPLOYMENT

A salaried exempt employee.

SALARY CLASSIFICATION

E-3

SECTION D

WRITTEN PROJECT PROGRAM

General: The written Project Program follows immediately after the signing of the Owner-Architect/Engineer agreement. Written Project Program should be prepared for every job regardless of its size. This document will form the basis for all design work performed and should be approved by both the Architect/Engineer and client.

A definite outline of the scope of the project should be prepared before starting any work. This outline should be confirmed in writing by the client. It is absolutely essential that both the client and the Architect/Engineer have a mutual understanding of the project requirements.

The responsibility of developing a written project program rests with the Project Manager. The written program must establish the design parameters for all Architectural and Engineering disciplines and reflect the client's budgetary limitations.

I. Project Program

The written Project Program should contain most, if not all, of the following:

A. Client Aims and Concepts

1. Define the function of the project.
2. Provide characteristics of the equipment used.
3. Indicate anticipated future expansion.
4. Set-out other items resolved with the Owner that would affect the project.

B. Cost Limitations

1. Set total project limitations.
2. Cost limitations for the various segments of the project should be developed, e.g. site work, architectural, HVAC, plumbing, electrical, etc.

C. Space Requirements

1. Identify each individual function with its associated space requirements.
2. Designate all functional groupings or separations.

3. Describe each space giving occupancy load, ceiling height or head room, access points, crane loads, lighting and electrical requirements, etc.

D. Functional Description and Requirements

1. List construction materials and finishes.
2. Describe all site improvements.
3. Describe all structural, mechanical and electrical requirements.

E. Site Data

1. Perform boundary and topographical survey.
 - a) Survey closures to be checked before survey party is taken off project. If closures do not meet criteria-added surveys may be needed.
2. Perform soil testing.
3. Determine location and size of existing utilities.
4. Determine zoning restrictions.
5. Study access and traffic data.
6. Investigate history of drainage features.

- F. Master Plan and Expansion, including a drawing showing the location of the proposed facility on the site and show all planned future improvements and possibilities for expansion if the information is available.

G. Code Restrictions

1. List all applicable codes.
2. List all restrictive code requirements that will affect the project.

H. Time Restrictions

1. Establish a project time schedule listing dates for:
 - a. Schematic Design Phase
 - b. Design Development Phase Contract Documents Phase

- c. Contract Documents Phase
- d. Bid Period
- e. Construction Period
- f. Project Completion

- 2. List lead time required for major items requiring long delivery periods.
- 3. Consider potential time delays due to reviewing authorities.

I. Bidding and Contract Procedures

- 1. Determine contractor selection procedure (negotiated contract, competitive bid, and direct selection).
- 2. Determine client-imposed alternates or requirements.
- 3. Determine Architect/Engineer responsibilities at contract award.

II. Administration of Project Program

A. Distribution of Program

- 1. Establish a written distribution list with the name and position of each team member, including outside consultants.
- 2. Include the client or client representative on the distribution list.

B. Changes or Revisions

- 1. Any change which deviates from the formal written Project Program should be issued and distributed as a numbered and dated addendum to the program.
- 2. If changes are excessive, the entire program should be reviewed.
- 3. Clearly indicate to client the impact of requested changes.

C. Program Coordination

- 1. Responsibility for strict adherence to the program must be acknowledged at all levels including outside consultants.

2. Each discipline, in-house or outside consultant, must be responsible for its own activities.
3. At each distribution of program information, ample time should be given for a thorough review and acknowledgment by all disciplines prior to completion of the project phase.
4. A thorough check of the written Project Program should be accomplished at the completion of each phase and confirmed with the client.

SECTION E

DESIGN BUDGET AND TIME SCHEDULE

General: Prior to the preparation of budget and time schedule, the entire scope of the project has been defined, the design fee has been set, the contractual agreement has been signed, the project organization has been formed and the project program has been written and reviewed.

Before work commences, the Project Manager should budget both money and time for each phase thus providing each discipline with a yardstick against which to measure performance and monitor progress. Regardless of the office size or the size of the project, quality tends to suffer when a project runs behind schedule and/or over budget.

Point to Remember: Each discipline must agree to its budget of time and money prior to starting work. It should evaluate both budget and schedule against its computed effort, advise the Project Manager of its acceptance or rejection and provide the Project Manager with recommended adjustments as appropriate. This is essential when outside consultants are involved.

I. Design Budget

A. Budget Determination

The total design fee should be broken down at the start of the project to determine the design cost. A simple formula for the design cost is as follows:

$$\text{Design Cost} = (\text{Total Design Fee}) - (\text{Profit} + \text{Overhead} + \text{Project Direct Expenses})$$

1. Design Cost is the budgeted figure for salary cost to all disciplines. Each discipline should receive a proportionate amount depending upon its estimated effort in the project.

Note: Initial proportioning of design cost to the individual disciplines may be estimated by historical data from comparative past projects, by estimated manhour requirements, by estimated drawings to be produced, by estimated construction dollar values of each discipline, or by other reasonable process.

B. Other Factors Affecting Design Budget

1. Requirements for outside consultants.

2. Requirements for overtime as determined in computing time schedule.
3. The impact of a new project on the schedule of other projects in progress.
4. Project delays due to extended review periods or program changes resulting from such reviews.
 - a. Be especially cognizant of potential delays resulting from public agency review and approval procedures.

II. Time Schedule

A. Review Owner's requirements.

1. The Owner naturally has strong recommendations for early project completion.
2. Management should be very careful at the outset not to "overstate" the capabilities of the firm at the time of negotiations. The client rarely forgets the first date mentioned for design completion.
3. "Fast-tracking" or split contracts is becoming commonplace. MEL should be aware of the great amount of coordination required and the inherent problems of control of manpower and finished product. Extra fees, top quality management and high priority over other projects are necessary for success when designing under these requirements.

B. Review other in-house project commitments.

1. Determine if overtime will be required to meet commitments.
2. Work priorities should be established by Firm Management for all projects. Each department or discipline must determine the impact of each new project on its workload. It is not up to individual departments or disciplines to establish project priorities.

C. Measure time schedule continually against man-hour effort computed in budget analysis.

III. Administering Design Budget and Time Schedule

- A. Distribute final Design Budget and Time Schedule to all disciplines.

- B. Require confirmation of both Design Budget and Time Schedule by each discipline.
- C. Monitor cost, distributing and reviewing current costs with each discipline periodically.
 - 1. Compare dollars expended to percentage complete.
 - 2. Do not permit any discipline to overspend without investigation.
- D. Exercise Project Control, without which the entire project may become a "panic situation" leading to "short cutting" and elimination of necessary checking time resulting in undetected errors.
- E. Consider outside Consultants. If outside consultants are required, remember that their performance directly affects your own. Impose the same controls on them as imposed on disciplines within your own organization. Also involve them in the same communication and coordination procedures as applied to the in-house team.
- F. Schedule Small Jobs carefully. Remember that small projects are just as important to the firm as large projects.

SECTION F

PROJECT PHASES AND REVIEWS

General: Each project should be divided into phases of development, with sufficient review after each phase to assure that client goals and functional and technical requirements have been met.

Phases listed below are for project development and control and may not be consistent with phases associated with client billing agreements under lump sum contracts. Project phases and reviews should be developed to suit its requirements for the type projects following outline is presented only as a guide.

Project phases are listed as follows, showing approximate effort in each phase:

<u>Project Phase</u>	<u>Percent Effort</u>
I. Study and Report Phase	15%
II. Preliminary Design Phase	20%
III. Final Design Phase	40%
IV. Bidding or Negotiating Phase	5%
V. Construction Administration Phase	20%

I. Study and Report Phase

General: The Study and Report Phase is the "Conceptual Design" effort to establish the Owner requirements for the project, and to define these requirements so that the Owner and Project Team clearly understand the scope and limitation of the services.

Main design requirements of the Study and Report Phase are as follows:

- A. Prepare written project program.
- B. Prepare schematic design studies.
- C. Prepare probable project cost.
- D. Hold project review with in-house team and outside consultants.
- E. Secure client's written approval of Phase I and authorization to proceed with Phase II.

Tasks prior to starting Study and Report Phase:

1. Assign project team.
 2. Review project scope and owner's requirements.
 3. Review design budget and time schedule for Study and Report Phase.
 4. Determine manpower requirements for Study and Report Phase.
- A. Prepare Written Project Program (See Section C).
1. Should be prepared by Project Manager after conferring with client and with all applicable disciplines.
 2. The Project Program should establish design parameters and restraints for all disciplines.
- B. Prepare Schematic Layouts.
1. Drawings and/or sketches (minimum to define concept)
 2. General project description
 3. Systems concepts (usually written descriptions of structural, mechanical, electrical, environmental, etc.; may include design criteria and code restrictions; equipment literature, etc.)
 4. Renderings and/or models
 5. Photographs (site, etc.)
- C. Prepare Probable Project Cost.
1. Generally "rough" cost estimate; compare with similar past projects.

2. Include allowances for following applicable items:
 - a. Building costs
 - b. Site improvement costs
 - c. Utilities
 - d. Furnishings and equipment (If applicable)
 - e. Landscaping
 - f. Surveys
 - g. Soils investigation
 - h. Architectural and Engineering fees
 - i. Consulting fees
 - j. Insurance
 - k. Testing costs
 - l. Field Representative
 - m. Escalation factors
- D. Hold In-House Review (include consultants).
 1. Select experienced, qualified committee or individual not involved on the project.
 2. Critique Studies against client goals outlined in program.
 3. Approve Studies or return to design team with recommendations for additional work.
 4. After acceptable modifications, approve project for presentation to client.
- E. Hold Client Review.
 1. Have Project Manager and/or design team conduct presentation of Studies to client.
 2. Review design solution and cost estimate in relation to original client goals.
 3. Secure client approval in writing before proceeding further with project.

II. Preliminary Design Phase

General: The Preliminary Design Phase is the "Design Freeze" effort to research and develop the Study and Report to the point of proving compatibility of all systems incorporated in the project. The intent is that final contract documents be developed from the Preliminary Design documents with minimum supervision.

Tasks prior to starting Preliminary Design Phase:

1. Utilize same Project Team as for Study and Report Phase.
 2. Revise Study and Report for Client's comments and/or additional requirements.
 3. Distribute and review corrected Study and Report with Project Team.
 4. Review Design Budget and Time Schedule for Preliminary Design Phase.
 5. Determine manpower requirements for Preliminary Design Phase.
- A. Prepare Preliminary Design Drawings.
1. Draw to proper scale (same as intended for contract drawings).
 2. Establish and describe systems of all disciplines (architectural, structural, mechanical, electrical, environmental, etc.) and make budget allocation to each.
 3. Provide typical details necessary to establish workability of each system.
 4. Drawings may include, but are not limited to, the following:
 - a. Site Plans
 - (1) General topography; floor elevations
 - (2) Parking and paving; access to roadways
 - (3) Utilities
 - (4) Landscaping; fencing
 - (5) Exterior lighting

b. Floor Plans

- (1) Control dimensions; column spacings
- (2) Wall thicknesses; doors; windows
- (3) Identification of spaces
- (4) Identification of fixtures and equipment
- (5) Details of special areas
- (6) Furniture layouts

c. Elevations

d. Sections

- (1) Transverse & longitudinal;
- (2) Typical sections and details, large scale, to satisfy major design conditions of each discipline (make maximum use of freehand sketches)

e. Finish schedules

- f. Single-line mechanical layouts, showing equipment size and location; plumbing, etc.

g. Electrical

B. Prepare Outline Specifications.

1. Describe major systems, equipment, and materials.
2. Each discipline must substantiate system design with preliminary backup analysis and/or description of components.
3. List materials, methods and quality by specification division.

C. Verify Design Criteria with Applicable Agencies.

1. Establish single-point coordination for all legal and code compliance activities among all disciplines.

2. Each discipline must confirm, in writing, compliance with jurisdictional codes.
 - a. Building codes (national, state, city, governmental agencies, etc.)
 - b. Fire code requirements
 - c. Utility regulations
 - d. Environmental regulations
 3. Contact utility companies and public authorities on services, and secure written approval for service connections.
- D. Prepare Probable Construction Cost.
1. Each discipline submit estimate of cost for its portion of the project.
 2. One person or department assemble estimates and check against Preliminary Design Documents for accuracy and completeness.
- E. Hold In-House Review (include consultants).
1. Select experienced, qualified committee or individual (preferably the same that reviewed Study and Report).
 2. Critique design for:
 - a. Technical adequacy and costs
 - b. Conformance with client goals stated in original program.
 3. Approve Preliminary Design Documents or return to Design Team with recommendations for additional work.
 4. After acceptable modifications, approve project for presentation to client.
- F. Hold Client Review.
1. Project Manager and/or design team conduct presentation of Preliminary Design Documents to client; include outside consultants as necessary.
 2. Review all project systems selected.

3. Review probable construction costs of components and total project cost.
4. Secure client's approval in writing of Phase II and authorization to proceed with Phase III.

III. Final Design Phase

General: The Final Design Phase is the design effort to prepare final contract drawings and specifications necessary to advertise for bids and/or construct the project. Final documents should evolve smoothly from the information provided in the Preliminary Design Documents.

Main design requirements of the Final Design Phase are as follows:

- A. Prepare contract drawings.
- B. Prepare contract specifications.
- C. Review and revise, if necessary, the probable construction cost statement.
- D. File contract document with applicable authorities.

Tasks prior to starting Final Design Phase:

1. Project team should be same team as for Preliminary Design Phase.
 2. Revise Preliminary Design Documents for Owner's comments and/or additional requirements.
 3. Distribute and review corrected Preliminary Design Documents with project team.
 4. Review design budget and time schedule for contract documents.
 5. Determine manpower requirements for Final design Phase.
- A. Prepare Contract Drawing.
 1. Convey precise information in a concise way.
 2. Use standard format and presentation for all disciplines.

3. Explain all symbols and abbreviations clearly.
4. Provide index of drawings on cover sheet or on first sheet after cover sheet.
5. Provide drawings for each discipline.
6. Coordinate carefully all references to drawings of other disciplines.
7. Check and coordinate all drawings individually and between disciplines.
8. Develop Contract Requirements.
 1. Determine Bidding Requirements and Contract System.
 - a. Single Contract
 - b. Multiple Contracts
 2. Determine General Conditions.
 3. Determine Supplementary Conditions.
 4. Determine Technical Specifications.
 - a. Have each discipline prepare sections relating to its activity.
 - b. Check specifications with drawings.
 5. Use Standard AIA or Engineer's Joint Committee documents where possible.
 6. Assist client's counsel in selection and review of contract agreements if required.
 7. Clearly define alternates where applicable.
 8. Clearly define cash allowances where applicable.
 9. Determine client's requirements for insurance and bonds. Caution: Do not offer insurance and bonding advice. Such device should be obtained from the client's insurance consultant.
 10. Clearly define client's requirements for occupancy; phased occupancy.

11. Clearly define all client-furnished equipment or other items.
12. Obtain schedule for delivery and installation of client furnished equipment.
13. Prepare testing and quality control program and budgets.

C. Prepare Probable Construction Cost Estimates.

1. Each discipline submit a detailed estimate of costs for its portion of the project.
2. One person or department assemble estimates and check against contract documents for accuracy and completeness.

D. File Contract Documents with Applicable Authorities.

1. Building Department
2. Fire Marshal (local and state)
3. Department of Health
4. Department of Education
5. Environmental Agencies
6. Others as required

IV. Bidding or Negotiating Phase

A. Determine Award Method.

1. Bid
2. Negotiation
3. Direct Selection

B. Determine Bidder Qualifications.

C. Establish Basis for Evaluation of Bids.

D. Prepare and Distribute Bid Documents.

E. Hold Pre-bid Conference.

F. Prepare and Issue Addenda as Necessary.

- G. Receive, Tabulate and Analyze Bids.
- H. Evaluate Bids with Client.
 - 1. Make recommendation for award of one bid or rejection of all bids.
 - 2. If low bid is rejected, develop detailed documentation of rationale for action and avoid statements which may be interpreted as libelous.
- I. Notify Unsuccessful Bidders.
- J. Assist Client in Award and Execution of the Contract
- V. Construction Administration Phase (See Section I)

SECTION G

PROJECT SCHEDULING AND CONTROL

General: The complex architectural and engineering projects of today require the involvement of all professional disciplines in the design process. Since a Project Team includes many members, and since the firm may have many projects in the design process at the same time, an orderly procedure should be established to coordinate effort, meet time schedules and control design costs. This orderly procedure we designate "PROJECT SCHEDULING AND CONTROL."

Proper Project Scheduling and Control will enable management to answer the following questions during any phase of the work (while there is still time to take corrective action):

1. Is the project proceeding on schedule?
2. If not, what is cause of delay?
 - a. In-house cause--which discipline?
 - b. External cause--outside consultant, client, others.
3. Can extra manpower expedite the lagging?
4. Must the project completion date be extended?

Tasks prior to starting Project Scheduling and Control:

1. Assign Project Team.
 2. Prepare design budget and overall time frame for the project phase under consideration (applicable to all design phases).
 - a. Make certain all disciplines have accepted the new project budget and time schedules.
- I. Project Scheduling
- A. Outline the effort of each discipline.
 1. Visualize effort of discipline by component parts (reports, schedule of drawings, etc.).

- B. Require each discipline to analyze the project as follows:
 - 1. List basic information required to accomplish the outlined tasks.
 - 2. Designate other disciplines which must furnish information to permit accomplishment of outlined tasks.
- C. List main items of information that must be exchanged among disciplines to complete total project, and initiating discipline for each item.
- D. Establish a chronological order of all exchanges of information among disciplines.
 - 1. Once established for a particular type project, the same general sequence may be repeated for future projects.
- E. Assign specific date for each listed exchange of information to fulfill project time requirements.
 - 1. Established dates will determine manpower requirements for each discipline initiating information.
 - 2. Each date becomes a "milestone" to measure progress of project. (If required information is not exchanged on the designated date, project is behind schedule and corrective action can be taken quickly with minimum effect.)
- F. Document clearly the format and distribution of each exchange of information in the scheduling procedures.
 - 1. Project Manager must receive copy of all information exchanges.
 - 2. Format may be drawings; sketches; memoranda of design criteria; equipment literature; etc.
 - 3. Distribution should be to all affected disciplines on the Project Team including outside consultants.
 - 4. Information on any change regardless of apparent magnitude should be exchanged.

II. Control of Project Scheduling

A. Project Manager must expedite project schedule.

1. Anticipate dates when information is to be exchanged.
 - a. Know what is to happen, when.
 - b. Know which discipline is to initiate information.
 - c. Know distribution requirements.
2. Check to see designated exchange has taken place.
 - a. Do not allow project to "float" and waste valuable time and, subsequently, money.
3. Take quick action when specific information is not exchanged on designated date.
 - a. Check with initiating discipline quickly.
 - b. Determine course of action as soon as possible.
 - (1) May need additional information from client or another discipline.
 - (2) May require additional manpower; check with initiating discipline Team Member and/or superiors.
 - (3) May require rescheduling project, with possible extension of completion date.
 - (a) Notify other Team Members early when schedules are altered.
 - (b) Notify client when extension may be apparent.

B. Status reviews of project schedules

1. Project Team meetings
 - a. General reviews at certain stages (30%; 60%; 90%; weekly; monthly; whatever fits best with particular project).
 - b. When changes or modifications are made in design criteria, document in writing to all disciplines.

2. Management reviews of all projects

- a. Should be held regularly (weekly; at least monthly).
- b. Each Project Manager should give status of all his projects (size and value should not control).
 - (1) Report all projects behind schedule.
 - (2) Report which disciplines are delaying project schedules.
 - (3) Determine reasons for delay, assurance of corrective action and effect on present project schedules.
 - (4) Make decisions to expedite projects and/or revise project schedules.

SECTION H

CHECKING PROCEDURES

General: The professionals of today face more complex problems and are asked to find solutions in less time than for standard designs in the past. Engineering costs also have risen; so it is natural to look for ways to cut back on time and money. Eliminating adequate checking time is not the answer. Orderly procedures should be established to provide quality control with the least expenditure of time.

Checking should begin at the beginning of a project and must continue to the end to be effective. Some basic recommendations are listed for the following items:

- I. Checking Design Calculations
- II. Checking Contract Drawings
- III. Checking Contract Specifications
- IV. Checking Shop Drawings
- V. Checking Project Design Budget and Schedule
- VI. Checking Outside Consultants

I. Checking Design Calculations

- A. Know the design capability of person making calculations.
- B. Have experienced lead-person check design criteria for completeness and accuracy before design begins.
 1. Prepare checklists for various type projects to avoid omissions.
- C. Require approval of basic design system before starting detailed calculations.
- D. Set up standard design procedures and format for use as guide.
- E. Establish format requirements for calculations.
 1. Make calculations neat and legible.
 2. List all design assumptions.
 3. List all formulas and define symbols.
 4. Group calculations for various portions of project.
 5. Number all pages in proper order.

6. Provide index for quick reference.
 7. File for future reference when complete.
- F. Set up procedures for checking calculations.
- G. Check in detail special, intricate, unusual designs.

II. Checking Contract Drawings

- A. Require experienced lead-person to check basic system sketches and typical details for completeness and accuracy before placing on final drawings.
- B. Require detailed check of all dimensions and notes on drawings.
- C. Require lead designer to check all schedules, design criteria, and typical details.
- D. Require lead designer to review all drawings to verify that sections and details are labeled correctly.
- E. Require lead designer to coordinate drawings with other disciplines'.
- F. Require supervisor to "review" all drawings for general check.
- G. Prepare a form of standard "General Notes" as a guide to avoid omitting necessary criteria.

III. Checking Contract Specifications

- A. Start specifications early in design; do not wait until last week of project.
- B. Do not specify untried or untested materials without reasonable research.
- C. Develop standard master guide specifications.
 1. Edit master copies for each particular project.
 2. Do not use specifications from similar or past projects.
- D. Do not insert a complete manufacturer's specification that you do not understand.

- E. Require lead designer to prepare technical sections for his portion of project.
- F. Require lead designer to review completed technical specifications with his supervisor at end of project prior to printing.
- G. Have Project Manager coordinate compilation of specifications and prepare other than technical sections of specifications.
- H. Evaluate carefully all substitutions for acceptability.

IV. Checking Shop Drawings

- A. Have lead designer of project accomplish shop drawing check.
- B. Require detailed shop drawing check.
- C. Verify that Contractor has checked shop drawings prior to your check; if not, return drawings to him without approval and require resubmission.
- D. Do not hold shop drawings in office for checking any longer than necessary.

V. Checking Project Design Budget and Schedule

- A. During Design make periodic checks against Project Budget and Time Schedule. Frequency depends on size and complexity of project but should occur at least monthly.

VI. Checking Outside Consultants

- A. During Design make regular periodic checks to assure coordination between work of outside consultants and in-house design team.

SECTION I

CONSTRUCTION CONTRACT ADMINISTRATION

General: Construction Contract Administration may be the most difficult service to fulfill of all professional practice. There is an evolution of an attitude in which society readily accepts litigation to resolve differences which places the A/E in a position of having to practice defensively.

The Design Professional must be very alert in this area of his service. No matter how masterful and ingenious the Design Professional has been in the design of a project, he can lose everything, including the confidence and respect of his client, if the Construction Administrator does not clearly understand or discharge his responsibilities.

Some basic Quality Control recommendations are listed in the following categories:

- I. Construction Contract Administration Philosophy
- II. Project Representative
- III. Professional Duties in Construction Contract Administration

I. Construction Contract Administration Philosophy

- A. Basic relationship of each participant in a construction project is as follows:
 - 1. Architect/Engineer designs project.
 - 2. Contractor builds the project.
 - 3. Owner pays for project A/E has designed and Contractor has properly built.
- B. Construction contract is between Owner and Contractor.
 - 1. A/E is not a party to contract.
- C. A/E responsibilities are as follows:
 - 1. A/E interprets contract documents and all changes to documents.
 - 2. A/E establishes standards of acceptability for materials and workmanship furnished by Contractor.

3. A/E observes work quantity and quality of Contractor according to contract requirements.
4. A/E makes recommendation for progress payments to Contractor for completed work.
5. A/E recommends acceptance of the project at time of substantial completion.
6. A/E keeps Owner informed of status of project.
7. A/E is not responsible for Contractor's failure to carry out work in accordance with contract documents.

D. Contractor responsibilities are as follows:

1. Contractor is responsible to carry out work in accordance with contract documents.
2. Contractor supervises assembly of all materials.
3. Contractor supervises all labor to complete project work.
4. Contractor determines methods, means, techniques, sequences and procedures of constructing project.
5. Contractor is responsible for adhering to all laws and regulations affecting construction.
6. Contractor is responsible for safety precautions and programs.
7. Contractor is responsible for completing project within specified time limitations.

E. Limitation of A/E authority is as follows:

1. A/E has authority to reject work that is defective or that does not meet contract requirements.
2. A/E does not have authority to stop work under AIA/Engineers' Joint Committee standard agreements.
 - a. Only the Owner can stop work.
 - b. The A/E may recommend that the Owner stop work due to non-conformance or negligent work by Contractor.

3. A/E should not supervise or direct work nor should he instruct Contractor on how to perform.
 4. A/E must use due care and meet a reasonable standard of skill and competence in observing work and in endeavoring to determine if work is in accordance with contract documents.
 5. A/E can be held responsible by Owner for negligence in meeting standards of (4.) above.
- G. A/E should endeavor to provide full Construction Administration Services.
1. Provides last and best opportunity to identify and correct problems arising as a result of misunderstanding or misinterpretation of contract documents.
- H. Construction Administration Services in Owner/A-E contract should Recognize risks involved in providing services beyond normal scope defined in standard documents.

II. Project Representative

- A. Principal of A/E firm is responsible for Construction Administration regardless of whether he or an employee performs that service.
- B. Ideal Project Representative for any portion of work is qualified professional who designed that work.

1. Prepare Construction Administration manuals and other guidelines to establish limits of decision-making for Project Representatives.
 2. Do not employ new people with untested qualifications as Project Representatives on any project.
 3. Secure qualified consultant in the specific project area for Construction Administration on smaller, isolated projects; or when staff is overloaded.
- D. Provide project indoctrination sessions for Project Representative with project design personnel to properly familiarize them with project details.
- E. Establish a schedule of strategic site visits by project designers to aid the Project Representative.
- F. Establish communication procedures to route all correspondence between the A/E and Contractor through the Project Representative.
- G. Coordinate all matters relating to interpretation of consultant's work with particular consultant involved. May require on-site visits by consultants.

III. Professional Duties in Construction Contract Administration

- A. Tasks prior to start of construction
1. Prior to contract award, review Contractor's list of subcontractors and notify Contractor of rejections and responsibility to secure acceptable substitutes.
 2. Obtain, review and forward to owner performance bond and labor and material payment bond from Contractor.
 3. Have Contractor file with Owner certificate of insurance.
 4. Have Contractor secure and pay for all required permits.
 5. Obtain and review Contractor's schedule of required shop drawings.

6. Obtain, review and approve, if appropriate, Contractor's estimated progress schedule.
7. Furnish Contractor required copies of contract documents.
8. Have Owner submit applications for permanent gas, electric, water, telephone and other services, as required.
9. Have Owner file a copy of all property insurance policies with Contractor.
10. If owner does not intend to purchase property insurance, have him notify Contractor in writing. If Contractor elects to purchase such insurance, initiate appropriate change order.
11. If Contractor requests in writing that insurance for special hazards be included, at his expense, in the property insurance policy, have Owner purchase such insurance. Initiate change order.

B. Scheduled Tasks

1. Keep Owner informed of the progress of the work. Prepare field report for each visit to the site.
2. Obtain and review Contractor's updated progress schedule and advise Owner of potential revisions to anticipated occupancy date.
3. Prior to the first application for payment, receive, review and approve Contractor's schedule values.
4. Receive and review Contractor's application for payment. Check against progress, retained percentage, potential claims, defective work, etc.
5. Verify requirements for reduction in retainage.
6. If no grounds exist for withholding payment, issue certificates of payment to Owner, with copy to Contractor.
7. Prepare and insure written field orders as appropriate.

D. Project Termination Tasks

1. Receive notification of substantial completion and list of items to be completed or corrected from Contractor.
2. Inspect the project for substantial completion. Notify governmental authorities who require inspection before occupancy.
3. When project is substantially completed, prepare a Certificate of Substantial Completion. Obtain Owner's and Contractor's written acceptance and approval.
4. If certificate of occupancy or occupancy permit is required, have the Owner obtain it.
5. Obtain from Contractor:
 - a. Guarantees
 - b. Certificates of inspection
 - c. Schedules
 - d. Operating instructions
 - e. Keying Scheduler
 - f. Maintenance stock
 - g. Record drawings
 - h. Bonds
6. Receive Contractor's written notice that all work has been completed.
7. Make final inspection of the project.
8. Receive the Contractor's final application for payment along with release of liens, consent of surety, if any, and verify that all other conditions of the contract have been met.
9. Issue final certificate for payment.
10. Assemble, analyze and file complete records for construction and professional services.
11. If defects become evident during the one-year period after completion, obtain authorization from Owner, as an additional service, to investigate thereon.

12. Prior to expiration of the one-year period, obtain Owner's authorization, as an additional service, to conduct a thorough inspection to determine if any work is required by Contractor to remedy defect.

MEL, INC. QUALITY CONTROL AUDIT PROCEDURE

COMMENTARY

This set of forms is intended to accompany the Guidelines for the project Quality Control Manual, published by MEL, Inc.

When an item is completed, it should be initialed in the left hand column by the person responsible so as to emphasize only those items which remain to be audited. Obviously, there are items which do not require other than a yes/no answer and, therefore, the dates may be indicated "Not Applicable". This is likewise true where dates are required and the yes/no columns are not applicable.

The language used to describe the items is that used in the Manual.

It is MEL's opinion that the design group must remain accountable for all of its participation in the project. To transfer this responsibility, because it is known that the project will be reviewed under these procedures is a basic point that is not acceptable and must be clear at the outset. It is also likely that personality conflicts may need to be addressed and again, the relationship of the parties needs to be clearly emphasized during the Project Organization.

MEL urges response from the users of the Manual and these forms, as it is only in this manner we can develop a meaningful document.

MEL, INC. QUALITY CONTROL AUDIT PROCEDURE

ABBREVIATIONS

AIA	-	American Institute of Architects
CP	-	Construction Phase
EJCDC	-	Engineers' Joint Contract Documents Committee
FDP	-	Final Design Phase
NA	-	Not Applicable
OC	-	Outside Consultant
PDP	-	Preliminary Design Phase
PM	-	Project Manager
QA	-	Quality Assurance
REP	-	Representative
SRP	-	Study and Report Phase
WPP	-	Written Project Program

MEL, INC. QUALITY CONTROL AUDIT PROCEDURE

NOTES

1. For "client type" in A2 suggest use of one of the following:
 - a. Governmental: Federal, State, Parish, City
 - b. Private - industrial
 - c. Private - hospital & health care
 - d. Private - commercial
 - e. Private - institutional
 - f. Engineering firm
 - g. Architectural firm
 - h. Other
2. Team Selection
 - a. Identify key services to be provided on a project and select team members who are experienced and qualified in those particular areas.
 - b. The average experience on a project team is a valuable measure of the overall team ability.
 1. Compute "Experience Quotient".
$$E.Q. = \frac{\text{Total Years of Experience (Applicable to project)}}{\text{Number of Team Members}}$$
 2. As a general rule, if the E.Q. is less than five (5), consideration should be given to provide closer supervision and/or checking of that project.
 - c. Experienced personnel should be assigned as lead personnel.
 - d. Inexperienced personnel should be carefully assigned and work only under supervision of experienced personnel.

PM _____ PROJECT _____ PROJECT NO. _____
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MEL, INC. QUALITY CONTROL AUDIT PROCEDURE

<u>ITEM COMPLETE</u>	<u>YES</u>	<u>NO</u>	<u>SCHED. DATE</u>	<u>COMPL. ACTUAL DATE</u>	<u>REMARKS</u>
<u>A. PRE-PROPOSAL PROJECT SCOPE CHECKLIST</u>					
_____	_____	_____	_____	_____	_____
1. PREVIOUS CLIENT WITHIN 5 YEARS	_____	_____	_____	_____	_____
2. CLIENT TYPE, SEE NOTE 1	_____	_____	_____	_____	_____
3. PREVIOUS RELATIONSHIP SATISFACTORY	_____	_____	_____	_____	_____
4. CLIENT PAYMENT RECORD SATISFACTORY	_____	_____	_____	_____	_____
5. CLIENT PREVIOUS LITIGATION RECORD SATISFACTORY	_____	_____	_____	_____	_____
6. FINANCING FOR PROJECT SATISFACTORY	_____	_____	_____	_____	_____
7. MEL IS QUALIFIED TO PERFORM	_____	_____	_____	_____	_____
8. PROPOSED DESIGN SCHEDULE REVIEWED	_____	_____	_____	_____	_____
9. DESIGN SCHEDULE COMPARED WITH MEL'S SCHEDULE	_____	_____	_____	_____	_____
10. PROBABLE FEE ESTABLISHED	_____	_____	_____	_____	_____
11. BILLING PROCEDURE ESTABLISHED	_____	_____	_____	_____	_____
12. FULL PERMITTING SERVICES INCLUDED	_____	_____	_____	_____	_____
13. R/W MAPS AND ACQUISITION	_____	_____	_____	_____	_____

MEL, INC. QUALITY CONTROL AUDIT PROCEDURE

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<u>ITEM COMPLETE</u>	<u>A. PRE-PROPOSAL PROJECT SCOPE CHECKLIST</u>	<u>YES</u>	<u>NO</u>	<u>SCHED. DATE</u>	<u>COMPL. ACTUAL DATE</u>	<u>REMARKS</u>
_____	14. FORMAL STUDY OF ALTERNATIVES	_____	_____	_____	_____	_____
_____	15. SCOPE REVIEWED WITH CLIENT	_____	_____	_____	_____	_____
_____	16. ENVIRONMENTAL IMPACT STATEMENT	_____	_____	_____	_____	_____
_____	17. PUBLIC HEARINGS/MEETINGS REQUIRED	_____	_____	_____	_____	_____
_____	18. REQUIREMENT FOR OUTSIDE CONSULTANT	_____	_____	_____	_____	_____
_____	19. TRAVEL REQUIREMENT	_____	_____	_____	_____	_____
_____	20. FULL CP SERVICES INCLUDED	_____	_____	_____	_____	_____
_____	21. EXISTING BUILDING SURVEYS	_____	_____	_____	_____	_____
_____	22. GOVERNMENTAL AGENCY CONSULTATION	_____	_____	_____	_____	_____
_____	23. INITIAL CONCEPT AND BUDGET REVIEW	_____	_____	_____	_____	_____
_____	24. TYPE OF OUTSIDE CONSULTANTS	_____	_____	_____	_____	_____

MEL, INC. QUALITY CONTROL AUDIT PROCEDURE

ITEM COMPLETE	PROJECT SCOPE		SCHED. DATE	COMPL. ACTUAL DATE	REMARKS
	YES	NO			
101.	MAKE FIELD MEASUREMENTS-EXISTING				
102.	DRAW EXISTING SYSTEMS				
103.	USE OF EXISTING DRAWINGS				
104.	WE RECEIVE UTILITIES SITE PLAN				
105.	RED LINE AND REVIEW BEFORE ISSUING				
106.	WORKING DRAWINGS				
107.	PAPER BY OTHERS				
108.	TITLE BLOCKS BY OTHERS				
109.	SEPIAS BY OTHERS				
110.	SPECIFICATION ON DRAWINGS				
111.	SPECIFICATION MASTER - CSI				
112.	SHOP DRAWING REVIEW				
113.	CONSTRUCTION REVIEW				
114.	CONFERENCES WITH _____				
115.	ANALYSIS OF BIOS				
116.	INSPECTION AND REPORT				

MEL, INC. QUALITY CONTROL AUDIT PROCEDURE

<u>ITEM COMPLETE</u>	<u>A. PROJECT SCOPE (Cont'd)</u>	<u>YES</u>	<u>NO</u>	<u>SCHED. DATE</u>	<u>COMPL. ACTUAL DATE</u>	<u>REMARKS</u>
_____	117. TENANT DRAWINGS	_____	_____	_____	_____	_____
_____	118. COST ESTIMATE	_____	_____	_____	_____	_____
_____	119. COST STUDY	_____	_____	_____	_____	_____
_____	120. REPRODUCTION COSTS	_____	_____	_____	_____	_____
_____	121. SPECIFICATION MASTER	_____	_____	_____	_____	_____
_____	122. DEMOLITION DRAWINGS	_____	_____	_____	_____	_____
_____	123. PLUMBING, INSIDE	_____	_____	_____	_____	_____
_____	124. PLUMBING, SITE	_____	_____	_____	_____	_____
_____	125. PRIVATE DISPOSAL SYSTEM	_____	_____	_____	_____	_____
_____	126. PRIVATE WATER SYSTEM	_____	_____	_____	_____	_____
_____	127. FIRE PROTECTION SYSTEM	_____	_____	_____	_____	_____
_____	128. SITE STORM DRAINAGE	_____	_____	_____	_____	_____
_____	129. INSIDE STORM DRAINAGE	_____	_____	_____	_____	_____
_____	130. SOIL CONSERVATION	_____	_____	_____	_____	_____
_____	131. Htg., Vent'g, AIR COND'g	_____	_____	_____	_____	_____
_____	132. ENERGY CONSERVATION	_____	_____	_____	_____	_____

MEL, INC. QUALITY CONTROL AUDIT PROCEDURE

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<u>ITEM COMPLETE</u>	<u>PROJECT SCOPE (Cont'd)</u>	<u>YES</u>	<u>NO</u>	<u>SCHED. DATE</u>	<u>COMPL. ACTUAL DATE</u>	<u>REMARKS</u>
_____	A. PROJECT SCOPE (Cont'd)	_____	_____	_____	_____	_____
_____	132. SOLAR COLLECTOR SYSTEM _____ Ht _____ Cool _____ DHW	_____	_____	_____	_____	_____
_____	133. ENERGY AUDIT	_____	_____	_____	_____	_____
_____	134. FUEL ANALYSIS	_____	_____	_____	_____	_____
_____	135. ELECTRICAL POWER	_____	_____	_____	_____	_____
_____	136. ELECTRICAL LIGHTING	_____	_____	_____	_____	_____
_____	137. SITE LIGHTING	_____	_____	_____	_____	_____
_____	138. FIRE AND SECURITY SYSTEM	_____	_____	_____	_____	_____
_____	139. SOUND SYSTEMS	_____	_____	_____	_____	_____
_____	140. TELEPHONE SYSTEM	_____	_____	_____	_____	_____
_____	141. POWER STUDY	_____	_____	_____	_____	_____
_____	142. DRAWING DELIVERY AFTER RECEIPT OF ARCHITECT'S DRAWINGS	_____	_____	_____	_____	_____

MEL, INC. QUALITY CONTROL AUDIT PROCEDURE

<u>ITEM COMPLETE</u>	<u>PROJECT SCOPE (Cont'd)</u>	<u>YES</u>	<u>NO</u>	<u>SCHED. DATE</u>	<u>COMPL. ACTUAL DATE</u>	<u>REMARKS</u>
_____	A. PROJECT SCOPE (Cont'd)					
_____	143. SITE MASTER PLANNING					
_____	144. DETAILED SITE UTILIZATION STUDIES					
_____	145. ON-SITE UTILITY STUDIES					
_____	146. OFF-SITE UTILITY STUDIES					
_____	147. ZONING ANALYSIS AND PROCESSING					
_____	148. ARCHITECTURAL DESIGN DEVELOPMENT					
_____	149. STATEMENT OF PROBABLE CONSTRUCTION COST					
_____	150. LANDSCAPE DESIGN					
_____	151. STRUCTURAL WORKING DRAWINGS					
_____	152. CIVIL WORKING DRAWINGS					
_____	153. MECHANICAL WORKING DRAWINGS					
_____	154. ELECTRICAL WORKING DRAWINGS					
_____	165. SPECIFICATIONS AND GENERAL CONDITIONS					
_____	156. GOVERNMENTAL/REGULATORY AGENCY APPROVALS					
_____	157. SPECIAL BID DOCUMENTS					
_____	158. FINAL STATEMENT OF PROBABLE CONST. COST					

MEL, INC. QUALITY CONTROL AUDIT PROCEDURE

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<u>ITEM COMPLETE</u>	<u>B. CONTRACTUAL AGREEMENTS</u>		<u>YES</u>	<u>NO</u>	<u>SCHED. DATE</u>	<u>COMPL. ACTUAL DATE</u>	<u>REMARKS</u>
	<u>221. AGREEMENT SUBMITTED</u>	<u>222. AGREEMENT SIGNED</u>					
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

221. AGREEMENT SUBMITTED

222. AGREEMENT SIGNED

223. EJCDC

224. NON-STANDARD AGREEMENT REVIEWED

225. NOTICE TO PROCEED RECEIVED

226. FEE TYPE

MEL, INC. QUALITY CONTROL AUDIT PROCEDURE

<u>ITEM COMPLETE</u>	<u>CD. PROJECT ORGANIZATION AND PROJECT PROGRAM</u>	<u>YES</u>	<u>NO</u>	<u>SCHED. DATE</u>	<u>COMPL. ACTUAL DATE</u>	<u>REMARKS</u>
_____	231. PM APPOINTED	_____	_____	_____	_____	_____
_____	232. TEAM SELECTED, (SEE NOTE TWO)	_____	_____	_____	_____	_____
_____	233. ORGANIZATION CHART COMPLETED	_____	_____	_____	_____	_____
_____	234. ORGANIZATION CHART TO CLIENT	_____	_____	_____	_____	_____
_____	235. PROJECT PROGRAM WRITTEN	_____	_____	_____	_____	_____
_____	236. WRITTEN PROJECT PROGRAM APPROVED BY CLIENT	_____	_____	_____	_____	_____
_____	237. OUTSIDE CONSULTANTS SELECTED (NOTIFIED)	_____	_____	_____	_____	_____
_____	238. AGREEMENTS WITH O.C.'s PREPARED & SIGNED	_____	_____	_____	_____	_____
_____	239. WRITTEN PROJECT PROGRAM DISTRIBUTED TO O.C.'s	_____	_____	_____	_____	_____
_____	240. WRITTEN PROJECT PROGRAM DISTRIBUTED TO DEPT'S	_____	_____	_____	_____	_____
_____	241. OC CERTIFICATE OF INSURANCE RECEIVED	_____	_____	_____	_____	_____
_____	242. OC LIABILITY AGREEMENT RECEIVED	_____	_____	_____	_____	_____
_____	243. PROJECT FILE PREPARED	_____	_____	_____	_____	_____

MEL, INC. QUALITY CONTROL AUDIT PROCEDURE

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<u>ITEM COMPLETE</u>	<u>E. DESIGN BUDGET & TIME SCHEDULE</u>	<u>YES</u>	<u>NO</u>	<u>SCHED. DATE</u>	<u>COMPL. ACTUAL DATE</u>	<u>REMARKS</u>
_____	251. DESIGN BUDGET PREPARED	_____	_____	_____	_____	_____
_____	252. DESIGN BUDGET APPROVED	_____	_____	_____	_____	_____
_____	253. DESIGN SCHEDULE PREPARED	_____	_____	_____	_____	_____
_____	254. DESIGN SCHEDULE APPROVED BY CLIENT	_____	_____	_____	_____	_____
_____	255. DESIGN SCHEDULE DISTRIBUTED (INCL. O.C.'s)	_____	_____	_____	_____	_____

MEL, INC. QUALITY CONTROL AUDIT PROCEDURE

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<u>ITEM COMPLETE</u>	<u>F. STUDY & REPORT PHASE</u>	<u>YES</u>	<u>NO</u>	<u>SCHED. DATE</u>	<u>COMPL. ACTUAL DATE</u>	<u>REMARKS</u>
_____	261. QA REVIEW #1	_____	_____	_____	_____	_____
_____	262. STUDY & REPORT PHASE (SRP) COMPLETE	_____	_____	_____	_____	_____
_____	263. CONSTRUCTION COST #1 PREPARED	_____	_____	_____	_____	_____
_____	264. DESIGN SCHEDULE #1 VERIFIED	_____	_____	_____	_____	_____
_____	265. WRITTEN PROJECT PROGRAM MODIFIED	_____	_____	_____	_____	_____
_____	266. REVIEW SRP WITH CLIENT	_____	_____	_____	_____	_____
_____	267. PREWORK CONFERENCE	_____	_____	_____	_____	_____

MEL, INC. QUALITY CONTROL AUDIT PROCEDURE

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<u>ITEM COMPLETE</u>	<u>F. PRELIMINARY PHASE</u>	<u>YES</u>	<u>NO</u>	<u>SCHED. DATE</u>	<u>COMPL. ACTUAL DATE</u>	<u>REMARKS</u>
_____	271. QA REVIEW #2	_____	_____	_____	_____	_____
_____	272. PRELIMINARY DESIGN PHASE (PDP) COMPLETE	_____	_____	_____	_____	_____
_____	273. CONSTRUCTION COST #2 PREPARED	_____	_____	_____	_____	_____
_____	274. DESIGN SCHEDULE #2 VERIFIED	_____	_____	_____	_____	_____
_____	275. WRITTEN PROJECT PROGRAM MODIFIED	_____	_____	_____	_____	_____
_____	276. REVIEW PDP WITH CLIENT	_____	_____	_____	_____	_____
_____	277. PLAN-IN-HAND (FIELD REVIEWS) REQUIRED	_____	_____	_____	_____	_____

MEL, INC. QUALITY CONTROL AUDIT PROCEDURE

ITEM COMPLETE	F. FINAL DESIGN PHASE		SCHED. DATE	COMPL. ACTUAL DATE	REMARKS
	YES	NO			
281. QA REVIEW #3					
282. NOTICE TO PROCEED RECEIVED					
283. FINAL DESIGN PHASE (FDP) COMPLETE					
284. CONSTRUCTION COST #3 PREPARED					
285. SPECIFICATIONS COMPLETE (SEE SPEC. CHECKLIST)					
286. REVIEW FDP WITH CLIENT					
287. QA REVIEW #4					
288. FILE DOCUMENTS WITH AUTHORITIES					

DIVISION 1—GENERAL REQUIREMENTS

- 01010 SUMMARY OF WORK
 - Work Covered by Contract Documents
 - Contracts
 - Work by Others
 - Owner-furnished Items
 - Future Work
 - Work Sequence
 - Contractor use of Premises
 - Partial Owner Occupancy
- 01020 Allowances
- 01030 Field Engineering
- 01031 Grades, Lines, & Levels
- 01050 Coordination
- 01051 Project Coordination
- 01052 Mechanical & Electrical Coordination
- 01070 Cutting and Patching
- 01080 Applicable Codes
- 01090 Abbreviations and Symbols
- 01091 Definitions
- 01100 ALTERNATIVES
- 01150 MEASUREMENT & PAYMENT
- 01200 PROJECT MEETINGS
 - Preconstruction Conferences
 - Progress Meetings
 - Job Site Administration
- 01300 SUBMITTALS
 - Construct on Schedules
 - Network Analysis
 - Progress Reports
 - Survey Data
 - Shop Drawings, Product Data & Samples
- 01360 Layout Data
- 01370 Schedule of Values
- 01380 Construction Photographs
- 01400 QUALITY CONTROL
 - Testing Laboratory Services
 - Inspection Services
- 01420 TEMPORARY FACILITIES AND CONTROLS
 - Temporary Utilities
 - Temporary Electricity
 - Temporary Lighting
 - Temporary Heat & Ventilation
 - Temporary Telephone Service
 - Temporary Water
 - Temporary Sanitary Facilities
 - Temporary First Aid Facilities
 - Temporary Fire Protection
 - Construction Aids
 - Construction Elevators and Hoists
 - Temporary Enclosure
 - Swing Staging
 - Barriers
 - Fences
 - Tree and Plant Protection
 - Guardrails & Barricades
 - Security
 - Access Roads & Parking Areas
 - Special Controls
 - Noise Control
 - Dust Control
 - Water Control
 - Pest Control
 - Rodent Control
 - Pollution Control
 - Traffic Regulation
 - Traffic Signals
 - Flagmen
 - Flares and Lights
 - Parking
 - Project Identification
 - Field Offices and Sheds
- 01800 MATERIAL AND EQUIPMENT
 - Transportation & Handling
 - Storage & Protection
 - Substitutions & Product Options
- 01700 PROJECT CLOSEOUT
 - Cleaning
 - Project Record Documents
 - Operations & Maintenance Data
 - Guarantees, Warranties, & Bonds
- 01750 Spare Parts & Maintenance Materials

DIVISION 2—SITE WORK

- 02010 SURFACE EXPLORATION
 - Borings
 - Core Drilling
 - Standard Penetration Tests
 - Seismic Exploration
- 02100 CLEARING
 - Structure Moving
 - Clearing and Grubbing
 - Tree Pruning
 - Shrub and Tree Relocation
- 02110 DEMOLITION
 - Building Demolition
 - Selective Demolition
- 02200 EARTHWORK
 - Site Grading
 - Rock Removal
 - Embankment
 - Excavating and Backfilling
 - Trenching, Backfilling, and Compacting
- 02222 Structural Excavation, Backfill and Compaction
- 02223 Roadway Excavation, Backfill, and Compaction
- 02225 Roadway Excavation, Backfill, and Compaction
 - Pipe Boring and Jacking
 - Waste Material Disposal
 - Soil Compaction Control
 - Soil Stabilization
 - Soil Stabilization: Lime Slurry Injection
 - Soil Stabilization: Vibro-Flotation
- 02245 Finish Grading
- 02250 SOIL TREATMENT
 - Termite Control
 - Vegetation Control
- 02300 PILE FOUNDATIONS
 - Pile Load Tests
 - Piles
 - Wood Piles
 - Precast Concrete Piles
 - Prestressed Concrete Piles
 - Compacted Concrete Piles
 - Steel H-Section Piles
 - Steel Pipe Piles
 - Concrete-Filled Steel Shell Piles
- 02350 CAISSONS
 - Drilled Caissons
 - Excavated Caissons
- 02400 SHORING
 - Steel Sheeting
 - Walers and Shores
 - Cribbing
 - Piling with Intermediates
 - Lagging
 - Underpinning
- 02510 SITE DRAINAGE
 - Subdrainage Systems
 - Foundation Drainage
 - Underlab Drainage
 - Drainage Structures
 - Drainage Pipe
 - Dewatering
 - Sand Drains
 - Wellpoints
 - Relief Wells
 - Erosion Control
- 02550 SITE UTILITIES
 - Gas Distribution System
 - Gas Transmission Lines
 - Oil Distribution System
 - Oil Transmission Lines
 - Water Distribution System
 - Water Transmission Lines
 - Steam Distribution
 - Hot Water Distribution
 - Chilled Water Distribution
 - Waste Water Collection
 - Water Wells
 - Sewage Lagoons
- 02600 PAVING AND SURFACING
 - Mudjacking
 - Paving
 - Crushed Stone Paving
 - Asphalt Concrete Paving
 - Brick Paving
 - Portland Cement Concrete Paving
 - Stippled Block Paving
 - Repair and Resurfacing
- 02617 Pavement Sealing
- 02618 Pavement Marking
- 02620 Curbs and Gutters
- 02630 Walks
- 02640 Synthetic Surfacing
- 02641 Synthetic Grass
- 02642 Synthetic Cinders
- 02643 Synthetic Resilient Matting
- 02700 SITE IMPROVEMENTS
 - Fences and Gates
 - Chain Link Fences
 - Wire Fences
 - Wood Fences
 - Road and parking Appurtenances
 - Guardrails
 - Signs
 - Traffic Signals
 - Culvert Pipe Underpasses
 - Playing Fields
 - Recreational Facilities
 - Fountains
 - Fountain Structures
 - Fountain Equipment
 - Irrigation System
 - Underground Sprinkler Systems
 - Aboveground Sprinkler Systems
 - Site Furnishings
 - Rubble Site Structures
 - Retrofitted Tie Structures
 - Lighting
- 02800 LANDSCAPING
 - Soil Preparation
 - Lawns
 - Seeding
 - Sodding
 - Plugging
 - Spigging
 - Trees, Shrubs, and Ground Cover
 - Tree and Shrubs
 - Ground Cover
 - Plants
 - Aggregate Beds
 - Wood Chip Beds
- 02850 RAILROAD WORK
 - Trackwork
 - Balasting
 - Service Facilities
 - Traffic Control
- 02900 MARINE WORK
 - Docks
 - Boat Facilities
 - Protective Marine Structures
 - Fenders
 - Seawalls
 - Groins
 - Jetties
 - Dredging
- 02950 TUNNELING
 - Tunnel Excavation
 - Tunnel Grouting
 - Support Systems
 - Rock Bolting

*Prior to commencing the writing of specifications, this checklist is to be reviewed and a check mark (✓) placed next to each item to be included for the job in question.

DIVISION 3—CONCRETE

- 03100 CONCRETE FORMWORK
- 03110 Formwork for Structural Cast-in-Place Concrete
- 03120 Formwork for Architectural Cast-in-Place Concrete
- 13130 Formwork for Structural Precast Concrete
- 03140 Formwork for Architectural Precast Concrete
- 03150 FORMS
- 03151 Formliners and Coatings
- 03152 Wood Forms
- 03153 Prefabricated Forms
- 03154 Panel Forms
- 03155 Pan Forms
- 03156 Steel Forms
- 03157 Fiberglass Forms
- 03158 Prefabricated Stair Forms
- 03200 CONCRETE REINFORCEMENT
- 03210 Reinforcing Steel
- 03220 Welded Wire Fabric
- 03230 Stressing Tendons
- 03250 CONCRETE ACCESSORIES
- 03251 Expansion and Contraction Joints
- 03252 Anchors and Inserts
- 03253 Waterstops
- 03300 CAST-IN-PLACE CONCRETE
- 03310 Structural Concrete
- 03311 Normalweight Structural Concrete
- 03312 Heavyweight Structural Concrete
- 03313 Lightweight Structural Concrete
- 03314 Prestressed Structural Concrete
- 03320 Architectural Concrete
- 03331 Normalweight Architectural Concrete
- 03332 Lightweight Architectural Concrete
- 03334 Prestressed Architectural Concrete
- 03340 Low Density Concrete
- 03341 Insulating Concrete
- 03350 SPECIALLY FINISHED (ARCHITECTURAL) CONCRETE
- 03351 Exposed Aggregate Concrete
- 03352 Tooled Concrete
- 03353 Blasted Concrete
- 03354 Grooved Surface Concrete
- 03360 SPECIALLY PLACED CONCRETE
- 03361 Shotcrete
- 03400 PRECAST CONCRETE
- 03410 Structural Precast Concrete
- 03411 Precast Wall Panels
- 03412 Precast Deck
- 03413 Precast Structural Sections
- 03420 Precast Prestressed Sections
- 03450 Architectural Precast Concrete
- 03451 Architectural Wall Panels
- 03500 CEMENTITIOUS DECKS
- 03510 Gypsum Concrete
- 03520 Cementitious Wood Fiber Deck
- 03600 GROUT
- 03601 Catalyzed Metallic Grout
- 03602 Nonmetallic Grout
- 03603 Epoxy Grout

DIVISION 4—MASONRY

- 04100 MORTAR
- 04110 Cement and Lime Mortars
- 04120 Acid Resisting Mortars
- 04130 Premixed Mortars
- 04150 MASONRY ACCESSORIES
- 04160 Joint Reinforcement
- 04170 Anchors and Tie Systems
- 04180 Control Joints
- 04200 UNIT MASONRY
- 04210 Brick Masonry
- 04212 Adobe Masonry
- 04220 Concrete Unit Masonry
- 04225 Defaced Concrete Unit Masonry
- 04230 Reinforced Unit Masonry
- 04232 High-Lift Grouted Masonry
- 04233 High-Lift Grouted Concrete Blocks
- 04236 Preassembled Masonry Panels
- 04240 Clay Backing Tile
- 04245 Clay Facing Tile
- 04250 Ceramic Veneer
- 04251 Terra Cotta Veneer
- 04252 Mechanically Supported Masonry Veneer
- 04270 Glass Unit Masonry
- 04280 Gypsum Unit Masonry
- 04285 Sound Absorbing Perforated Hollow Masonry Units
- 04400 STONE
- 04410 Rough Stone
- 04420 Cut Stone—Marble
- 04423 Limestone
- 04424 Granite
- 04425 Sandstone
- 04428 Slate
- 04430 Simulated Masonry
- 04435 Cast Stone
- 04440 Flagstone
- 04450 Natural Stone Veneer
- 04500 MASONRY RESTORATION AND CLEANING
- 04510 Masonry Cleaning
- 04520 Masonry Restoration
- 04550 REFRACTORIES
- 04551 Flue Liners
- 04552 Corrosion Resistant Brick Lining
- 04553 Combustion Chambers

DIVISION 5—METALS

- 05100 STRUCTURAL METAL FRAMING
- 05120 Structural Steel
- 05130 Structural Aluminum
- 05200 METAL JOISTS
- 05210 Steel Joists
- 05211 Standard Steel Joists
- 05212 Custom Fabricated Steel Joists
- 05220 Aluminum Joists
- 05250 Framing Systems
- 05251 Space Frames
- 05252 Geodesic Structures
- 05300 METAL DECKING
- 05310 Metal Roof Deck
- 05320 Metal Floor Deck
- 05400 LIGHTGAUGE FRAMING
- 05410 Metal Stud System
- 05420 Metal Joist System
- 05500 METAL FABRICATIONS
- 05501 Anchor Bolts
- 05502 Expansion Bolts
- 05510 Metal Stairs
- 05520 Handrails and Railings
- 05521 Pipe and Tube Railings
- 05530 Gratings
- 05540 Castings
- 05700 ORNAMENTAL METAL
- 05710 Ornamental Stairs
- 05720 Ornamental Handrails and Railings
- 05730 Ornamental Sheet Metal
- 05800 EXPANSION CONTROL

DIVISION 6—WOOD & PLASTICS

06100	ROUGH CARPENTRY
06110	Framing and Sheathing
06111	Light Wooden Structures
	Framing
06112	Preassembled Components
06113	Sheathing
06114	Diaphragms
06120	HEAVY TIMBER
	CONSTRUCTION
06131	Timber Trusses
06132	Mill-Framed Structures
06133	Pole Construction
06150	TRESTLES
06170	PREFABRICATED
	STRUCTURAL WOOD
06180	Glued Laminated Construction
06181	Glue-Laminated Structural
	Units
06182	Glue-Laminated Decking
06190	Wood Trusses
06191	Wood-Metal Joists
06200	FINISH CARPENTRY
06210	Mitework
06240	Laminated Plastic
06300	WOOD TREATMENT
06310	Pressure Treated Lumber
06311	Preservative Treated Lumber
06312	Fire Retardant Treated Lumber
06400	ARCHITECTURAL
	WOODWORK
06410	Cabinework
06411	Wood Cabinets: Unfinished
06420	Paneling
06421	Hardwood Plywood Paneling
06422	Softwood Plywood Paneling
06430	Stairwork
06431	Wood Stairs and Railings
06500	PREFABRICATED
	STRUCTURAL PLASTICS
06600	PLASTIC FABRICATIONS

DIVISION 7—THERMAL AND MOISTURE PROTECTION

07100	WATERPROOFING
07110	Membrane Waterproofing
07111	Elastomeric Membrane
	Waterproofing
07112	Bituminous Membrane
	Waterproofing
07120	Fluid Applied Waterproofing
07121	Liquid Waterproofing
07130	Benlonite Waterproofing
07140	Metal Oxide Waterproofing
07150	DAMP-PROOFING
07160	Bituminous Dampproofing
07170	Silicone Dampproofing
07175	Water Repellent Coatings
07180	Cementitious Dampproofing
07190	Vapor Barriers/Retardants
07191	Bituminous Vapor
	Barrier Retardants
07192	Laminated Vapor
	Barrier Retardants
07193	Plastic Vapor Barrier/Retardants
07200	INSULATION
07210	Building Insulation
07211	Loose Fill Insulation
07212	Rigid Insulation
07213	Fibrous and Reflective
	Insulation
07214	Foamed-in-Place Insulation
07215	Sprayed-On Insulation
07220	High and Low Temperature
	Insulation
07240	Roof and Deck Insulation
07250	Perimeter and Under-Slab
	Insulation
07300	Shingles and Roofing Tiles
07310	Shingles
07311	Asphalt Shingles
07312	Asbestos-Cement Shingles
07313	Wood Shingles and Shakes
07314	Slate Shingles
07315	Porcelain Enamel Shingles
07316	Metal Shingles
07320	Roofing Tiles
07321	Clay Roofing Tiles
07322	Concrete Roofing Tiles
07400	PREFORMED ROOFING AND
	SIDING
07410	Preformed Wall and Roof Panels
07411	Preformed Metal Siding
07420	Composite Building Panels
07440	Preformed Plastic Panels
07460	Cladding Siding
07461	Wood Siding
07462	Composition Siding
07463	Asbestos-Cement Siding
07464	Plastic Siding
07500	MEMBRANE ROOFING
07510	Build-Up Bituminous Roofing
07520	Prepared Roll Roofing
07530	Elastic Sheet Roofing
07540	Fluid Applied Roofing
07570	TRAFFIC TOPPING
07600	FLASHING AND SHEET METAL
07610	Sheet Metal Roofing
07620	Flashing and Trim
07630	Roofing Specialties
07631	Gutters and Downspouts
07660	Gravel Slope
07800	ROOF ACCESSORIES
07810	Skylights
07811	Plastic Skylights
07812	Metal-Framed Skylights
07830	Hatches
07840	Gravity Ventilators (not
	connected to ductwork)
07850	Prefabricated Curbs
07860	Prefabricated Expansion Joints
07900	SEALANTS
07950	Joint Fillers and Gaskets
07951	Sealants and Celling

DIVISION 8—DOORS & WINDOWS

08100	METAL DOORS AND FRAMES
08110	Hollow Metal Work
08111	Stock Hollow Metal Work
08112	Custom Hollow Metal Work
08120	Aluminum Doors and Frames
08130	Stainless Steel Doors and
	Frames
08140	Bronze Doors and Frames
08200	WOOD AND PLASTIC DOORS
08210	Weed Doors
08211	Flush Wood Doors
08212	Panel Wood Doors
08213	Plastic Faced Wood Doors
08220	Plastic Doors
08300	SPECIAL DOORS
08310	Sliding Metal Fire Doors
08320	Metal-Clad Doors
08330	Colling Doors
08340	Colling Grilles
08350	Folding Doors
08351	Folding Doors, Panel
08353	Accordion Folding Doors
08355	Flexible Doors
08360	Overhead Doors
08370	Sliding Glass Doors
08375	Safety Glass Doors
08380	Sound Retardant Doors
08390	Screen and Storm Doors
08400	ENTRANCES & STOREFRONTS
08450	Revolving Doors
08500	METAL WINDOWS
08510	Steel Windows
08520	Aluminum Windows
08530	Stainless Steel Windows
08540	Bronze Windows
08600	WOOD & PLASTIC WINDOWS
08610	Wood Windows
08620	Plastic Windows
08621	Reinforced Plastic Windows
08650	SPECIAL WINDOWS
08700	HARDWARE & SPECIALTIES
08710	Finish Hardware
08720	Operators
08721	Automatic Door Equipment
08725	Window Operators
08730	Weatherstripping & Seals
08740	Thresholds
08800	GLAZING
08810	Glass
08811	Plate Glass & Float Glass
08812	Sheet Glass
08813	Tempered Glass
08814	Wired Glass
08815	Rough and Figured Glass
08816	Bullet Resistant Glass
08817	Spandrel Glass
08820	Processed Glass
08821	Coated Glass
08822	Laminated Glass
08823	Insulating Glass
08830	Mirror Glass
08840	Glazing Plastic
08850	Glazing Accessories
08900	WINDOW WALLS-CURTAIN
	WALLS
08910	Window Walls
08911	Steel Window Walls
08912	Aluminum Window Walls
08913	Stainless Steel Window Walls
08914	Bronze Window Walls
08915	Wood Window Walls

DIVISION 9—FINISHES

09100	LATH AND PLASTER
09110	Furring and Lathing
09150	Gypsum Plaster
09180	Cement Plaster
09190	Acoustical Plaster
09196	Plaster Accessories
09250	GYPSUM WALLBOARD
09280	Gypsum Wallboard Systems
09290	Gypsum Wallboard Accessories
09300	TILE
09310	Ceramic Tile
09320	Ceramic Mosaics
09330	Quarry Tile
09340	Marble Tile
09350	Glass Mosaics
09380	Plastic Tile
09370	Metal Tile
09380	Conductive Tile
09400	TERRAZZO
09410	Portland Cement Terrazzo
09420	Precast Terrazzo
09430	Conductive Terrazzo
09440	Plastic Matrix Terrazzo
09500	ACOUSTICAL TREATMENT
09510	Acoustical Ceilings
09511	Acoustical Panels
09512	Acoustical Tiles
09520	Acoustical Wall Treatment
09530	Acoustical Insulation and Barriers
09540	CEILING SUSPENSION SYSTEMS
09550	WOOD FLOORING
09560	Wood Strip Flooring
09570	Wood Parquet Flooring
09580	Plywood Block Flooring
09590	Resilient Wood Flooring System
09600	Wood Block Industrial Flooring
09650	RESILIENT FLOORING
09651	Cementitious Underlayment
09660	Resilient Tile Flooring
09666	Resilient Sheet Flooring
09670	Fluid Applied Resilient Flooring
09675	Conductive Resilient Flooring
09690	CARPETING
09691	Carpet Cushion
09692	Carpet
09693	Bonded Cushion Carpet
09694	Custom Carpet
09690	Carpet Tile
09700	SPECIAL FLOORING
09710	Magnesium Oxide Floors
09720	Epoxy-Marble Chip Flooring
09730	Elastomeric Liquid Flooring
09731	Conductive Elastomeric Liquid Flooring
09740	Heavy-Duty Concrete Toppings
09741	Armored Floors
09750	Brick Flooring
09755	Laminated Plastic Flooring
09760	FLOOR TREATMENT
09900	SPECIAL COATINGS
09910	Abrasion Resistant Coatings
09920	Cementitious Coatings
09930	Elastomeric Coatings
09940	Fire-Resistant Coatings
09941	Sprayed Fireproofing
09950	Aggregate Wall Coatings
09960	PAINTING
09910	Exterior Painting
09920	Interior Painting
09930	Transparent Finishes
09950	WALL COVERING
09951	Vinyl-Coated Fabric Wall Covering
09952	Vinyl Wall Covering
09953	Cork Wall Covering
09954	Wallpaper
09955	Wall Fabrica
09956	Asbestos Wall Covering
09960	Flexible Wood Sheets
09970	Prefinished Panels
09990	Adhesives

DIVISION 10—
SPECIALTIES

10100	CHALKBOARDS & TACKBOARDS
10110	Chalkboards
10120	Tackboards
10150	COMPARTMENTS & CUBICLES
10151	Horizontal Cubicles
10180	Toilet Partitions and Urinal Screens
10181	Laminated Plastic Toilet Partitions and Urinal Screens
10182	Metal Toilet Partitions and Urinal Screens
10183	Stone Partitions
10170	Shower & Dressing Compartments
10200	LOUVERS & VENT (not connected to ductwork)
10240	GRILLES & SCREENS (not connected to ductwork)
10280	WALL & CORNER GUARDS
10270	ACCESS FLOORING
10290	SPECIALTY MODULES
10290	PEST CONTROL
10300	FIREPLACES
10301	Prefabricated Fireplaces
10302	Prefabricated Fireplace Forms
10310	Fireplace Accessories
10350	FLAGPOLES
10400	IDENTIFYING DEVICES
10410	Directories and Bulletin Boards
10411	Directories and Bulletin Boards
10411	Directories
10420	Plaque
10440	Signs
10460	PEDESTRIAN CONTROL DEVICES
10500	LOCKERS
10501	Wardrobe Lockers
10502	Box Lockers
10503	Basket Lockers
10530	PROTECTIVE COVERS
10531	Walkway Covers
10532	Car Shelters
10650	POSTAL SPECIALTIES
10651	Mail Chutes
10652	Mail Boxes
10600	PARTITIONS
10601	Mesh Partitions
10610	Demountable Partitions
10616	Movable Gypsum Partitions
10620	Folding Partitions
10623	Accordion Folding Partitions
10650	SCALES
10670	STORAGE SHELVING
10700	SUN CONTROL DEVICES (EXTERIOR)
10750	TELEPHONE ENCLOSURES
10751	Telephone Booths
10752	Telephone Director Units
10753	Telephone Shelves
10800	TOILET & BATH ACCESSORIES
10900	WARDROBE SPECIALTIES

DIVISION 11—
EQUIPMENT

11000	BUILT-IN MAINTENANCE EQUIPMENT
11061	Vacuum Cleaning System
11062	Powered Window Washing
11100	BANK AND VAULT EQUIPMENT
11180	COMMERCIAL EQUIPMENT
11170	CHECKROOM EQUIPMENT
11190	DARKROOM EQUIPMENT
11200	ECCLESIASTICAL EQUIPMENT
11260	Feets
11270	Ecclesiastical Furniture
11300	EDUCATIONAL EQUIPMENT
11400	FOOD SERVICE EQUIPMENT
11401	Food Service Equipment Custom Fabricated
11410	Bar Units
11420	Cooking Equipment
11430	Dishwashing Equipment
11435	Garbage Disposers
11440	Food Preparation Machines
11450	Food Preparation Tables
11460	Food Serving Units
11470	Refrigerated Cases
11471	Refrigerated Boxes
11480	VENTING EQUIPMENT
11500	ATHLETIC EQUIPMENT
11550	INDUSTRIAL EQUIPMENT
11600	LABORATORY EQUIPMENT
11610	Laboratory Furniture
11611	Steel Laboratory Furniture
11612	Wood Laboratory Furniture
11630	LAUNDRY EQUIPMENT
11660	LIBRARY EQUIPMENT
11700	MEDICAL EQUIPMENT
11800	MORTUARY EQUIPMENT
11820	MUSICAL EQUIPMENT
11850	PARKING EQUIPMENT
11860	WASTE HANDLING EQUIPMENT
11861	Packaged Incinerators
11862	Waste Compactors
11863	Bins
11864	Pulping Machines & Systems
11865	Chutes and Collectors
11870	LOADING DOCK EQUIPMENT
11871	Dock Levelers
11872	Leveling Platforms
11873	Portable Ramps, Bridges, & Platforms
11874	Seals & Shelters
11875	Dock Bumpers
11880	DETENTION EQUIPMENT
11900	RESIDENTIAL EQUIPMENT
11970	THEATER AND STAGE EQUIPMENT
11980	REGISTRATION EQUIPMENT

**DIVISION 12—
FURNISHINGS**

12100	ARTWORK
	Murals
	Photo Murals
	Carved or Cast Statuary
	Carved or Cast Relief Work
	Custom Alter Vestments
	Custom Chancel Fittings
12300	CABINETS AND STORAGE
12310	Classroom Cabinets
12320	Dormitory Units
12330	Metal Casework
12340	Wood Casework
12341	Educational Casework
12342	Hospital Casework
12500	WINDOW TREATMENT
12501	Blinds & Shades
12502	Shutters
12550	FABRICS
12600	FURNITURE
12670	RUGS AND MATS
12675	Floor Mats
12700	SEATING
12710	Auditorium Seating
12730	Stadium Seating
12735	Telescoping Bleachers
12800	FURNISHING ACCESSORIES

**DIVISION 13—SPECIAL
CONSTRUCTION**

13010	AIR-SUPPORTED STRUCTURES
13050	INTEGRATED ASSEMBLIES
13100	AUDIOMETRIC ROOM
13250	CLEAN ROOM
13250	HYPERBARIC ROOM
13400	INCINERATORS
13440	INSTRUMENTATION
13450	INSULATED ROOM
13500	INTEGRATED CEILING
13540	NUCLEAR REACTORS
13560	OBSERVATORY
13600	PREFABRICATED STRUCTURES
13601	Prefabricated Buildings
13700	SPECIAL PURPOSE ROOMS & BUILDINGS
13710	Prefabricated Rooms
13750	RADIATION PROTECTION
13751	Lead Radiation Shielding
13760	Radio Frequency Shielding
13770	SOUND AND VIBRATION CONTROL
13800	VAULTS
13850	SWIMMING POOL

**DIVISION 14—
CONVEYING SYSTEMS**

14100	DUMPS/WASTERS
14200	ELEVATORS
14210	Passenger
14230	Freight
14300	HOISTS AND CRANES
14400	LIFTS
14410	People Lifts
14420	Aerial Tramways
14430	Platform and Stage Lifts
14440	Funiculars
14600	MATERIAL HANDLING SYSTEMS
14650	Conveyors & Chutes
14551	Conveyors
14555	Chutes
14670	TURNABLES
14600	MOVING STAIRS AND WALKS
14610	Escalators
14620	Moving Walks
14700	TIRE SYSTEMS
14800	POWERED SCAFFOLDING

DIVISION

15—MECHANICAL

15010	GENERAL PROVISIONS	15172	Pressure Gages	15442	Gas Accessories
15016	Mechanical Reference Symbols	15173	Flow Measuring Devices	15443	Compressed Air Equipment
15020	Work Included	15174	Liquid Level Gages	15460	Plumbing Fixtures and Trim
15021	Work Not Included	15175	Tanks	15461	Special Fixtures & Trim
15023	Codes, Fees, and Lateral Costs	15176	Steel Tanks	15462	Fixture Carriers
15040	Starting the Piping Systems	15177	Plastic Tanks	15466	Domestic Watercoolers
15041	Chlorination of Domestic Water Lines	15178	Cast Iron Tanks	15466	Washfountains Check
		15180	INSULATION	15467	Showers
		15181	General	15468	Receptors
15042	Tests	15182	Cold Water Piping	15470	Pool Equipment
15043	Balancing of Air Systems	15183	Chilled Water Piping	15471	Circulation and Filtration Equipment
15044	General Completion	15184	Refrigerant Piping	15472	Pool Drains, Inlets, and Outlets
15046	Results Expected	15186	Hot Water Piping	15473	Pool Cleaning Equipment
15048	Demonstration	15186	Steam and Condensate Return Piping	15478	Chemical Treatment Equipment
15047	Identification	15187	Underground Piping	15480	Fountain Piping and Nozzles
15048	Maintenance Contracts	15188	Outside Piping	15480	Special Equipment
15049	Materials Manufacturers	15190	Duct	15486	FIRE PROTECTION
15050	BASIC MATERIALS AND METHODS	15195	Braaching Equipment	15601	General (To include a description of all systems)
15060	Pipe and Pipe Fittings	15200	WATER SUPPLY AND TREATMENT	15510	Sprinkler Equipment
15061	Steel Pipe	15201	General (To include descriptions of all systems involved) (Coordinate with Division 2)	15521	Foam Equipment
15062	Cast Iron Pipe	15220	Pump and Piping System	15522	Carbon Dioxide Equipment
15063	Copper Pipe	15230	Booster Pumping Equipment	15530	Standpipe and Fire Hose Equipment
15064	Plastic Pipe	15240	Water Reservoirs and Tanks	15531	Fire Hose Connections
15065	Glass Pipe	15250	Water Treatment	15532	Fire Hose Cabinets and Accessories
15066	Stainless Steel Pipe	15251	Filtration Equipment	15533	Fire Hose Reels
15067	Aluminum Pipe	15251	Aeration Equipment	15534	Fire Hose
15075	Hose	15252	Water Softening Equipment	15540	Portable Extinguishers
15080	Piping Specialties	15253	Chemical Feeding Equipment	15541	Fire Blankets
15081	Gaskets	15260	Chlorinating Equipment	15550	Fire Extinguisher Cabinets and Accessories
15082	Sumal Joints	15261	Metering and Related Piping	15560	Hood and Duct Fire Protection
15083	Strainers, Filters, and Driers	15270	WASTE WATER DISPOSAL AND TREATMENT	15570	Non-electrical Alarm Equipment
15084	Vent Caps	15301	General (To include descriptions of all systems, including sewerage, septic tank systems and sewage treatment) (Coordinate with Division 2)	15600	POWER OR HEAT GENERATION
15085	Traps	15310	Sewage Ejectors	15601	General (To include descriptions of all systems)
15086	Vacuum Breakers	15320	Grease Interceptors	15606	Fuel Handling Equipment
15087	Shock Absorbers	15350	Lift Stations	15608	Oil Storage Tanks, Controls, and Piping
15090	Supports, Anchors, and Seals	15361	Septic Tanks	15607	L.P. Gas Tanks, Controls, and Piping
15091	Anchors	15362	Drainage Fields	15610	Ash Removal System
15092	Wall Seal	15380	Sewage Treatment Equipment	15615	Lined Breachings
15093	Flashing and Siding	15381	Screens and Slumming Tanks	15616	Lined Prefabricated Chimneys and Stacks
15094	Hangers and Supports	15382	Sedimentation Tanks	15617	Exhaust Equipment
15100	Valves, Cocks, and Faucets (Manual)	15385	Filtration Equipment	15618	Draft Control Equipment
15101	Gate Valves	15390	Aeration Equipment	15620	Boilers
15102	Blowdown Valves	15395	Sludge Digestion Equipment	15621	Cast Iron Boiler
15103	Butterfly Valves	15400	PLUMBING	15622	Firebox Boiler
15104	Ball Valves	15401	General (to include descriptions of all systems, including: Water Supply System	15623	Scotch Marine Boiler
15105	Globe Valves		Chilled Water Piping System	15624	Water Tube Boilers
15106	Refrigerant Valves		Distilled Water Piping System	15625	Absorption Boiler
15107	Stop Cocks		Compressed Air Piping System	15630	Burners and Controls
15108	Curb Stops		Oxygen Piping System	15635	Stokers
15109	Hydrants		Helium Piping System	15638	Fuel Preheaters
15110	Check Valves		Nitrous Oxide Piping System	15639	Boiler Accessories
15111	Swing Check Valves		Vacuum Piping System	15640	Boiler Feedwater Equipment
15112	Backwater Valves		Laboratory Gas Piping System	15641	Packaged Boiler Feed Pump System
15113	Vertical Check Valves		Compressed Industrial Gas Piping Systems	15642	Decorators
15114	Stop and Check Valves		Central Soap Piping System	15650	REFRIGERATION
15115	Faucets		Soil Piping System	15661	General (Descriptions of all systems including Refrigeration Piping System)
15116	Washer Outlets		Waste Piping System	15655	Refrigerant Compressors
15120	Self Contained Control Valves		Roof Drainage System	15656	Centrifugal Compressor
15121	Pressure Regulating Valves		Chemical Waste Drainage System	15657	Rotary Compressor
15122	Pressure Relief Valves		Industrial Waste Drainage System	15658	Reciprocating Compressor
15123	Automatic Temperature and Pressure Relief Valves		Process Piping Systems	15660	Condensing Units
15124	Solenoid Valves		Equipment	15661	Air Cooled Condensing Units
15125	Steam Traps	15420	Floor and Shower Drains	15662	Water Cooled Condensing Units
15130	Tempering Controllers	15421	Roof Drains	15663	Evaporative Condensing Units
15131	Photo Lab Tempering Controller	15422	Cleanouts and Cleanout Access Covers	15670	Chillers
15132	Mixing Station	15423	Domestic Water Heaters	15671	Reciprocating Chillers
15133	Refrigerant Control Valves and Specialties	15424	Aftercoolers & Separators	15672	Air Cooled Chillers
15134	Feed Water Regulator	15425	Slu	15673	Ethylene Glycol Chillers
15140	Pumps	15426	Anti-siphon Equipment	15674	Centrifugal Chillers
15141	Centrifugal	15427	Sediment Interceptors	15675	Absorption Chillers
15142	Rotary	15428	Laundry/Utility Units	15676	Rotary Chillers
15143	Turbine	15429	Packaged Waste, Vent, or Water Piping Units	15680	Cooling Tower (Propeller type)
15144	Reciprocating	15430	Domestic Water Conditioners	15681	Cooling Tower (Centrifugal type)
15145	Sump Pump	15435	Special System Accessories	15685	Ice Bank
15146	Submersible Pump	15440	Soap System Accessories	15686	Special Ice Making Equipment
15147	Pneumatic Ejector	15441		15687	Commercial Ice Making Equipment
15150	Compressors			15688	Evaporators
15151	Vacuum Pumps				
15152	Air Compressors				
15180	Vibration Isolation and Expansion Compensation				
15161	Vibration Isolation				
15162	Expansion Joints				
15164	Flexible Connections				
15170	Meters and Gages				
15171	Temperature Gages				

15681 Unit Coolers
 15685 Condensers
 15688 Refrigeration Accessories
 15700 LIQUID HEAT TRANSFER
 15701 General; to include descriptions of all systems, including:
 Hot Water Piping System
 Chilled Water Piping System
 Steam Supply and Return Piping System
 Radiant Heat System
 Snow Making System
 15710 Hot Water Specialties
 15718 Steam Specialties
 15720 Condensate Pump and Receiver Set
 15730 Heat Exchangers
 15731 Storage Water Heater
 15732 Converter
 15734 Clean Steam Heat Exchanger
 15735 Water Heat Reclaim Equipment
 15740 Terminal Units
 15741 Induction Units
 15745 Radiant Panels
 15750 Coils
 15751 Baseboard Units
 15752 Finned Tube
 15753 Connectors
 15754 Radiators
 15760 Unit Heaters
 15761 Fan Coil Units
 15762 Unit Ventilators
 15763 Air Handling Units (with coils)
 15770 Packaged Heating and Cooling
 15772 Packaged Heat Pump
 15780 Humidity Control
 15781 Humidifiers
 15783 Centrifugal Type Humidifier
 15785 Dehumidifiers
 15786 Desiccant Dehumidifiers
 15790 Process Heating
 15795 Storage Cells
 15799 Special Devices
 15800 AIR DISTRIBUTION
 15801 General
 15810 Furnaces
 15811 Direct Fired Furnaces
 15812 Cast Iron Furnaces
 15813 Steel Furnaces
 15814 Rooftop Furnaces
 15815 Direct Fired Unit Heaters
 15816 Direct Fired Duct Heaters/Reheaters
 15820 Fans
 15821 Centrifugal Fans
 15824 Propeller Fans
 15825 Attic Exhaust Fans
 15826 Fly Fans
 15827 Axial Flow Fans
 15828 Induced Draft Fans
 15829 Exhaust Fans
 15830 Power Roof Ventilators
 15831 Power Wall Ventilators

15832 Roof Ventilators (connected to ductwork)
 15834 Air Handling Units (without coils)
 15835 Air Curtains
 15840 Ductwork
 15841 Low Pressure Steel Ductwork
 15842 High Pressure Steel Ductwork
 15843 Nonmetallic Ductwork
 15844 Special Ductwork
 15848 Prefabricated Insulated Ductwork
 15847 Flexible Ductwork
 15848 Duct Lining
 15848 Duct Hangers and Supports
 15850 Special Ductwork Systems
 15851 Tailpipe Exhaust Equipment
 15852 Dust Collection Equipment
 15853 Paint Spray Booth System Equipment
 15854 Fume Collection Systems Equipment
 15855 Breaching and Smokepipe
 15860 Duct Accessories
 15861 Manual Dampers
 15862 Gravity Backdraft Dampers
 15863 Barometric Dampers
 15864 Fire Dampers
 15865 Smoke Dampers
 15866 Turning Vanes
 15867 Distribution Devices
 15868 Duct Access Panels and Test Holes
 15870 Outlets
 15871 Wall and Floor Diffusers
 15872 Ceiling Diffusers
 15873 Ceiling Air Distribution System
 15874 Light Troffer-Diffusers
 15875 Warm Air Baseboard
 15876 Cabinet Diffusers
 15877 Air Floors
 15878 Roof Mounted Air Inlets & Outlets
 15879 Air Inlet and Outlet Louvers (connected to ductwork)
 15880 Air Treatment Equipment
 15881 Disposable Filters
 15882 Permanent Filters
 15883 High Efficiency Filters
 15884 Roll Filters
 15885 Oil Bath Air Filters

15886 Electronic Air Filters
 15887 Air Washers
 15888 Dust Collectors
 15888 Fume Collectors or Dispensers
 15890 Sound Attenuators
 15895 Special Devices
 15900 CONTROLS AND INSTRUMENTATION
 15901 General
 15902 Electrical and Interlocks
 15908 Identification
 15907 Inspection, Testing, and Balancing
 15910 Control Piping, Tubing, and Wiring
 15915 Control Air Compressor and Dryer
 15920 Control Panels
 15925 Instrument Panelboard
 15930 Primary Control Devices
 15931 Thermostats
 15932 Humidistats
 15934 Aquastats
 15935 Relays and Switches
 15936 Timers
 15937 Control Dampers
 15938 Control Valves
 15939 Control Motors
 15950 Sequence of Operation
 15960 Recording Devices
 15970 Alarm Devices
 15980 Special Process Controls

DIVISION 16—

ELECTRICAL

16010	GENERAL PROVISIONS	16481	Rectifiers
16015	Electrical Reference Symbols	16600	LIGHTING
16020	Work Included	16501	General
16021	Work Not Included	16510	Interior Lighting Fixtures
16025	Codes and Fees	16511	Luminous Ceiling
16030	Tests	16515	Signal Lighting
16031	Demonstration of Completed Electrical Systems	16530	Exterior Lighting Fixtures
16040	Identification	16531	Stadium Lighting
16100	BASIC MATERIALS AND METHODS	16632	Roadway Lighting
16101	General	16550	Accessories
16110	Raceways	16551	Lamps
16111	Conduits	16552	Ballasts and Accessories
16112	Bus Ducts	16570	Poles and Standards
16113	Underfloor Ducts	16600	SPECIAL SYSTEMS
16114	Cable Trays	16601	General (To include descriptions of all systems involved)
16120	Wires and Cables	16610	Lightning Protection
16121	Wire Connections and Devices	16620	Emergency Light and Power
16125	Pulling Cables	16621	Storage Batteries
16130	Outlet Boxes	16622	Battery Charging Equipment
16131	Pull and Junction Boxes	16640	Cathodic Protection
16132	Floor Boxes	16650	Electromagnetic Shielding
16133	Cabinets	16700	COMMUNICATIONS
16134	Panelboards	16701	General (To include descriptions of all systems involved)
16140	Switches and Receptacles	16710	Radio Transmission
16150	Motors	16711	Shortwave Transmission
16160	Motor Starters	16712	Microwave Transmission
16170	Disconnects (motor and circuit)	16720	Alarm and Detection
16180	Overcurrent Protective Devices	16721	Fire Alarm and Detection
16181	Fuses	16725	Smoke Detector
16182	Circuit Breakers	16727	Burglar Alarms
16190	Supporting Devices	16730	Clock and Program Equipment
16199	Electronic Devices	16740	Telephone
16200	POWER GENERATION	16750	Teletype
16201	General	16760	Intercommunication Equipment
16210	Generator	16770	Public Address Equipment
16220	Engine	16780	Television systems
16221	Reciprocating Engine	16781	Master TV Antenna Equipment
16224	Turbine	16790	Learning Laboratories
16230	Cooling Equipment	16850	HEATING AND COOLING
16240	Exhaust Equipment	16851	General
16250	Starting Equipment	16858	Snow Melting Cable and Mat Heating Cable
16260	Automatic Transfer Equipment	16859	Heating Cable
16300	POWER TRANSMISSION	16860	Electric Heating Coil
16301	General	16865	Electric Baseboard
16310	Substation	16870	Packaged Room Air Conditioners
16320	Switchgear	16880	Radiant Heaters
16330	Transformer	16881	Duct Heaters
16340	Vaults	16890	Electric Heaters (Prop Fan Type)
16350	Manholes	16900	CONTROLS AND INSTRUMENTATION
16360	Rectifier	16901	General
16370	Converter	16910	Recording and Indicating Devices
16380	Capacitor	16920	Motor Control Centers
16400	SERVICE AND DISTRIBUTION	16930	Lighting Control Equipment
16401	General (To include descriptions of all wiring systems)	16940	Electrical Interlock
16410	Electric Service	16950	Control of Electric Heating
16411	Underground Service	16960	Limit Switches
16420	Service Entrance	16970	Urinal Flush Valve
16421	Emergency Service		
16430	Service Disconnect		
16431	Primary Load Interrupter		
16440	Metering		
16450	Grounding		
16460	Transformers		
16470	Distribution Switchboards		
16471	Branch Circuit Panelboard		
16480	Feeder Circuit		
16490	Converters		

MEL, INC. QUALITY CONTROL AUDIT PROCEDURE

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<u>ITEM COMPLETE</u>	<u>YES</u>	<u>NO</u>	<u>SCHED. DATE</u>	<u>COMPL. ACTUAL DATE</u>	<u>REMARKS</u>
F. <u>BIDDING OR NEGOTIATING PHASE</u>					
291. DETERMINE BIDDER QUALIFICATIONS					
292. HOLD PRE-BID CONFERENCE					
293. DOCUMENT REQUESTS FOR CLARIFICATION					
294. ISSUE ADDENDA					
295. REVIEW BIDS WITH CLIENT					
296. RECOMMEND AWARD					

MEL, INC. QUALITY CONTROL AUDIT PROCEDURE

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ITEM COMPLETE	I. PRECONSTRUCTION CONFERENCE CHECKLIST	YES	NO	SCHED. DATE	COMPL. ACTUAL DATE	REMARKS
	361. PURPOSE OF PRECONSTRUCTION CONFERENCE					
	362. ATTENDANCE - SIGN ROSTER					
	363. CONTRACT					
	364. PERFORMANCE BOND					
	365. PAYMENT BOND					
	366. INSURANCE CERTIFICATES - NOTE SPECIAL PROVISIONS REGARDING EXCESS EMPLOYER'S LIABILITY COVERAGE; BUILDERS RISK AND OWNER AND DESIGN PROFESSIONAL AS NAMED INSUREDS.					
	367. SCOPE OF WORK - NOTICE OF AWARD					
	368. SUBCONTRACTORS, EQUIPMENT SUPPLIERS, AND MATERIALMEN SUBMITTAL					
	369. PROGRESS SCHEDULE					
	370. SCHEDULE OF VALUES SUBMITTALS					
	371. SHOP DRAWING AND JOB MIX FORMULAE SUBMITTALS - CONTRACTOR PRIOR APPROVAL REQUIRED(SEE SHOP DRAWING CHECKLIST)					

MEL, INC. QUALITY CONTROL AUDIT PROCEDURE

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ITEM COMPLETE	H. PRECONSTRUCTION CONFERENCE CHECKLIST (Cont'd)	YES	NO	SCHED. DATE	COMPL. ACTUAL DATE	REMARKS
_____	372. ARBITRATION	_____	_____	_____	_____	_____
_____	373. PAYROLL SUBMITTALS	_____	_____	_____	_____	_____
_____	374. STORED MATERIALS	_____	_____	_____	_____	_____
_____	375. SUBMITTAL OF CONTRACTOR PERSONNEL AUTHORIZED TO EXECUTE PAYMENT APPLICATIONS, CHANGE ORDERS, SUBSTANTIAL COMPLETION AND FINAL PAY APPLICATIONS	_____	_____	_____	_____	_____
_____	376. TRAFFIC HANDLING (DETOUR) PLAN - IF APPLICABLE	_____	_____	_____	_____	_____
_____	377. CONTRACTOR'S RESIDENT SUPERINTENDENT	_____	_____	_____	_____	_____
_____	378. SAFETY	_____	_____	_____	_____	_____
_____	379. DESIGN PROFESSIONAL'S REPRESENTATIVE	_____	_____	_____	_____	_____
	A. PROJECT DESIGN PROFESSIONAL OR PROJECT MANAGER	_____	_____	_____	_____	_____
	B. RESIDENT PROJECT REPRESENTATIVE - IF APPLICABLE	_____	_____	_____	_____	_____
_____	380. OWNER'S REPRESENTATIVE	_____	_____	_____	_____	_____
_____	381. PROJECT COMMUNICATION	_____	_____	_____	_____	_____

MEL, INC. QUALITY CONTROL AUDIT PROCEDURE

ITEM COMPLETE		YES	NO	SCHED. DATE	COMPL. ACTUAL DATE	REMARKS
	H. <u>PRECONSTRUCTION CONFERENCE CHECKLIST (Cont'd)</u>					
	382. UTILITY COMPANY COORDINATION					
	383. SURVEY AND LAYOUT RESPONSIBILITIES					
	384. TESTING RESPONSIBILITIES					
	385. CONSTRUCTION WATER					
	386. PERMITS					
	387. PROCEDURE FOR APPLICATIONS FOR PAYMENT					
	388. CHANGE ORDER PROCEDURES AND DETERMINATION OF AMOUNT					
	389. SPECIAL REQUIREMENTS/DOCUMENTATION REQUIRED BY OWNER AND/OR FUNDING AGENCIES					
	390. AFFIRMATIVE ACTION PLAN - IF APPLICABLE					
	391. EXTRA SETS OF CONTRACT DOCUMENTS REQUIRED BY CONTRACTOR					
	392. EXPECTED DATE OF NOTICE TO PROCEED					
	393. GROUNDBREAKING OR DEDICATION CEREMONIES					
	394. ADDITIONAL CONTRACTOR QUESTIONS:					
	A. ADMINISTRATIVE					
	B. TECHNICAL					
	395. OTHER COMMENTS					

MEL, INC. QUALITY CONTROL AUDIT PROCEDURE

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<u>ITEM COMPLETE</u>	<u>YES</u>	<u>NO</u>	<u>SCHED. DATE</u>	<u>COMPL. ACTUAL DATE</u>	<u>REMARKS</u>
<u>I. CONSTRUCTION PHASE</u>					
401. FULL CP SERVICES INCLUDED					
402. RECEIVED CONSTRUCTION SCHEDULE					
403. SITE VISITS SCHEDULED					
404. PROJECT REVIEWED WITH PROJECT REP.					
405. PRECONSTRUCTION CONFERENCE HELD(SEE CHECK LIST)					
406. PRECONSTRUCTION CONFERENCE MINUTES DISTRIBUTED					
407. SHOP DRAWING PROCEDURE ESTABLISHED					
408. CERTIFICATE OF SUBSTANTIAL COMPLETION ISSUED					
409. FINAL RECOMMENDATION FOR PAYMENT ISSUED					

APPENDIX B
RESUME OF NEGOTIATION

RESUME OF NEGOTIATIONS
CONTRACT NUMBER DACW29-
MEL, INC.
ENG NO. ED-251
SURVEY AND SURVILY SUPPORT SERVICES FOR INSPECTION OF STRUCTURES

1. Negotiations for the above contract were conducted at the office of the Chief, Survey Section, on 5 December 1983.

The AE was represented by the following personnel:

Morgan M. Watson, President, MEL, Inc.
A. L. Fabre, New Orleans Office Manager, MEL, Inc.
Thomas F. Phillips, MEL, Inc.
James O. Morgan, MEL, Inc.

The Government was represented by the following personnel:

Wayne W. Weiser, Chief Negotiator, Chief, Survey Section, Engr Div
Theodore F. Mehrtens, Negotiator, Chief, Structures Insp Unit, Engr Div
Leroy J. Thompson, Negotiator, A-E Coordinator, Engr Div
Jerry Merchant, Contract Specialist, Contract Award Sec, Proc & Sup Div
Aiden P. Andry, Structures Insp Unit, Engr Div
George M. Seghers, Jr., Structures Insp Unit, Engr Div

2. The AE representatives were advised of the following by Mr. Thompson:

a. That any estimates of cost prepared by the A-E firm for the project would be treated in a confidential manner.

b. That all data and/or correspondence that are marked "For Official Use Only" shall be protected as required by AR 340-16.

c. That the AE firm was not authorized to make any public announcements or releases pertaining to the negotiations of the subject contract until publicly released by the Department of Defense (DOD).

3. Mr. Thompson asked the AE representatives if there were any questions relative to the scope of work for the proposed contract. The AE representatives indicated that they understood the scope of work.

4. Each cost item of the AE's price proposal was discussed in sufficient detail to arrive at mutually agreeable prices. Factual data submitted by the AE and LMVD Audit Report No. 84-02 were relied upon during negotiations.

5. The AE proposed an overhead rate of 118-37% based upon a recent audit by the Louisiana Department of Transportation and Development. However, an overhead rate of 100% was agreed to based upon the findings of the LMVD audit.

6. The AE proposed a salary escalation rate of 7.5% over the life of the contract based upon anticipated salary increases, however, the AE was advised that based upon the projected rate of inflation for 1984, the Government would not allow an escalation rate greater than an annual rate of 6%. The 6% escalation rate was agreed to.
7. The AE proposed an hourly rate of \$2.40 for a project manager, however, it was agreed that the cost for project management would be included in the firm's overhead.
8. The AE proposed a party chief salary rate of \$9.90/hr, however, based upon the LMVD audit findings, a rate of \$8.92/hr was agreed to.
9. The proposed instrument person rate of \$8.31/hr was agreed to.
10. The proposed rodperson/chainperson rate of \$6.61 was agreed to.
11. The AE proposed a \$50.00/day per diem rate applicable for all work outside of a 50-mile radius of the AE's project office, however, a \$38.00/day per diem rate was agreed to for all work regardless of location.
12. The AE proposed a 3/4 ton truck vehicle rate of \$6.89/hr based upon a vehicle usage rate of 125 miles/day. A vehicle rate of \$5.64/hr was agreed to based upon a vehicle usage rate of 50 miles/day.
13. The proposed survey boat rate of \$2.59/hr was agreed to.
14. A rate of \$1.19/hr was agreed to for safety equipment, and field survey equipment and accessories.
15. The proposed profit rate of 11.8% was agreed to.
16. The next area addressed was the level of effort necessary to provide the required surveys for the 35 structures included in the proposed contract. Messrs. Mehrtens and Weiser addressed NOD's position based upon 4 years of records. The following list is the agreed to level of effort for the survey crews for each year (FY84 & FY85).

Mobilization & Demobilization	16hrs
Algiers Lock	24hrs
Bayou Bienvenue Control Structure	58hrs
Bayou Boeuf Lock	48hrs
Bayou Courtableau Drainage Structure	20hrs
Bayou Darbonne Drainage Structure	12hrs
Bayou Dupre Control Structure	80hrs
Bayou Sorrel Lock	40hrs
Bayou Yokely Pumping Station (FY 84 ONLY)	24hrs
Berwick Lock	32hrs
Calcasieu Lock	40hrs
Calcasieu River Salt Water Barrier	54hrs
Catfish Point Control Structure	60hrs
Charenton Floodgate	24hrs
DOE Floodwall - EABPL	16hrs
DOE Floodwall - WABPL	16hrs
Duvic Pumping Station	20hrs
EABPL Item E-75	20hrs
EABPL Item E-77	24hrs
EABPL Item E-85	12hrs
Empire Floodgate	20hrs
Grand Liard Pumping Station	16hrs
Harvey Lock	20hrs
IHNC Lock	24hrs
Keystone Lock & Dam	16hrs
Leland Bowman Access Bridge	10hrs
Morganza Control Structure	12hrs
Old River Lock & Tailbay	24hrs
Old River Navigation Bridge	12hrs
Old River Low Sill Control Structure	16hrs
Old River Overbank Control Structure	20hrs
Pointe Coupee Drainage Structure	12hrs
Port Allen Lock	30hrs
Schooner Bayou Control Structure	40hrs
Teche-Vermilion Pumping Station	16hrs
Vermilion Lock (FY 84 ONLY)	44hrs

17. The Government will furnish the EDM instrument for the measurements required at the IHNC Lock Structure. The Government will also provide a closed cabin boat for transportation and execution of surveys at Freshwater Bayou.

3. In closing Mr. Thompson informed the AE representatives that the unit rates and level of efforts for the proposed survey and survey support services for the inspection of structures contract was reasonable and acceptable to the Government subject to required levels of approval.


MORGAN M. WATSON
PRESIDENT
MEL, INC.

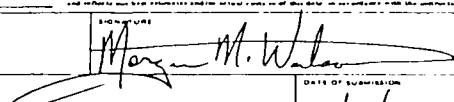
DATE

Wayne W. Weiser 30 Dec. 83

WAYNE W. WEISER
C/SURVEY SECTION
ENGINEERING DIVISION
GOVERNMENT NEGOTIATOR

DATE

CONTRACTOR DATA		<input type="checkbox"/> CHANGE ORDER <input type="checkbox"/> SUPPL. AGREEMENT	1. CONTRACT NR.
2. CONTRACT FOR <input type="checkbox"/> CONSTRUCTION <input checked="" type="checkbox"/> ARCHITECT-ENGINEER } SERVICES <input type="checkbox"/> AECM		3. NAME AND LOCATION OF PROJECT Survey and survey support service for inspection of structures in the New Orleans District	
4. FIRM NAME MEL, Incorporated		5. BUSINESS ADDRESS & TELEPHONE NR.* 2728 Wooddale Boulevard Suite D Baton Rouge, LA 70805	
6. TYPE OF FIRM* <input type="checkbox"/> INDIVIDUALLY OWNED <input type="checkbox"/> PARTNERSHIP		<input type="checkbox"/> JOINT VENTURE <input type="checkbox"/> CORPORATION (INC. IN STATE OF <u>LA.</u>)	
7. EXACT NAMES OF OWNERS, PARTNERS AND/OR OFFICERS* Morgan M. Watson (President) Press L. Robinson (Vice President) Mitchell Albert, Jr. (Secretary)			8. QUALIFIES AS SMALL BUSINESS* <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
9. TYPE PAYMENT PROVISION PREFERRED* <input checked="" type="checkbox"/> MONTHLY PARTIAL PAYMENTS <input type="checkbox"/> OTHER - SPECIFY <input type="checkbox"/> LUMP SUM UPON COMPLETION			
10. NAME OF ASSOCIATE FIRM OR FIRMS OR CONSULTANTS PERFORMING ANY SERVICES UNDER THIS A/E CONTRACT (For each firm or consultant indicate the services to be provided, e.g., Architect, Structural, Mechanical, Electrical, Drafting, etc. Any change in the following requires prior approval of the Contracting Officer.)			
11. The negotiation and proposed award are based upon, among other things, an understanding: <ol style="list-style-type: none"> a. That no member of the firm, owner or part owner, executive officer or director, and no employee of this organization receiving compensation therefrom is employed by the Government on construction work under the jurisdiction of the Corps of Engineers. b. That the contract cost, mutually agreed to in the amount of \$193,495.84 (options, if any included) is fair and reasonable compensation for the services to be rendered under the proposed contract and as indicated in the attached scope of work upon which the negotiations were based. c. That neither I, nor any member of this organization, employed any person, either directly or indirectly to solicit or secure a contract for the (construction A/E services), regarding which negotiations have just been concluded, upon any agreement for a commission, percentage, bonus, or contingent fee, that all information and data submitted by me to the United States, incident to these negotiations are accurate and true to the best of my knowledge and belief. Furthermore, that in the event the contract is awarded to my firm, no part of the contract price shall be paid to any person, firm or corporation for soliciting or assisting in any manner whatsoever in securing this contract. 			
1/10/84 (Date)		President (Title)	
 (Contractor Signature)			
(The contractor's negotiator may sign if there is evidence that the contractor has granted the negotiator that authority)			
When the type of contract involved requires such information the Contractor will provide as attachments, applicable data on organization, present and proposed salaries, contractor owned construction equipment, facility and/or security clearances and other pertinent items in accordance with understandings reached during the negotiations. The Government will provide, as an attachment a resume of the actual negotiation proceedings which were attended by the Contractor or his representative. Particular attention will be directed toward including matters of record which constitute areas of mutual understanding and will include project data, contract appendices, forms, schedules, design or other criteria, materials, and equipment furnished by the contractor by the Government. Provision will be made at the end of the resume for the signature of both the principal Contractor representative and the principal Government representative. A copy of the scope of work upon which negotiations were based MUST also be attached as part of the official contract file.			
*A statement of Not Applicable (N/A) may, where appropriate, be substituted for information required by items 5, 6, 7, 8, 9 and 10 when change orders are involved.			

DEPARTMENT OF DEFENSE CONTRACT PRICING PROPOSAL		FORM APPROVED 11/16/83 (REV)
<p>NAME, ADDRESS AND TELEPHONE NUMBER OF ORGANIZATIONAL ELEMENT RESPONSIBLE FOR SUBMITTING PROPOSAL</p> <p>MEL, Incorporated 2728 Wooddale Boulevard, Suite D Baton Rouge, LA 70805 504/927-7240</p>		
<p>TOTAL COST</p> <p>PROFIT/LOSS</p> <p>TOTAL \$193,495.84</p>		<p>TYPE OF CONTRACT</p> <p>PLACES AND PERIODS OF PERFORMANCE</p> <p>Corps of Engineers New Orleans District</p>
<p>IDENTIFICATION</p> <p>NOTE: List and identify the identification systems and data used proposed for each contract item. A copy of the contract is being submitted to the Contracting Office and a copy retained by the Contracting Office. (continued on page of required)</p> <p>See Attached Schedule</p>		<p>TYPE OF PROCUREMENT ACTION</p> <p><input checked="" type="checkbox"/> NEW PROCUREMENT <input type="checkbox"/> OTHER ORDER</p> <p><input type="checkbox"/> CHANGE ORDER <input type="checkbox"/> LETTER CONTRACT</p> <p><input type="checkbox"/> PRICE REVISION <input type="checkbox"/> DETERMINATION</p>
<p>CONTRACT ADMINISTRATION OFFICE</p> <p>U.S. Army Engineer District Corps of Engineers, New Orleans District New Orleans, LA.</p>		<p>AUDIT OFFICE</p> <p>Louisiana Department of Transportation and Development/Audit and Evaluation Section P.O. Box 44245, Capitol Station Baton Rouge, LA 70804 504/342-8081</p>
<p>II. IF YOUR ACCOUNTS AND RECORDS HAVE BEEN REVIEWED IN CONNECTION WITH ANY GOVERNMENT CONTRACT, FRAME OR SUBCONTRACT, GRANT OR PROPOSAL WITHIN THE PAST 3 YEARS BY A GOVERNMENT AGENCY OTHER THAN THE DDC AND YOU HAVE RECEIVED A NOTICE OF DISAPPROPRIATE PRACTICES AND TELEPHONE NUMBER RECORD</p>		
<p>III. DO YOU REQUIRE GOVERNMENT CONTRACT FINANCING TO PERFORM THIS PROPOSED CONTRACT?</p> <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, SPECIFY: <input type="checkbox"/> ADVANCE PAYMENTS <input type="checkbox"/> PROGRESS PAYMENTS OR <input type="checkbox"/> GUARANTEED LOANS</p>		
<p>IV. HAVE YOU BEEN AWARDED ANY CONTRACTS OR SUBCONTRACTS FOR THE SAME OR SIMILAR ITEMS WITHIN THE PAST 3 YEARS?</p> <p><input checked="" type="checkbox"/> YES <input type="checkbox"/> NO IF YES, SPECIFY ITEM, CONTRACT NUMBER AND CONTRACT NUMBER:</p> <p>Corps of Engineers, New Orleans District, Contract No. DACW29-82-D-0310 Corps of Engineers, New Orleans District, Contract No. DACW29-87-B-0339 Corps of Engineers, New Orleans District, Contract No. DACW29-80-D-0653</p>		
<p>V. COST ACCOUNTING STANDARDS BOARD (CASA) DATA PUBLIC LAW 96-35 AS AMENDED:</p> <p>1. WILL THIS PROCUREMENT ACTION BE SUBJECT TO CASE REGULATION? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, SPECIFY: Small Business Exemption</p> <p>2. HAVE YOU SUBMITTED A CASB DISCLOSURE STATEMENT (CASE OR 31)? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, SPECIFY THE NUMBER OF THE DISCLOSURE STATEMENT AND IF APPLICABLE TO BE AMPLIFIED</p> <p>3. HAVE YOU BEEN ADVISED THAT YOU ARE OR MAY BE IN NON-COMPLIANCE WITH YOUR DISCLOSURE STATEMENT OR COST ACCOUNTING STANDARDS? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, SPECIFY:</p> <p>4. IS ANY ASPECT OF THIS PROPOSAL INCONSISTENT WITH YOUR DISCLOSED PRACTICES OR APPLICABLE COST ACCOUNTING STANDARDS? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO IF YES, SPECIFY:</p>		
<p>THE PROPOSER'S ADDRESS AS PROVIDED IN 1917, PARAGRAPH 2011</p> <p>and in Part 1, and the PROPOSER'S ADDRESS AS OF THE DATE OF SUBMISSION AND THE ADDRESS OF THE FIRM</p>		
<p>TYPED NAME AND TITLE</p> <p>Morgan M. Watson, President</p>		<p>SIGNATURE</p> 
<p>NAME OF FIRM</p> <p>MEL, Incorporated</p>		<p>DATE OF SUBMISSION</p> <p>1/10/84</p>

RESUME OF NEGOTIATIONS
 FOR CONSTRUCTION SUPERVISION, INSPECTION AND RELATED SERVICES WITHIN
 THE LIMITS OF THE U.S. ARMY ENGINEER DISTRICT
 NEW ORLEANS AND L & D NO. 1 ON THE RED RIVER WATERWAY

SOLICITATION NO. DACW29-83-R-0102

1. On 16 Nov 83 at 0900 hours a negotiation meeting was held in Construction Division Conference Room. The persons in attendance were as follows:

Mr. Morgan M. Watson	President, MEL, Inc.
Mr. Thomas F. Phillips	Manager of Operations, MEL, Inc.
Mr. Alphonse L. Fabre	N. O. Office Mgr., MEL, Inc.
Mr. Albert B. Rowe	Comptroller, MEL, Inc.
Mr. James O. Morgan	Project Construction Mgr., MEL, Inc.
Mr. Jerry A. Merchant	C/Eval & Anal Sec, Proc & Supply, NOD
Ms. Janita Russell	SADBU Advisor, Proc & Supply, NOD
Mr. Daniel W. Cooper	C/S&I Br., Const. Div., NOD
Mr. Michael R. Price	C/Quality Assur. Sec., Const Div. NOD
Mr. Noel Grego	A/E Project Mgr., Const. Div, NOD

2. Proceedings:

Reference symbol COE for Corps of Engineers will be used.

The meeting was opened by presenting MEL with a counteroffer to their proposal. The following table shows MEL's proposed rates and the COE's counteroffer:

<u>Item No.</u>	<u>Pay Item</u>	<u>Proposed Rates</u>	<u>Counteroffer</u>
001	Const. Inspector I	\$20.602/hr.	\$16.47/hr.
002	Const. Inspector II	21.993/hr.	17.59/hr.
003	Const. Inspector III	24.776/hr.	19.80/hr.
004	Supv. Const. Rep.	33.549/hr.	29.03/hr.
005	Pickup Truck	41.610/day	27.22/day
006	Per diem	45.52/day	40.00/day

The following references were used in the computation of COE's counteroffer:

- a. Government General Pay Schedule
- b. Audit Report No. 83-31
- c. Weighted Guidelines Profit Determination Method
- d. COE's EP 1110-1-8 (Construction Equipment Ownership and Operating Expense Schedule, Region III).

After reviewing the COE's counteroffer Mr. Watson explained they would like to see a breakdown of the rates before they accepted or rejected the counteroffer.

Mr. Merchant explained that a breakdown disclosure would constitute a contract negotiation based upon the Cost Analysis method which was used when no historical data existed to backup the contractor's proposal, but was not the case in this situation. A contract negotiation based upon the Price Analysis method was preferred and would be the method used in the negotiation.

Mr. Price called MEL's attention to the fact that the COE's counteroffer represented rate increased of 27 percent and 37 percent for Items 1 through 3 and 4, respectively, when compared against the same items under existing contract DACW29-82-D-0310 with MEL's firm. MEL handed the negotiators information (Incl 2) in support of their proposed rates and at the same time explained that their proposed rates were a true reflection of expenditures during the performance period of the contract. After a lengthy discussion, both parties agreed that a recess should take place in order for MEL to study the COE's counteroffer in private.

Upon reconvening, MEL accepted the rates for Items Nos. 1 through 4 and 6 of COE's counteroffer. Item No. 5 was not accepted since: (1) It was out of line with the proposed rate; (2) the COE's counteroffer rate was lower than the rate the COE was presently paying them under Contract 82-D-0310; and (3) the rate was lower than all other rates paid by the COE in previous contracts. Mr. Price explained that the rate irregularity for Item No. 5 could be due to misinterpretation of COE's new pamphlet EP 1110-1-8 (Construction Equipment Ownership and Operating Expense Schedule, Region III, June 83) used in the computation of the rate.

Mr. Watson explained they felt the pamphlet penalized them for owning the vehicles. If the vehicle rate could only be arrived at by using EP 1110-1-8, and if the rate determined by the COE to be the applicable rate was unacceptable to them, then MEL would be forced to rent vehicles resulting in a greater costs to the COE.

COE promised to check with Government Estimate section to determine the possibilities of using other methods or rates to compute the vehicle rate. MEL concluded that they would withdraw their proposed rate for Item No. 5 and would propose a new lease rate. Copy of the lease agreement between MEL and Rental Company would be furnished to the COE.

Meeting was adjourned.

Reference MEL's letter dated 25 Nov 83 (Incl 3) in which they proposed to lease pickup trucks from Earl's Auto Sales in New Roads, La. The proposed lease unit price was \$55.04 per day. No action was taken on this vehicle rate proposal at the time of submission. MEL subsequently lowered the proposal for this item.

The Government Estimate was revised (see Revised Government Estimate, Incl 4) since Item No. 5, Pickup Truck was deleted from the solicitation and a new item, Vehicles (Item No. 5) was introduced with two subitems identified as 5(a) 1983 or Later Models and 5(b) 1982 or Earlier Models. The Revised Government Estimate unit prices for Item No. 5, Vehicles were as follows:

<u>Item No.</u>	<u>Pay Item</u>	<u>Unit Price</u>
005	Vehicles (Pickup Truck)	
	(a) 1983 or Later Model	37.52
	(b) 1982 or Earlier Model	33.00

All other unit prices remain unchanged as in the original Government Estimate.

On 30 Jan 84 in a telephone conversation between Mr. Price, Mr. Merchant and Mr. Watson, MEL was informed of the Government's decision to amend the solicitation to provide for two vehicle rates rather than just one as was in the original solicitation.

Reference MEL's letter dated 31 Jan 84 (Incl 5) in which they proposed \$39.76 per day for Item No. 5(a), 1983 or Later Model and \$33.00 per day for Item No. 5(b), 1982 or Earlier Model. The proposed rate for Item No. 5(a) was accepted based upon comparison with a rate previously negotiated with MEL (Contract 81-D-0133) of \$34.58. On 6 Feb 84 in a telephone conversation between Mr. Price and Mr. Watson a rate of \$37.52 per day was negotiated to conclude negotiations. This compares favorably with the vehicle rate of \$39.20 being paid under the present contract and was deemed to be in the Government's best interest.

3. Negotiations were concluded.

NOEL GREGO
A-E Project Manager

VITA

NAME: James Oliver Morgan, P.E.

DATE OF BIRTH: May 15, 1939

PLACE OF BIRTH: Lockheart, Texas

PARENTS: Mr. & Mrs. Henry Clay Morgan

EDUCATION: Phillis Wheatly High School
San Antonio, Texas, May 1957

Bachelor of Science, Mechanical Engineering
Prairie View A&M University
Prairie View, Texas, May 1969

Master of Science, Mechanical Engineering
Texas A&M University
College Station, Texas, December 1974

EXPERIENCE: May 1969 - Present

Industrial - E. I. DeNemours & Company
United Nuclear Industries
MEL, Inc. (Doctor of Engineering Internship)

Academic - Southern University
Texas A&M University

Research & Development -
Southern University
Texas A&M University
Battelle Northwest
Hughes Aircraft Company

PROFESSIONAL ORGANIZATIONS: American Society of Mechanical Engineers (Member)
American Society of Engineering Education (Member)
Pi Tau Sigma

PERMANENT ADDRESS: P. O. Box 277
Baker, Louisiana 70704-0277

The typist for this report was Mrs. Linda Short.