MIDLAND ENERGY CENTER
SPATIAL SYSTEMS INTERACTION PROGRAM/SEISMIC

CPCO Document Review/Approval Form

Documen. Title: PROCEDURF FOR PERFORMING CALCULATIONS AND
TECHNICAL STUDIES

Document Number/Revision/Date: ATP-12-Q/01/August 26, 1983

TABLE OF CPCO REVIEW/APPROVAL

Rev. No.	Date	SSIP/S Project Engineer	Date	MPQAD	Date
0	08/01/83	(Issued for Comment)			
1	08/26/83	_Rogus Tuttle_ 8/31/83		_Jerry Parcell_ 8/26/83	

PROCEDURE FOR PERFORMING CALCULATIONS AND
TECHNICAL STUDIES

ADMINISTRATIVE TASK
PROCEDURE NO: ATP-12-Q

REVISION NO: 1

DATE: August 26, 1983

PAGE: 1 of 11

PREPARED BY/Date: _Raymond J. Durand 8-26-83_

APPROVED BY/Date: _Steven P. H____ 8-26-83_

TABLE OF REVISIONS

Revision 0,   Date August 1, 1983

   Original Issue

Revision 1,   Date August 26, 1983

   Revised I, II.A, B, D, III.B, IV.C, IV.G.1 & IV.H.

Procedure for Performing Calculations

I. SCOPE

This procedure establishes the methods for control, preparation, review, and approval of calculations used in the analysis of quality-related designs.It sets forth the procedural steps to be followed in identifying the assumptions, references, design bases, and calculation methods used, and for maintaining calculation traceability and revision status control.

II. RESPONSIBILITIES

A. PROJECT MANAGER

The Project Manager shall review and approve calculations.

B. SUPERVISING ENGINEER

The Supervising Engineer:

o   Assigns Engineers or qualified personnel to perform calculations.

o   Designates independent Reviewers to check calculations, resolves comments as necessary.

C. ENGINEER

The Engineer assigned to perform the calculation is responsible for documenting his assumptions, method, design input, and references, and for resolving any comments made by the Reviewer.

D. REVIEWER

The designated Reviewer is responsible for reviewing all aspects of the calculations and for obtaining the originator's agreement with any checking comments before signing off as the Reviewer.

III. DEFINITIONS

A.   CALCULATIONS

The process and documentation of the resolution to a technical problem by analytic and/or computational methods.

B.   REVIEWER

Person responsible for reviewing all aspects of the calculations. The Reviewer shall not have originated any of the work to be checked.

IV. PROCEDURE

This procedure applies to work performed as calculations, analyses, and technical studies which involve technical computations and analytical steps.

A.   CALCULATION LOG

A calculation index or log shall be maintained as part of the Project File. The log shall identify the calculations performed for the project by unique number and current revision status. Calculation numbers will be assigned based upon the sequence or system of the numbers in the log. The log form shall be similar to that shown in Exhibit A. The log shall be updated whenever a calculation, or revision thereto, is approved.

B.   THE CALCULATION PROCESS

1.   General

Calculations shall be performed on standard calculation sheets similar to that shown in Exhibit B unless project requirements dictate a different format. Calculations shall comply with the following documentation criteria:

a.   Every major step of the calculation shall be identified.

b.   Formulas and equations used shall be documented; symbols and abbreviations not commonly used shall be defined.

c.   References and calculation inputs shall be identified, and shall be traceable to their source documents to permit subsequent verification.

d.   Each calculation sheet shall identify, as a minimum:

1)   project name and number
2)   originator and reviewer initials
3)   dates of preparation and check

e.   Calculations shall be neat and legible.

f.   Where preliminary data or other data not directly traceable to a verified source is used, the calculation shall identify such data as an assumption or open item which requires future verification.

2.   Page Numbering
Calculation pages shall be numbered such that the completeness of the calculation can be verified. The recommended method of pagination is to number the calculation cover sheet page "1 of n," where "n" is the total number of pages in the calculation, and assign each subsequent sheet an appropriate sequential number. Where this is not practical due to technical or format considerations, a table of contents or explanation shall be provided which clearly indicates the number of pages in each section.

3.   Method Statement
The Engineer shall describe the methods used in the performance of his calculation. The method shall clearly indicate the sequence of steps such that a competent Reviewer can verify the calculation process without recourse to the originator. Where a verifiable method is already established (e.g., in a technical procedure or manual), the Engineer may substitute a reference to the procedure. The reference shall include document number, title, date, revision or edition, and the author and originating organization, if appropriate.

C. USE OF COMPUTER PROGRAMS

Computer programs may be used in support of calculations for designs and analyses. Computer programs shall be identified, verified and controlled in accordance with Reference B.

Computer output shall be considered an extension of the base calculation, and shall comply with the following requirements:

o   Computer output for a calculation or analysis shall be identified by a unique identifier or run number placed at the front of the run.

o   Calculations shall clearly reference the final computer runs generated to support the calculation. The reference shall include the unique computer run identifier for each run.

o   When computer data is introduced into the calculation, or shown in a table, the source computer run number shall be referenced.

o   Computer runs shall include a listing of input, in addition to output.

o   Computer run input and output shall be traceable to originator and date, and reviewer and date.

o   Computer runs shall be traceable to the calculation or analysis and revision for which they were generated by indicating the calculation number and revision placed at the front of the run.

o   Completed computer runs shall be maintained in a neat and orderly condition, either filed with the calculation or maintained separately.

o   The version of computer programs shall be shown on the output.

D. RESULTS VERIFICATION

All calculation or computer run results shall contain, as part of the calculation package, a verification of the final results by the use of alternate or simplified calculational methods.

E.   CALCULATION REVIEW

The Reviewer shall document his check and have his comments resolved by the responsible Engineer.

F.   APPROVAL

Calculations shall be approved by the Project Manager or his designee. Signature approval shall be documented on the Calculation Cover Sheet, a form similar to Exhibit C. The approval siginifies that the calculation has been properly performed and checked, that inputs have been properly selected, and that the calculation results support the stated conclusion or design.

G.   REVISIONS

Changes to approved calculations shall be documented as calculation revisions. Revisions shall be prepared and approved in the same manner as the original calculation.

Each calculation revision shall contain a complete documentation record for that revision, and shall be independently verifiable by a Reviewer.

1.   Revision Documentation
Changes or revisions to calculations shall be identified by documenting the changed revision level on the Calculation Cover Sheet. Pages unaffected by the change shall remain unchanged. Documentation on the Calculations Cover Sheet and on the revised pages shall be sufficient to clearly describe the nature and extent of the changes throughout the revision cycle of the calculation.

Superseded calculation pages shall be marked "superseded", and copies retained for traceability of past calculation revisions. Superseded or voided calculations shall be so noted on the Calculation Log when it is not evident from the revision level sequence.

H.   SPECIAL TECHNICAL STUDIES

On a case basis, special studies may be performed to evaluate technical problems, nonconformances, or other developments outside the normal project scope. These special studies shall be documented as calculations as prescribed in this procedure and maintained in a seperate Calculation Log as prescribed in IV.A. above.

I. QUALITY ASSURANCE RECORDS

Completed calculations, analyses, special studies and associated computer outputs shall be controlled in accordance with Reference C.

V. REQUIRED DOCUMENTATION

A. Calculation Log (Exhibit A)

B. Calculation Sheet (Exhibit B)

C. Calculation Cover Sheet (Exhibit C)

V. REFERENCES

A. MTC Quality Assurance Manual (latest revision)

B. ATP-8-Q, MTC Procedure for Control of Computer Programs (latest revision)

C. ATP-10-Q, MTC Procedure for Document Control (latest revision)

MARK TECHNOLOGIES CORPORATION

CALCULATION LOG/INDEX

Client: _____

Project Number: _____

Sheet _____ of _____

Calculation No.:	Title	Rev. No.	Date	Rev. No.	Date	Rev. No.	Date	Comments

Mark Technologies
Corporation

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EXHIBIT B

Calculation Sheet

Project _____ Project Number _____

Subject _____ By _____ Date _____

Sheet _____ of _____ Checked _____ Date _____

Mark Technologies Corporation

CALCULATION COVER SHEET

CALCULATION/PROBLEM NO.: _____

PROJECT NAME: _____

PROJECT NUMBER: _____

TOTAL NUMBER OF PAGES (INCLUDING COVER SHEET): _____

CALCULATION TITLE: _____

_____

_____

REFERENCES: _____

_____

_____

_____

PREPARED BY: _____
DATE

REVIEWED BY: _____
DATE

APPROVED BY: _____
DATE

_____

REV. NO.	DESCRIPTION OF REVISION	APPROVED BY/DATE
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MIDLAND ENERGY CENTER
SPATIAL SYSTEMS INTERACTION PROGRAM/SEISMIC

CPCO Document Review/Approval Form

Document Title: PROCEDURE FOR RESOLUTION OF SSIP/S POSTULATED
                   INTERACTIONS

Document Number/Revision/Date: 8301-WTP-4-Q/01/August 26, 1983

TABLE OF CPCO REVIEW/APPROVAL OF REVISIONS

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INFORMATION ONLY