Environmental Project Management: Perspectives & Issues©
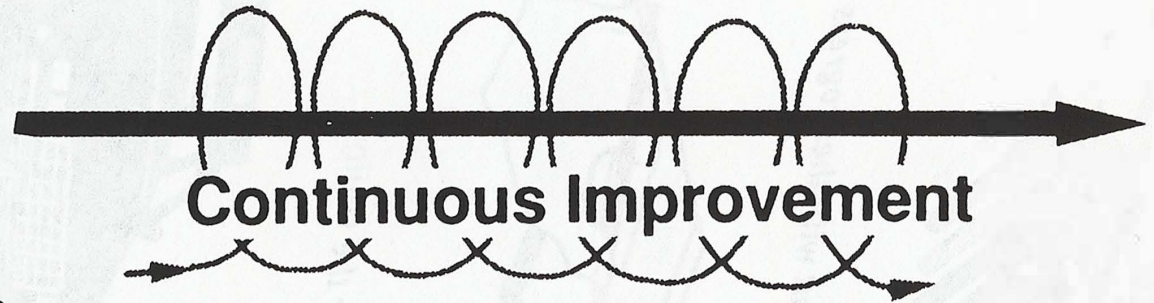
Michael D. Campbell, P.G., P.H.
Consultant to Industry
Houston, Texas

January 19, 1995

Introduction To Environmental Technology™
Houston Engineering & Scientific Society
Houston, Texas

The Key to Being Competitive

Continuous Improvement

What is Matrix Management System?

"It is a multidimensional sharing of authority, responsibility, and accountability in a dynamic, result-oriented system where personnel assignments, authority basis, and inter-personal relationships are constantly shifting within a framework of balanced power."

After: Cleland, 1981, Management Review, November, pp. 25-39

Why the Matrix Management System?

When it is essential that a company must:

- be highly responsive to client needs <u>and</u> technology requirements,

- face uncertainties that generate high information processing requirements,

- deal with strong constraints on financial and/or human resources, and

- provide both flexibility and balanced decision making.

After: Davis and Lawrence, 1978, <u>Harvard Business Review</u>, May-June, pp. 131-142

What are the Problems with the Matrix System?

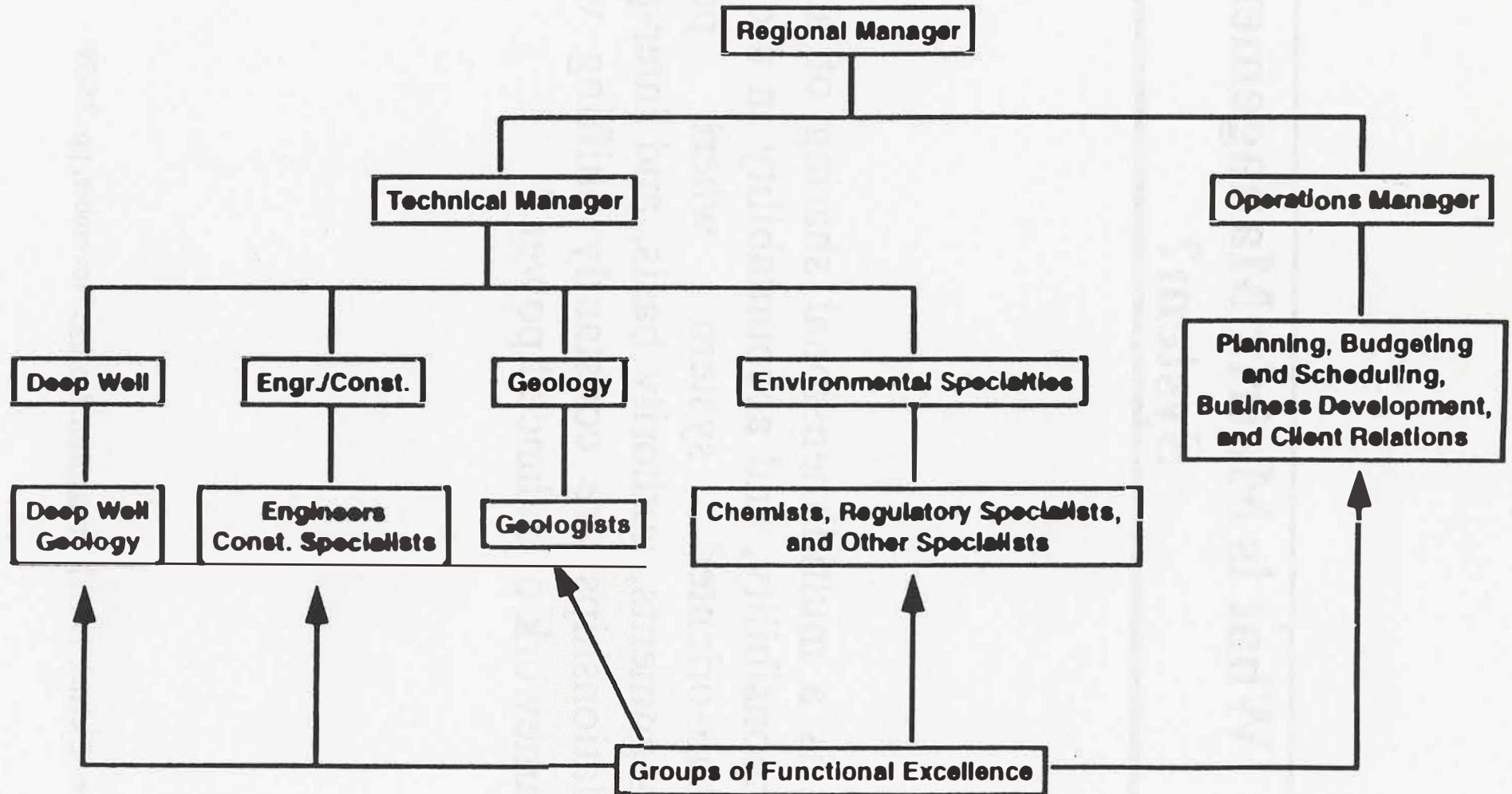| Symptom	Prevention/Elimination
● **Anarchy Breakout**	
● Employees do not recognize a "boss" to whom they are responsible	● Define relationship between Functional and Administrative Managers
● **Power Struggles**	
● System encourages jockeying for "power"	● Severe differences are not tolerated by Administrative Manager ● Shared perspective ● Requires strong, credible managers
● **Group Decision Making**	
● Many multi-manager meetings and discussions are required for successful projects ● Too many cooks in the kitchen	● Educate and define differences between group and individual matters. Leave decisions to most informed persons.
● **Collapse During Economic Crunch**	
● In times of stress or low utilization, requires authoritative decision making ● Matrix failure & revert to anarchy	● Good people manager ● Good planning and forecasting ● Manager is a coach

What are the Problems with the Matrix System?

Symptom	Prevention/Elimination
● **Excessive Overhead**	
● Dual chain of command required ● Non-billable costs are conspicuous.	● Fewer bad decisions ● Less feather bedding ● Less complex results
● **Decision Strangulation**	

● Too much democracy
 	
   ● Not enough action
   ● Escalates conflict
   ● Constant clearing of issues with Matrix
	● Change perception of power
	
	● Manage conflict
	
	● Delegation by manager

After: Davis and Lawrence, 1978

What Makes the Matrix Management System Work?

By having:

- dual control and evaluation systems (project managers and technical managers),

- leaders who operate comfortably with lateral decision making, and

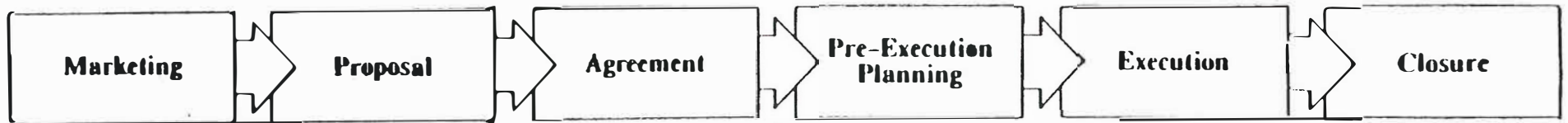- a company culture that can negotiate open conflict and a balance of power.
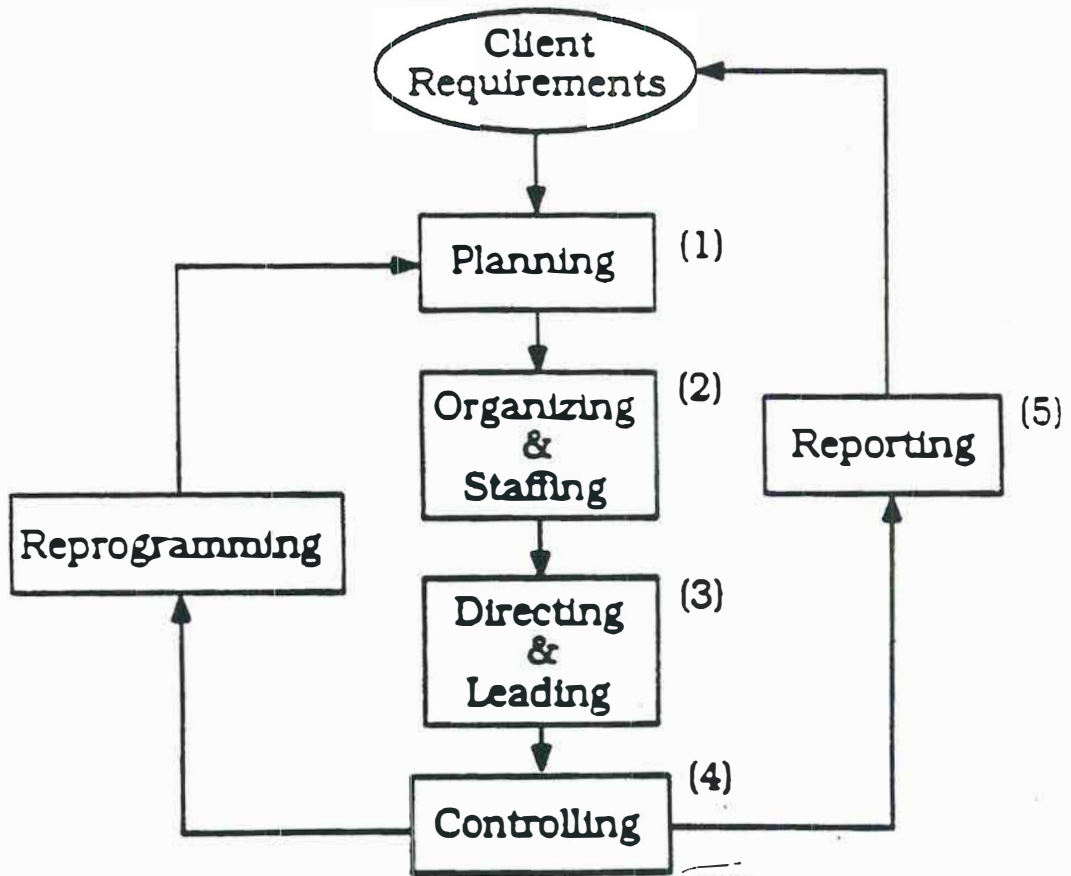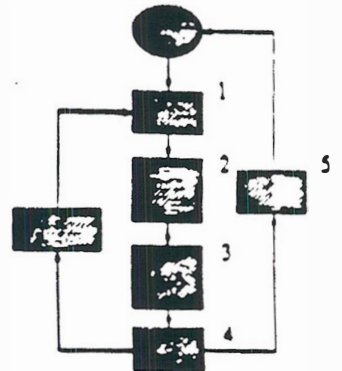
TECH/OPS ORGANIZATION

9/14/92

OVERVIEW OF PROJECT SEQUENCE

Marketing	Proposal	Agreement	Pre-Execution Planning	Execution	Closure
ACTION Identify possible clients and request that DERS perform work on their behalf.	Evaluate client need, develop preliminary scope, estimate, and schedule to satisfy need.	Attain contractual "pact" with client to perform work per defined scope, within accepted time frame and expenditure limits.	Refine scope to detail individual activities, tasks, and associated budgets. Finalize execution strategy(ies), assign manpower/finalize project team.	Perform work as defined by scope and per plan.	Close out project via final payments and paperwork. Critique project team performance to identify where enhancements may be made in the future.
KEY INDIVIDUAL Marketing/sales representative	Project Manager	Project Manager	Project Manager	Project Manager	Project Manager
SUPPORT STAFF Project Manager Technical group	Proposal Team: • PB&S group • Marketing rep • Technical specialists • H&S • •	Marketing rep PB&S group Procurement Technical specialists	PB&S group Support group Supervisors Project team: • Technical specialists • H&S • Biologist • • •	Procurement Project team Accounting Administration	Project team Accounting Administration

FIVE BASIC PROJECT
MANAGEMENT FUNCTIONS

```
Client
Requirements
        ↓
    Planning        (1)
        ↓
  Organizing        (2)
      &
   Staffing
        ↓
   Directing        (3)
      &
   Leading
        ↓
  Controlling       (4)

  Reprogramming

   Reporting        (5)
```

LSD-006

PROJECT REPORTING

The project manager is responsible for reporting on
project progress to the customer and to others
outside the project who require information about its
status.

This is consistant with
the project manager's
responsibility for
customer liaison.

In a project done under
a contract with an outside
organization, the project
is responsible for
reporting both to the
customer and to his/her
general management.
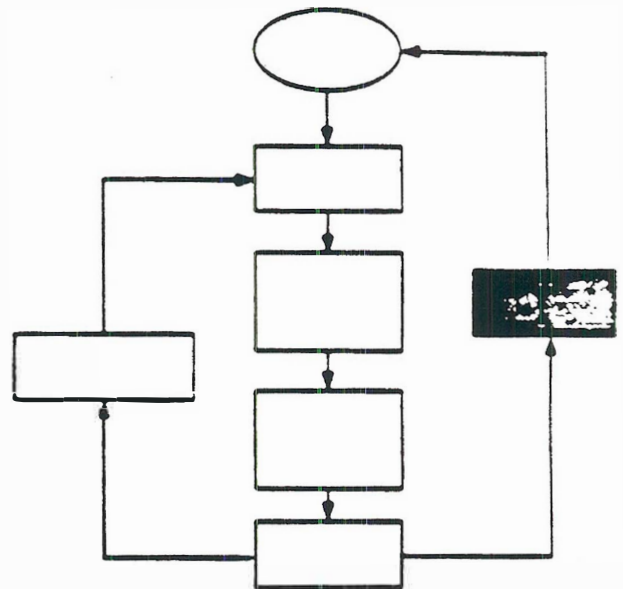
Charles Martin,
Project Management

PROJECT CONTROL

Making sure the project plans succeed,
Controlling is *Measuring* progress
toward project objectives, *Evaluating*
that progress, and taking *Corrective
Action* to achieve or exceed project
objectives.

|	
Measuring	(1)
Evaluating	(2)
Correcting	(3)
Recycle	
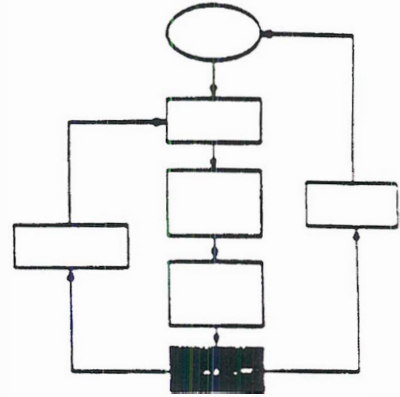
Measuring:
Determining the degree to
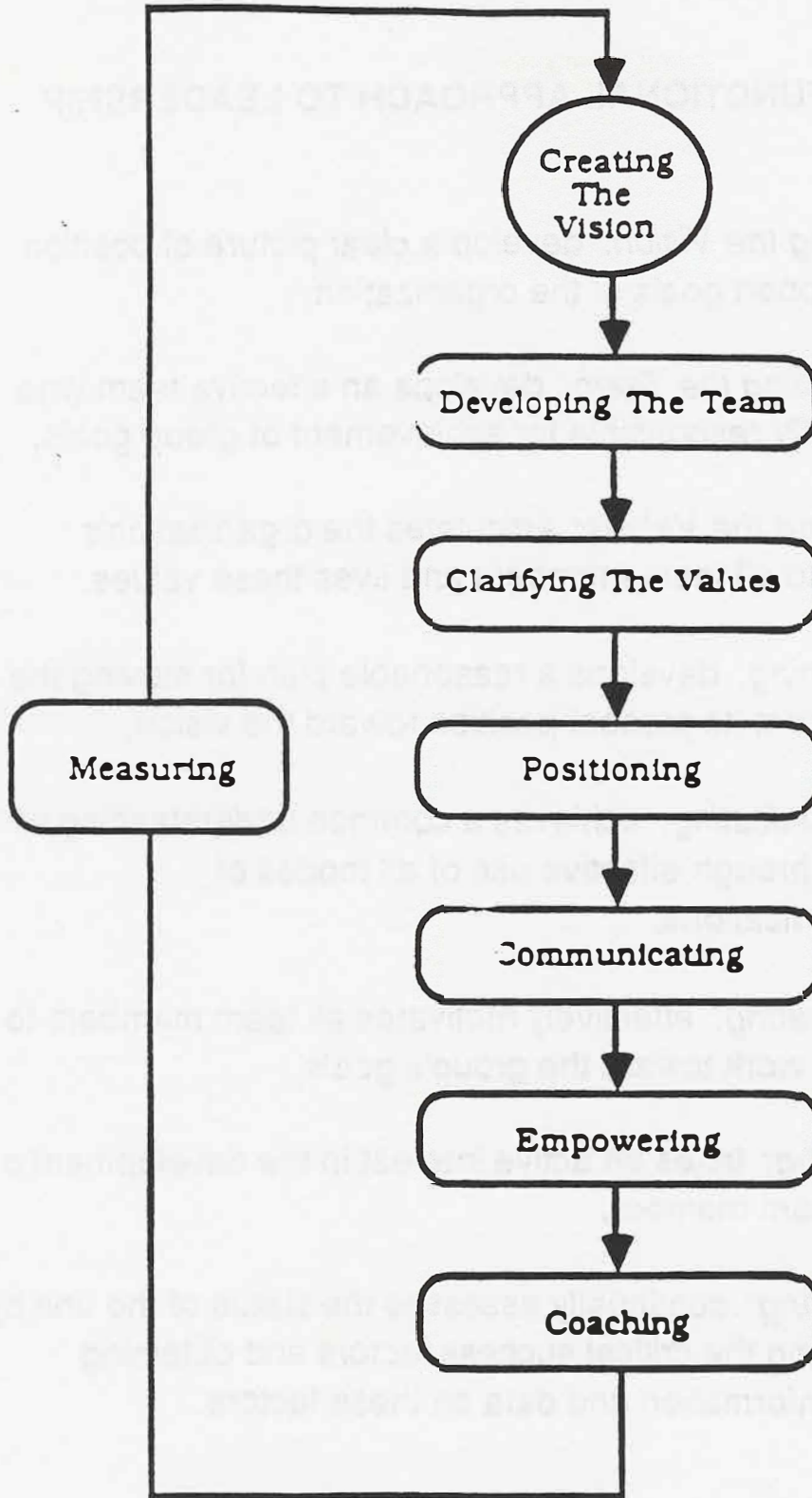which progress is being made,

Evaluating:
Determining causes and/or
potential causes for deviations
from planned performance and
possible ways to correct or avoid
problems,

Correcting:
Taking control management
actions to correct an unfavorable
trend or to take advantage of an
unusually favorable trend.
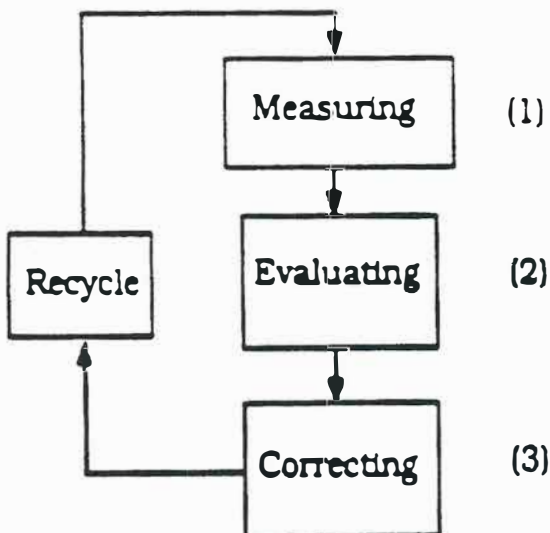
FUNCTIONS OF LEADERSHIP

A FUNCTIONAL APPROACH TO LEADERSHIP

- *Creating the Vision:* develop a clear picture of position that support goals of the organization,

- *Developing the Team:* develops an effective team who are jointly responsible for achievement of group goals,

- *Clarifying the Values:* articulates the organization's values to all team members and lives these values,

- *Positioning:* develops a reasonable plan for moving the group from its present position toward the vision,

- *Communicating:* achieves a common understanding with others through effective use of all modes of communications,

- *Empowering:* effectively motivates all team members to want to work toward the group's goals,

- *Coaching:* takes an active interest in the development of each team member,

- *Measuring:* continually assesses the status of the unit by identifying the critical success factors and obtaining timely information and data on these factors.

THE PROJECT SCHEDULE

Any project, however small, needs a written
set of schedules. The process of scheduling
forces determination, *first*, of the order in
which events must occur, and *second*, of the
time it will take to do them all.

Schedules are also a fundamental basis for
control. Schedules coming out of the planning
process should be in a form suitable for imme-
diate issue and use in tracking status.
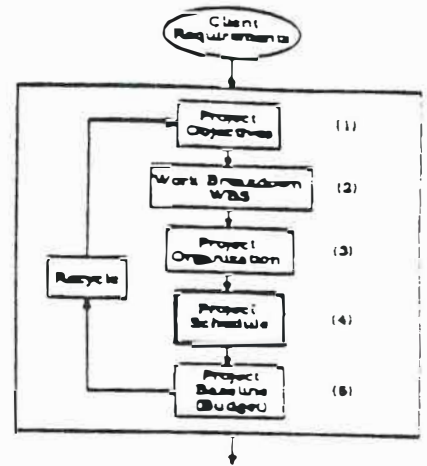
CONCEPT OF PROJECT PHASES

In organizing and managing a project, it is useful to think in terms
of sequential phases.

This helps to ensure that all decisions are made and all resources
allocated to permit going ahead efficiently into each succeeding
phase.

It also provides a framework for a series of in-depth project
reviews with an opportunity for management to provide
redirection or corrective action if required.

Charles Martin,
Project Management

LCD-0134

ROLE OF THE PROJECT MANAGER

- DEVELOP PROJECT SCOPE, BUDGET, AND SCHEDULE

- OBTAIN RESOURCES FOR PROJECTS

    - INTERFACE WITH TECHNICAL GROUP LEADERS

- SERVE AS PROJECT TEAM LEADER

    - ENGINEERS
    - GEOLOGIST
    - CONSTRUCTION
    - OPERATIONS

- PROVIDE PROJECT LEADERSHIP AND COORDINATION

    - EXECUTION
    - CONTINUITY ON PLANT

- SERVE AS PRIMARY CLIENT INTERFACE

- ENSURE PROFITABILITY OF PROJECT

REGIONAL MANAGER

SALES — ACCOUNTING — HUMAN RESOURCES — ADMINISTRATION — TECHNICAL MANAGER — OPERATIONS MANAGER

DRAFTING — FIELD SERVICES

MANAGER — MANAGER — MANAGER — MANAGER

GEOLOGY — PROCESS ENGINEER — ENVIRONMENTAL SPECIALIST — CIVIL ENGINEER — CONSTRUCTION

PROJECTS

PROJECT MANAGER — PROJECT DIRECTOR

PROJECT MANAGER — SCHEDULER

PROJECT MANAGER — CLERKS

PROJECT MANAGER — PROJECT DIRECTOR

TECHNICAL ACCURACY
PROJECT TASK IMPLEMENTATION
FUNCTIONAL EXCELLENCE
UTILIZATION

SCOPE
SCHEDULE
BUDGET
PROFIT
CUSTOMER INTERFACE

PROJECT FLOW

PROJECT REPORT REVIEW

```
                    ┌─────────────────┐
                    │     CLIENT      │
                    └─────────────────┘

        ┌──────────────────────┐         ┌──────────────────────────┐
        │  OPERATIONS MANAGER   │  TECHNICAL GROUP  │  SENIOR REVIEW BY       │
        │         &             │ ←───────────────  │  TECHNICAL MANAGER      │
        │  ASSIGNED             │   APPROVAL/       │                          │
        │  PROJECT MANAGER      │   RELEASE         └──────────────────────────┘
        └──────────────────────┘

        ┌──────────────────────────────────┐
        │          PROJECT TEAM             │      REVISION        APPROVED
        │        PROJECT MANAGER            │      REQUIRED
        │              +                    │
        │ ENVIRONMENTAL SPECIALTIES SECTION │
        │    DEVELOPMENT + REVIEW           │
        │   • SCOPE OF TECHNICAL APPROACH   │
        │   • SCHEDULE OF PROJECT           │
        │   • BUDGET OF PROJECT             │       ┌──────────────────────────┐
        │   • REGULATORY ISSUES             │       │  TECHNICAL REVIEW BY     │
        └──────────────────────────────────┘       │  SECTION MANAGER/DESIGNEE│
        ┌──────────────────────┐   REVISION         └──────────────────────────┘
        │ ASSIGNED TECHNICAL    │ ←───────
        │      STAFF            │   REQUIRED
        └──────────────────────┘
                                                    ┌──────────┐
                          1st DRAFT ───────────→    │ 1st DRAFT│
                                                    │ REPORT   │
                                                    └──────────┘
                                                       ┌──────────┐
                  2nd DRAFT ──────────────────────→    │ 2nd DRAFT│
                                                       │ REPORT   │
                                                       └──────────┘
                                                          ┌──────────┐
              FINAL REPORT ───────────────────────────→   │ FINAL    │
                                                          │ DRAFT    │
                                                          │ REPORT   │
                                                          └──────────┘
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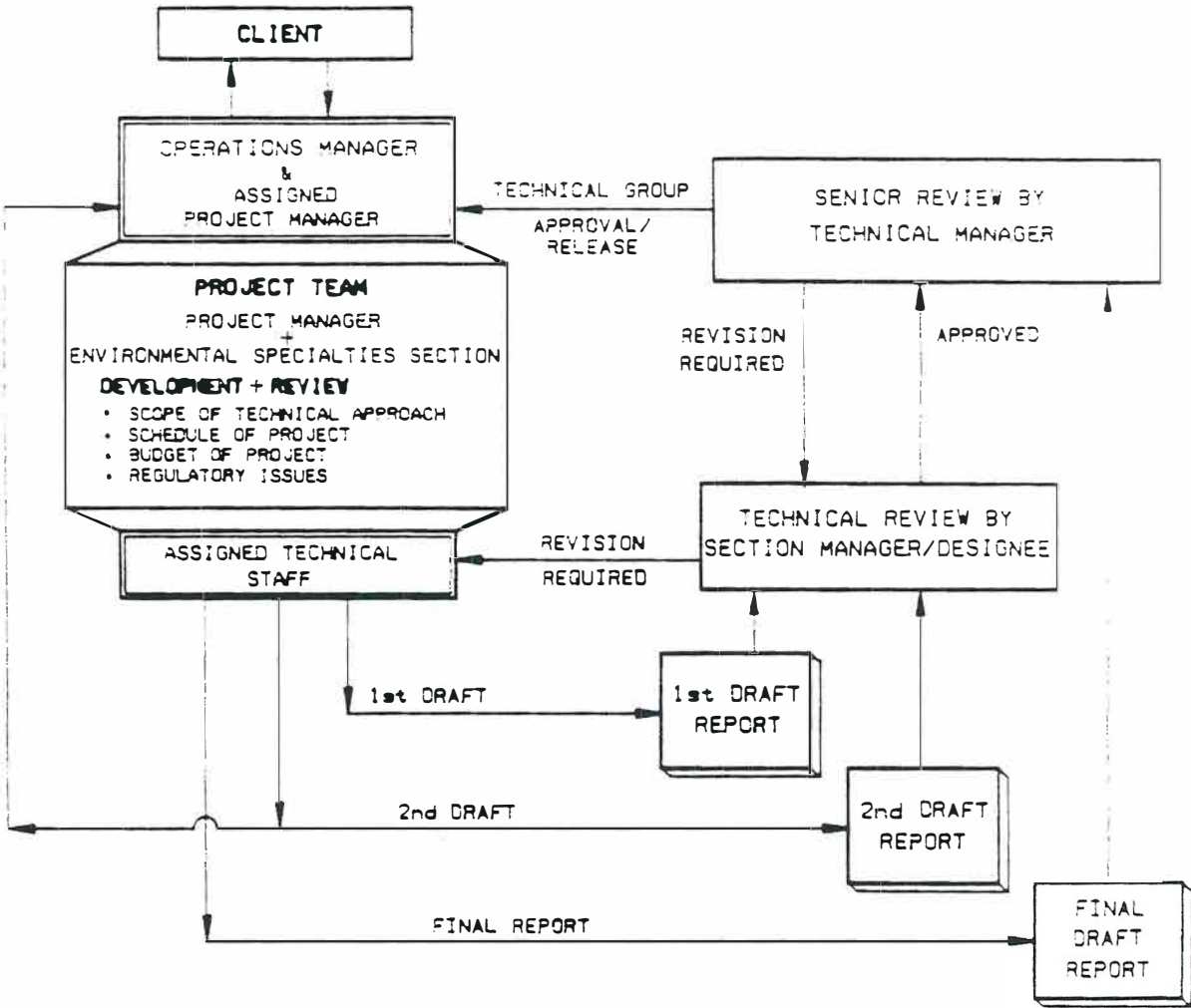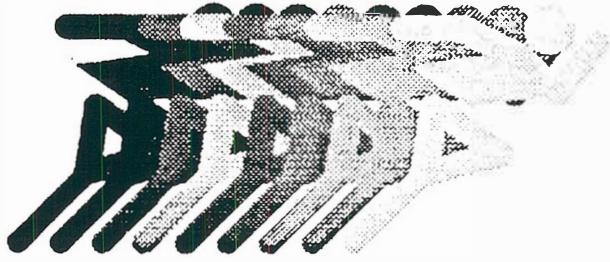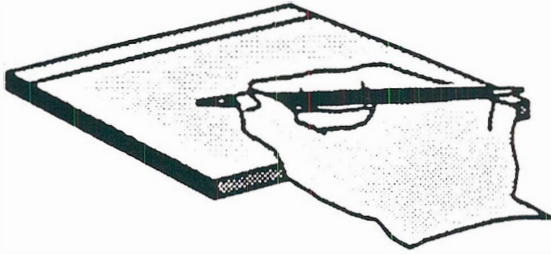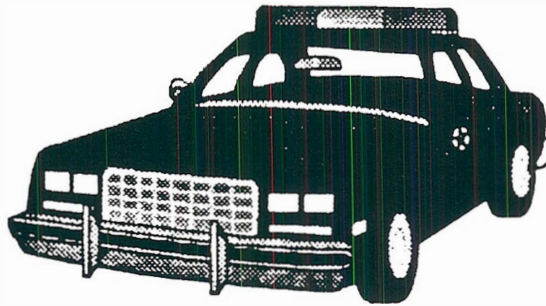
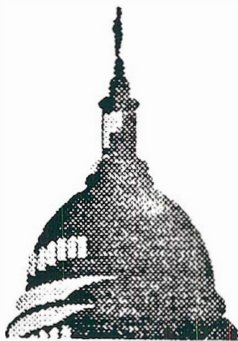- _Enthusiasm for the Goal_

- _Disallusionment with theProgress_

- _Search for the Guilty_

- _Persecution of the Innocent_

LSO - 001

Praise for the Nonparticipants

LSD-002