

Evaluation of Alternatives

Evaluation of Alternatives

- ◆ Objective: Compare Alternatives
- ◆ Types of Alternatives
 - Site Location
 - Design for Site
 - Project Size
 - Phasing
 - No-Action vs. Action (Build)
 - Timing

Trade-Off Analysis Matrix

| Decision Factor | Alternative | | | |
|---------------------------------|--------------------|----------|----------|----------|
| | 1 | 2 | 3 | 4 |
| Meeting Defined Need/Objectives | | | | |
| Economic Efficiency | | | | |
| Benefits | | | | |
| Costs | | | | |
| Social Impacts | | | | |
| Socioeconomics | | | | |
| Cultural Resources | | | | |
| Visual Resources | | | | |
| Hazardous Materials | | | | |

Trade-Off Analysis (cont.)

| Decision Factor | Alternative | | | |
|------------------------|--------------------|----------|----------|----------|
| | 1 | 2 | 3 | 4 |
| Physical Impacts | | | | |
| Water Quality/Quantity | | | | |
| Soils/Geology | | | | |
| Air Quality | | | | |
| Noise Levels | | | | |
| Ecological Impacts | | | | |
| Terrestrial Systems | | | | |
| Aquatic Systems | | | | |
| Wetlands | | | | |
| Species of Concern | | | | |

Approaches to Alternative Evaluation

- ◆ **Qualitative – Descriptive Synthesis**
- ◆ **Quantitative – Numerical Synthesis**
- ◆ **Importance-Weighting Techniques**
 - Ranking – Nominal Group Process
 - Rating – Predefined Importance Scale
 - Paired Comparison
- ◆ **Delphi Technique**

Qualitative - Descriptive Synthesis

| Decision factor | Alternative | | |
|-----------------|--|--|--|
| | A1 | A2 | A3 |
| F1 | Achieves 95% of identified needs and objectives. | Achieves 75% of identified needs and objectives. | Achieves 85% of identified needs and objectives. |
| F2 | Benefit-to-cost ratio is 1.3. | Benefit-to-cost ratio is 1.1. | Benefit-to-cost ratio is 1.5. |
| F3 | Undesirable social impacts expected. | No social impacts expected. | Beneficial social impacts expected. |
| F4 | Decreases overall environmental quality by 20%. ^a | Decreases overall environmental quality by 10%. ^a | Decreases overall environmental quality by 10%. ^a |

^aEnvironmental quality is reflected by joint consideration of air and water quality and available habitat quantity and quality.

Numerical Synthesis

- ◆ Predefine Impacts
- ◆ Predefine Scale
- ◆ -5 to +5
- ◆ Evaluate Attributes

Impact Rating Criteria

CUMMINS CREEK PROJECT—AIR-QUALITY-IMPACT RATING CRITERIA

| Rating | Criteria |
|--------|--|
| 0 | No potential negative impact. |
| 1 | The potential negative impacts, based on the level of emissions, would be insignificant. |
| 2 | The potential negative impacts, based on the level of emissions, would not be trivial, but would be handled by minimal controls. |
| 3 | The potential negative impacts, based on the level of emissions, would be significant but manageable. |
| 4 | The potential negative impacts, based on the level of emissions, would be serious and possibly unacceptable, but would be correctable. |
| 5 | The potential negative impacts, based on the level of emissions, would constitute a "fatal flaw"—i.e., one that is not easily mitigable. |

Source: Adapted from Wilson, 1991.

Impact Rating Criteria

CUMMINS CREEK PROJECT—ECOLOGICAL-IMPACT RATING CRITERIA

| Rating | Criteria |
|---------------|--|
| 0 | No potential negative impact to important species or habitats; no existing habitats (vegetation and/or soils) poor in quality and diversity or severely damaged. |
| 1 | The potential negative impact to important species or habitats would be minimal. |
| 2 | The potential negative impact to important species or habitats would be limited. |
| 3 | The potential negative impact to important species or habitats would be substantial. |
| 4 | The potential negative impact to important species or habitats would be only marginally acceptable. |
| 5 | The potential negative impact to important species or habitats would be excessive and unacceptable. Site is within an area containing critical habitat for endangered or threatened species. |

Impact Rating Criteria

CUMMINS CREEK PROJECT—LAND-USE- AND AESTHETICS-IMPACT RATING CRITERIA

| Rating | Criteria |
|--------|---|
| 0 | No impact, no conflict with known existing or proposed land use. No alteration from assigned visual-resource-management classification. Project not visible from public access road. |
| 1 | Minimal impact, minimal conflict with known existing or proposed land use. Minimal alteration from assigned visual-resource-management classification. Minimal disturbance of existing view from public access road. |
| 2 | Limited impact, limited conflict with known existing or proposed land use. Limited alteration from assigned visual-resource-management classification. Limited disturbance of existing view from public access road. |
| 3 | Moderate impact, moderate conflict with existing or proposed land use. Moderate alteration from assigned visual-resource-management classification. Moderate disturbance of existing view from public access road. |
| 4 | Significant impact, significant conflict with known existing or proposed land use. The alteration from assigned visual-resource-management classification would be marginally acceptable. Project is highly visible from public access road. Considered marginally acceptable. |
| 5 | Major impact, major conflict with known existing or proposed land use. The alteration from assigned visual-resource-management classification would be excessive and unacceptable. Project is highly visible from public access road. Considered unacceptable. Land-use and aesthetics concerns constitute "a fatal flaw" to project development. |

Source: Adapted from Wilson, 1991

Ranking - Nominal Group Process

- ◆ **Interactive Group Technique**
- ◆ **Steps of Process**
 - **Independent Writing of Ideas**
 - **Round-Robin Listing**
 - **Group Discussion**
 - **Independent Voting on Priorities**
 - **Group Decision Based on Voting**

Rating – Predefined Importance Scale

| Scale reference ^a | Definition |
|------------------------------|--|
| 1. Very important | A most relevant point First-order priority Has direct bearing on major issues Must be resolved, dealt with, or treated |
| 2. Important | Is relevant to the issue Second-order priority Significant impact, but not until other items are treated Does not have to be fully resolved |
| 3. Moderately important | May be relevant to the issue Third-order priority May have impact May be a determining factor to major issue |
| 4. Unimportant | Insignificantly relevant Low priority Has little impact Not a determining factor to major issue |
| 5. Most unimportant | No priority No relevance No measurable effect Should be dropped as an item to consider |

^aCould use numbers or letter codes in the application; the pertinent rationale for the assigned importance weight should be specified in the study; finally, one to several decision factors, or possibly no decision factors, could be assigned to each scale reference.

Source: Linstone and Turoff, 1975, p. 137.

Paired Comparison

- ◆ Importance Weight Assignment
 - Factor Importance Coefficient (FIC)
- ◆ Alternative Pairing
 - Alternative Choice Coefficient (ACC)
- ◆ Product Matrix = FIC x ACC
- ◆ Total Score

Data for Pair Comparison

| Decision factor | Alternative | | |
|-----------------|--|--|--|
| | A1 | A2 | A3 |
| F1 | Achieves 95% of identified needs and objectives. | Achieves 75% of identified needs and objectives. | Achieves 85% of identified needs and objectives. |
| F2 | Benefit-to-cost ratio is 1.3. | Benefit-to-cost ratio is 1.1. | Benefit-to-cost ratio is 1.5. |
| F3 | Undesirable social impacts expected. | No social impacts expected. | Beneficial social impacts expected. |
| F4 | Decreases overall environmental quality by 20%. ^a | Decreases overall environmental quality by 10%. ^a | Decreases overall environmental quality by 10%. ^a |

^aEnvironmental quality is reflected by joint consideration of air and water quality and available habitat quantity and quality.

Importance Weight Assignment

| Factor | Assignment of weight ^a | Sum | FIC |
|------------|--|-----------|-------------|
| F1 | 1 1 1 1 | 4 | 0.40 |
| F2 | 0 1 0 1 | 2 | 0.20 |
| F3 | 0 0 0 1 | 1 | 0.10 |
| F4 | 0 1 1 1 | 3 | 0.30 |
| F5 (dummy) | 0 0 0 0 | 0 | 0 |
| Total | | <u>10</u> | <u>1.00</u> |

^aIt is vitally important that the rationale basic to each assignment be documented.

Scaling of Alternative Related to Factors

SCALING, RATING, OR RANKING OF ALTERNATIVES RELATIVE TO F1

| Alternative | Assignment of desirability | Sum | ACC |
|-------------|----------------------------|----------|-------------|
| A1 | 1 1 1 | 3 | 0.50 |
| A2 | 0 0 1 | 1 | 0.17 |
| A3 | 0 1 1 | 2 | 0.33 |
| A4 (dummy) | 0 0 0 | 0 | 0 |
| Total | | <u>6</u> | <u>1.00</u> |

SCALING, RATING, OR RANKING OF ALTERNATIVES RELATIVE TO F2

| Alternative | Assignment of desirability | Sum | ACC |
|-------------|----------------------------|----------|-------------|
| A1 | 1 0 1 | 2 | 0.33 |
| A2 | 0 0 1 | 1 | 0.17 |
| A3 | 1 1 1 | 3 | 0.50 |
| A4 (dummy) | 0 0 0 | 0 | 0 |
| Total | | <u>6</u> | <u>1.00</u> |

Scaling of Alternative Related to Factors

SCALING, RATING, OR RANKING OF ALTERNATIVES RELATIVE TO F3

| Alternative | Assignment of desirability | Sum | ACC |
|-------------|----------------------------|-----|------|
| A1 | 0 0 1 | 1 | 0.17 |
| A2 | 1 0 1 | 2 | 0.33 |
| A3 | 1 1 1 | 3 | 0.50 |
| A4 (dummy) | 0 0 0 | 0 | 0 |
| Total | | 6 | 1.00 |

SCALING, RATING, OR RANKING OF ALTERNATIVES RELATIVE TO F4

| Alternative | Assignment of desirability | Sum | ACC |
|-------------|----------------------------|-----|------|
| A1 | 0 0 1 | 1 | 0.16 |
| A2 | 1 0.5 1 | 2.5 | 0.42 |
| A3 | 1 0.5 1 | 2.5 | 0.42 |
| A4 (dummy) | 0 0 0 | 0 | 0 |
| Total | | 6 | 1.00 |

Calculated Values

FIC AND ACC VALUES FOR EXAMPLE DECISION PROBLEM

| Decision factor | FIC values | ACC values, by alternative | | |
|-----------------|------------|----------------------------|------|------|
| | | A1 | A2 | A3 |
| F1 | 0.40 | 0.50 | 0.17 | 0.33 |
| F2 | 0.20 | 0.33 | 0.17 | 0.50 |
| F3 | 0.10 | 0.17 | 0.33 | 0.50 |
| F4 | 0.30 | 0.16 | 0.42 | 0.42 |

| Decision factor | FIC × ACC, by alternative | | |
|-----------------|---------------------------|-------|-------|
| | A1 | A2 | A3 |
| F1 | 0.200 | 0.068 | 0.132 |
| F2 | 0.066 | 0.034 | 0.100 |
| F3 | 0.017 | 0.033 | 0.050 |
| F4 | 0.051 | 0.124 | 0.124 |
| Total score | 0.334 | 0.259 | 0.406 |

Delphi Approach

- ◆ **Interactive Technique**
- ◆ **Expertise in Field**
- ◆ **Steps of Process**
 - **Factor Identification Based on Collective Professional Judgment**
 - **Relative-Importance Weighting**
 - **Group Decision Based on Voting**

Public Involvement

Role of Public

- ◆ NEPA's success depends of public disclosure and review
- ◆ NEPA requires invitation of public review and comment
 - Scoping
 - Draft EIS/EA
 - Public hearings
- ◆ Public Enforce NEPA
 - Involvement
 - Administrative Appeals
 - Litigation

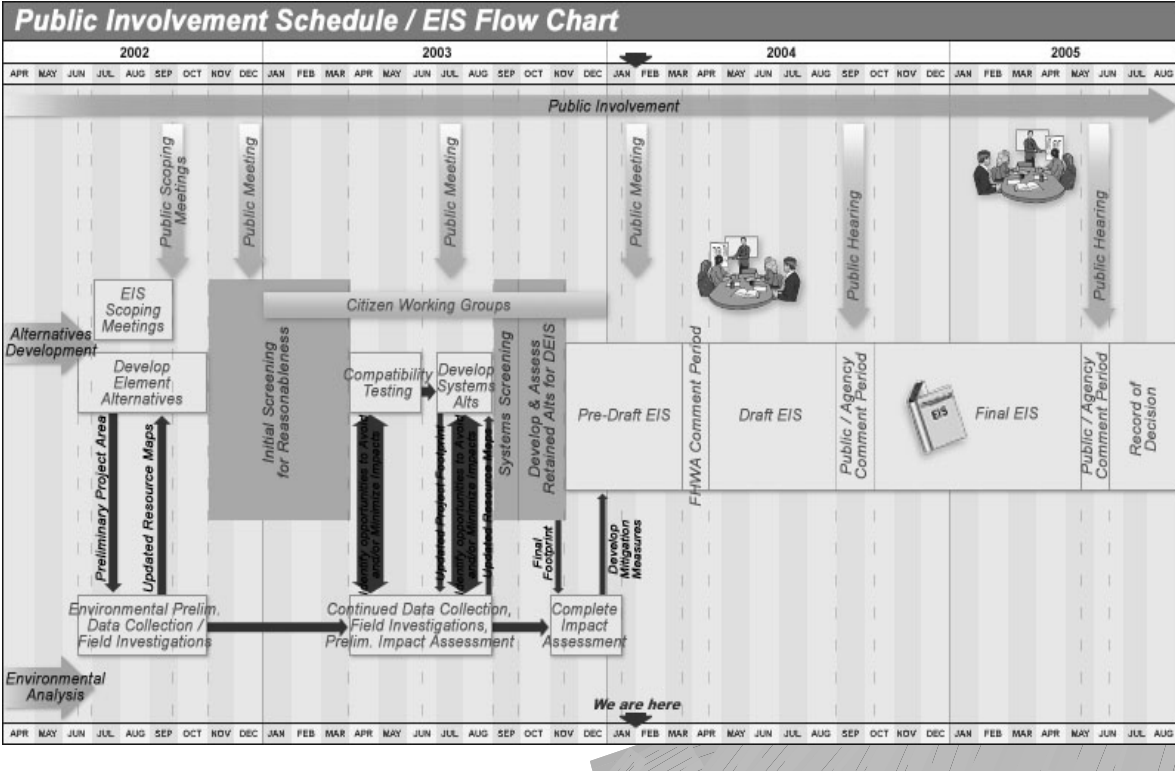
Public Participation

- ◆ **Regulatory Requirement (CEQ Regs)**
 - Scoping
 - General Public-Involvement
 - Review of Draft EIS

- ◆ **Public Participation ? Public Relations**

- ◆ **Objectives of Public Participation:**
 - Information Dissemination
 - Identification of Problems
 - Idea Generation/Problem Solving
 - Evaluation of Alternatives
 - Conflict Resolution by Consensus

Points of Public Involvement



Advantages/Disadvantages

◆ Advantages

- Exchange Information**
- Source of Information on Local Views**
- Aid in Establishing Credibility of Process**

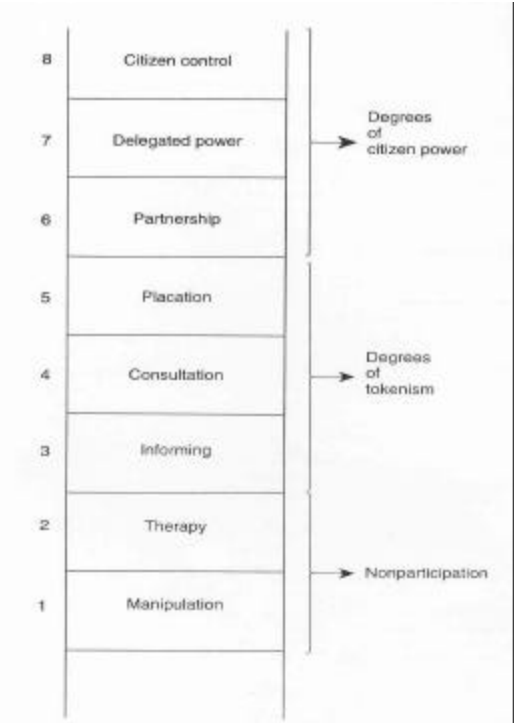
◆ Disadvantages

- Confusion (many new perspectives)**
- Erroneous Information**
- Uncertainty of Results of Process**
- Delay**

Levels of Public Participation

| Awareness | Involvement | Participation |
|----------------|--------------|-----------------|
| Monologue | Dialogue | Empowerment |
| Altering | Interaction | Planning |
| One-way | Two-way | Partnership |
| “Tokenism” | Engagement | Citizen Control |
| “Manipulation” | Consultation | |
| Therapy | | |

Levels of Citizen Involvement



Types of Publics

- ◆ **Persons Immediately Affected**
- ◆ **Ecologist**
- ◆ **Business and Commercial Developers**
- ◆ **General Public**

Techniques of Public Involvement

PUBLIC PARTICIPATION TECHNIQUES CLASSIFIED BY FUNCTION

1. Information dissemination

Public information programs
Drop-in centers
Hot lines
Meetings—open information

2. Information collection

Surveys
Focused group discussions
Delphi-based techniques
Community-sponsored meetings
Public hearings
Ombudsman activities

3. Initiative planning

Advocacy planning
Charettes
Community planning centers
Computer-based techniques
Design-in and color mapping
Plural planning
Task forces
Workshops

4. Reactive planning

Citizens' advisory committees

Citizen representatives on policy-making boards

"Fishbowl" planning

Interactive cable TV-based participation

Meetings—neighborhood

Neighborhood planning councils

Policy capturing

Value analysis

5. Decision making

Arbitrative and mediative planning

Citizen referendum

Citizen review board

Media-based issue balloting

6. Participation process support

Citizen employment

Citizen honoraria

Citizen training

Community technical assistance

Coordinator or coordinator-catalyst

Game simulation

Group dynamics

Effectiveness of Techniques

EFFECTIVENESS OF DIFFERENT COMMUNICATION TECHNIQUES ON VARIOUS "PUBLICS"

| Public | Public hearings and meetings | Printed brochures | Radio programs and news | TV programs and news | Newspaper articles | Magazine articles | Direct mail and newsletters | Motion picture, film | Slide-tape presentation | Telelecture |
|---------------------------------------|------------------------------|-------------------|-------------------------|----------------------|--------------------|-------------------|-----------------------------|----------------------|-------------------------|-------------|
| Individual Citizens | M | L | H | H | H | L | L | M | M | L |
| Sportsmen Groups | M | M | M | M | M | H | H | H | H | M |
| Conservation-Environment Groups | M | M | M | M | M | H | H | H | H | M |
| Farm Organizations | M | M | M | M | M | H | H | M | M | M |
| Property Owners and Users | M | L | H | H | H | L | L | M | M | L |
| Business-Industrial | L | L | M | M | M | M | H | M | M | L |
| Professional Groups and Organizations | L | L | M | M | M | M | H | M | M | L |
| Educational Institutions | M | L | L | L | M | M | H | M | M | M |
| Service Clubs and Civic Organizations | L | L | M | M | M | M | L | H | H | M |
| Labor Unions | L | L | M | M | M | L | L | M | M | L |
| State-Local Agencies | H | M | L | L | L | M | H | H | H | H |
| State-Local Elected Officials | H | M | L | L | L | L | H | H | H | H |
| Federal Agencies | H | M | L | L | L | L | H | M | M | M |
| Other Groups and Organizations | H | M | M | M | M | M | H | H | H | M |

Problems in Implementing Programs

- ◆ Coordination Between Agencies
- ◆ Control
- ◆ Representativeness
- ◆ Dissonance

Practical Considerations for Implementation

- ◆ **Coordination between federal/state/local agencies**
- ◆ **Delineate objectives of Public Participation Program**
- ◆ **Identify publics (develop a mailing list)**
- ◆ **Select Public Participation techniques**
- ◆ **Develop Public Participation Program Plan**
 - Elements of Program
 - Schedule of Program
 - Responsibilities

Elements of a Public Participation Program

◆ Disseminate Information

- News Media – newspapers, radio, television
- Newsletters – regularly scheduled publication
- Informational Meetings – meet the expert

◆ Formal Public Meetings

- Notice of Availability
- Publicize Meeting (newspapers, radio, television)
- Sufficient Room in Meeting Hall
- Hand-Out Materials
- Registration – sign in to speak
- Agenda
 - Open Remarks – Purpose, Ground Rules, Review Project
 - Public Officials
 - General Public
- Transcript or Notes

Causes of Environmental Conflicts

- ◆ **Different Understanding of Facts**
- ◆ **Different Values**
- ◆ **Different Interests**

Conflict Resolution

◆ Conditions Required:

- Motivation Towards Resolution
- Roughly Equals Power
- Acceptable, Minimal Risk of Failure
- Organizational Authority
- Negotiability of Issues
- Control of Process
- Focus Must Be Problem-Solving
- Focus of Interests of Parties

Impartial Third-Party Intervention

◆ Roles:

- Create Climate of Trust
- Ensure Fair and Adequate Representation
- Brings Experts When Needed
- Break Deadlock (setting goals/deadlines)
- Suggest Solutions
- Outlines Implementation Plans

◆ Strategy:

- Areas of Agreement
- Areas of Disagreement
- Conflict-Resolution Procedure
- Issue-by-Issue Negotiation

Lessons Learned From Conflict Resolution

- ◆ **People bargain as long as positive outcome is possible**
- ◆ **Issues must be apparent**
- ◆ **Parties must be willing to address issues**
- ◆ **Success depends on having enough issues to trade off**
- ◆ **Agreement is unlikely if parties must compromise fundamental values**
- ◆ **Limit number of participants**
- ◆ **Pressure of deadline must be present**

Practical Management of NEPA Projects

Constraints of NEPA Projects

- ◆ Results
- ◆ Budget
- ◆ Time

NEPA Project Life Cycle

- ◆ Initiation
- ◆ Develop Detailed Plan
- ◆ Execution of Plan
- ◆ Produce Deliverables
- ◆ Final Approval

NEPA Project Initiation

- ◆ Conceptualize Project
 - Establish Project Objectives
 - Establish Deliverables
 - Estimate Costs
 - Estimate Schedule
- ◆ Obtain Project Authorization

Develop Detailed Plan of Project

- ◆ Describe Objectives
- ◆ Describe Scope
- ◆ Define and Sequence Activities
- ◆ Estimate Duration and Resources
- ◆ Develop Schedule
- ◆ Develop Budget
- ◆ Develop Formal Quality Plan
- ◆ Develop Formal Communication Plan

Executing the Project

- ◆ Organize and Acquire Staff
- ◆ Periodically Summarize Results
- ◆ Identify Changes in Scope
- ◆ Identify Changes in Schedule
- ◆ Identify Changes in Budget

Produce Deliverables

- ◆ Create Prototypes
- ◆ Create Partial Deliverables
- ◆ Complete Integrated Deliverables
- ◆ Obtain Approval of Deliverables

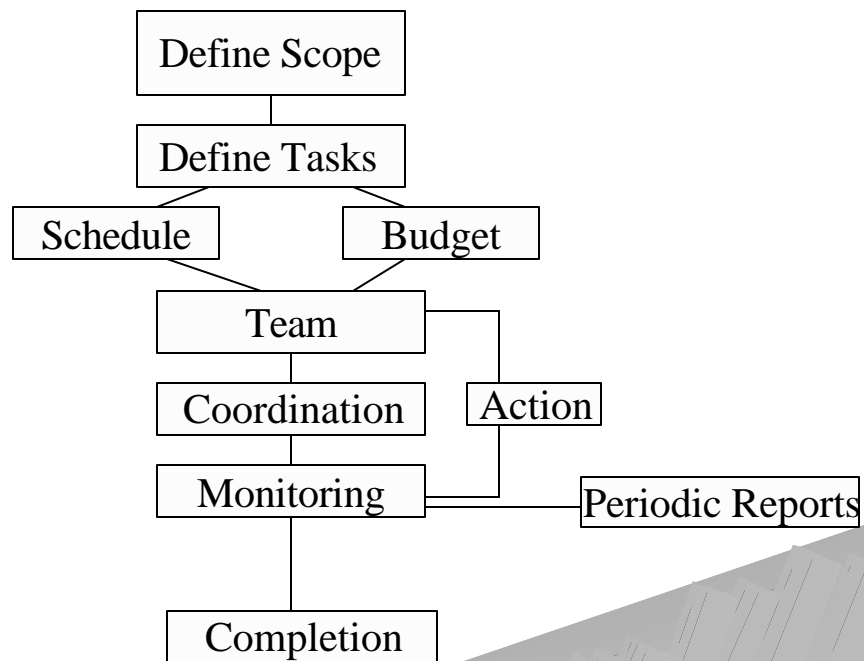
Finishing the Project

- ◆ Scope Verification
- ◆ Formal Acceptance of Deliverable
- ◆ Formal Acceptance of Project
- ◆ Administrative Closure
- ◆ Plan for Follow-up

Project Management Activities

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Define Scope of NEPA Project

- ◆ Specific Project Objectives
- ◆ Secondary Project Objectives
- ◆ Project Outcome
- ◆ Clarify Assumptions
- ◆ Document Decisions

Define Tasks

- ◆ Breakdown Project into Phases
- ◆ Visualize All Tasks by Phase
- ◆ Breakdown Tasks into Subtasks
- ◆ Sequence Activities
 - Network
 - Critical Path Method (CPM)
 - Program Evaluation and Review Technique (PERT)

Tasks in a NEPA Project

A. Preliminary Activities

1. Identify basic issues
 - need for action
 - technical alternatives
 - geographic alternatives
 - administrative/procedural alternatives
2. Identify authorizations needed for action:
 - sponsor's authority & budget to proceed: legislative, presidential & judicial
 - nonsponsor authority: budget; approval of specific parts of the action; permitting, licensing & special enabling action (as may be obtained by interagency land transfers, agreements, etc.)

B. Scoping

3. Develop mailing/notification list
 - federal agencies
 - state agencies
 - local authorities & Indian tribes
 - citizen & environmental groups
 - private parties with major stake in outcome
4. Prepare information package
 - describe proposed action & alternatives
 - describe potential environmental concerns
 - describe proposed scope of DEIS
5. Notify interested parties & invite comments:
 - publish notice of intent in Federal Register
 - mail notice and information package to selected government and private parties
 - make information package available to public at designated locations
6. Obtain and consider comments:
 - collect comments (public meetings optional, if so announced in item 5)
 - consider all comments
7. Develop EIS preparation strategy
 - incorporation by reference
 - tiering of NEPA documents
 - integration of other federal & state laws (i.e., concurrent compliance plan)
 - participation of other federal & state agencies
 - role of Indian tribes & local governments
 - preliminary assessment of motivations for judicial review
 - preliminary strategy to avoid judicial review (e.g., agreements, mitigation measures, etc.)
 - plan to manage public communications & to respond to public concerns

Tasks in a NEPA Project

- C. Draft EIS (DEIS) Preparation
 - 8. Prepare EIS implementation plan:
 - work breakdown structure (WBS)
 - budget & schedule
 - responsibilities for preparation
 - page limits
 - 9. Prepare prelim. DEIS (Prepare checklist per WBS)
 - 10. Comply with internal agency review procedures
 - 11. Finalize DEIS
 - 12. Publish notice and invite comments
 - mailing list
 - availability in public places
 - optional scheduling of public meetings
 - 13. Obtain comments
 - correspondence
 - public meetings (optional)
 - coordination meetings with government agencies
 - 14. Respond to comments
 - make changes
 - enlarge EIS scope (new WBS elements)
 - negotiate & adopt mitigation measures
 - prepare written record of response to comments
- D. Final EIS
 - 15. Produce final EIS (Expand checklist per new WBS)
 - 16. Comply with internal agency review procedures
 - 17. Distribute final EIS & invite comments
 - 18. Receive & consider comments on final EIS
- E. Record of Decision (ROD)
 - 19. Prepare draft ROD
 - 20. Follow internal agency review procedures
 - 21. Publish ROD in *Federal Register*

Source: Freeman, March, and Sponsley, 1992, pp. 106–107.

Develop Schedule

- ◆ Use Project Task Sequence
 - Dependent Tasks
 - Independent Tasks
- ◆ Plan Start Dates
- ◆ Estimate Duration of Each Task
- ◆ Meet with Team
- ◆ Modify Schedule to Achieve Completion Date
- ◆ Prepare Gantt Chart

Prepare Budget

- ◆ Prepare Budget by Phase and Task
- ◆ Preliminary Labor Estimate
- ◆ Materials/Travel
- ◆ Overhead
- ◆ Consult with Team
- ◆ Modify Budget
- ◆ Prepare Budget

Budget Estimate for NEPA Project

| Phase | Task | Personnel | Rate | Hours | Labor Cost | Materials/Travel | Cost |
|--|------|-----------|------|-------|------------|------------------|------|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| Total | | | | | | | |
| Fringe Benefits (35% of labor cost) | | | | | | | |
| | | | | | | | |
| Indirect Costs (75% of Costs) | | | | | | | |
| | | | | | | | |
| Project Total | | | | | | | |

Organizing Your Team

- ◆ Identify Project Needs by Phase and Task
- ◆ Identify Potential Problem Areas
- ◆ Request Team Members
- ◆ Involve Team in Planning
- ◆ Get Team's Commitment
- ◆ Set Out Clear Responsibilities/
Time/Budget

Expertise Needed for NEPA Projects

| Natural resource | Subcomponent | Specialist |
|------------------|---|---|
| Air | Air quality Wind direction/speed Precipitation/humidity Temperature Noise | Air quality/pollution analyst Air pollution control engineer Meteorologist Noise expert |
| Land | Land capability Soil resources/structure Mineral resources Tectonic activity Unique features | Agronomist Soils engineer Soils scientist Civil engineer Geologist Geotechnical engineer Mineralogist Mining engineer Engineering geologist Seismologist |
| Water | Surface waters Groundwater regime Hydrologic balance Drainage/channel pattern Flooding Sedimentation | Hydrologist Water pollution control engineer Water quality/pollution analyst Marine biologist/engineer Chemist Civil/sanitary engineer Hydrogeologist |
| Flora and fauna | Environmentally sensitive areas: wetlands, marshes, wildlands, grasslands, etc. Species inventory Productivity Biogeochemical/nutrient cycling | Ecologist Forester Wildlife biologist Botanist Zoologist Conservationist |
| Human | Social infrastructure/institutions Cultural characteristics Physiological and psychological well-being Economic resources | Social anthropologist Sociologist Archaeologist Architect Social planner Geographer Demographer Urban planner Transportation planner Economist |

Coordination

- ◆ Provides Critical Links - team, information
- ◆ List of Team Members - e-mail/fax/phone
- ◆ Inform Other Managers - before/during project
- ◆ Meet with Team Member
 - Review Schedule
 - Review Budget
- ◆ Resolve Conflicts - other priorities
- ◆ Relay Exactly What is Expected

Monitoring

- ◆ Develop Quality Plan
 - Define Standards of Performance
 - Schedule
- ◆ Review On-Going Work
- ◆ Review Budget
- ◆ Review Schedule
- ◆ Identify Conflict Between Team Members
- ◆ Solve Problems as They Arise

Periodic Reporting

- ◆ To Team
 - Key Phases of Project
- ◆ To Management
 - Regularly with Accurate Information
 - Include Bad News with Solutions
- ◆ To Client
 - Regularly
 - Warn of Bad News Before It Happens

Supporting Documentation

- ◆ All Team Members Need It
 - Sequence of Phases and Tasks
 - Schedule
- ◆ Narrative Instructions
- ◆ Change in Schedule/Budget
- ◆ Change in Scope