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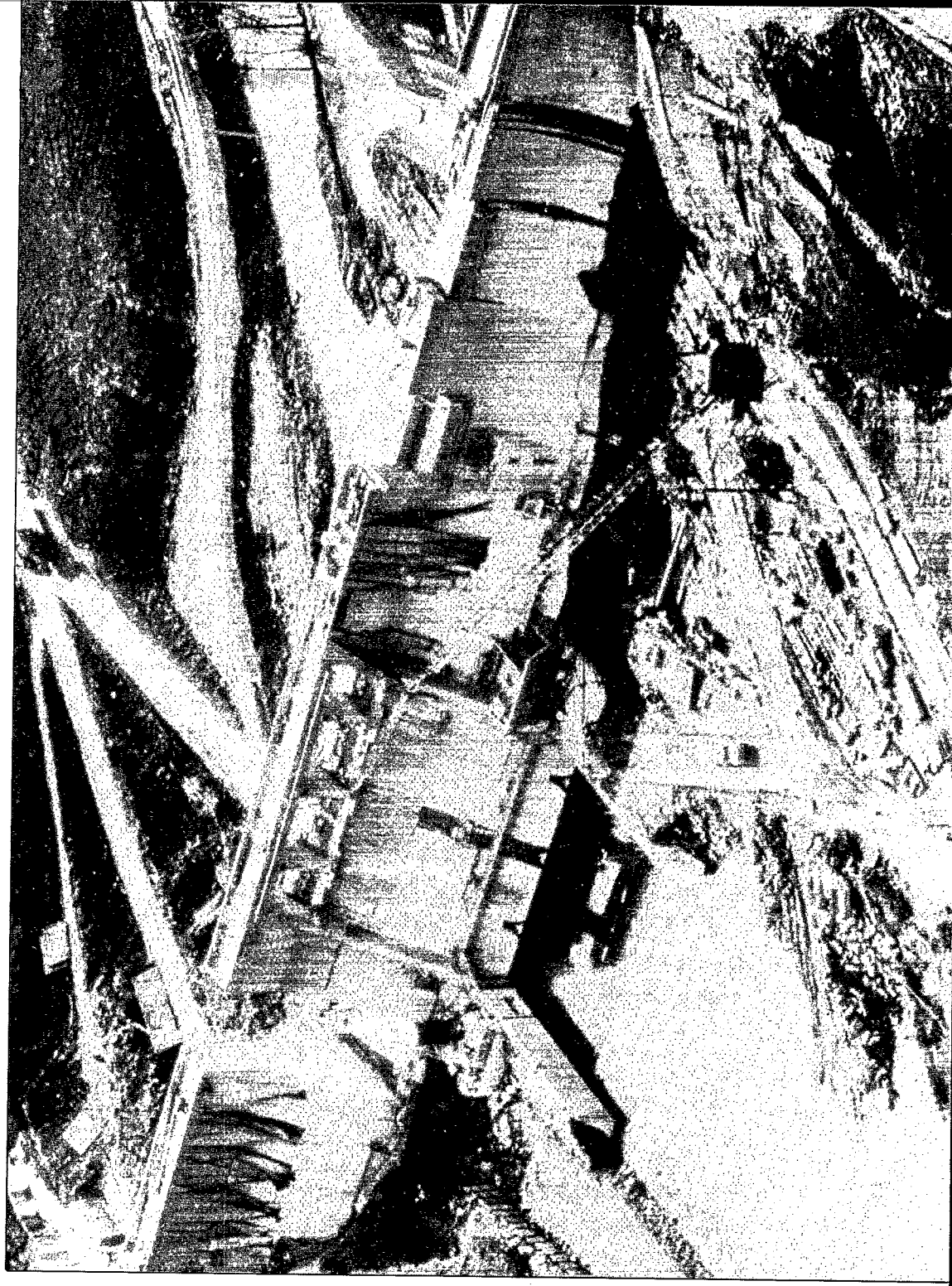
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Washington, DC 20460



Environmental Impact Assessments



EPA Technical Information Packages

This brochure is part of a series of information packages prepared by the United States Environmental Protection Agency (EPA). Aimed at the international community, the packages focus on key environmental and public health issues being investigated by EPA. The products highlighted within these packages provide a sound technical basis for decisions regarding the development of environmental policy, abatement activities, and pollution prevention. By pooling expertise in the areas of environmental science and technology, significant progress can be anticipated to ensure a habitable environment for all nations.

Environmental Impact Assessments presents information on the components, applicability and benefits of the environmental assessment process. Brochures and associated support material are available on the following topics:

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| • Ensuring Safe Drinking Water EPA/600/M-91/012 | • Water Quality EPA/600/M-91/033 |
| • Mining Waste Management EPA/600/M-91/027 | • Risk Assessment EPA/600/M-91/034 |
| • Pesticide Waste Disposal EPA/600/M-91/028 | • Pesticide Usage Guidelines EPA/600/M-91/035 |
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| • Small Community Wastewater Systems EPA/600/M-91/032 | • Environmental Management ... EPA/600/M-91/039 |

Each complete Technical Information Package (TIP) consists of a cover brochure as well as all of the documents highlighted within the body of the brochure. Generally, the cover brochures contain a section discussing the environmental issue, associated health and environmental effects, guidelines, sampling and analytical methods, as well as treatment and disposal technologies. Following this section, a bibliography is provided to identify other important sources and documents in the field. An attempt has been made to provide references that are readily available in technical libraries. Finally, a number of EPA contacts followed by some additional resources are listed to facilitate consultation and technical assistance. Document ordering information is provided on page 8.

Environmental Assessment Process

Key Concepts

Environmental Assessment (EA) Process¹: This generic term denotes a multifaceted decision-making process. The process is structured to anticipate, analyze and disclose the consequences associated with proposed activities² with respect to established public policies for protecting and enhancing the natural and man-made environment.

Terms associated with the EA process include:

Assessment: An "assessment" is any documentation describing the consequences associated with a project and the means by which the estimates were derived.

Environmental Assessment: An "EA" is a document containing information in sufficient detail to determine whether a project's environmental consequences will fall above or below thresholds considered to pose significant adverse impact to the environment.³

Environmental Impact Assessment: An "EIA" is a document containing an assessment of environmental consequences for projects known, or expected, to exceed thresholds of significant adverse impact to the environment.⁴

The overall purpose for undertaking an environmental assessment is to seek ways to avoid or minimize adverse effects of a pro-

posed project to the extent practicable, and the maintenance, restoration or enhancement of environmental quality as much as possible.

Notes:

¹ "Environmental Review" (ER) process is the legal term used in the United States (U.S.).

² "Proposed activities" subject to assessment are not limited to physical projects, but may also include plans, programs, policies and even legislation or regulations if it is determined that their implementation, directly or indirectly, could cause potentially significant environmental impacts to occur. The term "project" is used generically hereafter for any or all of these categories.

³ In the U.S., EAs are coupled with a decision document termed a "Finding of No Significant Impact."

⁴ In the U.S., EIAs consist of an "Environmental Impact Statement" (the "assessment") coupled with a decision document termed a "Record of Decision."

Support documents:

- *Facts About The National Environmental Policy Act*, September 1989, Council on Environmental Quality and U.S. EPA.

The Benefits of an EA Process

An EA process is essentially an early warning process. The primary objectives of an EA process are to alert all interested parties to:

the purposes and potential negative impacts associated with a proposed project; and alternatives that optimize positive outcomes while minimizing undesirable effects. The earlier it is initiated the greater the benefits it will provide.

Proposed projects start with an initial planning/design stage, followed by detailed planning/engineering, and ends in implementation or construction. The review for potential environmental impacts should be coupled with the early phases of initial planning and design. If unacceptable impacts are anticipated, changes can be made during early project planning to minimize them less expensively than would be required once engineering or construction work has begun. In some cases, environmentally preferable alternatives may be identified. Therefore, the effectiveness of an EA process is dependent on the following two conditions: first, that the process is an integral part of the plan of action, begun early in the budgeting cycle before irrevocable commitments of resources have been made; and second, that it is linked to the decision-making processes involving location and design studies.

An EA process can greatly influence where and how a project or activity is sited, the size of facilities to be built, the technologies employed, and the area a project is to serve or otherwise affect. Location analysis can help to avoid areas of environmental importance, such as critical habitats of endangered species and highly productive farmland. It can also help to avoid potential catastrophic situations such as diverting developments from areas that are

frequently flooded or potentially hazardous to life and property in other ways.

If critical or sensitive resources or locations cannot entirely be avoided, comparative analysis of alternatives can help identify options that minimize irreparable damage. Similarly, analysis of alternative technologies can identify cost-effective solutions that reduce discharges of air and water pollutants as well as providing collateral savings to the public in terms of reduced maintenance and health costs. Finally the analyses of an EA can influence the extent of project service areas, thereby allowing local communities to exercise control over land-use and urban growth incompatible with preserving environmental amenities.

Establishing the Framework

Assigning responsibilities: There are several approaches for constructing a framework. They require the following questions to be answered: who will be responsible for (1) preparing the basic format and other assessment requirements to be followed; (2) preparing assessment documents on individual projects; (3) making the final decisions based on project assessments; and (4) evaluating the adequacy of assessments and decisions that flow from them.

For example, a single agency can be designated to be responsible for all four tasks. The benefit to this approach is that it might produce the greatest uniformity of EA application and, incidentally, may preclude the need for evaluating the adequacy of individual assessments.

A drawback to this model is that this approach would be the least effective in convincing other agencies about the benefits of the EA process.

Another approach would be to spread the responsibilities for the four tasks among as many agencies as possible. This model would enable the responsibility for the actual production of assessments to be assigned to every agency having jurisdiction over activities affecting development. However this approach would require an independent agency for conducting task four. In the long run, this model could maximize government-wide regard for environmental principles.

There are several other combinations that could be established in between. The most common approach is to require each agency to produce and issue assessments on all projects within their jurisdiction and make final decisions on them, and rely on another agency to undertake the tasks of establishing basic requirements and evaluating the adequacy of assessments.

Note:

⁵ The discussion in this and other sections assumes that the process is being conducted by a governmental agency.

Applicability of Projects to Assessment

All projects can benefit from EA even on an individual business level. On a governmental level, triggering mechanisms for subjecting projects to EA are usually defined in the law

creating the process. For example, the American federal process requires only projects involving a "federal action" to undergo an EA. Federal actions are generally limited to project sponsors applying for federal financial assistance, a permit or license. Different levels of government may subject different kinds of projects to assessment. When an assessment is required by two different levels of government, requirements of both are usually incorporated into an assessment conducted at the highest level of government.

However, some project actions are so inconsequential that it would be a waste of resources to require them to undergo an EA. Therefore, the EA process usually begins with an initial step for determining whether or not a project should undergo an assessment at all.

To be exempted from the EA process, a project must meet two tests:

Test 1 - the project should be consistent with categories of projects that have been determined not to individually, cumulatively over time, or in conjunction with other projects in the same area, have a significant effect on the quality of the environment (e.g., minor rehabilitation of existing facilities or replacement of equipment); however,

Test 2 - a project meeting the criteria for exemption (test 1) must not be located in or near areas that might affect the protection of sensitive natural or cultural resources (e.g., endangered species, historic sites, etc.).

Categories of potentially excluded projects (test 1) are sometimes based on criteria resulting from public policy. More often they result from agency experience indicating that certain project categories rarely result in adverse impacts to the environment. Criteria for not granting an exclusion from EA (test 2) are almost always due to public policy.

Even though, based on the tests above, a decision is made to exclude a project from EA, good practice suggests that the affected public should be notified about these projects as with any other type of assessment. The value of the notice is that local interested parties may know reasons other than those considered by the assessment team, why a particular project should not qualify for exemption.

Experience gained on the federal level in the U.S. indicates that approximately 10-15% of projects covered by the EA process are categorically excluded from further assessment.

Determining the Appropriate Level of Assessment

For project actions not excluded from further assessment, the majority of project actions will fall into a category of assessment whose impacts are unknown. The procedures for undertaking an EA generally begin with an examination of the proposed action to whatever level of detail is required in order to make one of two determinations: either there will be no significant impact expected to result; or, there

will be significant impacts. If at any time during the preparation of an EA information is uncovered that would indicate the project could impact the environment in a significant way, the EA can be immediately terminated and a full-scale EIA begun.

As experience in EA is gained, project actions that have significant impacts associated with them in every case (e.g., power plants, reservoirs and dams) should be identified and categorized. Criteria that may be useful in identifying significant project actions include when a project (1) impacts directly on air and water quality, particularly if there is a possibility that standards may be exceeded or degradation of high quality conditions may occur; (2) adversely affects protected ecological resources, such as endangered species; (3) creates undesirable secondary impacts, such as increased traffic or rapid urban growth; (4) causes release of toxic or hazardous materials or generation of wastes; and (5) in combination with other activities causes adverse cumulative effects.

A majority of project actions result in findings that do not significantly affect the environment, or are easily changed to avoid any undesirable impacts. Only a small percentage of all project actions will require a detailed EIA.

Components of an EA Process

There is not a precise and uniform methodology for EIA. There are, however, four components, each having a core set of activi-

ties, that are generally characteristic of EIA as it is practiced throughout much of the world. These four basic components are infinitely adaptable to fit unique environmental, political or cultural conditions. EIA is very much an evolving process, reflecting both the growth in environmental knowledge and increasing experience.

The four basic components to an EIA process, regardless of the complexity of the evaluation to be undertaken, include (1) *Surveying and Information Gathering* - describing the existing environmental/social setting and identifying the project's potential benefits and adverse impacts; (2) *Alternatives Generation and Forecasting* - identifying alternatives and projecting the future environmental and social setting by anticipating the consequences of each alternative; (3) *Screening* - comparing and contrasting the short and long-term effects of each alternative for acceptability of change they cause; and (4) *Communicating* - informing the affected and interested public about the rationale for selecting a "preferred alternative" and soliciting input. There is a fifth component that is not a formal part of an assessment process but is very much related to it. This is: (5) *Monitoring* - ensuring that a project is carried out as approved.

Component 1 - *Surveying and Information Gathering*: project needs and objectives and general solutions are defined; surveys are conducted to collect data descriptive of the existing environmental setting (base line data); meetings with affected and interested parties

are held to identify the environmental issues that need to be addressed (scoping process); and, the nature and intensity of current trends causing changes to the setting are identified. Governmental agencies having jurisdiction over areas that may be affected by the project as well as other groups having special knowledge and information pertinent to the project should be identified and invited to participate in this and succeeding steps. These activities can be best handled by creating an inter-disciplinary team early in this step to work on producing an integrated assessment involving all five steps.

Component 2 - *Generating Alternatives and Forecasting*: First agreement on a set of viable alternatives is reached. Then a "no-action" forecast is made to determine what the future environmental setting might look like without the project being undertaken. Next, modifications to the initial forecast are made to determine the beneficial or negative effects that each alternative under consideration might produce. This step should, if feasible, also take into account scenarios that identify "areas of uncertainty" for projects expected to have detrimental effects to various segments of the environment; and, should also identify cumulative affects caused by long-term phased projects and/or from other developments in the project area.

Component 3 - *Screening*: The beneficial and adverse short- and long-term impacts of each alternative should be compared and con-

trasted, and summarized in a way to facilitate discussion and evaluation by the affected public and other interested parties. As a part of this step, the limits of acceptable change and risk should also be identified and explained. The results of this step will be a draft EA document that summarizes the alternatives studied and, whenever possible, identifies the preferred alternative and the reasons for its selection.

Component 4 - *Communicating*: There are numerous benefits to inviting the affected public and other interested parties to comment on all aspects of an assessment, especially on the draft EA. The two principal benefits are that it produces better informed judgements and creates a better climate for public acceptance of a proposed project. Their active participation helps in clarifying the options available and to disclose additional appropriate issues. New issues raised by the public that have not been addressed in the draft EA document should be resolved and included within a final EA document. Whenever necessary, a mitigation plan should be worked out with all interested parties. Finally, a decision document for the public record is prepared focusing on the reasons for the selection of the alternative to be built.

Component 5 - *Monitoring*: This is sometimes considered as one of the major components of an EIA process. In reality, monitoring is generally undertaken during, and following, the implementation or construction of a project. An entity having legal capacity to enforce com-

pliance of restrictions that may have been imposed on the project should be given responsibility for seeing that mitigation measures, when appropriate, are implemented, and environmental safeguards are enforced.

Support documents:

- *Scoping Guidance*, Memorandum of the Council on Environmental Quality, issued April 30, 1981.

The Substance and Content of Assessments

An EA process is an umbrella under which concerns for the protection of impacted natural and cultural resources can be weighed against the benefits derived from the project. Each individual project will raise different issues. One project may require diverse expertise in many socio-economic, ecological and cultural disciplines. Another may have only narrow concerns involving only one or two disciplines. To address this problem, checklists have been developed to quickly assess which potential areas of impact will, or may, be involved. Project managers should consider probable consequences in the following areas (although this is not intended to be an exhaustive list):

- **Human health concerns** include the identification and minimization of undesirable releases of: particulate or hazardous substances to the air; nutrients or hazardous substances to surface water; and solid wastes or hazardous

substances (e.g., pesticides) to soils and groundwater. Assessments should also examine disposal methods for unavoidable contaminants so that environmental problems are not transferred among media. Although the concerns in this area focus on human health, measures taken to prevent contamination of drinking water or waters used for recreation, for example, also will benefit ecological concerns such as fish and wildlife habitats.

- **Other Socio-Economic concerns** include avoiding: the displacement of residents; unaffordable user fees to build, operate and maintain projects; adverse effects on property values and land-use zoning including the uses or misuses of lands in floodplains; overloading community services; and, problems stemming from induced growth in general, including transportation costs and mobility.

- **Ecological concerns** vary widely among geographic and climatological regions of a country or the world. On a national scale, major areas of concern include protection of endangered species of plant and animal life and their aquatic and terrestrial habitats, preservation of wild and scenic rivers and national parks, and other resources considered "critical" (e.g., prime farmland, wetlands, barrier islands and wilderness areas). On a more local level, additional concerns (e.g., preservation of farmlands that produce specialty crops, areas other than prime agricultural land, land of importance to local economies or that which provides open-space

relief from otherwise unbroken development) may need to be considered.

- **Cultural concerns** include identifying and determining the worthiness of preserving the artifacts of early cultures and historic settlements (e.g., tools, utensils, furnishings, buildings and other structures). Where and when it becomes impossible to preserve items which have been designated as official historic landmarks, or otherwise considered significant by interested parties, then an effort should be made for experts to study the site and document its attributes and significance prior to its loss by construction activities.

Support documents:

- *Cross-Cutting Environmental Laws: A Guide for Federal/State Project Officers*, January 1991, Office of Federal Activities, U.S. EPA.

(2 model checklists)

- *EPA Reviewers Checklist and Guidance for EPA Regional Oversight of State National Environmental Policy Act Delegation.*

Oversight of the EA Process

Oversight of the EA process is necessary to ensure that the intent of an EA process is implemented in a fair and equitable manner.

Establishing Uniform Procedural Requirements

One agency must be relied upon to provide leadership for establishing the basic procedural requirements and guidelines for undertaking the basic components of the EA process. Its primary objective is to establish ground rules to ensure uniform application of legal EIA procedural requirements fashioned to minimize adverse impacts from projects. It should also be responsible for producing guidance documents, as needed, to aid responsible parties in carrying out their duties such as: clarifying requirements of the law; or clarifying how the basic requirements may apply to new assessment situations.

The lead agency should also be responsible for: gathering information on the conditions and trends in environmental quality; evaluating the programs of all responsible parties in light of the goals established in law; developing and promoting national policies to improve environmental quality; and conducting studies, surveys, research and analyses relating to ecosystems and environmental quality. Each year an annual report should be published to inform all responsible parties and the general public on the status of various environmental concerns including the success, or lack thereof, of the EA process.

Responsible Party Adaptation of the EA Process

Once established, the EA process should be applied uniformly across all program areas.

This does not mean that the EA process need to be pursued apart from planning processes established under individual program requirements. It only means that agencies should prepare EAs and EIAs using a common format modified to include all other project planning information needed for an agency to reach its final decision. The format should be such that decisions that result in adverse impact to the environment will clearly highlight the trade-offs being made between project benefits and impacts. It should also allow for presenting how project benefits outweigh impacts, or, how other priorities may override the environmental ones involved.

Independent Review of Projects

When many agencies are involved in an EA process, there are bound to be differences of opinion on interpreting the significance of impacts, including the acceptability of permissible change to elements of the natural and man-made environment. For this reason several countries, including the U.S., have established an independent evaluation process for all "major" projects (e.g., projects determined to have "significant" impacts). Usually the same agency that establishes the original EIA guidelines is also charged with the independent evaluation of major projects.⁶ The function of this reviewing agency is twofold. First it must review individual project EA documentation for

adherence to the minimum set of requirements for EIA including public notification and participation in the process. Second it must review for acceptability of the impacts caused, including whether or not the alternative chosen is the most appropriate in minimizing adverse impacts to protected environmental resources. The reviewing agency should also have the responsibility for maintaining a file, available to public inspection, on all major projects evaluated, including a brief description of the action, how well the agency met the requirements of the law and how acceptable the agency's action is in protecting and restoring environmental resources.

Note:

⁶In the U.S. the Council on Environmental Quality originally produced the original requirements and provided the independent evaluation of major project assessments. The independent review is now carried out by the Environmental Protection Agency.

Attachments:

Sect 1502.10, Recommended format, Regulations for Implementing the Provisions of the NEPA, Council on Environmental Quality, 1980.

Additional References

- *Application of Environmental Impact As-*

essment: Highways & Dams, United Nations Economic Commission for Europe, Environmental Series ECE/ENV/50.

National Environmental Policy Act [NEPA] of 1969, 42 U.S.C. 4321 et seq.

Executive Orders 11514 and 11991; Council on Environmental Quality Regulations Implementing NEPA, November 29, 1978 (43 FR 55978).

Environmental Impact Assessment: Theory and Practice, Ed. by Peter Wathern, Unwin Hyman, 1988.

Evaluation of EPA's EIS Program for Wastewater Treatment Facilities, November 1980, Office of Federal Activities, U.S. EPA.

Procedures for Implementing the Requirements of the Council on Environmental Quality on The National Environmental Policy Act, 40 CFR Part 6, U.S. EPA.

Environmental Impact Assessment, Larry W. Canter, McGraw-Hill Book Co., 1977.

Environmental Impact Assessment, Proponent Sponsored Engineer Corps Training, U.S. Corps of Engineers, CE Training Management Div., 1991.

Environmental Assessment Contact List

<u>Technical Area</u>	<u>Contact</u>	<u>FAX Number</u>
Basic Principles & Processes	John Gerba	202-260-0129
Cultural Assessments	Bob Hargrove	212-264-6693
Current Issues	William Dickerson	202-260-0129
Ecological Assessments	Heinz Mueller	404-257-5206
Methods for Identifying & Forecasting Impacts	Larry Canter	405-325-7596
Policy & Plan Assessment	Joseph Montgomery	202-260-0129
Post Assessment Effectiveness	Gene Wojcik	312-886-0168
Public Participation	David Ketchum	202-205-1708
Recommended Formats & Evaluating Documentation	Anne N. Miller	202-260-0129
U.S. Experience	Nicholas C. Yoast	202-887-0689
U.S. National Environmental Policy Act (NEPA)	Dinah Bear	202-395-3744

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Training Contacts

The following U.S. federal government agencies provide open enrollment workshops:

CE Registrar
 U.S. Army Corps of Engineers
 Engineering Division, Huntsville
 ATTN: CECND-TD-RG
 Huntsville, AL 35807-4302

Group Leader for Training and Support
 Environmental Coordination Staff
 Forest Service
 U.S. Department of Agriculture
 P.O. Box 96090
 Washington, D.C. 20090-6090

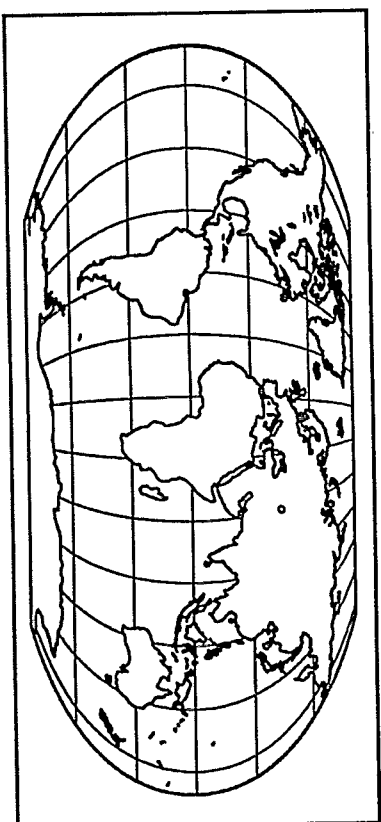
Ordering Technical Documents

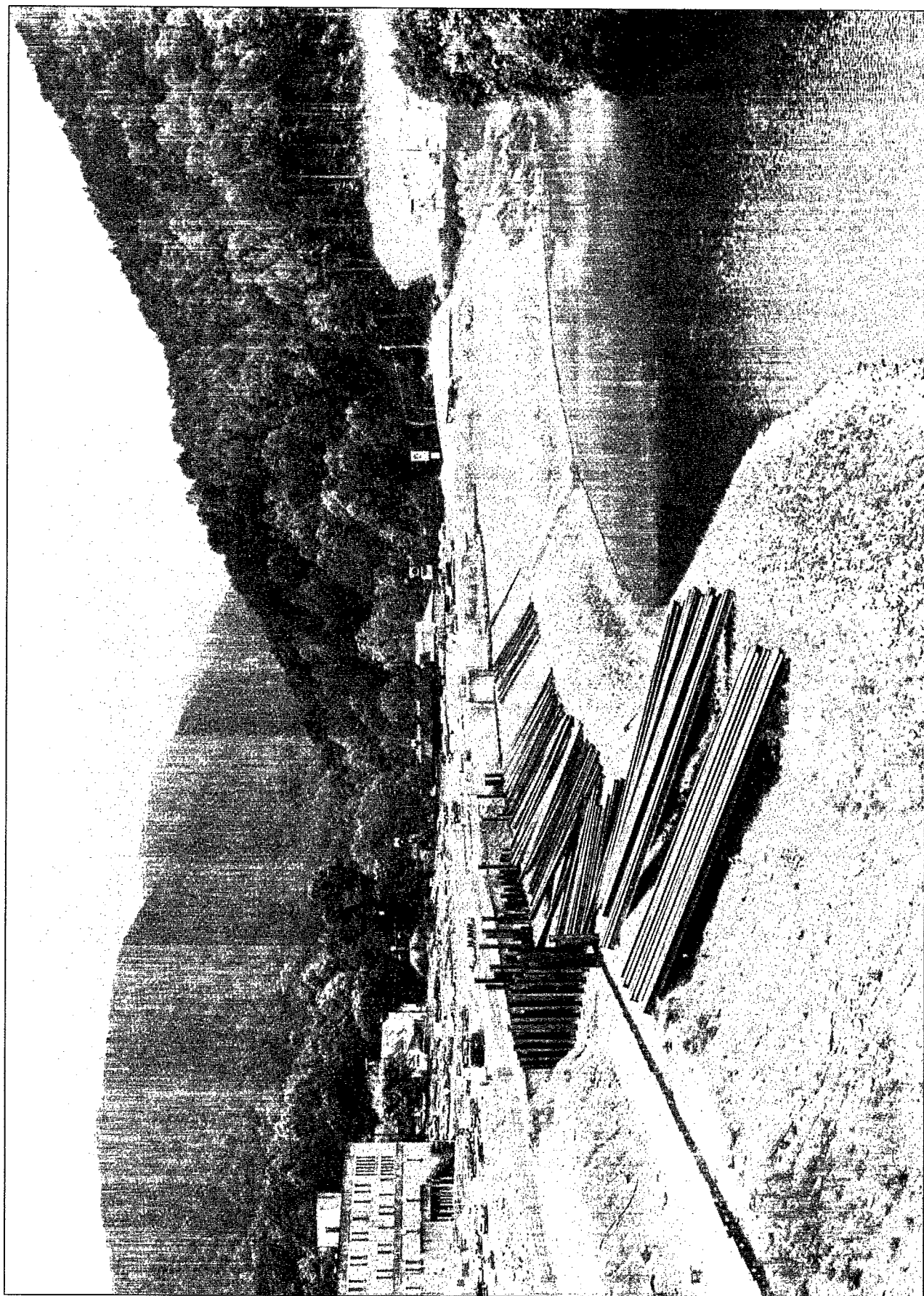
The EPA documents mentioned in the Technical Information Package brochures can be ordered at no charge (while supplies are available) from the Center for Environmental Research Information (CERI). Once the CERI inventory is exhausted, clients will be directed to the National Technical Information Service (NTIS) where documents may be purchased. Orders can be placed by mail, phone, or FAX. To order documents, have the document number or the EXACT title ready. The journal articles listed in the *Additional References* section may be ordered from the U.S. National Focal Point of INFOTERRA.

CENTER FOR ENVIRONMENTAL RESEARCH INFORMATION (CERI)
U.S. EPA, P. O. BOX 19963
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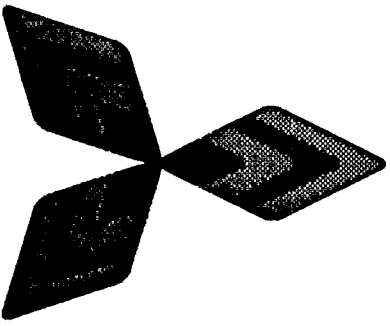
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Levy and stream bank protection project in Pineville, Kentucky.

Photo courtesy of U.S. Army Corps of Engineers



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