u of Mines Information Circular/1979

Quarrying Near Urban Areas: An Aid to Premine Planning

By J. M. Pugliese, D. E. Swanson, W. H. Engelmann, and T. R. Bur

UNITED STATES DEPARTMENT OF THE INTERIOR

Bureau of Mines Information Circular/1979

Quarrying Near Urban Areas: An Aid to Premine Planning

By J. M. Pugliese, D. E. Swanson, W. H. Engelmann, and T. R. Bur

UNITED STATES DEPARTMENT OF THE INTERIOR

Information Circular 8804

Quarrying Near Urban Areas: An Aid to Premine Planning

By J. M. Pugliese, D. E. Swanson, W. H. Engelmann, and T. R. Bur

UNITED STATES DEPARTMENT OF THE INTERIOR
Cecil D. Andrus, Secretary

BUREAU OF MINES
Lindsay D. Norman, Acting Director

CONTENTS

QUARRYING NEAR URBAN AREAS: AN AID TO PREMINE PLANNING

by

J. M. Pugliese,[1] D. E. Swanson,[2] W. H. Engelmann,[3] and T. R. Bur[4]

ABSTRACT

The Bureau of Mines, in support of its overall goal of helping to meet future U.S. demand for minerals, undertook this study to aid the quarry entrepreneur and/or operator in developing quarries near urban areas. In response to increased environmental concerns, the quarry operator often must take steps beyond those required in the last decade toward gaining permits for quarrying near metropolitan areas. Following the steps suggested in this report should increase the chances to obtain the permits to open and develop a quarry. Each task and question in the general plan flow diagrams are described in detail, with the flow diagrams aimed at the goal of acquiring the necessary permits. The appendixes include (1) types of projects for which Environmental Impact Statements (EIS's) may be prepared and Federal agencies responsible for preparing them, (2) State contacts for information regarding environmental impact assessment requirements and mining and mineral land reclamation laws, (3) a checklist of environmental inventory factors, (4) a tabulation of different regulations that affect mining in Michigan and the number of townships and counties that have each of the listed regulations, and (5) environmental logic associated with site selection.

A central recommendation is that the quarry entrepreneur and/or operator coordinate plans at the beginning with local government officials (such as township supervisors and/or city and county planning board members), State and Federal officials, and public groups that will be affected.

INTRODUCTION

The Bureau of Mines has developed this report to help the quarry entrepreneur and/or operator avoid unnecessary delays in gains permits for proposed operations near metropolitan centers. The reported general plan is an attempt

---

[1]Environmental specialist (mining).

[2]Mining engineer.

[3]Research chemist.

[4]Geophysicist.

All authors are with the Twin Cities Mining Research Center, Bureau of Mines, Twin Cities, Minn.

from the aforementioned sources. Four large Standard Metro Statistical Areas (SMSA) (15)--Detroit, Los Angeles, Minneapolis-St. Paul, and Pittsburgh--were investigated further for additional data to test the general plan. The present report stresses the importance of cooperation with local governments, as well as with State and Federal Governments; urges that reclamation and environmental impact rationale be included from the earliest stages of mine planning; and gives a logical plan aimed at aquisition of operating permits.

ACKNOWLEDGMENTS

The authors wish to thank the late Fern L. Krech, physical science technician, Twin Cities (Minn.) Mining Research Center, for obtaining data from the Minneapolis-St. Paul, Minn., area. The authors also thank the Bureau of Mines Liaison Officers, W. H. Kerns, E. C. Peterson, R. C. Briggs, and W. Kebblish, for their input from California, Michigan, Minnesota, and Pennsylvania, respectively. Professor R. E. Yarbrough, Southern Illinois University, Edwardsville, Ill., made valuable suggestions in the early phase of this study.

GENERAL PLAN

Generalized, premine objectives for quarrying near an urban area must meet ordinance and environmental requirements with a minimum of cost, time delay, and adverse citizen pressure. Figures 1-6 shows a progression of efforts from initial project and site consideration to the final permit effort. To better explain these figures, tasks (lettered) are discussed under questions (numbered).

The following questions are covered: (1) Is amount and source of capital available to put the project into operation? (2) Is the business and public climate favorable for quarrying in this area? (3) Will the regulatory agencies invoke the Environmental Impact Statement (EIS) process? (4) Is the detailed data collection program acceptable? (5) Should the detailed data collection program be revised? (6) Are there large, unavoidable environmental impacts that may stop authorization? (7) Should permits be obtained?

In the figures, when data up to a certain point show that an area precludes operation, a "stop action" instruction urges consideration of alternative land uses or aborting the effort. In response to a "stop action," other possible quarry sites may be sought, and some data already collected may be used.

Question 1.--Is Amount and Source of Capital Available To Put the Project Into Operation (fig. 1)?

Task A.--Initial Project and Site Consideration

At this time, the proposed project may be little more than one individual's idea. This task is an office effort, a brainstorming meeting, and should be conducted as an in-house effort. This task should not be performed without those who will be the financial partners in the endeavor and may be

3. Cost of data for environmental assessment possibly required by State, Federal, or local regulatory agencies.

4. Bond requirements and permits needed.

5. Nature of site (physical character and present use in relation to area).

6. Source and amount of capital needed to put plans into operation.

7. Ability to acquire property and mineral rights (rate of rise of land values and present owner's possible intended use).

8. Previous industrial experience in the area.

9. Project alternatives (adjacent or nearby sites equally promising or better?).

10. Local zoning ordinances.

After completion of task A, question 1 is asked. This question addresses several topics--amount of capital available, predicted cost of project, possible costs which may arise, project feasibility, and risk of investment. If the answer is yes, proceed to task B. If the answer is no, stop action.

Task B.--Review of Available Information

There are geological, environmental, political, social, and economic considerations that must be investigated in more detail. The following list is included as a general aid for review of available information, based upon case histories and the authors's findings. The list's numbering sequence does not reflect priority. In regard to item 1, the operator should first determine which agencies must be contacted for obtaining permits and licenses for the proposed operation.

1. Contact the U.S. Environmental Protection Agency (EPA), the State's department of natural resources, the State's environmental quality council or equivalent, the State planning agency, and local zoning authorities. Many of these agencies have local representatives; the county or township officials may be of help in locating them. If regulatory officials are made aware of the proposed venture and are asked to comment, the probability of their intervention at later, unexpected times is reduced.

2. Review for the particular area appendixes A through D. These appendixes provide information concerning (a) types of projects for which EIS's may be needed and Federal agencies responsible for preparing them; (b) State contacts for information regarding environmental impact assessment requirements, and mining and mineral land reclamation laws, (c) environmental inventory factors, and (d) excerpts from reference 13 concerning effect of local zoning ordinances on mining in Michigan, as an example of zoning ordinances as a primary tool to regulate mining operations.

300-397 O - 79 - 2

Task C.--Acquirement of Property and Mineral Rights (Mineral Lease)

Begin prospecting and exploration efforts. For example--

1. Determine exploration requirements.

2. Lease property for exploration. It is important that term of lease be long enough to allow exploration, but the entrepreneur should strive for the option of release if the deposit does not warrant development.

3. Obtain prospecting or exploration permits if necessary.

4. Obtain physical samples required to give a cursory but accurate assessment of important geologic parameters.

5. Assess important geologic parameters. Accurate geological data must be acquired to make a comprehensive decision on determining project feasibility and acquiring property and mineral rights.

When acquiring property and mineral rights, purchase of property adjacent to that to be used for quarrying may be advisable. This adjacent property could serve as a buffer.

Barrows, Ostrom, and Preston (1) note that the option to buy often joins a mining lease but may be a separate agreement which has many of the same provisions as a mining lease. A landowner may not wish to sell property if royalties paid on leases would approach or exceed the land's market price. A lease containing an option to buy should be investigated thoroughly soon after the lease agreement.

Leases should specify the following:

1. Tract of land involved.

2. Manner of mining.

3. Rights of access.

4. Liability and responsibility for damage or injury.

5. Provisions for land reclamation after completion of mining activities.

6. Inspections.

7. Taxes.

8. Royalties.

9. Termination date.

10. A legally acceptable means of settling disputes.

9. Determine if an Environmental Assessment (EA) or an EA-EIS might be prepared by regulatory agencies. Estimate what the decision threshold might be, above which the EIS process is triggered. For this report, "categorical exclusions" will not be considered in the EIS process.

Separate discussions with proposed aggregate purchasers may also be planned as part of task D.

Question 2.--Are the Business and Public Climates Favorable for Quarrying in This Area (fig. 2)

Based upon preliminary information gathered, decide whether the social, political, and business climates, as well as their anticipated responses to the operation's level of environmental impact, favor quarrying in this area. If these climates are unfavorable, stop action. At this point, little effort and capital have been invested in the total endeavor, and the search for an alternative quarry site may be easily continued elsewhere. If conditions for quarrying appear favorable, proceed to tasks E and F.

Task E.--Environmental Impact Update

Update background on the environmental impact of the proposed operation, based on the results of tasks A-D; specifically--

1. Alter the reduced matrix in response to the preliminary meetings.

2. Determine the aspects of the operation which are most environmentally controversial.

3. Determine, from earlier discussions with regulatory officials, the criteria that must be met to satisfy permit application procedures.

4. Modify the project idea, if possible, to reduce adverse impacts and to comply with regulatory requirements.

5. Determine a monitoring or impact-testing program that satisfies permit requirements and budget restrictions. Professional consultation is advisable in this matter; impact assessment experts may already be on the premine planning team (task A) or may be hired.

Task F.--General Public Relations Effort (Part 1)

At this time, the proposed project should become public knowledge to decrease the probability of later delays and complications resulting from the pressures of unforeseen public opposition. At this point, local regulatory officials and concerned citizens residing near the proposed site will already know of the proposal to mine. Consider releasing news of the pending operation to local newspapers. Public hearings called by local authorities provide an excellent opportunity to further assess public opinion and to inform the public of matters concerning the proposal.

Task G.--Preliminary Assessment Report for Use In-House

A preliminary assessment report serves as a reference for future efforts. It comprises a comprehensive file on the activity to this point. The following information might be included in the preliminary assessment report:

1. Site description.
    a. Location and legal description.
    b. Topography and climate.
    c. History and present use (zoning).
    d. Present owner's property rights.
2. Site geology.
    a. Stratigraphy.
    b. Structural geology.
    c. Economic geology.
    d. Resource estimation.
3. Developmental economics.
    a. Market potential.
    b. Ownership or lease.
    c. Royalties and/or taxes.
    d. Production prerequisities.
    e. Inflation projections.
    f. Investment comparision with low-risk investments.
    g. Amount and source of available capital.
4. Equipment and labor needs.
    a. Blasthole drills.
    b. Blasting materials.
    c. Dozers, scrapers, front-end loaders, shovels.
    d. Conveyor systems, trucks.

5. Plant trees around the main plant area.

6. Construct a solid, dust-free, entrance driveway with gate enclosures.

7. Erect modest but attractive office buildings and weigh stations.

8. For the shallow quarry, consider backfilling the excavation face with overburden to create gently sloping banks; cover with topsoil, grade smooth, and do final landscaping and seeding while the excavation progresses.

The above suggestions are exemplified in environmental planning reports (5); similar suggestions are found in the Environmental Impact Statement for a proposed copper mine in Wisconsin (20). According to the U.S. Bureau of Outdoor Recreation (21), the absence of preplanning frequently results in a mined area where topographic and vegetative characteristics are poorly suited for long-term land usage and whose reclamation may involve excessive costs and manpower.

Reports (16-17) may be reviewed for information on quarry planning and blast pattern design with respect to the geologic structure of the area.

Question 3.--Will the Regulatory Agencies Invoke the Environmental Impact Statement (EIS) Process (fig. 3)?

The EIS process has been considered above in the project feasibility efforts. Find out if regulatory agencies will prepare "full blown" EIS's on the proposed effort. Each agency and its officer responsible for preparing the EIS must be identified. A yes response to the question could trigger a choice between stopping action or proceeding to tasks H and I.

Proceed to tasks H and N if the response if no. Compliance with a regulatory agency's request for information, including that of environmental assessment substance, may require certain efforts similar to those described below for the yes response, but probably to a lower degree.

Task H.--General Public Relations Effort (Part 2)

This effort may be thought of as a continuation and expansion of task F. The following suggestions should be helpful:

1. Have a local printer prepare a brochure containing facts about the mining operations such as mining and processing methods, pit dimensions, life of operation, work force requirements, service to the community, tax base support, and reclamation plans. The brochure should be written in layman's terms.

2. Have an open-door office policy for citizens to obtain brochures and to discuss any aspects of the operation proposal.

3. Construct displays depicting the planned operation and subsequent reclamation.

Task I.--Confirmation of Data Voids

Confirm the information voids from review of the preliminary assessment report (task G). The voids must be addressed before developing a detailed program for data collection (task J) and the actual data collection effort (task L).

Task J.--Development of a Detailed Program for Data Collection

A program for data collection aids in meeting the requirements of the National Environmental Policy Act of 1970 (NEPA), the State permit requirements, and the local ordinances. Local ordinances may use the same language as the Federal act.

Specific needs should be explained by specialists involved in studies necessary to make environmental impact decisions.

Statistical techniques may be helpful in analyzing data sets that have incomplete data points. Ranges of expected values for some parameters (derived from similar situations) can be expressed where measured values are available.

The following suggestions should be taken in the planning of environmental studies:

1. Conduct measurements in a manner acceptable to the permit-approving agencies who request impact data.

2. Describe the specifications of monitoring devices to be used.

3. Use equipment endorsed by the permit-reviewing agencies and organizations such as the American National Standards Institute.

4. Indicate sources of environmental impact on an operations map in relation to other undesirable impacts and site conditions.

5. If consultants are hired, contract them to tabulate data and complete the necessary paperwork for permit application.

Task K.--Review of Detailed Program by Regulatory Agencies

Organize a meeting for the review of the program for collecting EIS required information. Bring in the reviewers who attended the preliminary regulatory meetings (task D). These reviewers should, from previous discussions, be familiar with the initial proposal. Their opinions of the detailed plan are important and should be obtained in writing, if possible.

Conditions may change before permits are acquired and periodic review of the detailed program may be necessary.

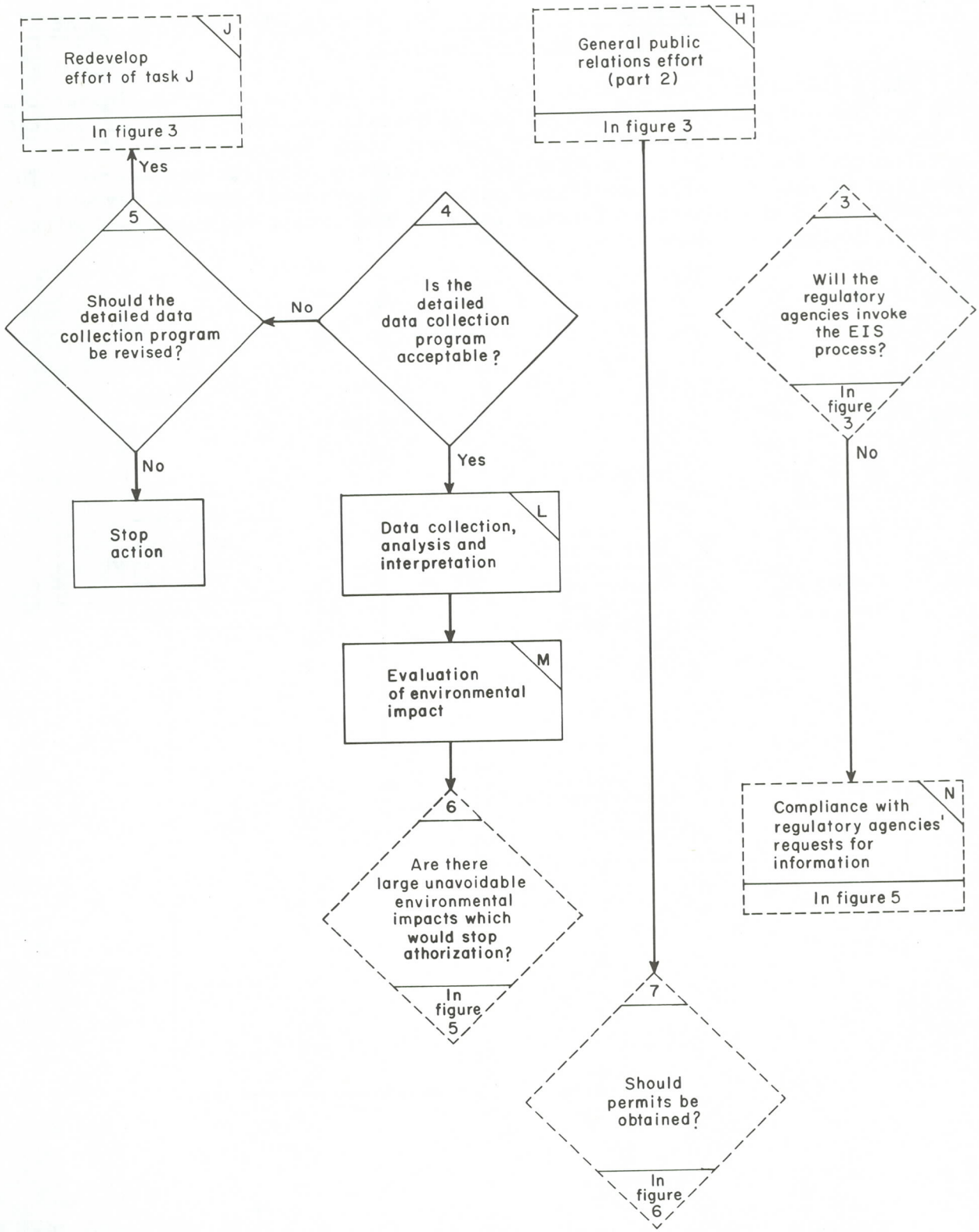

FIGURE 4. - Questions 4 and 5: Is the detailed data collection program acceptable? Should the detailed data collection program be revised?

If the answer to question 6 is yes, stop action. If no, proceed to task N.

Task N.--Compliance With Regulatory Agencies' Requests for Information

Prior discussions with regulatory officials should have indicated whether the proposal requires the furnishing of significant amounts of environmental data for the preparation of a formal EIS. If the answer to question 3 was no, then the information requested would pertain primarily to fulfilling permit requirements, although information may also be desired for environmental assessment.

EIS preparation is the responsibility of government regulators who control actions that pose significant environmental impact. In regard to agencies concerned with EA-EIS requirements, see appendix A for examples of Federal agencies and appendix B for examples of State agencies. Because these agencies cannot always fund all aspects of their own EIS preparation, the operator may have to furnish input at the operator's expense.

The EIS process can be quite time consuming. Steps performed by regulatory agencies in this task are exemplified in the handbook by Ross (18).

In figure 5, note that the public relations effort of task H continues.

Question 7.--Should Permits Be Obtained (fig. 6)?

This question requires a last look at all indicators before deciding to obtain permits. If all matters are in order and permit approval appears certain, advance to task O. However, if after completing all previous tasks acquisition of all needed permits seems remote because of last-minute developments, stop action.

If the yes decision is made, a public relations effort will still be needed in the mining phase. This study concerns only the premining phase and will conclude with the next task, that of obtaining permits.

Task O.--Obtain Permits

The necessary applications for permits should be completed and submitted to the appropriate agencies. Applications should be prepared by persons who have been successful in gaining permits in the immediate past.

The following lists gathered from State government reports (14, 20) show that permits may be required for a variety of operating conditions. Normally, State and local contacts are the best sources for information and permits. While these lists are meant to be inclusive, items are for reference and are not meant to guide the operator toward seeking permits in all the following categories:

From the State department of natural resources:

1. Structure and deposits in navigable waterways.

12. Work in beds of public water.

13. Utility crossing.

14. Zoning guidelines (land use).

From the State pollution control agency:

1. Liquid-waste disposal.

2. Compliance with water-quality standards.

3. Gaseous-waste disposal.

4. Solid-waste disposal.

From the State department of health:

1. Sewage disposal system.

2. Plumbing plans.

3. Potable water supply.

4. Water well construction.

5. Industrial waste disposal.

6. Occupational disease requirements.

From the State department of industry and labor, U.S. Occupational Safety and Health Administration, and U.S. Mine Safety and Health Administration:

1. Occupational health and safety.

2. Structures.

3. Equipment.

4. Facilities.

From the State department of transportation, U.S. Department of Transportation:

1. Highway access.

2. Utilities.

300-397 O - 79 - 4

REFERENCES

1. Barrows, D., M. E. Ostrom, and J. Preston. Mining on Your Land? Summary Information for Landowners on Mineral Leases, Prospecting Agreements, and Other Mineral Transactions. Univ. Wis. Ext. Geol. and Nat. History Survey Spec. Rept. 3, University of Wisconsin, Madison, Wis., March 1975, 10 pp.

2. Bauer, A. M. Mining in an Increasingly Urban Environment. Pit and Quarry, v. 168, No. 3, September 1975, pp. 58-62.

3. Burchill, R. W., and D. Listokin. The Environmental Impact Handbook. Center for Urban Policy Research, Rutgers University, New Brunswick, N.J., 1975, 234 pp.

4. Dames & Moore. Development of Pre-mining and Reclamation Plan Rationale for Surface Coal Mines. BuMines Open File Rept. 100 (1-3)-76, June 1976, 590 pp.; available for consultation at Bureau of Mines facilities in Denver, Colo., Twin Cities, Minn., Bruceton, Pa., Pittsburgh, Pa., Spokane, Wash.; at the Department of Energy facility in Morgantown, W. Va.; at the Central Library, U.S. Department of the Interior, Washington, D.C.; and from the National Technical Information Service, Springfield, Va., PB 258 041/AS (set).

5. Environmental Planning Urban Design Landscape Architecture (EDAW, Inc.) (Minneapolis, Minn.). Yard C Site Plan. J. L. Shiely Co., Minneapolis, Minn., December 1974, 40 pp.

6. Evans, J. R. Extraction of Sand and Gravel in Orange County. Calif. Geol., v. 26, No. 11, November 1973, pp. 255-272.

7. Flatiron Companies and City of Boulder, Colo. South Boulder Creek Environmental Impact Assessment, Boulder, Colo., April 1975, 85 pp.

8. French, R. R., A. W. Stuart, and D. H. White. Socioeconomic Aspects of Mining in Selected Cities. Urbanization and Surface Mining, Atlanta, Ga. BuMines IC 8477, 1970, 50 pp.

9. Gatley, W. S., and E. E. Frye. Regulation of Noise in Urban Areas. A Manual Prepared for Public Officials, Managers, and Environmental Engineers. University of Missouri at Rolla, Rolla, Mo., 2d ed., 1972, 380 pp.

10. Imhoff, E. A., T. O. Friz, and J. R. LaFevers. A Guide to State Programs for the Reclamation of Surface Mined Areas. U.S. Geol. Survey Circ. 731, 1976, 33 pp.

11. Landerman, N. J., and S. Schwartz. Community Resource. The Development--Rehabilitation of Sand and Gravel Lands. California State Polytechnic University, Pomona, Calif., 1972, 63 pp.

24. U.S. Office of Personnel Management, Chicago Region. Course: Workshop in Environmental Assessment, Environmental Inventory Factors, R. E. Yarbrough, instructor. St. Paul, Minn., May 12-14, 1975; course materials with R. E. Yarbrough, Southern Illinois University, Edwardsville, Ill.

25. Westmoreland County, Pa. List of County and Township Officials. 65th Ann. Conv. of the Westmoreland County Assoc. of Township Officials, Westmoreland County Seat, Greensburg, Pa., March 1975, 40 pp.

Types of Projects and Sponsoring Agencies

Extraction

Mineral exploration.....IGS
Mining.....AFS, BLM, BOM, FWS

Water supply, waste disposal, pollution control systems

Air pollution control (funding or grant).....EPA
Area waste-treatment plans (approval).....EPA

NPDES new source discharge (permit).....EPA

Research and monitoring (funding or grant).....EPA

Sanitary landfills.....USN
Sewage treatment and facilities.....AFS, HUD
Solid-waste management (funding or grant).....AFS

Wastewater management.....COE
Wastewater treatment works (grants).....EPA
Water supply (reservoirs).....COE

Water resource development

Beach erosion.....COE
Boat harbors (small boats).....COE

Dredge and fill (diked disposal).....COE, USN

Flood insurance.....HUD

Multipurpose impoundments.....COE

Navigation.....COE

Operation and maintenance of civil works water resources.....COE

Permits for works in navigable waters.....COE

Watershed protection and flood control.....SCS, COE

Transportation

Highways.....FHW, AFS

Mass transit.....UMT

Off-road vehicle use.....AFS

Railroads.....ICC
Rate increase on transportation of recyclables.....ICC

APPENDIX B.--STATE CONTACTS[1] FOR INFORMATION REGARDING ENVIRONMENTAL IMPACT ASSESSMENT REQUIREMENTS AND MINING AND MINERAL LAND RECLAMATION LAWS

State	Environmental impact assessment requirements,[2] contact	Mining and mined-land reclamation laws[3]	
		Contact	Minerals regulated
Alabama.....	Office of the Director Alabama Environmental Health Administration Room 328 State Office Bldg. Montgomery, AL 36130 Tel: (205) 832-3176	Alabama Surface Mining Reclamation Commission Box 1027 Jasper, AL 33501 Tel: (205) 221-4130	Coal.
		Alabama Department of Industrial Relations 204 Industrial Relations Bldg. Montgomery, AL 36130 Tel: (205) 832-3628	All minerals except coal.
Alaska[4].....	Land Use Supervisor Division of Terrestrial Programs Alaska Department of Environmental Conservation Pouch O Juneau, AK 99811 Tel: (907) 465-2635	Attn: Pete Nelson Land Management Officer Division of Mineral and Energy Management Alaska Department of Natural Resources 323 East 4th Ave. Anchorage, AK 99510 Tel: (907) 274-8542	Oil and gas, metals, coal.
		Attn: Ed Barber Land Management Officer Division of Land Alaska Department of Natural Resources 323 East 4th Ave. Anchorage, AK 99510 Tel: (907) 279-5577	Sand, gravel, clay, other minerals for the construction industry.
Arizona[4].....	State Clearing House Office of Economic Planning and Development 1700 West Washington St. Mail Room 505 Phoenix, AZ 85007 Tel: (602) 271-5004	Arizona State Land Department 1627 West Adams Phoenix, AZ 85007 Tel: (602) 271-4628	All minerals.

See footnotes at end of table.

State	Environmental impact assessment requirements,[2] contact	Mining and mined-land reclamation laws[3]	
		Contact	Minerals regulated
District of Columbia.	Director Office of Environmental Planning Department of Environmental Services 415 12th St. NW. Washington, DC 20004 Tel: (202) 629-3105	Office of Environmental Planning Department of Environmental Services 415 12th St. NW. Washington, DC 20004 Tel: (202) 629-3105	All minerals.
Florida.....	Office of Environmental Services Florida Game and Freshwater Fish Commission Bryant Bldg. 1620 South Merridian Tallahassee, FL 32304 Tel: (904) 488-6661	Bureau of Geology Florida Department of Natural Resources 903 West Tennessee St. Tallahassee, FL 32304 Tel: (904) 448-2479	Do.
Georgia.....	State Office of Planning and Budget 270 Washington St., SW. Atlanta, GA 30334 Tel: (404) 656-3861	Bureau of Land Reclamation Georgia Department of Natural Resources Box 233 Macon, GA 31201 Tel: (912) 744-3346	Do.
Hawaii[7].....	Director Office of Environmental Quality Control Office of the Governor Room 301 550 Halekauwila St. Honolulu, HI 96813 Tel: (808) 548-6915	Division of Water and Land Development State Department of Land and Natural Resources Box 373 Honolulu, HI 96809 Tel: (808) 548-7643	Do.
Idaho.....	Division of Environment Idaho Department of Health and Welfare State Offices--State House Boise, ID 83720 Tel: (208) 384-2393	Idaho Department of Lands State House Boise, ID 83727 Tel: (208) 384-3617	Do.

See footnotes at end of table.

State	Environmental impact assessment requirements,[2] contact	Mining and mined-land reclamation laws[3]	
		Contact	Minerals regulated
Kentucky.....	Office of Planning and Research Secretary's Office of the State Department of Natural Resources and Environmental Protection 6th Floor Capitol Plaza Tower Frankfort, KY 40601 Tel: (502) 564-7320	Division of Reclamation State Department of Natural Resources and Environmental Protection 6th Floor Capitol Plaza Tower Frankfort, KY 40601 Tel: (502) 564-6940	All minerals.
Louisiana....	Director Office of Wetlands State Wildlife and Fisheries Department 400 Royal St. New Orleans, LA 70130 Tel: (504) 568-5665	Division of Oil and Gas State Department of Conservation Box 44275 Baton Rouge, LA 70804 Tel: (504) 389-5161	Coal.
Maine.....	Commissioner State Department of Environmental Protection State House Augusta, ME 04333 Tel: (207) 289-2811	Bureau of Land Quality State Department of Environmental Protection State House Augusta, ME 04333 Tel: (207) 289-2111	All minerals.
Maryland.....	Clearinghouse Department of State Planning 301 West Preston St. Baltimore, MD 21201 Tel: (301) 383-2467	Tower Plant and Siting Administration Maryland Department of Natural Resources Tawes State Office Bldg. Annapolis, MD 21401 Tel: (301) 269-2261	Do.
Massachusetts	Massachusetts Environmental Policy Act Executive Office of Environmental Affairs 100 Cambridge St. Boston, MA 022202 Tel: (617) 727-5830	([6])	XX

See footnotes at end of table.

State	Environmental impact assessment requirements,[2] contact	Mining and mined-land reclamation laws[3]	
		Contact	Minerals regulated
Montana.....	Executive Director Environmental Quality Council Capitol Station Box 215 Helena, MT 59601 Tel: (406) 449-3742	Montana Department of State Lands Capitol Station Helena, MT 59601 Tel: (406) 449-2074	All minerals.
Nebraska.....	Comprehensive Planning Coordinator Office of Planning and Programing Box 94601 State Capitol Lincoln, NE 68509 Tel: (402) 471-2414	([6])	XX
Nevada.....	Division of Environmental Protection Nevada Department of Conservation of Natural Resources 201 South Fall Carson City, NV 89710 Tel: (702) 885-4670	([6])	XX
New Hampshire	Office of Comprehensive Planning Office of the Governor State House Annex Concord, NH 03301 Tel: (603) 271-2155	Division of Forests and Lands State Department of Natural Resources Box 856 State House Annex Concord, NH 03301 Tel: (603) 271-2214	All minerals.
New Jersey...	Office of Environmental Review State Department of Environmental Protection Box 139 Trenton, NJ 08625 Tel: (609) 292-2662	([6])	XX

See footnotes at end of table.

State	Environmental impact assessment requirements,[2] contact	Mining and mined land reclamation laws[3]	
		Contact	Minerals regulated
Ohio.....	Division of Environmental Assessment Office of Planning Coordination Ohio Environmental Protection Agency 361 Broad St. Columbus, OH 43215	Division of Reclamation Ohio Department of Natural Resources Fountain Square Columbus, OH 43224 Tel: (614) 466-4850	All surface-mined minerals.
		Division of Mines Ohio Department of Industrial Relations Box 825 2323 West 5th Ave. Columbus, OH 43216 Tel: (614) 466-4240	All underground-mined minerals.
Oklahoma.....	State, Oklahoma Department of Economic and Community Affairs 5500 North Western Oklahoma City, OK 73118 Tel: (405) 840-2811	Oklahoma Department of Mines and Mining 117 Capitol Bldg. Oklahoma City, OK 73105 Tel: (405) 521-3859	All minerals.
Oregon.....	Assistant to the Governor for Natural Resources Office of the Governor Room 160 State Capitol Bldg. Salem, OR 97310 Tel: (503) 378-3109	Division of Mined Land Reclamation Department of Geology and Mineral Industry Box 1028 Albany, OR 97231 Tel: (503) 928-2386	Do.
Pennsylvania.	Chief of the Division of Policy Planning and Project Revision Bureau of Environmental Planning State Department of Environmental Resources Room 813 Executive Office Bldg. 2nd St. and Chestnut Harrisburg, PA 17120 Tel: (717) 783-1334	Bureau of Surface Mine Reclamation State Department of Environmental Resources 7th Floor Fulton Bldg. Harrisburg, PA 17120 Tel: (717) 787-5103	Do.

See footnotes at end of table.

State	Environmental impact assessment requirements,[2] contact	Mining and mined land reclamation laws[3]	
		Contact	Minerals regulated
Utah.....	Environmental Coordinator State Planning Office Room 118 State Capitol Bldg. Salt Lake City, UT 84114 Tel: (801) 533-5245	Division of Oil, Gas, and Mining Utah Department of Natural Resources 1588 West North Temple Salt Lake City, UT 84116 Tel: (801) 533-5771	All minerals except sand and gravel.
Vermont.....	State Environmental Board Agency of Environmental Conservation State Office Bldg. Montpelier, VT 05602 Tel: (802) 828-3309	State Environmental Board[8] Agency of Environmental Conservation State Office Bldg. Montpelier, VT 05602 Tel: (802) 828-3309	All minerals.
Virginia.....	Environmental Impact Coordinator Council on the Environment Room 903 9th St. Office Bldg. Richmond, VA 23219 Tel: (804) 786-4500	Division of Mined Land Reclamation Virginia Department of Conservation and Economic Development Drawer U Bigstone Gap, VA 24219 Tel: (703) 523-2925	Do.
Washington...	Washington Department of Ecology St. Martin's College Olympia, WA 98504 Tel: (206) 753-6890	Division of Geology and Earth Resources Washington Department of Natural Resources Olympia, WA 98504 Tel: (206) 753-6183	All minerals.
West Virginia	Division of Research and Statistics West Virginia Department of Natural Resources 1800 Washington St. East Charleston, WV 25305 Tel: (304) 348-2754	Reclamation Division West Virginia Department of Natural Resources Room 322 1800 Washington St. East Charleston, WV 25305	Do.

See footnotes at end of table.

APPENDIX C.--ENVIRONMENTAL INVENTORY FACTORS (24)

I. Earth science factors

A. Climatology and meteorology: (1) Precipitation; (2) temperature; (3) wind; (4) storms.

B. Geology: (1) Lithology; (2) stratigraphy; (3) structure; (4) mineral resources; (5) engineering characteristics of rock types.

C. Physiography: (1) Slopes; (2) elevations-depressions.

D. Hydrology: (1) Drainage areas; (2) stream discharge; (3) water tables; (4) ground-water yields and quality.

E. Pedology: (1) Permeability; (2) porosity; (3) stability; (4) erodability; (5) utilization.

II. Ecological factors

A. Ecosystem: (1) Structure (species density, diversity, dominance, successional stages; standing crops); (2) population-induced changes in system (pollution, removal of individuals or species, nonindigenous species present).

B. Unusual qualities: (1) Unique or rare ecosystems; (2) endangered species; (3) scenic values.

C. Economic values: (1) Forestry (productivity, marketable species); (2) recreation (hunting, fishing, boating); (3) agriculture (crops, livestock); (4) special problems (drainage, flooding, slope, soils); (5) dollar value of land; (6) commercial fishing.

III. Water quality factors

A. Data sources and data: (1) State water survey; (2) reservoir suitability of land data; (3) surface water resources data; (4) waste water treatment data; (5) water quality studies--case records.

B. Water quality legislation and regulations: (1) Federal Government; (2) State and local governments.

C. Water quality: (1) Chlorides; (2) sulfates; (3) nitrates; (4) phosphates; (5) oil; (6) pH; (7) Chemical Oxygen Demand; (8) dissolved O_2; (9) dissolved solids; (10) temperature; (11) turbidity; (12) conductivity; (13) hardness; (14) suspended solids; (15) biota; (16) Biological Oxygen Demand (BOD).

D. Source of water pollution: (1) Runoff; (2) industry; (3) sewage effluents; (4) soil erosion; (5) salt; (6) storm sewers; (7) fertilizers and insecticides; (8) thermal emissions.

E. Flood control.

F. Precipitation.

VI. Economic factors

A. Relocation costs--immediate and long-range: (1) Individuals; (2) families; (3) business; (4) general community.

B. Community economic growth: (1) Current commercial trade; (2) changes in community economic mode; (3) employment projection.

C. Taxes: (1) Base loss due to public allocation; (2) base gains due to rezoning; (3) base changes due to land-value fluctuations.

D. Property values (individual).

E. Impact on economic resources.

F. Employment effects.

VII. Historical factors

A. Description of type of property: (1) Size; (2) type of structures.

B. Description of significance: (1) Local; (2) State; (3) national.

C. Particular sensitivity problems associated with project: (1) visual; (2) audio; (3) atmospheric.

D. Inclusion in National Register of Historic Places: (1) Inclusion at present; (2) desirability to include, if not at present.

conditional-use permits usually require the same general information. Information requested in an application includes the following:

1. Name and address of applicant.

2. Legal description of land involved.

3. Legal interest in property and name of property owner.

4. Type and estimated amount of material to be removed.

5. Measures to be taken by applicant to control noise, vibration, dust, and traffic.

6. A description of any traffic control devices, public facilities, or public services which will be required and a statement as to how the costs will be paid.

7. Measures proposed by the applicant to insure public safety, exclusion of children from the property, and the lateral support of surrounding land and structures.

8. The time required to complete the proposed operation.

9. A detailed description, by maps or otherwise, of the intended operation.

element of the environment; 10 represents the greatest magnitude and 1 represents the least.

f. Place a number for the degree of importance in the lower right corner of each slashed box. Use a 1-to-10 scale similar to that used in step e.

g. Text explaining the criteria used in determining each matrix value should accompany the completed matrix to persons examining the matrix at a later time to subjectively evaluate the impacts on their own matrices.

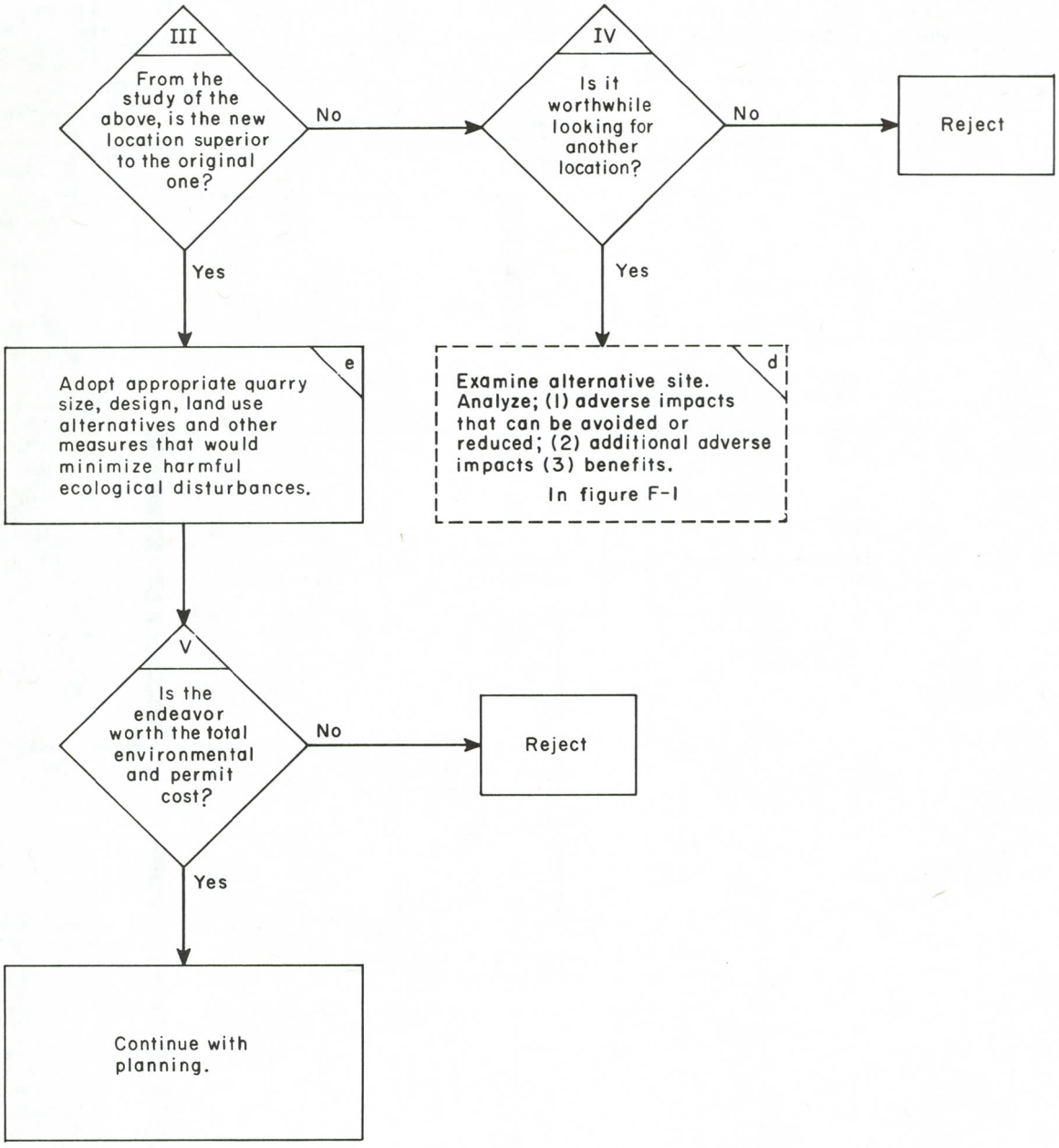

FIGURE F-2. - Environmental logic associated with site selection (part 2).