1979 TAPPI ENVIRONMENTAL PROCEEDINGS

1979 ENVIRONMENTAL CONFERENCE PROCEEDINGS

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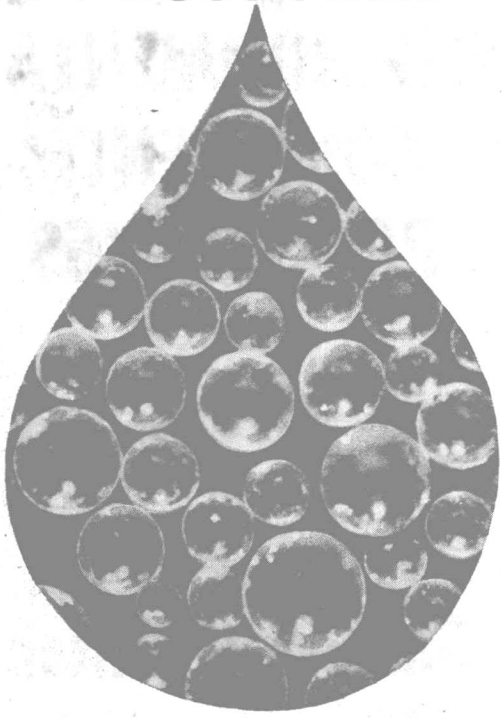

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TAPPI PUBLICATIONS POLICY

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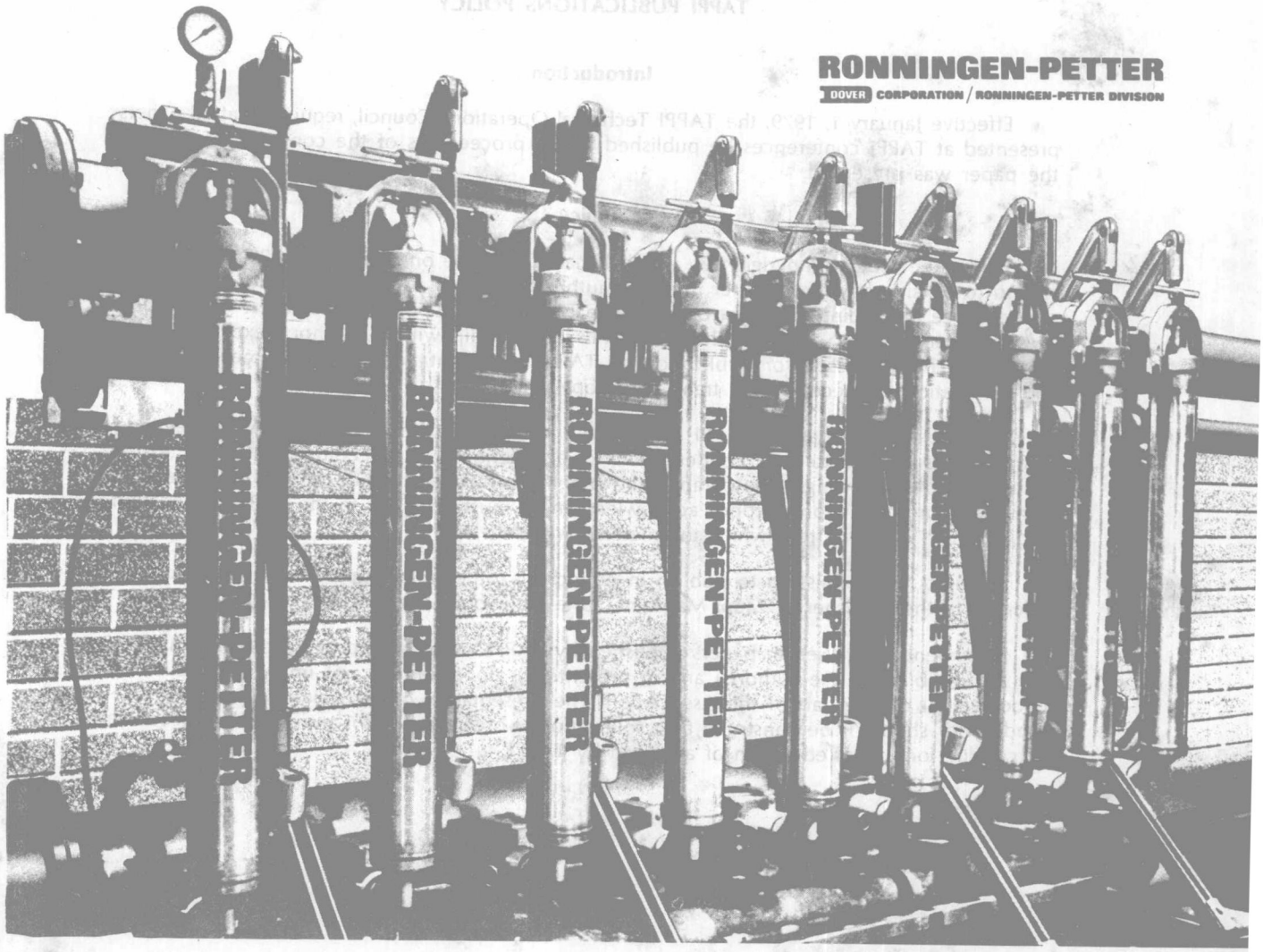

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TAPPI's Antitrust Policy

The Technical Association of the Pulp and Paper Industry, Inc., is a professional and scientific association organized to further the application of the sciences in the pulp and paper industry. Its aim is to promote research and education in the science and practice of pulp and paper manufacture. TAPPI is not intended to, and may not, play any role in the competitive decisions of its members or their employers, or in any way restrict competition in the pulp and paper industry.

Through its seminars, short courses, technical conferences, and other activities, TAPPI brings together representatives of competitors in the pulp and paper industry. Although the subject matter of TAPPI activities is normally technical in nature, and although the purpose of these activities is principally educational and there is no intent to restrain competition in any manner, nevertheless the Board of Directors recognizes the possibility that the Association and its activities could be seen by some as an opportunity for anticompetitive conduct. For this reason, the Board has taken the opportunity, through this statement of policy, to make clear its unequivocal support for the policy of competition served by the antitrust laws and its uncompromising intent to comply strictly in all respects with those laws.

In addition to the Association's firm commitment to the principle of competition served by the antitrust laws, the penalties which may be imposed upon both the Association and its individual and corporate members involved in any violation of the antitrust laws are so severe that good business judgment demands that every effort be made to avoid any such violation. Certain violations of the Sherman Act, such as price-fixing, are felony crimes for which individuals may be imprisoned for up to three (3) years or fined up to $100,000, or both, and corporations can be fined up to $1 million for each offense. In addition, treble damage claims by private parties (including class actions) for antitrust violations are extremely expensive to litigate and can result in judgments of a magnitude which could destroy the Association and seriously affect the financial interests of its members.

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To assist the TAPPI staff and all its officers, directors, committee chairmen, and local section officers in recognizing situations which may raise the appearance of an antitrust problem, the Board will as a matter of policy furnish to each of such persons the Association's General Rules of Antitrust Compliance. The Association will also make available general legal advice when questions arise as to the manner in which the antitrust laws may apply to the activities of TAPPI or any committee or section thereof.

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2 No TAPPI activity or communication shall include discussion for any purpose or in any fashion of prices or pricing methods, production quotas, or other limitations on either the timing or volume of production or sale, or allocation of territories or customers.

3 No TAPPI committee or section shall undertake any activity which involves exchange or collection and dissemination among competitors of any information regarding prices, pricing methods, or costs of production, sales, or distribution without first obtaining the advice of legal counsel provided by the Association.

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7 No TAPPI activity or communication shall include any discussion which might be construed as an agreement or understanding to refrain from purchasing any raw materials, equipment, services, or other supplies, or might otherwise lead to such a result.

8 In conducting TAPPI committee meetings, the chairman shall prepare and follow a formal agenda. Minutes of the meeting shall be distributed to all committee members. Approval of the minutes shall be obtained from the committee at its next meeting. A copy of the minutes shall be transmitted to the headquarters staff.

9 Authors of conference papers shall be informed of the need to comply with the Association's antitrust policy in the preparation and presentation of their papers.

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NEW SITE ENVIRONMENTAL STUDIES AND PERMIT APPROVALS FOR THE FLINT RIVER BLEACHED KRAFT PULP MILL

J. Floyd Byrd, Manager
Environmental Control
The Procter & Gamble Company
Cincinnati, Ohio

John C. Goodrich, National Market Manager
Pulp & Paper Industries
Environmental Research & Technology, Inc.
Concord, Massachusetts

Dr. Jeffrey W. Bradstreet
Manager, Air Quality Studies Division
Environmental Research & Technology, Inc.
Concord, Massachusetts

Dr. Jeffrey C. Howry
Senior Anthropologist for Cultural Resources
Environmental Research & Technology, Inc.
Concord, Massachusetts

Michael O. Molley
Manager, Life Sciences
Southeastern Region
Environmental Research & Technology, Inc.
Atlanta, Georgia

ABSTRACT

In 1975, The Buckeye Cellulose Corporation, a wholly owned subsidiary of The Procter & Gamble Company, started site investigations for locating a new bleached Kraft pulp plant in the southeastern United States. Following extensive discussions with the Georgia Environmental Protection Division (EPD), Buckeye decided in early 1977 on a prime site on the Flint River near Oglethorpe, Georgia. After EPD preliminary approval, Buckeye began detailed environmental studies assisted by Environmental Research & Technology, Inc. (ERT) with the aim of obtaining all permits by January 1, 1978. ERT provided technical consulting services in the areas of air quality, ecology, socioeconomic, and cultural resources. Other consultants were engaged by Buckeye for assistance in water pollution control. This paper describes the successful approach at achieving that goal. Emphasis is placed on the aspects the authors feel were most significant in the permitting process.

As a first step, Buckeye presented an outline and schedule for the Environmental Engineering Report preparation and permitting process to EPD for comment and approval. The technical studies undertaken by Buckeye, ERT, and other consultants included the following:

- Ecological Reconnaissance Survey, including terrestrial and aquatic field observations and extensive literature review. This survey was followed by a pre-operational biological survey on the Flint River in the fall of 1978. After start-up in 1981, a postoperational biological survey will be run to provide a comparison with pre-operational conditions and a positive measure of the plant's environmental performance. Extensive coordination and explanation of studies with both federal and state agency personnel were required.

- Cultural Resources Survey, to assess the potential for impact on archaeological or historical resources on or near the proposed site; archaeological investigations included both a preliminary reconnaissance and an intensive survey on the site.

- Socioeconomics Survey, to consider regional demographics, employment and community services in order to evaluate the potential impacts of the proposed plant.

- Air Quality Studies designed to meet the Prevention of Significant Deterioration requirements under the Clean Air Act Amendments of 1977 (this was one of the first PSD permit submittals to EPA Region IV after the passage of the CAAA of 1977); the studies were also used to design the control systems and discharge points so as to minimize odor impact resulting from TRS emissions from the new plant.

- Water Pollution Control Studies, including analyses to define critical stream conditions and to determine assimilative capacity and wastewater treatability studies.

In addition to providing the data base to prepare the Environmental Engineering Report, these studies were also extremely valuable in determining the technical and economic feasibility of locating this new plant on the Flint River. In order for Buckeye Management to make a final decision to build this new plant, pollution abatement systems which would meet certain specific objectives were required.

Buckeye recognized the need to take organized environmental organizations into confidence early in the site selection process. Information sharing with the general public, community leaders, and responsible environmentalists, as well as with the agencies involved, was an integral part of the successful site selection and permitting process. The result? Not one letter of protest was written in response to the dozen or so newspaper announcements of the three permit applications. All the necessary permits were approved by January 1978, and the stage was set for management to make the final decision to build the proposed plant.

INTRODUCTION

The Buckeye Cellulose Corporation, a wholly owned subsidiary of the Procter & Gamble Company, selected a site near Oglethorpe, Georgia for location of a new bleached Kraft pulp plant. Following preliminary approval from Georgia Environmental Protection Division (EPD), Buckeye began detailed environmental studies. Environmental Research & Technology, Inc. (ERT) assisted Buckeye with this program. The approach used to obtaining all environmental permits by January 1, 1978 had two essential elements: (1) extensive open communications with concerned government agencies beginning in 1975, and subsequently with environmentalist interest groups continuing throughout the project, and (2) the completion of a technical Environmental Engineering Report on a wide range of environmental factors including cultural resources, socioeconomic, ecology, air and water quality. This paper, using the Flint River Project as an example, discusses this successful approach to pulp and paper plant site development.

BASIC ENVIRONMENTAL CONCEPTS FOR SITE DEVELOPMENT AND REQUIRED PERMITS

Three basic concepts were followed throughout the project with the overall objective of developing the chosen site and procuring the environmental permits with a minimum of delay and adverse publicity: open communications with agencies, technical studies on a range of areas, and dialogue with the public.

At all stages of the project the Georgia EPD was kept up to date and informed of progress and preliminary results. This allowed timely EPD input into the study scope to avoid delay and later revisions after submission of the application.

Environmental considerations in industrial site selection no longer encompass just the classical fields of air and water pollution control. Environmentalists and citizens' groups have understandably and appropriately focused attention on such other broader areas as effects of site development on wildlife, archaeological resources, cultural and historical resources, etc. ERT's technical assessments of these issues focused on specific areas of highest environmental sensitivity. The composite Environmental Engineering Report on these wide ranging environmental factors included the better features of an Environmental Impact Statement without the red tape, verbosity, and delay of a formal Environmental Impact Statement. Georgia does not require a formal Environmental Impact Statement.

Finally, no project with a potential environmental impact such as a Kraft operation can proceed in the face of opposition from well organized environmental groups and other citizen civic groups. There is now a history in the USA of proposed projects which have been aborted because of protests from vocal and well organized environmental and citizen groups. Buckeye recognized the need to take these groups into confidence early in the site selection and site development process. Much time and effort, all worthwhile, was spent in establishing a dialogue with civic and political leaders and environmentalists.

Three major environmental permits were required for the new Kraft pulp and paper plant; an air pollution control permit, a National Pollutant Discharge Elimination System (NPDES) permit and a Section 10 Corps of Engineers Permit. With a policy of open communications with agency personnel and environmentalist groups, the work and studies supporting the permit applications were completed.

AIR POLLUTION PERMIT

The State of Georgia was authorized to handle air pollution control permits by Region IV EPA. Therefore, the permit application accompanied by ERT's air quality studies was submitted directly to the Georgia Environmental Protection Division (EPD) for an Air Pollution Control Permit. Merely as general supporting information, the ecological reconnaissance studies, the archaeological and cultural studies, and the demographic and economic studies were submitted to the state.

WASTEWATER DISCHARGE PERMIT

The second major permit required for the proposed Flint River plant was an NPDES (National Pollutant Discharge Elimination System) permit. Although the NPDES program is a national system, states may apply for and

receive authorization to administer these permits. As Georgia has such authorization, the Company's application was made to the state. The major studies supporting this application were the ecological reconnaissance survey, the assimilative capacity study, and the wastewater treatability study.

CORPS OF ENGINEERS SECTION 10 PERMIT

The third major permit required prior to making a final decision to build the proposed plant was a Corps of Engineers Section 10 Permit. This permit is required to place a physical structure in navigable waters. Both the raw wastes intake and treated wastewater outfall come under Section 10 jurisdiction. The ecological reconnaissance survey was the key report supporting the Corps permit application. Other studies which served in minor support of this permit included the assimilative capacity study, the wastewater treatability study, the cultural resources survey, and the demographic survey. As part of processing this permit, the Corps also surveyed the site and designated all wetland areas so that we would be able to determine if our activities would require a 404 permit. We chose to avoid the wetlands completely and hence eliminated any need to file for any 404 permits.

GENERAL APPROACH

As a first step, after the site had been selected in January 1977, an outline and schedule for the Environmental Engineering Report preparation and permitting process was developed. Both the outline and schedule were presented to EPD for comment and approval. The final Environmental Engineering Report Index is shown in Figure 1. The schedule developed with EPD encompassed only one year's time (Figure 2). This schedule would have been considerably longer in a state lacking EPD's excellent regulatory program and without NPDES permit issuing authority.

Once the contents of the Environmental Engineering Report were defined with EPD, the studies required to develop an adequate data base for the report was determined and consultants were contracted to complete the analyses (Figure 3). In addition to providing the data base to prepare the Environmental Engineering Report, these studies were also extremely valuable in determining the technical and economic feasibility of locating this new plant on the Flint River. In order for management to make a final decision to build this new plant, pollution abatement systems which could meet the following objectives were required:

1) Avoid any adverse effects on the environment
2) Be a good neighbor and a oid being a nuisance
3) Obey all applicable federal, state, and local laws, rules, and regulations
4) Be socially responsive to the needs of society, and
5) Be economical and reliable to operate.

I. Introduction
II. Site Usage and Resources
III. Description of Facility
IV. Air Pollution Control
V. Water Pollution Control
VI. Water Supply and Use
VII. Construction Impact on Erosion and Sedimentation
VIII. Solid Waste

Figure 1 Index of the Environmental Engineering Report for the Flint River Plant

January, 1977	— Single site chosen
February & March, 1977	— Develop schedule with EPD and select consultants
April, 1977	— Let contracts and begin studies
July, 1977	— Consultant's reports due and write Environmental Engineering Report
August, 1977	— Complete permit applications and final draft of report
September, 1977	— File permit applications and report with EPD
October, 1977	— Public notice of EPD intent to issue permits
November, 1977	— Issue permits
January, 1978	— Company decision to proceed with construction of plant

Figure 2 Schedule of Environmental Permitting for the Flint River Plant

1. Ecological Reconnaissance Survey
2. Cultural Resources Survey
3. Demographic, Employment, Community Intrastructure and Land Use Reconnaissance Survey
4. Air Quality Assessment
5. Waste Assimilative Capacity Study
6. Wastewater Treatability Investigation

Figure 3 Environmental Studies for the Flint River Plant

The estimated cost of preparing the Environmental Engineering Report which summarized the consultants' data and conclusions was nearly $0.5 million and required 20 people-months of engineering effort in-house. The permit applications, the Environmental Engineering Report, and all the consultants' reports were officially filed with the EPD on August 31, 1977.

Information sharing with the general public, thought leaders, and responsible environmentalists was an integral part of the successful site selection process. Acceptance by the state and county citizenry was deemed essential to successfully build and operate in the area. All environmental permit applications were announced publicly in the local press, and granting of permits by state and federal agencies was more predictable based on a favorable reception by the general public.

Several days prior to the public announcement of our interest in the Flint River site, meetings were arranged throughout the state with civic leaders, political leaders, and environmental groups. These groups were presented with information on the nature of the operations, the environmental control equipment and processes to be used, the negligible impact on the environment from the proposed plant, and the Company's enlightened corporate policy to protect the environment. Technical literature describing the extensive environmental control facilities and activities at other Procter & Gamble pulp and paper mill sites in the USA and Canada was given to the environmental organizations.

This approach received an excellent reception. The environmentalists appreciated the effort to completely inform them and to share plans for their review. These people were well informed, articulate, and reasonable. Their questions were searching, penetrating, and appropriate. In addition to the formal meetings with the environmental groups, numerous telephone calls and letters were made to the leaders of these groups just before and after the initial meeting.

The success of this type of open dialogue is exemplified by the discussions with the Georgia BASS (bass, anglers, sportsmen's society) Federation. Initially, this group has been inadvertently overlooked. An evening meeting was scheduled at their convenience. Present at the meeting were about 20 members and officers of the state and local chapters of the Georgia BASS Federation. A very stimulating and interesting 3-1/2 hours were spent with these outdoorsmen, who were genuinely interested in preserving the excellent fishing in the Flint River and Lake Blackshear. The sincerity of these people and the love of the outdoors was apparent throughout the lively meeting. These 3-1/2 hours were truly an example of democracy at the local level in action. These fishermen were very knowledgeable and well grounded in the basics of aquatic biology. Discussion included plans for having unbiased scientists from a prestigious consulting firm run aquatic surveys of the river before and after start-up of the proposed plant to determine if the highly treated wastes were having any adverse impact on the aquatic environment. (ERT began a pre-operational aquatic survey of the Flint River in the fall of 1978.) Scientific reports on similar river surveys at other Company installations were passed out showing that the highly treated wastes, similar in nature to those which would be discharged from the proposed Flint River plant, had no measurable impact on the ecology of the receiving stream.

After the presentation and a lively question and answer period, the fishermen caucused privately. After the caucus, the group announced that the organization was in favor of the project. In fact, several key individuals were very open with their support.

Nearly 4-1/2 months after these preliminary meetings with the environmentalists and civic leaders and prior to public notice of EPD's intent to issue environmental permits, the environmental groups were provided with the entire Environmental Engineering Report and the technical reports. A letter of transmittal contained a brief summary of the Report. Telephone calls were made to determine if there were any unanswered questions or concerns. The reaction was unanimously positive. The conservationists expressed surprise that an industry would take so much time and effort to communicate and inform them. Several said they were overwhelmed. All reacted favorably. There were no adverse comments to the proposed plan.

What were the results of these efforts? Not one letter of protest was written in response to the dozen or so newspaper announcements of the three permit applications. This is probably unprecedented in the recent history of siting major plants of this type which have a potential negative impact on the environment. The moral of the story is simple: An industry which has nothing to hide can share its knowledge with the citizenry not only safely but also profitably. All the necessary permits were approved by January 1978 and the stage was set for management to make the final decision to build the proposed plant.

The technical reports which provided the assessment of probable impacts were key elements in providing the data base for the public discussions. The scope of the studies was developed from input of EPD requirements and Buckeye experience and expertise. Each study focused on the areas of greatest environmental sensitivity which in some cases went beyond the EPD requirements. These studies are summarized in the following sections.

ECOLOGICAL RECONNAISSANCE

An ecological reconnaissance of the 567 hectare (1,400 acres) site in south Georgia was completed by ERT for Buckeye. Federal regulatory review over ecological factors comes from Sections 402 (NPDES) and 404 (Dredge and Fill Considerations) of the Clean Water Act and from the Rivers and Harbors Act. These laws delegate to the Corps of Engineers permit authority for dredge and fill activities, structures in navigable water and wetlands contiguous or adjacent to navigable waters. The Rare and Endangered Species Act provides the Department of Interior advisory review over the Corps permit process findings with respect to rare and endangered species. At the state level the Wildlife Preservation Act and the Endangered Wildlife Act of 1973 make it a misdemeanor to tamper with protected plants and animals in the State of Georgia.

Available literature - both site specific and for southern Georgia - was reviewed and contact made with appropriate state aquatic and terrestrial specialists, to properly interpret the requirements of the regulations in preparation for the on-site work.

An historical background of the Flint River and the site environs was developed from these data and contacts, to aid in the ecological survey.[1]

The on-site reconnaissance was conducted over a three-day period in May 1977, along a series of transects outlined using available aerial photographs and U.S.G.S. maps. Transects were walked and habitat types characterized according to the predominant vegetation and topography, i.e., upland hardwood, bottomland hardwood, wetlands. Throughout the survey particular attention was given to the following:

- occurrence of rare and endangered species and associated habitat - five plant and four animal species, in these classifications, has the potential for on-site occurrence (Table 1).
- environmentally sensitive areas, i.e., wetlands.

TABLE 1

RARE, ENDANGERED, AND THREATENED SPECIES FOR MACON COUNTY GEORGIA[3,4]

Plants

Endangered		
Sweet pitcher plant	-	Sarracenia rubra
Threatened		
Witch alder	-	Fothergilla gardenii
Quillwort	-	Isoetes melanospora
		I. virginica
Needle palm	-	Rhapidophyllum hystrix

Animals

Endangered		
American alligator	-	Alligator mississippiensis
Southern bald eagle	-	Haliacetus leucocephalus
Red cockaded-woodpecker	-	Picoides* borealis
Eastern indigo snake	-	Drymarchon corias couperi

*The red cockaded woodpecker has recently been changed from genus, Dondrocopus to Picoides.

The proposed site consisted of an upland hardwood community with evidence of extensive logging, leaving a considerable portion of the site clear cut and in a secondary succession state (Figure 4). No evidence of rare and endangered species was found on-site; however, there is potential for occurrence in the marsh areas along the river. Major areas of investigation centered around the wetlands and river bottom swamp, along the Flint River (Figure 4).

The aquatic areas (Flint River, Goose Creek, and Walker Branch; Figure 4) were also observed and walked. Most of the information on the river, however, was developed through available literature and agency interaction.[1] The Flint River was an area of concern since it would receive the effluent discharge from the proposed plant and be impacted to some degree during intake/discharge construction.

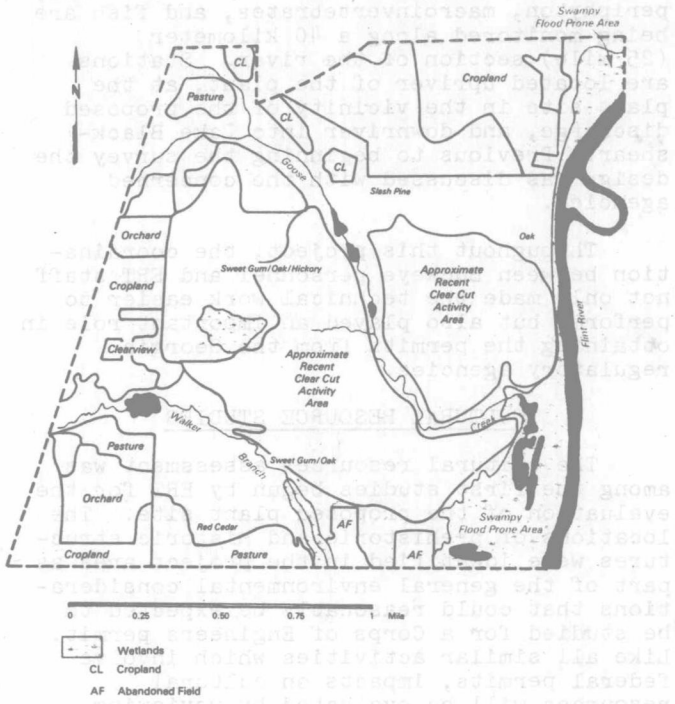

Figure 4 Vegetative Characteristics of Flint River Plant Site

ERT's recommendations were to (1) leave the wetland/swamp areas undisturbed, (2) control on-site runoff according to Georgia regulations, and (3) conduct a site specific biological survey in the river. These recommendations were similar to the views held by Buckeye corporate personnel involved in the project.

Following completion of the ecological reconnaissance, ERT was requested by Buckeye to assist in follow-up work with the agencies, involving clarification of the on-site wetlands areas and the potential impact to specific species of fish in the river. An ERT biologist, Michael Molley, conducted a tour of the wetland areas for representatives of the Mobile District Corps of Engineers. Subsequent to this, an official determination on the extent of the Corps jurisdiction was made; it was determined that part of the site should be considered as wetlands under the Corps jurisdiction and part of the site not wetlands.

ERT was also asked to discuss the potential for occurrence and impact on two fish species, proposed for endangered species classification, with the U.S. Fish and Wildlife Service. In response to this, ERT prepared a comprehensive literature review concerning the Flint River fish populations[2] and discussed the findings with Fish and Wildlife representatives.

ERT is presently conducting a pre-operational survey of the aquatic communities within the Flint River subsequent to permit approval. The survey is designed to monitor the aquatic environment before plant start-up and to establish a baseline to which future surveys can be

compared. Baseline conditions for plankton, periphyton, macroinvertebrates, and fish are being monitored along a 40 kilometer (25 mile) section of the river. Stations are located upriver of the plant, at the plant site in the vicinity of the proposed discharge, and downriver into Lake Blackshear. Previous to beginning the survey the design was discussed with the concerned agencies.

Throughout this project, the coordination between Buckeye personnel and ERT staff not only made the technical work easier to perform, but also played an important role in obtaining the permits from the Georgia regulatory agencies.

CULTURAL RESOURCE STUDIES

The cultural resources assessment was among the first studies begun by ERT for the evaluation of the proposed plant site. The locations of prehistoric and historic structures were identified in the project area as part of the general environmental considerations that could reasonably be expected to be studied for a Corps of Engineers permit. Like all similar activities which involve federal permits, impacts on cultural resources will be evaluated by reviewing agencies to ensure that no adverse effects will occur. This concern is also shared by state representatives, specifically the State Historic Preservation Officer. Each state has the mandated federal responsibility to review cultural resource assessments conducted in their jurisdiction and assist in implementing preservation programs.

While there is always the involvement of project, federal, and state personnel, there is an equally important aspect of local community concern and participation in regard to cultural resources. Local residents can be excellent sources of information on a site and are, therefore, one of the documentary resources used in cultural resource studies.

IDENTIFICATION AND EVALUATION

For the Flint River plant site there were several local residents whose knowledge of the immediate area went back nearly 70 years. One person was able to describe the area as a large farm existing prior to World War I and could describe what occurred in later decades. This type of investigation combined with local research in county records and libraries produced an historical profile that enabled the evaluation of the older, potentially historic structures on the site.

An effort was made to identify possible prehistoric sites on the property. Each different environment represented on the site was investigated by an on-the-ground survey team consisting of the ERT archaeologist, Dr. Jeffrey C. Howry, and an archaeologist from the University of Georgia. This is an important example of the kind of collaboration often necessary for environmental studies. The environmental consultant understands the total scope of the project and the kind of landscape alteration that could potentially destroy prehistoric sites. At the same time, local experts can assist in identifying site-specific qualities of a selected location with a larger region.

The case for prehistoric occupation at the Flint River plant site proved most interesting. Evidence of native American occupation dates back several thousand years. Indications consist of scattered debris from materials used by the area's early occupants as part of their daily activities.

Figure 5 illustrates a sample of these artifacts. Represented is both the traditional technology, evidenced by the flint projectile points, scrapper and ceramic sherd, and the use of European trade goods indicated by the hand-blown glass bottle fragments, the handle and rim from an iron vessel and a turpentine pot fragment. This

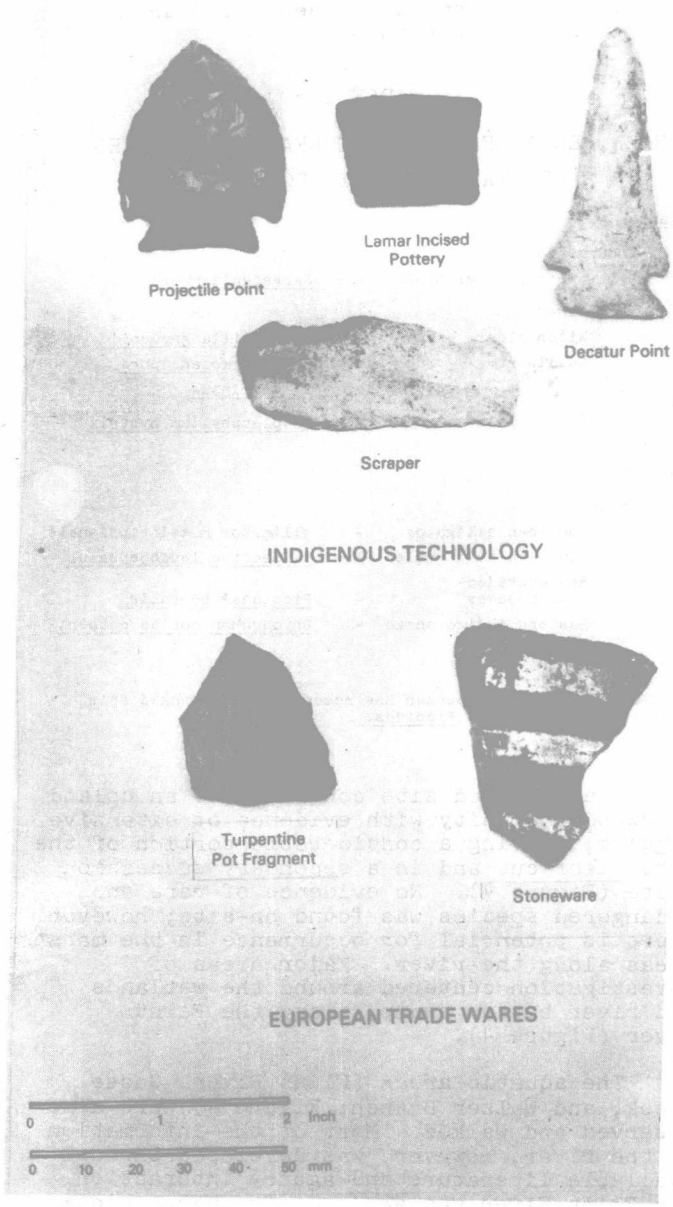

Figure 5 Sample of Artifacts from the Flint River Plant Site

last item provides some indication of the early European settler's economy and possibly that of the Creek Indians who occupied the central Flint River basin. The earthenware vessels produced for collecting pine pitch (the raw material for turpentine) has a distinctive ribbed surface whose decoration is evident in the fiture. One possible use was for the collection of pitch which was traded with the Europeans for manufactured goods. Alternately, the vessel could have been used as an ordinary cooking pot, since it was as durable as native vessels and probably the least expensive of all European trade wares. This is just one example of the kind of clues provided by cultural resource surveys which enable the interpretation of prehistoric and historic sites.

The survey for the mill site property disclosed six locations occupied by prehistoric inhabitants. The most recent indigenous people were probably related to the Creek Indian Confederacy.

SURVEY RESULTS AND CONSTRUCTION PLANNING

In discussions with the Georgia State Archaeologist and State Historic Preservation Officer, it was decided that measures should be taken to recover the potential scientific data contained in these sites. A mitigation program was designed by ERT and carried out by ERT and University of Georgia archaeologists.

The program had the following activities:

- Systematic collection of surface artifacts prior to any terrain modification in areas where sites were identified.
- Selective clearing and excavation of identified site locations by plow, backhoe, and grading equipment. These activites were supervised by archaeologists, who collected and recorded the location of all artifacts or subsurface features associated with the sites.
- Monitoring of plant site clearing and excavation during the initial construction stage so that any artifacts or other significant remains could be recovered.

All these activities took place in coordination with the contractors performing site preparation. In one case where a site was outside the area of mill construction, it was left undisturbed, thereby preserving it for future archaeological research opportunities.

The results of the survey and mitigation program indicate that at selected locations, often in close relation to water sources, indigenous inhabitants repeatedly camped and probably hunted in the area encompassed by the new plant. This happened as recently as 150 years ago, but had occurred many times during the previous two millenia. However, there was no evidence found that the area was ever used as a permanent habitat.

CONCLUSIONS AND RECOMMENDATIONS

This environmental study indicates the ability to include cultural resource considerations as part of overall new site selection and development. The initial reconnaissance work took place two years prior to actual ground breaking. Subsequent to this initial identification of archaeological sites, further detailed studies were conducted to determine the extent of prehistoric occupation. The impacts on the cultural resources were evaluated and measures were taken to minimize the mill construction impacts. These plans were carried out prior to and during construction, thereby assuring that the valued resource was either preserved or recovered.

In total, the cultural resources activities covered a period of nearly 18 months. Through such long-term planning and implementation the plant development could proceed in a timely manner.

SOCIO-ECONOMIC SURVEY

ERT undertook a survey of regional demographics, employment, and community services in order to evaluate the potential impacts of the proposed plant. The development of a major production facility in a relatively stable, rural community necessitates consideration of both short- and long-term effects. For example, while there may be long-term economic benefits from increased employment and the expenditure of salary monies in the local economy, short-term demands on temporary housing during construction may create labor or management difficulties outside the scope of the customary planning process. Identification of local level issues in an early stage of project planning can clearly signal those issues which must be considered as part of the environmental context.

Nearly all the largest towns in Macon and adjacent counties have an annual population increase of less than 1%. The notable exception is Oglethorpe, the town nearest the mill, whose recent population has increased approximately 3% per year. Projections for the region predict population decline in the coming decades, probably as a result in the continued decrease in the farm population and migration to urban areas.

Employment profiles for Macon County indicate that approximately 27% of the present work force is involved in manufacturing related activities. However, the county unemployment rate is relatively high at 8.4%. It was therefore concluded that much of the long-term employment needs could be provided by local labor. The net result would be a significant improvement of employment opportunities for a rural labor market.

Short-term demands during mill construction were found to exceed local labor sources both in skills and total manpower. Demand for temporary housing units would be high with the influx of new laborers. A survey of housing availability indicated that there were mobile home lots, a new housing subdivision, and a limited number

of apartments. It was therefore concluded that there would be a considerable short-term effect on housing. Although this need could not be alleviated immediately, it did assist in overall planning since project personnel were able to alert contractors regarding housing availability, thereby minimizing potential delays in project construction schedules.

The need for permanent personnel at the mill would result in demand for increased community services by the new residents. Schools, medical facilities, sewage treatment as well as fire and police services were evaluated for the neighboring communities. An adequate school capacity was found that could accommodate new students without expansion of the existing system; sewage capacity and water availability was sufficient; and general community services were adequate to provide for the new work force.

Overall evaluation of impacts on regional development were found favorable to the proposed project. Identifying local level needs and capabilities assured project development personnel that necessary labor resources and associated components could meet the project's needs.

AIR QUALITY STUDIES

OVERVIEW AND REGULATORY REQUIREMENTS

Air quality studies for the new Flint River plant were completed by ERT. Federal regulatory review is derived from the Clean Air Act, as amended in 1977 and involves both source emission limitations and ambient air quality review against National Ambient Air Quality Standards (NAAQS). The State of Georgia has similar source and ambient requirements.

Maximum allowable emissions for various sources at the plant are based on either "Rules and Regulations for Air Quality Control" published by the Georgia Department of Natural Resources (DNR), or the "Proposed Standards of Performance for New Stationary Sources - Kraft Pulp Mills" published in the Federal Register, 41 Federal Register 42012-42028. Where both regulations could apply, the more stringent one was applied. The actual emissions from the new plant will be less than these maximum allowable limits since all air pollution control equipment will be designed with an adequate margin of safety to ensure continued compliance with regulations.

The Clean Air Act Amendments of 1977 require a permit to construct for major new sources such as the proposed Flint River plant. The air quality studies for this plan began prior to the passage of these Amendments and were completed prior to the formal interpretation of the Amendments. The Georgia DNR has been granted the authority to review and permit such sources by the U.S. EPA, based on submittal of the proper information. In order to efficiently coordinate the preparation of the permit application, a preliminary meeting was held with the Georgia DNR. At this time the requirements of the agency for preparing the permit application were reviewed and discussed. Agency requirements were to model for the predicted impact of sulfur dioxide (SO_2) and particulate matter (PM) and to briefly discuss the expected impact of these predicted ambient concentrations on the environment.

As a result, an air quality impact study was performed to compare maximum ambient particulate and SO_2 levels, which would result from the new plant's emissions, with four criteria:

1) Federal National Ambient Air Quality Standards (NAAQS);
2) Georgia Ambient Air Quality Standards (GAAQS);
3) Federal Increments for the Prevention of Significant Deterioration (PSD) (small fractions of the Federal Ambient Air Quality Standards enacted to prevent air quality deterioration in clean areas; "Class II" increments applied in this area); and
4) Sulfur dioxide levels which cause damage to pecan trees.

The latter comparison was not a requirement of the Georgia DNR, but was done because of Buckeye's concern for the impact the plant might have on a sensitive indigenous crop.

DETERMINATION OF PLANT EMISSIONS

In order to determine the air quality impact of the pollutants to be emitted by the plant, it was first necessary to define the pollutants amounts that would be emitted.

Atmospheric emissions from the plant include both gaseous and particulate materials. The major gaseous pollutants are SO_2 and a group of reduced sulfur compounds, referred to as TRS (Total Reduced Sulfur). The specific compounds normally included in this group known as TRS are hydrogen sulfide, methyl mercaptan, dimethyl sulfide, and dimethyl disulfide. The particulate matter emissions are primarily sodium sulfate and sodium carbonate, calcium oxide, and calcium sulfate, and residual ash from the combustion of both fossil-fuels and wood wastes.

The major sources of particulate matter emissions in the Kraft process are the recovery furnace, the lime kiln, the bark boiler, and the smelt tank. The major sources of emissions of sulfur dioxide are the recovery furnace, the bark boiler (resulting from the combustion of fuel oil), and the lime kiln. The major sources for the emission of TRS from the Kraft process are the recovery furnace, the lime kiln, the digester, the brownstock washers, the evaporator, the condensate stripper, and the smelt tank.