PB84-118256

Final Environmental Impact Statement Malakoff Electric Generating Station and Trinity Lignite Mine, Henderson and Anderson Counties, Texas

(U.S.) Environmental Protection Agency
Dallas, TX

Sep 83

U.S. Department of Commerce
National Technical Information Service
NTIS

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15. SUPPLEMENTARY NOTES	

16. ABSTRACT

EPA IS PROPOSING ISSUANCE OF NPDES PERMITS TO HOUSTON LIGHTING & POWER COMPANY FOR THE MALAKOFF ELECTRIC GENERATING STATION AND THE NORTH AMERICAN COAL CORPORATION FOR THE TRINITY LIGNITE MINE. WASTEWATER WILL BE DISCHARGED TO VARIOUS TRIBUTARIES OF THE TRINITY RIVER. THE PLANT WATER FOR THE 2-600 MEGAWATT UNITS WILL BE OBTAINED FROM THE UPPER NECHES MUNICIPAL RIVER WATER AUTHORITY AND WILL BE TRANSPORTED VIA A 45 MILE PIPELINE TO A STORAGE POND AT THE PLANT SITE. BOTTOM ASH, FLY ASH, AND OTHER SOILD WASTE WILL BE DISPOSED OF ON-SITE. NACCO PROPOSES TO MINE APPROXIMATELY 600 ACRES PER YEAR FOR A PERIOD OF 35 YEARS.

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United States
Environmental Protection
Agency

Region 6
1201 Elm Street
Dallas TX 75270

Water

EPA 906/9-83-011
SEPTEMBER 1983

PB84-118256

EPA

Environmental Impact Statement

Final

Malakoff Electric Generating Station and Trinity Mine, Henderson and Anderson Counties, Texas

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SPRINGFIELD, VA. 22161

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
1201 ELM STREET
DALLAS, TEXAS 75270

September 9, 1983

TO ALL INTERESTED PARTIES:

Enclosed for your review and comment is the Final EIS (FEIS) on EPA's New Source National Pollutant Discharge Elimination System (NPDES) permits for the Trinity Lignite Mine and the Malakoff Electric Generating Station.

Because changes from the Draft EIS are minor, this Final EIS incorporates the Draft EIS by reference and includes the following: (1) a revised summary which presents the major conclusions of the Draft and Final EIS; (2) a listing of and responses to comments on the Draft EIS; (3) revisions to the Draft EIS; and (4) a discussion of EPA's preferred action.

Comments on this FEIS should be sent within 30 days of the date of this letter to Mr. Clinton B. Spotts, Regional EIS Coordinator, EPA, Region 6, 1201 Elm Street, Dallas, Texas 75270. A "Record of Decision," documenting the completion of the environmental review and EPA's decision on the NPDES permits will be sent to agencies and interested parties who either comment on the FEIS or request a copy.

Sincerely yours,

Dick Whittington

Dick Whittington, P.E.
Regional Administrator

Enclosure

1-a

FINAL ENVIRONMENTAL IMPACT STATEMENT
MALAKOFF ELECTRIC GENERATING STATION
TRINITY LIGNITE MINE
HENDERSON AND ANDERSON COUNTIES, TEXAS

RESPONSIBLE AGENCY: U.S. Environmental Protection Agency, Region 6

ACTION BEING CONSIDERED: Issuance of new source National Pollutant Discharge Elimination System (NPDES) permits to The North American Coal Corporation for construction and operation of a surface lignite mine and Houston Lighting & Power Company for construction and operation of an electric generating station.

COOPERATING AGENCIES: USDA Soil Conservation Service; USDOI Fish & Wildlife Service; US Army Corps of Engineers; Texas Historical Commission; USDOI Office of Surface Mining; Railroad Commission of Texas; Texas Air Control Board; Texas State Department of Highways and Public Transportation; Texas Parks and Wildlife Department.

CONTACT FOR FURTHER INFORMATION: Clinton B. Spotts, Regional EIS Coordinator, U.S. Environmental Protection Agency, Region 6 (ES-F), 1201 Elm Street, Suite 2800, Dallas, TX 75270; (214) 767-2716 or FTS 729-2716

ABSTRACT: This Final EIS has been prepared based on comments received during the review period on the Draft Environmental Impact Statement and additional information supplied by the applicants. HL&P will delay the beginning of construction of the generating station and will begin operation of the first unit in 1990 and the second unit in 1991. The extended construction schedule will reduce the socioeconomic impacts. NACCO has provided more detailed information on their plans for wildlife habitat management, wetlands including ripiarian areas, and mining in prime farmland areas. Additional analysis since the Draft EIS indicates that the City of Malakoff could experience an inability to meet its peak daily water demand during 1989 and 1990 due to groundwater pumping by the power plant. The City will also experience additional pumping costs throughout the life of the project. Mining activity has the potential of impacting shallow water wells outside of the mine boundary. This FEIS contains EPA's preferred alternative which is to issue an NPDES permit to NACCO with conditions to mitigate impacts to cultural resources and to issue an NPDES permit to HL&P.

DATE COMMENTS DUE: 07 NOV 1983

RESPONSIBLE OFFICIAL:

Dick Whittington, P.E.
Regional Administrator

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PREFACE

On February 16, 1983, the US Environmental Protection Agency (EPA) issued a draft Environmental Impact Statement (EPA 906/9-83-002) concerning issuance of a new source National Pollutant Discharge Elimination System (NPDES) permit to Houston Lighting & Power Company (HL&P) for discharge of wastewater from the Malakoff Electric Generating Station (Malakoff EGS) into Walnut Creek, a tributary of the Trinity River and to The North American Coal Corporation (NACCO) for discharge of wastewater from the Trinity Mine into various tributaries of the Trinity River. Since that time, EPA has received and reviewed public comments on the Draft EIS and has determined its preferred course of action with regard to NPDES permit issuance to HL&P and NACCO.

This document is the Final Environmental Impact Statement (EIS). Since responses to comments received on the Draft EIS did not require significant changes in data or analyses, the Draft EIS was not reprinted in full. This Final EIS incorporates the Draft EIS by reference and identifies all written and oral comments received during public review, the responses to those comments, and additions and corrections to the Draft EIS text resulting from public review. The Draft EIS and this Final EIS together, constitute the complete Final Environmental Impact Statement.

The Final EIS contains four parts: (Part I) a summary which presents the major conclusions of the Draft and Final EIS; (Part II) a listing of and responses to comments on the Draft EIS; (Part III) revisions to the Draft EIS; and, (Part IV) a discussion of EPA's preferred action. A copy of the Draft EIS is available for review in the EPA Regional Office or one can be obtained at cost from the National Technical Information Service, US Department of Commerce, Springfield, Virginia 22161.

PART I. SUMMARY OF DRAFT AND FINAL EIS

A. BACKGROUND

The National Environmental Policy Act of 1969 (NEPA) requires that all federal agencies prepare environmental impact statements on major actions significantly affecting the quality of the human environment. Furthermore, Section 511(c)(1) of the Federal Water Pollution Act (FWPCA or P.L. 92-500) as amended by the Clean Water Act of 1977 (P.L. 95-217) mandates that the requirements of NEPA apply to issuing a permit under Section 402 of FWPCA for discharging any pollutant by a "New Source" as defined in Section 306 of FWPCA. The Environmental Protection Agency (EPA) determined that the issuance of new source NPDES permits to Houston Lighting & Power Company (HL&P) for the proposed Malakoff Electric Generating Station (Malakoff EGS) and The North American Coal Corporation (NACCO) for the proposed Trinity Mine represented major federal actions significantly affecting the quality of the human environment. Therefore, this Final Environmental Impact Statement (FEIS) is prepared to assess the impacts of these EPA permit actions.

B. PROJECT ALTERNATIVES

HL&P considered several alternatives that would not require creation of new generating capacity. These included: (1) energy conservation; (2) purchasing power from neighboring utilities; (3) reactivation or upgrading of older units; and (4) base-load operation of existing peaking facilities. None of these options alleviated the need for new generation.

HL&P then evaluated alternative energy sources which included: (1) geothermal; (2) solar; (3) wind; (4) coal and petroleum gasification; (5) natural gas; (6) western coal; (7) nuclear; (8) biomass; and (9) lignite. Based on a thorough evaluation of alternative fuels, HL&P selected lignite.

Next, HL&P evaluated several lignite reserves in the State of Texas. This evaluation was primarily an economic comparison which also considered mine plan development and availability of a suitable power plant site. Based on a comparison of all resource areas evaluated, HL&P selected the Trinity Mine as the fuel source for its required new generation.

Once the fuel source was identified, the site selection process was initiated to locate a prime site having high environmental and economic acceptability for a nominal two-unit lignite-fired steam-electric generating station.

A candidate area was selected first. Within the candidate area, five potential sites were located and evaluated. The proposed site of the Malakoff EGS was ranked first in the overall evaluation.

HL&P also considered alternative water sources to supply cooling water needed for the Malakoff EGS. Of the 129 possible sources or combinations of sources identified, all but four were eliminated by basic physical, permitting or economic considerations.

From an economic standpoint, due in part to its proximity, Cedar Creek Reservoir was the prime candidate. However, after careful consideration, use of Cedar Creek Reservoir as the source of cooling water was eliminated as a favorable option, due to the inability of Cedar Creek Reservoir to be a reliable source of water for the Malakoff EGS.

The next alternative considered was water from the Neches River - Lake Palestine. Based upon several engineering and economic evaluations, the Upper Neches River Municipal Water Authority system was selected as an economic and reliable source of water for the Malakoff EGS.

HL&P also considered various design alternatives for the generating station including: (1) cooling system alternatives; (2) biological control system alternatives; (3) plant discharge system alternatives; (4) liquid waste management system alternatives; (5) solid waste management alternatives; (6) sanitary waste system alternatives; (7) air quality control system alternatives; and (8) transmission facility alternatives.

Alternatives considered by NACCO included: (1) mining method alternatives; (2) overburden handling alternatives; (3) resource recovery and transportation alternatives; (4) reclamation alternatives; (5) postmining land use alternatives; and (6) sand and gravel handling alternatives.

C. COMMENTS ON DRAFT EIS

EPA distributed the Draft EIS in February 1983. On 5 April 1983, EPA held a public hearing in Cross Roads, Texas for the purpose of receiving public comments on the Malakoff EGS and Trinity Mine Draft EIS. Two people made statements. Their comments and EPA's responses are contained in Part II of this Final EIS. Concerns expressed included the impact to area roads resulting from increased traffic and overweight trucks.

Written letters have been received from several governmental agencies including the National Oceanic and Atmospheric Administration, US Department of Housing and Urban Development, US Public Health Service, US Department of Agriculture, US Department of the Army, US Department of the Interior, Texas Department of Water Resources, Texas Historical Commission, State Department of Highways and Public Transportation, Texas Air Control Board, Bureau of Economic Geology, General Land Office, Texas Department of Health, Texas Parks and Wildlife Department, and Office of Planning and Intergovernmental Relations. Letters were also received from the Wildlife Management Institute, Sierra Club, two individuals, and the applicants, HL&P and NACCO. All comment letters along with EPA's responses are included in Part II of this Final EIS.

D. EPA'S PREFERRED ALTERNATIVE

The alternatives evaluated by EPA included (1) the issuance of new source NPDES permits to HL&P for the proposed Malakoff EGS, and to NACCO for the proposed Trinity Mine and (2) denial of the NPDES permits. Conditional requirements or provisions may be added to the permit(s), if necessary, to mitigate adverse environmental impacts.

Based on a review of the comments received on the Draft EIS, EPA has determined its preferred action to be issuance of a new source NPDES permit to HL&P for the proposed Malakoff EGS and to NACCO for the proposed Trinity Mine. The NPDES permit for the Trinity Mine will include a condition to mitigate impacts to cultural resources. Most of the adverse effects associated with the project are minor. However, the most notable adverse effects include: increased soil erosion, changes in local stratigraphy and potential loss of prime farmlands; localized lowering of ground-water levels and minor degradation of ground-water quality; increased levels of suspended materials in area streams; increased levels of emissions (i.e., particulates, SO_2 and NO_x) and fugitive dust; a potential for long-term conversion of riparian and forestlands to pasture, and associated loss of wildlife habitat; and increased stress on housing and community services. The most positive effects from the project will be a stimulation in area economy brought about by increased job opportunities and revenues, and the electricity produced which will assist HL&P in its ability to supply an economic and reliable supply of energy to its ratepayers.

EPA's draft NPDES permit for the Trinity Mine is included as Appendix A to this Final EIS. EPA's draft NPDES permit for the Malakoff EGS is included as Appendix B to this Final EIS. A few comments on the preliminary draft permits were received during review of the Draft EIS and as a result, changes have been made to the permits since issuance of the Draft EIS. Shortly after, or concurrent with EPA's filing of this Final EIS with the EPA Office of Federal Activities, the draft NPDES permits for wastewater discharge from the Trinity Mine and Malakoff EGS will go to public notice. EPA's final decision regarding permit issuance will not be made until after expiration of the 30-day review period on the Final EIS and expiration of the 30-day public notice period on the permits. Any additional comments received during these 30-day periods will be considered prior to a final decision being made.

PART II. CONSULTATION AND COORDINATION

This section of the Final EIS contains the verbal and written comments received on the Draft EIS as well as EPA's responses to these comments.

A. COMMENTS ON THE DRAFT EIS

1. Public Hearing

On 5 April 1983, EPA held a public hearing in Cross Roads, Texas for the purpose of receiving public comments on the Malakoff EGS and Trinity Mine Draft EIS and draft NPDES permits. Approximately 52 people attended the meeting including representatives of EPA, their consultant, representatives of HL&P and NACCO, and interested citizens. The panel presenting formal statements and the subject of their presentations were as follows:

INDIVIDUAL	TOPIC OF STATEMENT
Ms. Jan Horn Presiding Officer EPA Region 6	Opening Remarks: Rules of Procedure EPA
Ms. Elaine Pickle EPA Project Monitor EIS Preparation Section EPA Region 6	EIS Process Environmental Impacts

Following the formal statements, comments and questions were solicited from the audience. Of the 52 people in attendance at the public hearing, two people from the audience made statements. Their comments and EPA's responses are contained in Section B.

2. Written Comments

The Draft EIS on the Malakoff EGS and Trinity Mine Project was distributed by EPA in February 1983. The period for receiving written comments on the Draft EIS continued until 18 April 1983. EPA received 21 written letters from several Federal and State agencies, public interest groups, and private citizens. These comment letters and EPA's responses are contained in Section B.

B. RESPONSES TO COMMENTS

1. Public Hearing

Mr. Daniel A. Aylor of the State Department of Highways and Public Transportation expressed concern about the impact to Farm-to-Market roads resulting from the transport of construction materials and equipment which might exceed weight limits, thereby causing damage to existing Farm-to-Market roads requiring increased maintenance. He requested that this potential impact be addressed in the Final EIS.

EPA Response:

EPA discussed this impact in Draft EIS Section 5.20.3.1 (page 5-241 and 5-242), however EPA was unable to quantify impacts.

NACCO and HL&P have indicated that for those activities that will have an impact on roads in the area, they will coordinate with the State Department of Highways and Public Transportation and/or the Henderson County Commissioners Court, depending upon jurisdiction. At that time, the companies or their subcontractors will enter into any necessary agreements and obtain necessary permits.

Mr. Clifford Erwin representing NACCO also made a statement at the Public Hearing.

2. Written Comments

The following list has been prepared to key the reader to the origin of the comments received on the Draft EIS. The comments and EPA's responses are contained on the following pages.

LIST OF COMMENTORS ON THE MALAKOFF EGS AND TRINITY MINE DRAFT EIS

LIST OF COMMENTORS ON THE MALAKOFF EGS AND TRINITY MINE DRAFT EIS
(concluded)

Letter/ Comment No.	Date of Comment	Agency, Organization, or Individual	Page No.
14	14 April 1983	Billy C. Griffin - State Conservationist, Soil Conservation Service, US Department of Agriculture	II-29
15	14 April 1983	Allie J. Majors, P.E. - Chief, Operations Division, Fort Worth District Corps of Engineers, US Department of the Army	II-30
16	15 April 1983	Mike Hightower - Assistant Land Commissoner, General Land Office	II-33
17	18 April 1983	Carl P. Venzke - Director of Environmental Affairs, The North American Coal Corporation	II-34
18	19 April 1983	David M. Cochran, P.E. - Associate Commissioner for Environmental and Consumer Health Protection, Texas Department of Health	II-44
19	20 April 1983	Charles D. Travis - Executive Director, Texas Parks and Wildlife Department	II-47
20	28 April 1983	Bruce Blanchard - Director, Environmental Project Review, US Department of the Interior	II-49
21	9 June 1983	David Nesenholtz - Assistant Director, Office of Planning and Intergovernmental Relations, Office of the Governor, State of Texas	II-52

Nov 6, 1983

Mr. Clinton B. Spotts
Regional EIS Coordinator

Dear Sir:

This is written in relation to the draft EIS for the Malakoff EGS and Trinity Mine.

The document is both comprehensive and impressive.

I have been unable to determine answers to a couple of questions and I'm hoping you can advise me. Exactly how many families will be displaced from the project area during the life of the project? How many active or working farms will be affected by this project? Do you have an appropriation or estimate as to the number of livestock in the area of the project? Will the EPA monitor NPDES throughout the life of this project. Do you have an estimate as to

I-5

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Responses to Comments from William A. Allen

1. According to information obtained from HL&P, 6 families will be displaced from the property purchased for the Malakoff EGS site. This action is considered a permanent situation. According to information obtained from NACCO, approximately 500 individuals comprising 100 to 150 family units will be displaced during the life of the mine. The mine related displacements will occur on an intermittent basis over the life of the project (35 years). The mine related displacements may or may not be permanent. After mining in a given area occurs, reclamation is completed and the tract is released from bond, the owners may choose to return. This decision will be based on personal preference and cannot be predicted at this time.

2. Because no standard definition of "active or working farms" is available, the following estimates, based on information provided by NACCO, are presented. If the term "active or working farm" is defined as an area developed for agricultural use which provides total financial support to a family, it is estimated that approximately 25 such farms exist within the project area. It is further estimated that approximately 200 farming/ranching operations occur within the project area that meet the statistical definition of a "farm," as defined by the US Department of Commerce, Bureau of the Census, "as any place from which $1,000 or more of agricultural products were sold or normally would have been sold during the census year."

3. Livestock production in the project area is dominated by beef cattle. Based on survey data made available for Henderson County by the Texas Agricultural Extension Service (1983), it is estimated that in 1982 approximately 14,800 beef cattle occurred within the 55,980 acres of the project area which can be used for grazing purposes (total pastureland plus total forest land). This estimate is based on a county-wide average stocking rate of 1 cow per 3.78 acres.

4. EPA will regularly receive and review effluent discharge reports from both companies to determine if they are in compliance with their NPDES discharge permits. The Texas Department of Water Resources will receive and review discharge reports from both companies to determine if they are in compliance with their State discharge permits. The Railroad Commission of Texas will monitor the operation of the mine to ensure that Performance Standards are met. Additionally, the Prevention of Significant Deterioration (PSD) permit requires HL&P to monitor its stack emissions and report excesses to EPA. Impacts to ground water will be monitored through the Railroad Commission.

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4 the quantity of EPA personnel will be involved in this monitor operation. Do we have any assurances there will always be a budget adequate enough to support the monitor force?

5 It's not clear in my mind whether NACCO intends to mine 5 or 7 days per week. Do you have the answer?

6 Will the EPA publish or distribute any information to the landowners annually, or at any particular intervals during the life of the project?

7 It should be obvious that I am not too familiar with the overall subject nor the area. Are you able to offer an opinion as to the sentiments of those persons that presently live on the 5,000 acres?

8 How long do you anticipate the meeting of [illegible] 5th in [illegible] will last?

Thank you,

[illegible]

5. NACCO presently anticipates that mining activities will be conducted 24 hours per day, 7 days per week.

6. No. EPA's public participation program is most active prior to completion of the Environmental Impact Statement and the issuance of permits. Subsequent to that all information is available by request.

7. EPA does not have enough input from landowners to form a valid opinion about the consensus of the landowners' sentiments.

8. The meeting lasted approximately 30 minutes.

TEXAS DEPARTMENT OF WATER RESOURCES
1700 N. Congress Avenue
Austin, Texas

TEXAS WATER DEVELOPMENT BOARD
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Executive Director

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John D. Stover

March 7, 1983

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MAR 10 1983
OFFICE OF THE GOVERNOR
O.M.B./O.P.I.R.

Mr. Harden Wiedemann, Director
Governor's Office of Planning &
Intergovernmental Relations
Intergovernmental Section
P. O. Box 13561
Austin, Texas 78711

Dear Mr. Wiedemann:

Subject: Review of U. S. Environmental Protection Agency, Region VI Draft Environmental Impact Statement (DEIS) on Malakoff Electric Generating Station and Trinity Mine, Henderson and Anderson Counties, Texas. February 1983 (Report No. EPA 906/9-83-002).

In response to your March 3, 1983 memorandum, members of the Texas Department of Water Resources (TDWR) staff have reviewed the subject DEIS, prepared by the U. S. Environmental Protection Agency (EPA), as required by Section 102(2)(C) of P.L. 91-190, and Sections 306, 402, and 511(c)(1) of P.L. 92-500, amended by P.L. 95-217, in considering the following applications filed with EPA for federal permits authorizing new-source wastewater discharges under the National Pollutant Discharge Elimination System (NPDES) program:

1. APPLICATION NO. TX 0090981, filed by the Houston Lighting & Power Company (HL&P) for a permit to discharge wastewater to the Trinity River via tributaries, from the Malakoff Electric Generating Station (EGS), now under construction, on a 3,400-acre tract located southwest of the City of Malakoff. (NOTE: We understand that HL&P proposes to construct facilities and install the first of two 600-MW lignite-fueled steam electric generating units in March 1988, and the second unit in March 1989. The electricity produced will be transmitted through the ERCOT System to meet projected power needs in the HL&P service area, located approximately 320 miles to the south. The service area comprises approximately 5,000 square miles, covering all or parts of 12 counties, and including the major cities of Houston, Galveston, Pasadena, and Baytown, and approximately 150 other cities, towns, and communities.)

2. APPLICATION NO. TX 0092134, filed by the North American Coal Corporation (NACCO) for a permit to discharge wastewaters into Walnut Creek, thence to Cedar Creek, thence to the Trinity River in Segment No. 0804 for Outfalls 001 through 010; and into Turkey Creek, thence to the Trinity River in Segment No. 0804 of the Trinity River Basin

for Outfalls 011 and 012. (NOTE: We understand that NACCO proposes to mine 21,400 acres of the surface lignite mine area at a rate of approximately 610 acres per year for a period of 35 years to supply approximately 6.5 million tons of lignite fuel to the mine-mouth Malakoff EGS; and to mine an additional 16,700 acres for other lignite fuel users if a market demand arises. In addition, NACCO plans to mine approximately 130 million tons of gravel which either will be marketed, or mixed into reclaimed soils for mine-area reclamation purposes.)

We offer the following staff review comments:

1. Reference is made to Table 3-1 (pages 3-4 and 3-5) and the related narrative in Section 3.2 (page 3-3), regarding the four items shown as requiring submission of applications or notifications to TDWR for permits or certifications of approvals, relative to the following items:

   a. Application for Appropriation of State Water Permit, filed by the Upper Neches River Municipal Water Authority (UNRMWA).

   b. Applications for Wastewater Discharge Permit, filed by HL&P relative to the Malakoff EGS; and by NACCO relative to the Trinity Lignite Mine.

   c. Industrial Solid Waste Notification and Registration, filed by HL&P relative to the Malakoff EGS; and by NACCO relative to the Trinity Mine.

   d. Requests for Approval of Plans for Reclamation Engineer Projects Pursuant to Section 16.236 of the Texas Water Code.

The status of action by TDWR on the above-listed requirements is as follows:

   a. TDWR is reviewing the revised applications filed on December 2, 1981, June 22, 1982, and January 3, 1983, by UNRCAWA to amend its present Water Rights Permit No. 1832, to increase the total amount of State water authorized to be appropriated, diverted, and used by 18,000 acre-feet per year (i.e., from 212,800 acre-feet to 230,800 acre-feet), and to divert this increased amount of water via a proposed 46-mile interbasin make-up water pipeline from the Downstream Diversion Dam below Lake Palestine (Neches River Basin) to a proposed 680-acre-foot-capacity terminal, off-channel reservoir to be constructed approximately 11 miles southwest of Athens, Texas (Trinity River Basin), for industrial uses by HL&P at the Malakoff EGS, in accordance with a May 5, 1987, water supply contract made by UNRCAWA with HL&P.

Responses to Comments from Charles E. Nemir

1. Comment noted.

2

b. On December 13, 1982, TDWR approved and issued to HL&P, State Permit No. 02588, relative to industrial and domestic wastewater discharges from the Malakoff EGS. On February 28, 1983, TDWR approved and issued to NACCO, State Permit No. 02606, relative to the intermittent discharges of wastewaters from lignite surface mining activities and domestic wastewater effluent discharges at the Trinity Mine Project. These two State permits are consistent with the NPDES permits proposed to be issued by EPA to HL&P and NACCO, as indicated in Appendix B of the subject DEIS.

3

c. TDWR has not yet received notifications from HL&P and NACCO regarding the registration of industrial solid wastes to be generated, and the industrial solid wastes handling and disposal practices and sites to be finally adopted after the Malakoff EGS and the Trinity Mine Project become operational. (Reference: Section 4.4.1.2--"Solid Waste Management Systems Alternatives" pages 4-22 to 4-27.) TDWR anticipates that these notifications will be made at least 90 days prior to the start of facility and project operations.

4

d. TDWR will review and evaluate the aspects of the proposed Trinity Mine Project pertaining to the Reclamation Engineer function as set out in Section 16.236 of the Texas Water Code, after the Texas Railroad Commission (TRC) transmits to TDWR for review, NACCO's application for a State Mining Permit. Pursuant to Texas Coal Mining Regulations, applicants for mining permits must include in their applications to the Texas Railroad Commission detailed plans on the above-listed water - related items. TDWR's review of these items will be accomplished pursuant to TRC/TDWR review and coordination agreements.

5

2. TDWR concurs in principle with the subject DEIS, insofar as it pertains to our statutory responsibilities, interests, and activities relative to water resources planning, development, management, and regulation under the Texas Water Code and the Texas Administrative Code. We believe that the DEIS adequately fulfills the requirements of Section 102(2)(C) of P.L. 91-190 and the implementing Federal Regulations 40 CFR Part 1500. We concur in the issuance of the proposed NPDES Permits, presented in Appendix B of the subject DEIS.

Please advise if we can be of further assistance.

Sincerely yours,

Charles E. Nemir
Executive Director

II-9

2. Comment noted.
3. Comment noted.
4. Comment noted.
5. Comment noted.

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MAR 29 1983
6 ES

P. O. Box 712
Ocean Springs, Miss., 39564
March 21, 1983

Mr. Dick Whittington, P. E.
Regional Administrator
United States Environmental Protection Agency
1201 Elm Street
Dallas, Texas, 75270

Dear Mr. Whittington, Re. Malakoff EgG
Trinity Mine

II-10

1 You were kind enough to send me a copy of the draft of your ENVIRONMENTAL IMPACT STATEMENT ON THE ABOVE PROJECTS. I have not found any estimate of the amount of the lignite in the area.

2 If you have readily available any estimate of the thickness of the lignite strata in the area in question and would send it to me ,I would greatly appreciate it.

3 I am interested in land in the John Albright Survey and can not locate it in reference to the map Shown as Figure 4-13 on page 4-93 of your report. If you could give me any help in correlating this land to your map it would be most helpful and appreciated.

Very truly yours,

A. Y. Harper

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6 ES

Responses to Comments from A. Y. Harper

1. Draft EIS Section 4.5.2.1 (page 4-87) states:

> "Total in-place lignite reserves [within the mine project area] are approximately 295,750,000 metric tons (325,000,000 tons). Total lignite recovery using best available technology is presently estimated to be 225,680,000 metric tons (248,000,000 tons)."

2. Reserve estimates are unavailable for specific tracts of land. However, according to information supplied by NACCO, the lignite seams in the area of interest range from approximately one to five feet in thickness.

3. Based on information supplied by NACCO, the John Albright Survey is located approximately 3 miles southeast of Malakoff. With respect to the mining sequence map (EIS Fig. 4-13), the John Albright Survey is located along and on either side of the boundary between the mining blocks designated as A 1997-2001 and A 2002-2006.

II-11

TEXAS HISTORICAL COMMISSION

CURTIS TUNNELL
EXECUTIVE DIRECTOR

P.O. BOX 12276
AUSTIN, TEXAS 78711
(512) 475-3092

March 24, 1983

Mr. Clinton Spotts
Regional EIS Coordinator (6ES-F)
U.S. Environmental Protection Agency
1201 Elm Street
Dallas, Texas 75270

Re: Draft EIS - Malakoff Electric Generating Station & Trinity Mine, Henderson and Anderson Counties, TX

Dear Mr. Spotts:

We have revieved the draft EIS referenced above. We note that some changes to the cultural resources section have been made in accordance with our comments dated September 16, 1982, for the PDEIS. We suggest the following additional information be included in the Final EIS.

1 A complete listing of sites, their time period, and information potential within the project area would be helpful. The following sites should be included in addition to those in the DEIS: HE79, HE80, and HE89; 41AN77, 78, 79, 80, 81; X41AN70; X41HE74, 85, 88, 90, 91 and sites F-1 through F-7.

2 The percentage of the project area surveyed should be changed; the State Historic Preservation Officer's files indicate 30 to 40% of the mine lease area has been surveyed.

3 We suggest the last sentence on page 5-174 be changed to read "During the course of ground disturbing activities, emergency discovery situations involving cultural resources will be coordinated with the State Historic Preservation Officer in a timely manner," or some similar phrasing.

We look forward to continued close coordination on this project pursuant to 36 CFR, Part 800.

Sincerely,

LaVerne Herrington

LaVerne Herrington, Ph.D.
Deputy State Historic Preservation Officer

Lil/cr

RECEIVED
APR 5 1983
6ES

The State Agency for Historic Preservation

Responses to Comments From LaVerne Herrington, Ph.D.

1. Three of the sites listed are discussed in the Draft EIS. However, the site designations in the draft EIS are SMU site designations, not TARL site numbers. As indicated by Dr. Herrington in the "Addendum to Preliminary Case Report for Trinity Mine" (SHPO,1983), Site X41AN17=41AN77; X41AN18 = 41AN78; X41AN55 = 41AN80; therefore, the reader is referred to the site descriptions in the Draft EIS. Section 5.12.1.3 of the EIS has been revised to include the additional sites. Please refer to pages III-15 through III-19 of this Final EIS.

2. Section 5.12.1.3 has been revised to indicate that the State Historic Preservation Officer's files indicate that 30 to 40 percent of the mine lease area has been surveyed. Please refer to page III-4 of this Final EIS.

3. The last sentence on page 5-174 of the Draft EIS has been revised to read as suggested. Please refer to page III-5 of this Final EIS.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Washington D.C. 20235
OFFICE OF THE ADMINISTRATOR

MAR 30 1993

Mr. Clinton B. Spotts
Regional EIS Coordinator
U.S. Environmental Protection Agency
Region 6
1201 Elm Street
Dallas, Texas 75270

II-12

Dear Mr. Spotts:

This is in reference to your Draft Environmental Impact Statement on the proposed issuance of new source National Pollutant Discharge Elimination System permits for wastewater discharges from the Trinity Mine in Henderson and Anderson Counties, Texas and the Malakoff Electric Generating Station in Henderson County, Texas. Enclosed are comments from the National Oceanic and Atmospheric Administration.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving two copies of the final environmental impact statement.

Sincerely,

Joyce Wood

Joyce M. Wood
Chief
Ecology and Conservation Division

Enclosure

RECEIVED
APR 1 1993
6 ES

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Washington, D.C. 20230

TO: PP2 - Joyce M. Wood

FROM: N - K. E. Taggart

SUBJECT: DEIS 8302.11 - Malakoff Electric Generating Station and Trinity Mine, Henderson and Anderson Counties, Texas

The subject statement has been reviewed within the areas of the National Ocean Service's (NOS) responsibility and expertise, and in terms of the impact of the proposed action on NOS activities and projects.

Geodetic control survey monuments may be located in the proposed project area. If there is any planned activity which will disturb or destroy these monuments, NOS requires not less than 90 days' notification in advance of such activity in order to plan for their relocation. NOS recommends that funding for this project includes the cost of any relocation required for NOS monuments. For further information about these monuments, please contact Mr. John Spencer, Director, National Geodetic Information Center (N/CG17) or Mr. Charles Novak, Chief, Network Maintenance Branch (N/CG162), at 6001 Executive Boulevard, Rockville, MD 20852.

II-13

10TH ANNIVERSARY 1970-1980
National Oceanic and Atmospheric Administration
A young agency with a venerable tradition of service to the Nation

Response to Comments from Joyce M. Wood

1. NACCO will contact the National Geodetic Information Center to obtain the survey coordinates of the monuments located within the project area prior to mining. Based on the information received, NACCO will notify NOAA 90 days prior to any disturbance of the monument and arrange for temporary or permanent relocation.

PART III. MODIFICATION AND CORRECTIONS TO THE DRAFT EIS

This part contains revisions made to the Draft EIS based on new, updated, or more complete information, or errors and omissions identified during the public review process. Minor changes are incorporated as errata in Section A. Where significant changes were required, the entire page from the Draft EIS has been reprinted, with the changes highlighted by vertical lines in the margin. Reprinted pages are contained in Section B.

HL&P has modified the commercial operation dates for Units 1 and 2 of the Malakoff EGS from 1988 and 1989, respectively in 1990 and 1991. References to these dates have been amended in Section IIIA. The change in commercial operation dates also affects the construction schedule and the timing and magnitude of impacts on population, economics, housing, community services and facilities, local government finances, transportation, and recreational facilities and aesthetics. These changes are reflected in revised discussions presented in Section IIIB.

EPA has now prepared Draft NPDES Permits for the Trinity Mine and the Malakoff EGS. These draft permits are presented in Appendix A and Appendix B of this Final EIS, respectively.

Since publication of the Draft EIS, additional groundwater analyses are available to better estimate the magnitude of the impact on municipal wells currently in use by the City of Malakoff due to withdrawal of groundwater during construction and operation of the Malakoff EGS. The results of the revised analyses are presented in Section IIIB. Pertinent information is also included as Appendix C to this Final EIS.

Since publication of the Draft EIS, a Preliminary Case Report was prepared by EPA. The SHPO provided additional information in a document entitled, "Addendum to Preliminary Case Report for Trinity Mine." On June 1, 1983, a Memorandum of Agreement was transmitted to EPA by the Advisory Council on Historic Preservation. This information is included as Appendix D to this Final EIS.

Since publication of the Draft EIS, NACCO has provided a soil reconstruction plan, a fish and wildlife habitat plan, and a wetlands habitat plan, including riparian areas, for the Trinity Mine. The documents are included as Appendix E, Appendix F and Appendix G, respectively of this Final EIS. Revised impact analyses based on this new information is included in Section IIIA of this Final EIS.

Since publication of the Draft EIS, the US Fish and Wildlife Service has issued a biological opinion for the Trinity Mine (Appendix I).

A. ERRATA

The following changes to the draft EIS are those considered to be minor, and therefore the affected pages have not been reprinted in full. The changes listed below are hereby incorporated into the Draft EIS. Paragraph 1 will always be the first full paragraph on a page.

1. Page 2-11, line 35: Change title of Table 5-28 to "Assessments of Known Sites Within Trinity Mine Boundaries".

2. Page 3-6, paragraph 6, line 1: Change "1990" to "1991".

3. Page 3-12, paragraph 2, line 3: Change ". . . 1988 and 1989 . . ." to ". . . 1990 and 1991 . . .".

4. Page 4-4, paragraph 1, line 9: Change ". . . 1988 and 1989 . . ." to ". . . 1990 and 1991 . . .".

5. Page 4-9, Section 4.3.9, lines 1-3: Delete entire second sentence, "The Bureau . . . the state" and insert the following:

> "The Bureau of Economic Geology (Kaiser et al., 1980) estimates that a total of 7.8 to 10.1 billion metric tons (8.6 to 11.1 billion tons) of near surface reserves occur within the state."

6. Page 4-48, Section 4.5.1.1, line 10-11: Delete both lines 10 and 11 and replace with the following:

> ". . . an access road, 3.08 km (1.91 mi) in length which will enter the plant . . ."

7. Figure 4-13: Add two years to the dates given which identify the year of mining, to compensate for the projected two-year delay in the commercial operation dates for the proposed generating station.

8. Page 5-5, paragraph 1, line 2: Insert the following sentences after ". . . Fig. 5-1." and before "Also shown . . .".

> "The map symbols for the soil map units shown on Fig. 5-1 for Henderson County are numeric, while those for Anderson County are alphabetic abbreviations. The corresponding soil map unit names are listed in Table 5-1."

9. Page 5-29, paragraph 3, line 3; Change ". . . Derly is prime and Rader is non prime" to ". . . Rader is prime and Derly is non-prime".

10. Page 5-30, line 3: Change "Rader" to "Derly".

11. Page 5-34, paragraph 1: After line 3 and before line 4 insert the following:

> "A number of impulsive events have been recorded on a single-channel smoked paper seismograph installed in 1980 near Rusk, Texas. According to Pennington, et al. (1981), 'many of the events resemble microearthquakes (of M_L = 0.0 to 1.5) rather than explosions, but no definite conclusion can be reached at this time.' "

12. Page 5-34, paragraph 2, line 6: Change "Cathedral Bluff" to "Calvert Bluff". This change should be made consistently throughout the EIS where Cathedral Bluff is mentioned.

13. Page 5-38, Section 5.5.1, paragraph 2, line 1: Change "aquicludes" to "aquitards".

14. Page 5-48, line 10: Add the following sentences after ". . . for livestock watering".

> "It is possible that the radius of influence from mine dewatering on water levels downdip from the project area may extend a significant distance beyond the project boundary. It is recommended that NACCO monitor existing wells downdip from initially mined areas to develop accurate predictions of effects from dewatering by pumping. This monitoring should coincide with the monitoring program required by the RRC."

15. Page 5-117, add the following information after paragraph 3.

> "NACCO has developed a fish and wildlife plan for the Trinity Mine. NACCO has also developed a wetlands habitat plan, including riparian areas, for the Trinity Mine. Implementation of procedures outlined in these documents should mitigate adverse impacts to fish and wildlife and their habitats resulting from mining and mine related activities."

16. Page 5-151, paragraph 3, line 3: Add the following two sentences after ". . . adverse."

> "NACCO has prepared a wetlands habitat plan, including riparian areas, for the Trinity Mine. Implementation of procedures outlined in this plan should mitigate adverse impacts to wetlands caused by mining and mine related activities."

17. Page 5-158, paragraph 1, lines 11 and 12: Delete the last sentence "The hydric . . . the headwaters (USCE, 1982)." Substitute the following sentence in its place.

> "With the exception of that portion of the pipeline to be constructed in the Neches River flood plain, the hydric communities within the proposed right-of-way of the makeup water pipeline were determined by the USCE to all be above the headwaters."

18. Page 5-162, insert the following paragraph between existing paragraphs 1 and 2:

> NACCO has prepared a wetlands habitat plan, including riparian areas, for the Trinity Mine. Implementation of procedures outlined in this plan should mitigate adverse impacts to wetlands caused by mining and mine related activities.

19. Page 5-165, paragraph 3: Delete the discussion presented under "Historic", and replace with the following:

> "Tennessee Colony, in northwestern Anderson County, was settled in 1847. The town of Cayuga, named by one of the early Tennessee Colony settlers, is immediately east of the proposed mine boundary. Athens, in Henderson County, was established in 1850 and soon became established as a pottery and brick manufacturing center. Malakoff was also established in 1850, and became a commercial center for cotton and river commerce. Mining for lignite began in the early 1900s, and the area contains historic mines. Numerous ranches, whose holdings have remained in the same family for over 100 years, are located immediately proximate to the project area.
>
> As noted above an intensive pottery industry flourished in Henderson County in the 1800s. Documentation has been found which traces the industry's beginning to 1857 in Athens, Texas. Athens became a center for the industry housing such companies as the Athens Pottery Company, Miller Pottery, and Holloway Pottery. A branch of the industry moved to Malakoff, where various others began business. Clay was mined from pits within the Athens-Malakoff area; brick making still continues there today (from the files of the State Archeologist, Henderson County).
>
> The combined results of the Tennessee Colony and Trinity River basin surveys identified 87 historic sites which date prior to 1930; some have historical references which indicate occupation as early as 1800. This portion of Texas has been intensively occupied for over 5,000 years; the historic period plays an important part in the land use patterns and settlement and adaptive strategies through time for the area."

20. Page 5-166, Section 5.12.1.3, line 10-3: Delete the sentence, "A review... separate studies", and replace with the following sentences:

"The State Historic Preservation Officer's files indicate that 30 to 40 percent of the mine lease area has been surveyed. In all, four separate studies contribute to the knowledge of cultural resources within the project boundary".

21. Page 5-168, paragraph 4: Delete the entire paragraph and insert the following.

"Within the affected mine area or between this area and the mine lease boundary, some sites have good potential for listing on the NRHP, some sites have good potential to contain important information, and others require evaluation to determine significance (SHPO, 1983). These sites are described below and are listed in Table 5-28."

22. Page 5-174, Section 5.13.3.2, paragraph 2: Delete entire paragraph and substitute the following taken from SHPO (1983).

"Although no sites located within the affected mine area or between this area and the mine lease boundary are listed or determined eligible for listing on the National Register of Historic Places, some sites have good potential to contain important information, and others require further evaluation to determine significance.

No survey has been performed specifically for the lignite prospect; all information concerning the region is gained through previous investigations for other projects conducted several years past. Prior survey methodologies and criterion of evaluation may not be entirely appropriate for the proposed project. In addition, the condition of the sites may have changed since they were recorded. The SHPO recommends that sites which have potential to be eligible, or for which further evaluation is necessary to assess significance, should be relocated and reevaluated through field inspection. Recommendations for additional surveys should be formulated after sites are relocated and additional data are complied as additional survey may be unnecessary for some areas. A study of work performed to date, individual detailed site summaries, and synthesis of information will be valuable to determining future survey strategies, and assessing significance of historic properties.

Sites eligible for listing on the National Register of Historic Places are thought to be present in the proposed project area, but additional evaluations are necessary before requests for determinations of eligibility can be submitted."

23. Page 5-174, Section 5.12.3.2, after paragraph 2 and before paragraph 3: Add the following.

"The Post Oak Cemetery lies within the affected mine area and the Union Cemetery is located adjacent to, but outside the mine area. Because cemeteries are included in the list of areas designated by Act of Congress where mining is prohibited or limited, NACCO will not mine within 100 feet measured horizontally of a cemetery. Therefore, no impact to these cemeteries is anticipated."

24. Page 5-174, Section 5.12.3.2, paragraph 4, line 13: Add "in a timely manner." after "SHPO of Texas".

25. Page 5-248, Table 5-46: Change "Source: U. S. Department of Agriculture, Texas Department of Agriculture, Texas County Statistics 1978-1979" to "Texas Crop and Livestock Reporting Service, Texas County Statistics, 1978, 1979 and 1980". These references have been added to the Bibliography (See page III -7).

26. Page 5-252, Table 5-48: After footnote c add "Source: Texas Crop and Livestock Reporting Service, Texas County Statistics, 1978, 1979 and 1980.

27. Page 5-264, paragraph 1, line 4: Change "(Texas A & M, 1978)" to "(Texas A & M, 1981)".

28. Pages 8-5 and 8-6: Add the following references to the Bibliography:

North American Coal Corporation. 1982d. Land use input to the Trinity Mine EIS. Dallas, Texas.

Pennington, W. D., C. W. Kreitler and E. W. Collins. Potential Microseismicity in East Texas. In "Geology and Geohydrology of the East Texas Basin." Bureau of Economic Geology, Geological Circular 81-7. The University of Texas at Austin, Austin, Texas.

Pepper, G. L. 1980. Hydrogeology of a reclaimed central Texas lignite mine: Unpublished Master of Science Thesis, Department of Geology, Texas A & M University, College Station, Texas.

Rangel, J. E. 1979. The effect of stratigraphy and clay mineralogy on the settlement characteristics of reclaimed surface mined land. MS Thesis Texas A & M University, College Station, Texas.

Rosholt, J.N., B. R. L[illegible], and M. Tatsumoto. 1966. Evolution of the isotopic composition of uranium and thorium in soil profiles: Geological Society America Bulletin, Volume 77, number 9.

SHPO 1983. Addendum to preliminary case report for Trinity Mine. Unpublished Report, Texas Historical Commission, Austin, Texas.

Texas A & M University 1981. Timber use values schedules, Rusk County.

Texas Agricultural Extension Service. Personal communication from Gayle L. Finch, County Extension Agent, Henderson County to Charles Jasper (EH&A).

Texas Crop and Livestock Reporting Service. 1979. 1978 Texas County Statistics

____.1980. 1979 Texas County Statistics.

____.1981. 1980 Texas County Statistics.

University of Texas School of Public Health and Espey, Huston & Assso-ciates, Inc. 1982. Analysis of potential adverse human health effects due to airborne emissions from the Fayette Power Project and the Cummins Creek Mine. Prepared for the lower Colorado River Authority, Austin, Texas.

U. S. Department of Agriculture. 1980. Statewide erosion study. Soil Conservation Service.

B. PAGE REVISIONS OR ADDITIONS

The following pages were reprinted due to the inclusion of complicated or extensive changes. Changes are indicated by a vertical line in the left margin.

TABLE I-1
ENVIRONMENTAL CONSEQUENCES

Factor	Project Alternatives	No Action Alternative
Geology and Topography	Long-term disruption of geologic strata; no long-term adverse impacts to topography. Short-term, adverse impacts to oil and gas production. Potential loss of sand and gravel in portions of the mine. No cumulative effects.	No adverse impacts to geologic structure or topography with the exception of sand and gravel mining in the alluvial area.
Soils	Erosion will increase during construction and mining prior to re-establishment of vegetation. Final impact will be determined by final overburden handling technique selected. With the randomly mixed overburden or the segregated weathered zone as a topsoil substitute, the following impacts are expected: 1) short-term surface crusting; 2) short-term absence of microbial organisms; and 3) short-term absence of organic material. Except for soils in Group B (see Table 5-3) which represent approximately 10 percent of the mine site, data indicate no initial liming requirement for either of the overburden soil substitute alternatives. The potential for the occurrence of highly acidic surface areas, "hot spots," is highest with the randomly mixed alternative. These areas must be treated with lime or buried to a depth of 4 ft. Topsoiling (A horizon) will return the original surface soils over a subsoil of overburden material. This alternative will approximate existing soil surface layer on the mine area. Long-term, adverse impact of loss of prime farmland soil characteristics. Potential loss of 10 percent productivity of all soils.	Minimal erosion from agriculture and impact due to sand and gravel mining operations in alluvial area.
Ground Water	Dewatering will cause short-term, adverse impacts to shallow aquifer but impacts will be largely confined to within project boundary; no significant cumulative effects. Long-term, adverse anticipated reduction in horizontal permeability and transmissivity causing a reduction in lateral flow of ground water through cast overburden material, when compared to aquiferous strata above the lignite which existed prior to mining. Ground-water withdrawals of 200 gpm during construction of the power plant will potentially produce a 24-ft drawdown at the City of Malakoff's water wells. The drawdown projected during construction is anticipated to reduce the maximum potential capacity of the City's three wells by approximately 55 gpm. This reduction, when combined with increased demand for water due to projected population increases, could affect the ability of the City to meet peak-daily demand for water in 1989 and 1990. Ground-water withdrawal of 50 gpm during operation will potentially produce a 9-ft drawdown at the City of Malakoff's wells. Projected drawdowns are anticipated to increase the City's pumping costs for the life of the project.	Continued impact to alluvial aquifer from sand and gravel operations.

TABLE I-1 (Cont'd)

Factor	Project Alternatives	No Action Alternative
Surface Water	During mining, a slight increase in runoff volumes to the Trinity River is projected. Peak flows after mining will be decreased slightly; runoff volume not affected significantly; no long-term or short-term adverse impacts to water quality of streams; no significant cumulative effects.	None
Wetlands	About 619 ha (1,510 ac) of wetlands may be adversely affected; adverse cumulative impacts by reduction of wetland acreage.	Minor adverse cumulative impacts by reduction of wetland acreage.
Terrestrial Biology	Short-term adverse impacts related to removal of upland and bottomland forest acreage with concomitant reduction of wildlife habitat. Long-term impact will depend on postmining land use alternative selected. Return to existing land use will result in a short-term increase in diversity after the period of vegetation establishment and until climax community is established. The time required for the grassland communities to be reestablished will be relatively short (2 to 5 years). For forest communities, the climax will take 35 years or longer. After the establishment period, biological productivity will approximate existing conditions. Conversion to 100 percent improved pasture will represent a significant, adverse impact to wildlife. Adverse cumulative impacts associated with removal of wildlife habitat.	Minor cumulative adverse impacts by reduction of upland forest acreage due to landowner preferences.
Aquatic Biology	Minor short-term adverse impacts associated with construction and operation activities.	None
Threatened or Endangered Species	Disruption of potential alligator and bald eagle habitat in some areas of the mine.	Minor cumulative adverse impacts by reduction of bottomland forest acreage.
Archaeological and Historical Resources	Adverse impacts to sites will be mitigated by complying with the terms of a Memorandum of Agreement to be signed by the Advisory Council, the State Historic Preservation Officer, and EPA.	Adverse impacts caused by local collectors, and further natural weathering.
Air Quality	No adverse impacts to air quality from stack and fugitive emissions.	No impacts expected.
Sound Quality	Slight increase in ambient sound levels offsite; no significant impact expected.	No impacts expected.
Land Use and Recreation	Long-term impacts will result from the reduction in the amount of forested land on the site and an increase in the amount of pasture. No impacts will occur to recreation.	Long-term decreases in upland and bottomland forest and increases in pasture.
Population	Short-term population increase of 3,503 people peaking in 1990. Long-term population increase of 2,952 people during operation.	Long-term increases due to predicted future growth.
Economy	Both short-term and long-term beneficial impacts will result directly from the project (wages, land purchases and capital expenditures) and secondary beneficial impacts also will result.	Minor long-term changes possible with future development.
Housing	Adverse short-term impacts are expected, stabilizing during operation.	Minor long-term changes possible with predicted future growth.

TABLE I-1 (Concluded)

Factor	Project Alternatives	No Action Alternative
Water and Wastewater Systems	The impact of project-related in-migrants will vary among project area communities. In Athens, current user demands on water and wastewater systems equal or exceed current design capacity. The City is seeking Federal grant assistance for wastewater system improvements. In Corsicana, both water and wastewater systems appear to have ample excess capacity to handle more than the predicted peak in-migrating population. The potable water system of the City of Malakoff has sufficient excess treatment capacity to accommodate anticipated in-migrating population, but will require storage capacity in excess of its current capacity. The Malakoff wastewater system is now operating at or near design capacity and will require expansion to accommodate growth. Trinidad has sufficient excess treatment capacity for both water and wastewater systems, but will have to expand potable water storage capacity. Palestine will also need to add potable water storage capacity; the City has received approval for a wastewater construction grant to make system improvements required by current user demand.	In Athens, current user demands on water and wastewater systems equal or exceed current design capacity. Grant assistance has been requested for wastewater improvements. Corsicana water and wastewater systems have ample capacity for growth. Malakoff has sufficient excess treatment capacity for potable water but requires additional storage capacity. The Malakoff wastewater treatment plant is now operating at or near design capacity. Trinidad has sufficient excess treatment capacity for both water and wastewater. Palestine is deficient in elevated storage for potable water. Palestine's wastewater treatment facilities require expansion to meet current user demands.
Police and Fire Protection	Project-related in-migrants to Corsicana, Athens and Malakoff will require two additional officers in each city, while Trinidad and Palestine will each require one officer to maintain current population to service ratios. A population influx of 3,503 persons represents a need for five additional firefighters in the project area. Athens, Corsicana, Malakoff and Trinidad may each receive sufficient new residents to warrant one or two additional firefighters.	Police and fire protection are adequate for existing populations.
Medical Services	The influx of 3,503 persons represents a need for two to three additional doctors, according to HEW service recommendations. With the greater proportion of in-migrants likely to move into Athens, Corsicana and Malakoff, an additional doctor would be needed in each of these cities. However, no significant, adverse impact is expected at existing service levels over the temporary peak population period.	Current levels can accommodate a moderate increase in demand.
Education	In order to maintain current teacher-student ratios, an additional 9 to 10 teachers would be needed in the three-county area, two to three each in the Athens, Corsicana and Malakoff school districts, two in the Trinidad school district and one in the Palestine school district.	Minor additional increases in staffing levels possible to meet anticipated future growth.
Transportation	No short-term or long-term adverse impacts to transportation systems will result because of minor traffic increases. Increased traffic and particularly heavy loads will contribute to road surface deterioration which will require increased maintenance.	Minor long-term changes possible with predicted future growth.
Community Finances	Short-term and long-term beneficial impacts to municipal, county and state finances associated with tax revenues.	Minor long-term changes possible with future development.

TABLE 3-2

GENERATION, DEMAND, CAPABILITY AND RESERVE

FOR HOUSTON LIGHTING & POWER COMPANY SYSTEM

Year	Net Generation and Purchases (GWH)	Peak Demand[a] (MW)		Net Capability at Peak[b] (MW)		Reserve (MW)	Reserve (%)
1971	30,888	5,308	(222)	6,245		937	17.65
1972	34,468	6,010	(228)	7,295		1,285	21.38
1973	36,694	6,484	(224)	7,708		1,224	18.88
1974	38,191	6,930	(220)	8,760		1,830	26.41
1975	40,276	7,252	(213)	9,510		2,258	31.14
1976	43,355	8,019	(200)	9,810		1,791	22.33
1977	48,534	8,445	(200)	10,170		1,725	20.43
1978	53,323	9,114	(248)	10,828		1,714	18.81
1979	55,057	9,336	(266)	11,193		1,857	19.89
1980	57,948	10,266	(269)	12,263	(500)	1,997	19.45
1981[c]	59,539	10,540	(279)	12,563	(800)	2,023	19.19
1982	62,584	10,900	(0)	13,063	(1,300)	2,163	19.85
1983	65,017	11,150	(0)	13,613	(1,200)	2,463	22.09
1984	67,831	11,325	(0)	13,413	(1,000)	2,088	18.44
1985	70,262	11,800	(0)	13,713	(1,300)	1,913	16.22
1986	72,073	12,100	(0)	14,013	(900)	1,913	15.82
1987	73,532	12,475	(0)	15,398	(1,200)	2,923	23.44
1988	74,570	12,600	(0)	14,131	(0)	1,531	12.10[d]
1989	78,764	13,150	(0)	14,516	(0)	1,366	10.40[d]
1990	82,919	13,650	(0)	15,131	(0)	1,481	10.80[d]
1991	84,171	14,100	(0)	16,383	(0)	2,283	15.99

a. Does not include interruptible load. Numbers in parentheses indicate amount of interruptible load at time of system peak.

b. Capability includes purchased capacity. Purchases are in parentheses.

c. Actuals through 1981; forecast data for 1982-1991.

d. Additional reserves, if needed in the period 1988 to 1990, are to be supplied from load management, conservation, and congeneration.

(DEIS 3-11)

TABLE 3-6 (Concluded)

Station	Unit No.	Capability (MW)	Type of Service[a]	Proposed Date of Addition Yr/Mo
Proposed Units (in Order of Addition)				
W. A. Parish	8	540	Base	1982/12
Limestone	1	700	Base	1986/04
Limestone	2	700	Base	1987/04
South Texas Project	1	385	Base	1987/06
South Texas Project	2	385	Base	1989/06
Malakoff	1	600	Base	1990/04
Malakoff	2	600	Base	1991/04

a. Based on average capacity factors for 1973-78: base, 36 to 100 percent; intermediate, 16 to 35 percent; peaking, 0 to 15 percent.

b. Capability ratings on emergency-use-only units not included in total system capability.

TABLE 5-28

ASSESSMENTS OF KNOWN SITES WITHIN TRINITY MINE BOUNDARIES

Sites Within Affected Mine Area		Sites Within Mine Lease Boundary	
X41HE77	potential unknown	41AN77	good potential
X41HE79	low potential	41AN78	potential unknown
X41HE80	low potential	41AN79	good potential
X41HE81	low potential	41AN80	good potential
X41HE82	good potential	41AN81	good potential
X41HE89	potential unknown	41AN83	good potential
X41HE100	good potential	X41AN53	good potential
X41HE101	good potential	X41AN70	good potential
		X41HE74	low potential
Site F1	low potential	X41HE78	good potential
Site F2	low potential	X41HE85	low potential
Site F3	good potential	X41HE88	low potential
Site F4	low potential	X41HE90	good potential
Site F5	potential unknown	X41HE91	potential unknown
Site F6	low potential	X41HE92	potential unknown
Site F7	low potential	X41HE102	good potential
		X41HE103	good potential
		X41HE104	good potential
		X41HE105	good potential
		X41HE135	good potential

List of Sites provided by SHPO, 1983.

(DEIS 5-169)

X41HE81. This prehistoric midden site is located on a terrace edge of the Turkey Creek drainage in Henderson County. The site contains a wide and fairly dense lithic scatter (100 m^2) with a depth of 100 cm. The cultural affiliation is Archaic and Neo-American. Sand quarrying activities have caused moderate disturbance to the site. Potential for analysis is + on a scale of +, - and ? (Richner and Lee, 1977).

X41HE82. This prehistoric site is located on a sandy rise at the edge of a terrace west of Turkey Creek in Henderson County. Lithics, ceramics and fire-cracked rocks were observed over a 2,500-m^2 area to a depth of 120 cm. The site has been subjected to moderate disturbance by oil wells. Cultural affiliation is Neo-American. Research potential is listed as ? on a scale of +,- and ? (Richner and Lee, 1977). Research potential is good (site form on file at TARL).

X41AN17. This multicomponent prehistoric-historic site is situated on a terrace edge 2.4 km southeast of the confluence of Wildcat Creek and the Trinity River in Anderson County. The historic component contains a log cabin with a fireplace. Lithic material, fire-cracked rocks and charcoal were collected from the prehistoric component. The cultural affiliation of the prehistoric component is Neo-American. Site size is undetermined, depth of cultural material is 60 cm. Site disturbance is low; the area is wooded. Potential for analysis is + on a scale of +,- and ? (Richner and Lee, 1977).

X41AN18. This prehistoric midden site is situated on a terrace edge east of the Trinity River in Anderson County. Lithic and ceramic materials collected from the site indicate an Archaic to Neo-American occupation. The scatter size is 40,000 m^2, the depth of the cultural material is 400 cm. A large area of the site has been destroyed by a quarry; however, it appears that the site may extend north and testing is recommended (site form on file at TARL). Potential for analysis at the site is + on a scale of +,- and ? (Richner and Lee, 1977).

X41HE74. This site is 1,200 square meters in size and contains deposits 40 centimeters in depth. Materials have been assigned to the prehistoric period (Middle to Late Archaic). Also present is an historic component which dates between 1840

and 1925. The potential for research is apparently low in that the site is highly eroded and has a low potential for recovery of in situ remains, including carbon and faunal materials (Richner and Lee 1977:170).

X41HE79. This site is 250 square meters in size and dates to the late Neo-American period. Deposits are 30 centimeters in depth. The site has been moderately disturbed, and has poor potential for the recovery of carbon materials, faunal remains and in situ deposits (Richner and Lee 1977:158,170).

X41HE80. This site is 1,000 square meters in size and contains material 40 centimeters in depth which dates to the prehistoric period. The site has been moderately disturbed and has poor potential for the recovery of carbon samples and in situ materials (Richner and Lee 1977:158,170).

X41HE85. This site, dating from the Middle to Late Archaic, consists of 10 centimeters of deposits over a 2,000 square meter area. The site has very high erosional disturbance and a low potential for the recovery of in situ remains (Richner and Lee 1977:170).

X41HE88. This site contains prehistoric materials and has a low potential to yield additional information. The site is deflated and the potential for dateable material in situ is negligible (Richner and Bagot 1978:261).

X41HE89. This site consists of a scatter of cultural materials. It is disturbed, with only fair potential for recovery of carbon material, faunal remains or in situ materials (Richner and Bagot 1978:261).

X41HE90. This site consists of a building dating to the 1880s. It has been minimally disturbed and is judged to have fair potential for in situ materials. The building is important for its style of construction (Richner and Bagot 1978:261). It is potentially eligible for the National Register of Historic Places.

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X41HE91. This site is the location of a building dating to 1920-1926 (Richner and Bagot 1978:261). The site is deflated, and there is low potential for in situ materials; however, historic ceramics are present.

X41AN70. This site consists of a shell midden, with the areal and vertical extent undetermined at this time. It was recorded in 1976 during the course of the Trinity River Basin Survey (Richner and Bagot 1978:263) and, at that time, had only minimal disturbance. It is situated on a low, left bank first terrace 1.5 meters above the Trinity River, and contains prehistoric materials. The investigators assess the information yield potential as high; there is a high probability that intact charcoal and faunal remains and in situ deposits may be recovered. The site may be eligible for inclusion on the National Register of Historic Places.

41AN79 (previous designation X41AN54). This prehistoric site is situated on the first left bank terrace above the Trinity River on the southern slope of Lindsey Bluff. It was originally recorded in 1976 during the survey conducted for the Trinity Basin Survey (Richner and Bagot 1978:263). The site is a midden deposit approximately 1 meter in depth, and is being eroded by the Trinity River. The site was recommended by the investigators in order to assess the deposits on the basis of National Register of Historic Places criteria. The potential for datable remains and functional information is presently unknown; however, the remaining deposits appear to be intact and the site may be eligible for inclusion on the National Register of Historic Places.

41AN81 (previous designation X41AN48). This Neo-American campsite is situated on the left bank second terrace above the Trinity River. Native American sherds were recovered from the surface of the midden. The site is minimally 35 centimeters deep, and has been disturbed by recent oil drilling activities. It was originally recorded in 1976 during the course of the Trinity River Basin Survey and, although disturbed, was assessed as having a moderate potential to yield in situ deposits, charcoal and faunal materials. This site may be eligible for inclusion on the National Register of Historic Places.

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F-1. This site is located on a terrace above the Trinity River floodplain to the north of Turkey Creek. The prehistoric site was initially reported and tested (Hays and Larson 1978a) after the observation of two dart points and lithic flakes in an eroded area. Subsequent testing (Hays and Larson 1978b) included the excavation of two backhoe trenches and two controlled test pits. The additional excavations found the site deposit to be disturbed and to lack organic materials. The SHPO (1983) has reported that the site did not meet the criteria of eligibility for the National Register.

F-2. This prehistoric site is located along a steeply inclined edge of the upland which is drained by a minor tributary of Walnut Creek. The site, containing surface flakes and chips on a quartzite gravel deposit was designated as a quarry site by the identifying investigators (Hays and Larson 1978a). Additional testing included the excavation of two backhoe trenches and the collection of a representative sample of the gravels. The SHPO (1983) has reported that the site did not meet the criteria of eligibility for the National Register.

F-3. This prehistoric site is located at the confluence of two tributaries of Walnut Creek and is topographically situated on a terrace at the upland edge. Based on the findings of surface observation and limited posthole testing (Hays and Larson 1978a) more intensive backhoe trenches and controlled test squares were excavated at the site (Hays and Larson 1978b). A limited quantity of faunal material was recovered during the testing. The SHPO (1983) has noted that F-3 is potentially eligible for nomination to the National Register and should be reevaluated if it cannot be avoided.

F-4. This prehistoric site is topographically situated along the western slope of the upland edge above a minor tributary to Walnut Creek. The discovery of F-4 was initiated with the finding of an Edgewood dart point on the surface of the site (Hays and Larson 1978a). Subsequently, more intensive testing found the site to be disturbed and to contain few dateable materials (Hays and Larson 1978b). The SHPO (1983) has reported that the site did not meet the criteria of eligibility for the National Register.

F-5. This historic site contains four features and is located in the uplands to the southwest of Walnut Creek. The features include a log barn, a well, the site of a burned 1940s vintage house and the site of a burned pre-1900 log home (Hays and Larson 1978a). An intensive archaelological testing of the site area included the use of backhoe trenches, controlled test pits and shovel tests (Hays and Larson 1978b). The log barn has been recommended for reconstruction and while the initial cultural resource studies (Hays and Larson 1978a, 1978b) indicate the site did not meet the criteria for eligibility the SHPO (1983) reports that additional evaluation would be desirable if the area is to be mined.

F-6. This prehistoric site is located on an upland edge above a small ephemeral drainage to the southeast of Walnut Creek. The site was initially identified by the presence of a single biface fragment, four flakes and one firecracked rock (Hays and Larson 1978a). Additional investigation of F-6 included the excavation of four backhoe trenches which found that the site did not possess in situ materials. The SHPO (1983) has reported that the site did not meet the criteria of eligibility for the National Register.

F-7. This prehistoric site is located immediately downstream from the confluence of two ephemeral streams which form a tributary to Walnut Creek. The site was originally identified by the presence of flakes and chips found in a posthole test (Hays and Larson 1978a). Additional testing, including two backhoe trenches and two test pits, found that the site area was disturbed and contained few artifacts (Hays and Larson 1978b). The SHPO (1983) has reported that F-7 does not meet the eligibility requirements of the National Register.

5.12.2 Impacts of No Action Alternative

If the proposed power station and mine are not constructed, environmental conditions within the project site will remain approximately as they presently exist, including cultural resource site deterioration due to natural weathering, erosion, continued bulldozer clearing, sand and gravel quarrying, oil and gas development, cultivation and possible vandalism (Richner and Lee, 1977).

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5.14.3.3 Cumulative

Cumulative noise impacts associated with other projects in the area are not anticipated in the Malakoff EGS/Trinity Mine area due to the distance between projects. Topography and ground cover also tend to reduce cumulative noise levels between project areas.

5.15 POPULATION

5.15.1 Existing Environment

Between 1940 and 1970, the project area experienced steady population losses largely due to the nationwide rural-to-urban migration. By 1970, population growth became evident as the lake areas in the region began to develop, and smaller Texas cities exhibited increasing levels of in-migration. Major population centers in the three-county area include Athens, Corsicana, Palestine, Malakoff and Trinidad, all of which experienced recent population growth (Table 5-35). Smaller communities in proximity to the project site include Cross Roads and Cayuga.

5.15.2 Impacts of No Action Alternative

Taking into account 1980 Census data and 1960-1970 and 1970-1980 economic trends, "without project" population projections indicate steady growth for the three-county area. By the year 2000, Henderson County is projected to increase to an estimated 73,000 people, Navarro County to 43,000 and Anderson County to 59,000. This projected growth represents a 50 percent population increase in the project area.

5.15.3 Impacts of Project Alternatives

5.15.3.1 Impacts of Construction

Increased employment opportunities will result in the growth of the project area's population over "without project" levels through in-migration of workers and their families. Construction of the proposed project is scheduled to occur within an eight-year time period, with Malakoff EGS construction workers on site in early 1984 and full operation of both the Malakoff EGS and the Trinity Mine in late 1991. The initial

construction work force will consist of 100 Malakoff EGS employees in 1984 and 40 Trinity Mine employees in late 1986. The combined project peak construction employment will occur in 1988 with an average of 1,800 workers. Construction employment will then decrease as the project approaches operation in 1991, at which time approximately 360 construction workers will be required (Table 5-36). Major skills needed for projects construction include engineers, heavy equipment operators, carpenters, iron workers, electricians, pipefitters and general laborers.

The construction work force will be comprised of local residents (within 48 km (30 mi) of the project site) as well as those workers who will in-migrate to the local area and/or commute (i.e., from Tyler, southeast Dallas or other areas within a 80-km (50-mi) radius). It is anticipated that local workers will provide approximately 20 percent (360 positions) of the needed peak construction work force. An estimated 55 percent (990 positions) of the work force will consist of in-migrants with the remaining 25 percent (450 positions) being commuters. This labor distribution is based upon the extent of skilled and unskilled workers in the local area as well as the commuting distance of the larger urban centers to the project site that may be a source of contract labor. Employment in the three-county project area is largely concentrated in manufacturing, trades and services, with the construction sector accounting for less than 10 percent. However, with rising unemployment rates, there is likely to be a number of persons available for work although not specifically skilled for project construction.

It should also be noted that due to the variable nature of project construction schedules during both the planning phase and site construction, the actual distribution of workers involved in regional construction projects is difficult to determine. Because East Texas is a prime region for energy development, there is the potential that the degree of in-migration for the proposed project may be less than estimated due to the release of construction workers from another project.

Based upon energy employee family characteristics developed by Denver Research Institute (1979), approximately 60 percent of energy-related construction workers are married with an average family size of 3.55 persons. Therefore, during peak construction employment in 1988, the in-migrating primary work force of 990 will result in a peak population influx of 2,505 persons, as shown in Table 5-37. This total population influx is anticipated to consist of 911 households and 212 school-age children. The secondary population influx is estimated at 111 persons, comprised of 11 school-age children and 34

TABLE 5-36

MALAKOFF EGS/TRINITY MINE CONSTRUCTION WORK FORCE

Month/Year	Malakoff EGS	Trinity Mine	Total
4/84 - 6/84	100	0	100
7/84 - 12/84	150	0	150
1/85 - 6/85	250	0	250
7/85 - 12/85	350	0	350
1/86 - 6/86	500	0	500
7/86 - 12/86	1,100	40	1,140
1/87 - 6/87	1,400	40	1,440
7/87 - 12/87	1,600	40	1,640
1/88 - 6/88	1,700	100	1,800
7/88 - 12/88	1,700	100	1,800
1/89 - 6/89	1,600	160	1,760
7/89 - 12/89	1,400	160	1,560
1/90 - 6/90	1,000	160	1,160
7/90 - 12/90	600	160	760
1/91 - 6/91	200	160	360
7/91 - 12/91	0	160	160
1/92 - 6/92	0	100	100
7/92 - 12/92	0	10	10

Source: HL&P, 1982c; NACCO, 1982c.

TABLE 5-37
CONSTRUCTION PHASE
POPULATION EFFECTS

Month/ Year	Total Construction Work Force[a]	In-Migrant Primary Workers[b]	In-Migrant Primary Population	In-Migrant Secondary Population	Total In-Migrant Population
4/84-6/84	100	55	139	6	145
7/84-12/84	150	83	210	9	219
1/85-6/85	250	138	349	15	364
7/85-12/85	350	193	488	22	510
1/86-6/86	500	275	696	31	727
7/86-12/86	1,140	627	1,586	70	1,656
1/87-6/87	1,440	792	2,004	89	2,093
7/87-12/87	1,640	902	2,282	101	2,383
1/88-6/88	1,800	990	2,505	111	2,616
7/88-12/88	1,800	990	2,505	111	2,616
1/89-6/89	1,760	968	2,449	108	2,557
7/89-12/89	1,560	858	2,171	96	2,267
1/90-6/90	1,160	638	1,614	71	1,685
7/90-12/90	760	418	1,058	47	1,105
1/91-6/91	360	198	501	22	523
7/91-12/91	160	88	223	10	233
1/92-6/92	100	55	139	6	145
7/92-12/92	10	6	15	1	16

a. Source: Table 5-36.

b. Based on assumed 55 percent in-migration.

households. According to a survey of energy-related in-migrants, typical newcomers to the area will have a median age of 22 years (Mountain West Research, Inc., 1975). The latest census data indicate that the three-county project area median age is approximately 34 to 36 years (U. S. Department of Commerce, 1971b). However, it is estimated that the new wave of in-migration to the area since 1970 has lowered this age, thus likely lessening the disparity between existing residents and in-migrants associated with the Malakoff EGS/Trinity Mine. Nonetheless, the younger in-migrant population will likely cause changes in the structure of local communities, which can be viewed either positively or negatively by existing residents.

The estimated 2,616 project-related population influx (2,505 primary and 111 secondary) will not cause a significant increase in the overall area population density. The location of the Malakoff EGS/Trinity Mine is such that workers could choose to reside in Athens, Malakoff, Trinidad or Corsicana, for instance, and still be within commuting distance.

A general indication of the potential distribution of the in-migrating population among the various project area communities was based upon a location ratio for each community as determined by current population, population growth rates and distance from the project site. These variables were chosen based on the assumption that an in-migrant's desire to live in a particular community is directly related to the community's distance from work and its relative amenities. Population and population growth rates were used as proxy variables for amenity levels.

According to the above methodology, Athens and Corsicana could each potentially capture 27 percent (706 persons) of the in-migrating construction-related population, while Malakoff could receive 21 percent (549 persons), Trinidad 12 percent (314 persons), Palestine 11 percent (288 persons), and the remainder distributed throughout the counties. Nonetheless, the ultimate in-migration distribution to the various communities will greatly depend on actual housing and service availability.

It should be noted that this population influx represents a construction peak, and that it will not occur all at once in 1988 but rather build up gradually from 1984 and then decline through 1991. The staging of construction employment over an eight-year period will aid in mitigating potential adverse impacts associated with overall in-migration.

The proposed transmission line will have minimal impact to the study area population because of the scarcity of residential dwellings. As a result of careful routing, no residents along the proposed route will be displaced. The nearest dwelling is projected to be approximately 150 to 210 m (500 to 700 ft) from the route. Minor inconveniences may result in areas where construction equipment must cross roads, temporarily disrupting traffic.

5.15.3.2 Impacts of Operation

Staffing of the operation and maintenance work force for the Malakoff EGS/Trinity Mine will begin in late 1987 to early 1988 and increase to a stable, long-term employment of 1,107 by 1999 (Malakoff EGS employment will stabilize at 622 workers in 1991, while mine employment will gradually increase to its peak of 485 by 1999) (Table 5-38). It is anticipated that local workers will provide approximately 20 percent (221 positions) of the needed long-term work force. Due to the shortage of skilled operations workers in the immediate area relative to the demand of the proposed project and another major energy project in the area, 80 percent (886 positions) of the peak operation/maintenance workers are expected to in-migrate. To the extent that rising local unemployment levels result in a significant number of workers available to fill those positions conducive to training, in-migration will be lessened.

No additional secondary jobs are anticipated to be created solely on the basis of operations workers, however, this stable long-term population will be able to support those jobs arising from construction employment. A portion of the secondary employment generated through the peak project employment during construction activities is expected to carry over into the long-term operations period. The larger in-migration associated with construction work will provide the initial impetus to secondary employment, however, the actual creation of most of the service-related jobs is not anticipated to occur until the more permanent population moves into the area and generates expanded economic activity.

During long-term project operation, the in-migrating primary work force of 886 will result in a peak population influx of 2,952 (Table 5-39). This population is expected to consist of 868 total households and 290 school-age children. The demographic structure of the project area is likely to change as the median age decreases and as the level of employment and median income associated with project in-migrants both increase. As

TABLE 5-38

MALAKOFF EGS/TRINITY MINE OPERATIONS WORK FORCE

Year[a]	Malakoff EGS	Trinity Mine	Total
1987	15	32	47
1988	75	42	117
1989	250	80	330
1990	500	182	682
1991	622	270	892
1992	622	315	937
1993	622	343	965
1994	622	345	967
1995	622	362	984
1996	622	384	1,006
1997	622	405	1,027
1998	622	411	1,033
Life of Project	622	485	1,107

a. Employment at mid-year.

Source: HL&P, 1982c; NACCO, 1982c.

TABLE 5-39
OPERATION PHASE
POPULATION EFFECTS

Year	Total Operations Work Force[a]	In-Migrant Primary Workers[b]	Total In-Migrant Population[c]
1987	47	38	125
1988	117	94	312
1989	330	264	880
1990	682	546	1,818
1991	892	714	2,378
1992	937	750	2,497
1993	965	772	2,572
1994	967	774	2,577
1995	984	787	2,623
1996	1,006	805	2,681
1997	1,027	822	2,737
1998	1,033	826	2,753
Life of Project	1,107	886	2,952

a. Source: Table 5-38.

b. Based on assumed 80 percent in-migration.

c. Secondary employment assumed to be met 100 percent from local labor force.

the number of younger families increases, services to meet their needs may also increase (i.e., retail, recreational and various leisure activity centers). Overall, the composition of population growth is not anticipated to generate significant, long-term, adverse impact.

Based upon the assumed in-migrant population distribution, Athens and Corsicana could each potentially capture 797 of the inmigrating operations population, Malakoff could receive 620 persons, Trinidad 354, and Palestine 325. The remaining 59 individuals would be distributed throughout the counties.

5.15.3.3 Impacts of Combined Operation and Construction

A five-year "overlap" period (1987-1992) exists during which both construction and operation personnel will be required. The combined work force is presented in Table 5-40. As shown in Table 5-40, a combined peak population of 3,503 in-migrants is projected in 1990. The resulting population distribution of in-migrants is presented in Table 5-41.

5.15.3.4 Cumulative

Another energy project is expected to undergo development in the three-county project area potentially within a similar time frame as the Malakoff EGS/Trinity Mine. The Forest Grove mine and power plant project is estimated to be approximately the same magnitude as the Malakoff project, and is located about 24 km (15 mi) to the east. Because no scheduling or employment estimates have been completed for Forest Grove, it is difficult to determine the project's actual contribution to a cumulative impact of developments in the three-county area. However, based upon assumptions utilizing Malakoff EGS/Trinity Mine Project requirements, some generalizations can be discussed.

Based upon an estimated 1,800 jobs associated with Forest Grove, of which 60 to 80 percent (1,080 to 1,440 jobs) would be filled by in-migrants, approximately 2,730 to 3,640 additional people could potentially move into the area. This population influx would consist of an additional 972 to 1,280 households and 232 to 310 school-age children.

5.16 ECONOMICS

5.16.1 Existing Environment

Between 1975 and 1981, the labor force growth in the three-county project area averaged 23 percent compared to approximately 34 percent for the State. Reported 1981 local

TABLE 5-40
COMBINED PROJECT OPERATION AND
CONSTRUCTION PHASE
POPULATION EFFECTS

Year	Total Work Force	Total In-Migrant Population
1984	150	219
1985	350	510
1986	1,140	1,656
1987	1,687	2,508
1988	1,917	2,928
1989	2,090	3,437
1990	1,848	3,503
1991	1,252	2,901
1992	1,037	2,642
1993	965	2,572
1994	967	2,577
1995	984	2,623
1996	1,006	2,681
1997	1,027	2,737
1998	1,033	2,753
Life of Project	1,107	2,952

TABLE 5-41
PROJECTED POPULATION DISTRIBUTION OF
PROJECT-RELATED IN-MIGRANTS

Year	Malakoff	Trinidad	Athens	Corsicana	Palestine	Other	Total
1984	46	26	59	59	24	5	219
1985	107	61	138	138	56	7	510
1986	348	199	447	447	182	33	1,656
1987	527	301	677	677	276	50	2,508
1988	615	351	791	791	322	58	2,928
1989	722	412	928	928	378	69	3,437
1990	736	420	946	946	385	70	3,503
1991	609	348	783	783	319	59	2,901
1992	555	317	713	713	291	53	2,642
1993	540	309	694	694	283	52	2,572
1994	541	309	696	696	283	52	2,577
1995	551	315	708	708	289	52	2,623
1996	563	322	724	724	295	53	2,681
1997	575	328	739	739	301	55	2,737
1998	578	330	743	743	303	56	2,753
Life of Project	620	354	797	797	325	59	2,952

are affected by the spending of directly employed project personnel. Due to the transient nature of the construction work force, only a portion of worker income will be spent in the local area thereby reducing the overall secondary employment effects occurring in trade and service sectors. Accordingly, peak project construction activities in 1988 can potentially support approximately 1,050 secondary jobs in the local/regional economy. These include existing jobs within the current capacity of the various trade and service sectors, as well as new jobs created due to increased business investment. Any additional secondary jobs created in the local economy as a result of the proposed project are not anticipated to occur all at once, but rather build gradually as expanded economic activity becomes more observable in the operations period of the project.

Direct income benefits of the proposed project will include wages and salaries paid to construction workers and management personnel as well as the various capital expenditures. Total annual direct labor expenditures during peak construction are estimated at $70.8 million, of which $49.6 million is disposable income, the majority of which will be spent and invested directly in the project area economy. Capital expenditures (materials, equipment, power and fuels) over the full construction period are estimated at approximately $200 to $250 million (HL&P, 1982c; NACCO, 1982c).

Indirect income benefit to the local area resulting from construction worker consumer expenditure is estimated at $90.1 million. This total is based upon regional secondary income multipliers of 2.277 (power plant construction) and 1.955 (coal mining) (Golden et al, 1980c); an assumption that 75 percent of the construction workers will reside locally (existing residents plus project in-migrants); and a local expenditure capture rate of 75 percent. At the multi-county regional level, this income benefit increases to approximately $120 million.

5.16.3.2 Impacts of Operation

The distribution of long-term project employment is projected to be among the construction, service, transportation and utilities, retail trade and public service sectors. Over the long term, the project is expected to contribute to changing employment patterns by reducing unemployment and allowing lower income workers to move into higher paying jobs. Changes in the project area may in turn diversify the regional economy.

Income effects of operations activities will include direct income from wages/salaries and capital expenditures, as well as secondary income flow from increased consumer spending and expanded capital expenditures. Average annual labor expenditures are estimated at $26.4 million for the combined Malakoff EGS/Trinity Mine. Other operations and maintenance expenditures (i.e., materials, power and fuels, annual lease payments, clean up services) are estimated at $38.0 million. Such items as fuel, trash pick-up, pest control services and some materials are likely to be purchased on the local level. Indirect or secondary income benefit to the local area resulting from operations worker consumer expenditure is estimated at $29.5 million.

5.16.3.3 Cumulative

Based upon the general assumption that the Forest Grove project will require an employment level comparable to the Malakoff EGS/Trinity Mine, 2,900 energy-related jobs will be created in addition to the 2,907 associated with construction and operation of the proposed project. However, assuming that scheduling may allow a 15 to 20 percent level of employee transfer between the two projects, particularly construction workers, Forest Grove is anticipated to generate approximately 2,350 jobs. The total cumulative impact of both energy projects is approximately 5,250 primary jobs during construction and operation.

Due to a shortage of skilled and unskilled workers in the local area relative to the demand of two major energy projects, it is expected that as much as 60 to 80 percent (1,080 to 1,440) of the jobs associated with the second of the two projects may need to be filled by in-migrants.

5.17 HOUSING

5.17.1 Existing Environment

Henderson County has the largest existing housing stock fairly distributed throughout the county. Athens accounts for only about 18 percent of the housing in Henderson County, whereas Corsicana and Palestine each represent 50 to 60 percent of the housing in their respective counties. All of the project area counties and cities have increased their housing supply since 1970. Residential growth in the cities averaged 16 to 22 percent,

while overall housing growth in the counties varied from 20 percent in Navarro County to 105 percent in Henderson County.

According to the 1980 Census, there are 1,373 vacant units in the five major project area cities. At this point in time, there is no differentiation between the type of units (e.g., single-family, multi-family, mobile homes, or sale property and rental property) or the quality of units. Census data indicate that in 1970 approximately 16 percent of all housing in the three-county area was substandard, and more specifically, 41 percent of all vacant rental property was substandard. Therefore, not all of the 1,373 vacant units can automatically be considered desirable or even habitable.

Discussions with local realtors and review of city building permits further demonstrate the relative unavailability of housing in the project area. While new housing starts have been apparent in recent years, a considerable amount of demolition of substandard units has resulted in relatively small net gains in the housing inventory. Realtors emphasize that rental property is scarce and that most apartment units have waiting lists. Mobile home space is available in any of the mobile home parks in the project area (King, 1981; Butler, 1982).

5.17.2 Impacts of No Action Alternative

Housing availability varies among communities in the project area, although most cities are experiencing shortages. Building activity is expected to increase to accommodate energy development projects in the region. Rental property is foreseen as a high priority. However, any construction activity (single-family units or apartments) will be greatly dependent upon interest rates and financing arrangements.

5.17.3 Impacts of Project Alternatives

5.17.3.1 Impacts of Construction

Based upon the potential distribution of the in-migrating population, Athens and Corsicana are expected to receive the largest proportion of the 945 project-related new households. Accordingly, each of these cities will need to provide 255 housing units, while Malakoff will face a demand for 198 new units, Trinidad 113 units, and Palestine 104 units.

Based upon surveys of worker housing preference (Denver Research Institute, 1979; Mountain West Research, Inc., 1975), the 945 project-related new households would require 435 single-family units, 85 multi-family units, 359 mobile homes and 67 other housing types. These figures of individual housing types are not to be assumed definitive, but rather a general indication of magnitude. At the present time, the project area cannot meet this housing demand. Although some construction has occurred in recent years, there have been no large housing developments to accommodate significant levels of population in-migration. As a result, housing demand of this magnitude represents a significant, adverse impact to the local area.

With the shortage of rental property compared to the relative availability of mobile home space, it is expected that larger numbers of workers will choose mobile homes particularly for the short-term construction period. However, extensive mobile home development may affect future land use patterns in the local communities. If land is divided to be used only for mobile homes, it will be difficult in the future to use the land for any other type of use. As a result, if desire for mobile homes decreases in the future, the land could become unused.

In anticipation of population growth associated with large-scale energy development, some of the local communities are in the process of compiling housing inventories in order to evaluate future need. Some apartment construction will likely start up prior to significant population in-migration in order to provide temporary accommodations. Without some initial steps to meet the increased demand, local communities may experience extensive mobile home development.

5.17.3.2 Impacts of Operation

Assuming 868 new households during project operation, Athens and Corsicana are each expected to face a demand for 234 housing units, Malakoff 182 units, Trinidad 104 units, and Palestine 95 units. The 868 new households during project operation will require 608 single-family units, 95 multi-family units, 148 mobile homes and 17 other housing types. Operations workers may experience less problems finding housing than the initial construction work force due to the expected turnover in housing stock as construction workers complete their jobs and move out of the area. However, this transfer will only be effective if adequate housing construction takes place over the energy project construction period. Overall, the housing impact during the operations phase is not anticipated to

be as disruptive to local communities as that stemming from in-migration of construction workers.

5.17.3.3 Impacts of Combined Operation and Construction

As discussed in Sec. 5.15.3.3, an overlap in personnel staging will result in a total project-related peak in-migrant population of 3,503 individuals representing a total of 1,274 households. Athens and Corsicana will each need to provide 344 housing units, while Malakoff will face a demand of 268 new units, Trinidad 153 units and Palestine 140 units. As discussed in Sec. 5.17.3.1, new units will be required to meet demand.

5.17.3.4 Cumulative

The estimated 2,246 to 2,554 new households associated with two energy projects in the three-county area are projected to need approximately 1,175 single-family units, 230 multi-family units, 971 mobile homes and 179 other housing types.

5.18 COMMUNITY SERVICES AND FACILITIES

5.18.1 Existing Environment

Municipal potable water supply systems vary as to relative capacities to meet existing demands and comply with regulatory standards. In Corsicana, the largest city in the project area, current treatment capacity of 53.0 million liters per day (14.0 million gallons per day (mgd)) exceeds maximum daily use by approximately 13.2 million liters/day (3.5 mgd)), allowing for an estimated 2,666 connections (Table 5-42). Palestine utilizes just over half of its system treatment capacity of 38.3 liters per day (10.112 mgd), leaving sufficient surplus capacity to accommodate about 5,200 additional connections. Athens, with a system treatment capacity of about 10.8 million liters per day (2.85 mgd), reported a peak use of 10.18 million liters per day (2.69 mgd) in 1980. More recent data on average daily or maximum daily use has not been made available by the city; current use is assumed to equal or exceed capacity. The city continues efforts to add to its water treatment system capacity; local bond issues were defeated twice during 1982, however. The smaller communities of Malakoff and Trinidad have sufficient treatment capacities to accommodate additional connections, with surpluses of .67 million liters per day (.177 mgd) and 1.2 million liters per day (.324 mgd), respectively.

Health facilities in the project area consist of three hospitals and several clinics with a combined hospital bed capacity of approximately 400. The overall doctor-population service ratio is within the Department of Health, Education and Welfare maximum standard of 1:1400 (Golden et al, 1980b; McIntyre, 1981; Summerlin, 1981).

Collectively, the five-project area school districts reported a 1980-81 enrollment of approximately 12,000 students with a teacher-student ratio averaging 1:31. Accepted ratios vary among states, however, generally recommended levels range from 1:20 to 1:27.

5.18.2 Impacts of No Action Alternative

Community facilities and services in the project area will expand as necessary to meet "without project" population projections to the extent that funds are available. Water and sewage systems are currently well below capacity levels in the five major communities. Police and fire protection are adequate for existing populations, and local communities foresee adding one or two personnel if significant population influxes occur. Medical and school facilities can accommodate a moderate increase in demand, although additional teachers are expected to be hired over the next several years, and hospital expansion needs are being evaluated particularly in Henderson County.

5.18.3 Impacts of Project Alternatives

5.18.3.1 Impacts of Construction

The estimated construction phase in-migrating population of 2,616 during peak construction activities will require approximately 1.54 million liters/day (0.405 mgd) of potable water supply, assuming an average consumption of 587 liters/capita/day (155 gallons per capita per day (gpcd)) (Chalmers and Anderson, 1977). Peak water consumption associated with this level of in-migration is estimated at 4.6 million liters/day (1.2 mgd), assuming peak demand as generally three times average use (Urban Systems Research and Engineering, 1980). Based on the assumed in-migrant population distribution among major communities discussed in Sec. 5.15.3.1, the 706 newcomers to the City of Athens will require 0.41 million liters/day (0.109 mgd). As detailed in Sec. 5.18.1, Athens' municipal water system is already experiencing difficulty in meeting current demands, and additional in-migration will further stress system capacity. Recent local bond issues to

upgrade the city's water system have not been successful. The 706 construction-related in-migrants projected for the City of Corsicana are also expected to generate an incremental demand for about 0.41 million liters/day (0.109 mgd). Unlike Athens, however, the Corsicana potable water system currently operates with an excess flow of 13.2 million liters/day (3.5 mgd), more than enough to accommodate construction-phase in-migrants. The incremental water demand associated with projected in-migration to Malakoff is estimated at 0.32 million liters/day (0.085 mgd), which will consume less than half of that city's .67 million liters/day (.177 mgd) excess capacity. Note that the Malakoff water system currently operates under an elevated storage deficit; any system expansion will further amplify the need to construct additional storage. The City of Trinidad is projected to incur a construction-related incremental water demand of 0.18 million liters/day (0.049 mgd), which will consume a small part of the city's 1.2 million liters/day (.324 mgd) excess capacity. Additional water demand will also require Trinidad to expand its elevated storage capacity. The City of Palestine's potable water system can supply about 17.0 million liters/day (4.5 mgd) in excess of current maximum daily use, more than enough excess treatment capacity to accommodate the projected 0.17 million liter/day (0.04 mgd) incremental demand associated with the project construction phase. As noted in Sec. 5.18.1, however, Palestine's system has an existing elevated storage deficit, and any additional user population will enhance the need for additional storage.

Expansion capacities of wastewater systems also vary among project-area municipalities. Again, the greatest impacts will be felt in the City of Athens, where the largest construction-related wastewater service demand (estimated at 0.45 million liters/day (0.119 mgd)) will occur. Athens appears to have no available excess treatment capacity under existing conditions. Corsicana, unlike Athens, has a wastewater system capable of handling about 9.0 million liters/day (2.4 mgd) in excess of current demands. This is sufficient to accommodate the projected 0.45 million liters/day (0.119 mgd) associated with project construction.

Incremental construction-related sewage system demand in Malakoff is estimated at 0.35 million liters/day (0.092 mgd), less than existing excess capacity of .492 million liters/day (0.13 mgd). Existing excess capacity in Trinidad, estimated at .719 million liters/day (0.19 mgd), is sufficient to handle the construction-related system demand of 0.20 million liters/day (0.053 mgd). The lowest incremental demand is expected to occur in Palestine, where construction-related in-migrants will require an additional 0.18 million

liters/day (0.048 mgd). The assessment of Palestine's existing wastewater treatment system (see Sec. 5.18.1) indicates little or no capacity for expansion under current conditions; the small construction-phase increment will therefore add to the need for system expansion.

Project-related in-migration will reduce the ratio of police and fire protection personnel to population in the local communities. The current ratio of law enforcement officers to population is slightly below recommended levels when viewing the project area as a whole. New residents to Corsicana, Athens and Malakoff will require one additional officer in each city to maintain current population to service ratios. A population influx of 2,616 persons represents a need for four additional firefighters in the project area. Athens, Corsicana, Malakoff and Trinidad may each receive sufficient new residents to warrant one additional firefighter.

The service ratio of doctors to population in the project area just meets nationally recommended levels, thereby warranting additional personnel with in-migrant population demand. The influx of 2,616 persons represents a need for two additional doctors, according to HEW service recommendations. With the greater proportion of in-migrants likely to move into Athens and Corsicana, an additional doctor would be needed in each of these cities. However, no significant, adverse impact is expected at existing service levels over the temporary construction period.

Assuming peak construction activities, the proposed project will contribute 246 in-migrating school-age children. Based upon a moderate level of existing excess capacity and anticipated "without project" minimal growth in enrollment, local school districts should be able to absorb the increased population. Potential in-migration, however, will increase teacher-student ratios. In order to maintain current teacher-student ratios, an additional eight teachers would be needed in the three-county area, two each in the Athens, Corsicana and Malakoff school districts and one each in the Trinidad and Palestine school districts. Planned facility expansions in both the Corsicana and Palestine school districts over the next three to five years will help to mitigate potential adverse impact. These include construction of an additional 30 classrooms in the Corsicana school district (Wardell, 1982) and a new middle school along with additional high school expansion in the Palestine school district (Thornton, 1982).

5.18.3.2 Impacts of Operation

The estimated in-migrant population of 2,952 during long-term project operations will require about 1.73 million liters/day (0.458 mgd) of potable water supply (5.3 million liters/day (1.4 mgd) during peak demand). Based on the assumed in-migrant population distribution among project area communities, Athens and Corsicana may be expected to receive approximately 797 operations-phase in-migrants each. As stated in Sec. 5.18.3.1, Athens' municipal water supply system is operating at or near capacity. If system improvements are made in response to the demands of the project construction phase, the operations-phase demand will not pose additional problems. Corsicana, with an excess flow potential of 13.2 million liters/day (3.5 mgd), will have no trouble meeting both construction- and operations-phase demands. The City of Malakoff, with excess flow capacity of .67 million liters/day (.177 mgd), could accommodate the demand for 0.363 million liters/day (.096 mgd) for the anticipated 620 operations-phase in-migrants, particularly if improvements to the city's treatment and storage facilities are made in response to construction-phase demands. The Trinidad water system, with excess flow capacity of 1.2 million liters/day (.324 mgd), could easily accommodate the needs of operations-phase in-migrants for .208 million liters/day (.055 mgd). Similarly, the City of Palestine, with 17.0 million liters/day (4.5 mgd) excess treatment capacity, would not be affected by water demands of 0.19 million liters/day (0.05 mgd), provided that city's storage deficit is rectified.

Operations-phase wastewater service needs will also have varying effects on project area systems. Athens, with no currently available excess treatment capacity, will have to complete proposed system improvements to accommodate construction-phase impacts and the ensuing operations-phase demands of .508 million liters/day (.134 mgd). Corsicana's wastewater system, which is expected to receive a similar level of operations-phase demand, has excess treatment capacity estimated at about 9.0 million liters/day (2.4 mgd) and should experience no significant impacts. Incremental operations-related sewage system demand at Malakoff is estimated at 0.395 million liters/day (0.104 mgd), which would consume much of that city's excess capacity of .492 million liters/day (0.130 mgd). Existing excess capacity at Trinidad, estimated at .719 million liters/day (0.19 mgd), is amply sufficient to handle the operations-phase demand of .226 million liters/day (.059 mgd). The City of Palestine, which currently has little or no excess system capacity, is undertaking wastewater system improvements which should be sufficient to respond to construction-phase demands as well as the ensuing operations-phase demands of 0.207 million liters/day (0.055 mgd).

Project in-migration will not adversely affect local police and fire protection, particularly if minor additional staffing takes place to serve the increased construction population. However, if no personnel changes occur with the larger construction-period in-migration, it may be necessary to add a few police officers once the more permanent operations in-migration occurs. According to state and nationally recommended levels, a population influx of 2,952 represents a need for five to six officers. This additional staffing will likely be in Athens, Corsicana and Malakoff.

The operations-period population influx represents a need for one or two additional doctors. However, no significant adverse impact is expected to occur at the existing service level in the area, particularly if one or two doctors are added during the construction period.

The permanent operations work force will contribute 290 school-age children. In order to maintain existing teacher-student ratios, an additional two teachers would be needed in each of the Athens, Corsicana and Malakoff school districts. One additional teacher would be required in the Trinidad school district. Planned facility expansions will be completed by the time this increased enrollment occurs; therefore, no adverse impact is anticipated. As classroom capacity is increased, the school districts also plan to increase personnel levels, further mitigating adverse impact. Furthermore, any additional staffing during the construction period will alleviate personnel deficiencies during the operations period.

5.18.3.3 Impacts of Combined Operation and Construction

As discussed in Sec. 5.15.3.3, a five-year overlap period (1987-1992) exists during which a combined work force will be required. A combined peak population of 3,503 in-migrants is projected in 1990. Based on review of the projected population distribution, it is apparent that during the period from mid-1989 through mid-1990, in-migrant population increases will occur above those previously evaluated for the operation-related population. Therefore, the following discussion is presented to evaluate the peak project-related impacts on community services and facilities.

The estimated peak in-migrating population of 3,503 will require approximately 2.06 million liters/day (0.543 mgd) of potable water supply, assuming an average consumption of 587 liters/capita/day (155 gallons per capita per day (gpcd)) (Chalmers and Anderson, 1977). Peak water consumption associated with this level of in-migration is estimated at 6.2 million liters/day (1.6 mgd), assuming peak demand as generally three times average

use (Urban Systems Research and Engineering, 1980). Based on the assumed in-migrant population distribution among major communities shown in Table 5-41, the 946 newcomers to the City of Athens will require 0.56 million liters/day (0.147 mgd). As detailed in Sec. 5.18.1, Athens' municipal water system is already experiencing difficulty in meeting current demands, and additional in-migration will further stress system capacity. Recent local bond issues to upgrade the city's water system have not been successful. The 946 project-related in-migrants projected for the City of Corsicana are also expected to generate an incremental demand for about 0.56 million liters/day (0.147 mgd). Unlike Athens, however, the Corsicana potable water system currently operates with an excess flow of 13.2 million liters/day (3.5 mgd), more than enough to accommodate peak project in-migrants. The incremental water demand associated with projected peak in-migration to Malakoff is estimated at 0.43 million liters/day (0.114 mgd), which will consume most but not all of that city's 0.67 million liters/day (0.177 mgd) excess capacity. Note that the Malakoff water system currently operates under an elevated storage deficit; any system expansion will further amplify the need to construct additional storage. The City of Trinidad is projected to incur a peak project-related incremental water demand of 0.25 million liters/day (0.065 mgd), which will consume a small part of the city's 1.2 million liters/day (0.324 mgd) excess capacity. Additional water demand will also require Trinidad to expand its elevated storage capacity. The City of Palestine's potable water system can supply about 17.0 million liters/day (4.5 mgd) in excess of current maximum daily use, more than enough excess treatment capacity to accommodate the projected 0.23 million liter/day (0.06 mgd) incremental demand associated with the peak project-related in-migrant population. As noted in Sec. 5 '8.1, however, Palestine's system has an existing elevated storage deficit, and any additional user population will enhance the need for additional storage.

Expansion capacities of wastewater systems also vary among project-area municipalities. Again, the greatest impacts will be felt in the City of Athens, where the largest project-related wastewater service demand (estimated at 0.60 million liters/day (0.159 mgd)) will occur. Athens appears to have no available excess treatment capacity under existing conditions. Corsicana, unlike Athens, has a wastewater system capable of handling about 9.0 million liters/day (2.4 mgd) in excess of current demands. This is sufficient to accommodate the projected 0.60 million liters/day (0.159 mgd) associated with the peak project in-migrant population.

Incremental project-related sewage system demand in Malakoff is estimated at 0.47 million liters/day (0.124 mgd), which approaches existing excess capacity of 0.492 million liters/day (0.13 mgd). Existing excess capacity in Trinidad, estimated at 0.719 million

liters/day (0.19 mgd), is sufficient to handle the peak project-related system demand of 0.27 million liters/day (0.071 mgd). The lowest incremental demand is expected to occur in Palestine, where project-related in-migrants will require an additional 0.25 million liters/day (0.065 mgd). The assessment of Palestine's existing wastewater treatment system (see Sec. 5.18.1) indicates little or no capacity for expansion under current conditions; the small project-related increment will therefore add to the need for system expansion.

Peak project-related in-migration will reduce the ratio of police and fire protection personnel to population in the local communities. The current ratio of law enforcement officers to population is below recommended levels when viewing the project area as a whole. New residents to Corsicana, Athens and Malakoff will require two additional officers in each city, while Trinidad and Palestine will each require one officer to maintain current population to service ratios. A population influx of 3,503 persons represents a need for five additional firefighters in the project area. Athens, Corsicana, Malakoff and Trinidad may each receive sufficient new residents to warrant one or two additional firefighters.

The service ratio of doctors to population in the project area just meets nationally recommended levels, thereby warranting additional personnel with in-migrant population demand. The influx of 3,503 persons represents a need for two to three additional doctors, according to HEW service recommendations. With the greater proportion of in-migrants likely to move into Athens, Corsicana and Malakoff, an additional doctor would be needed in each of these cities. However, no significant, adverse impact is expected at existing service levels over the temporary peak population period.

Assuming peak construction and operation activities, the proposed project will contribute approximately 296 in-migrating school-age children. Based upon a moderate level of existing excess capacity and anticipated "without project" minimal growth in enrollment, local school districts should be able to absorb the increased population. Potential in-migration, however, will increase teacher-student ratios. In order to maintain current teacher-student ratios, an additional 9 to 10 teachers would be needed in the three-county area, two to three each in the Athens, Corsicana and Malakoff school districts, two in the Trinidad school district and one in the Palestine school district. Planned facility expansions in both the Corsicana and Palestine school districts over the next three to five years will help to mitigate potential adverse impact. These include construction of an

additional 30 classrooms in the Corsicana school district (Wardell, 1982) and a new middle school along with additional high school expansion in the Palestine school district (Thornton, 1982).

5.18.3.4 Cumulative

A second energy project in the three-county area represents a need for an additional 2 to 3 million liters/day (0.5 to 0.8 mgd) of both potable water supply and sewage system demand. The Malakoff EGS/Trinity Mine and the Forest Grove project represent a combined demand for approximately 2,246 to 2,554 new utility connections. None of the local communities could individually handle this demand for water connections, although Athens and Corsicana have excess sewage system capacity to each accommodate slightly more than 5,000 additional sewer connections (Tables 5-36 and 5-37). Based upon 1980-81 data, local utility systems combined can currently support an additional 6,286 water connections and 12,374 sewer connections. In order to minimize significant, adverse impact, in-migration would need to be distributed among several of the major communities.

It should be noted, however, that this demand represents the estimated peak employment demand, and therefore, it will build up over five to six years and then level off to a stable, long-term demand over project life.

The cumulative peak population influx of 7,000 persons represents a need for approximately 14 additional police officers, 10 firefighters and 5 doctors under recommended state and national operating levels. With regard to the potential cumulative impact on local schools, it is anticipated that additional staffing will not likely occur until the more permanent operation in-migration becomes evident. The influx of an estimated 500 to 600 school-age children during project operations represents a need for approximately 16 to 20 additional teachers to maintain the current average teacher-student ratio of 1:31, which already exceeds the nationally recommended range of 1:20 to 1:27.

5.19 LOCAL GOVERNMENT FINANCES

5.19.1 Existing Environment

Ad valorem and sales taxes account for the majority of all county and municipal revenues in the project area. The principal local government expenditures include street and road maintenance, public safety and general administration.

All of the project area cities with the exception of Athens, reported both general obligation debt (tax-supported debt) and special obligation debt (revenue bonds) in 1981. All of the local revenue bonds have been issued for waterworks and sewer system expansion and/or improvements. Debt obligation represents a small percentage of assessed valuation in all of the major communities, making additional bonding capacity available for capital improvements. In addition, debt coverage in all but Corsicana was above the recommended 1.5 times the debt requirement thereby enabling cities to service current debt.

5.19.2 Impacts of No Action Alternative

Water and sewer system facilities will continue to be the major items requiring issuance of revenue bonds. Based upon actual future populations, cities are expected to incur additional debt for water and sewer expansions/improvements. The proposed reduction from 75 percent to 55 percent of the Federal share of the allowable cost for construction of a wastewater treatment plant will result in an increased burden on local financial resources in cities requiring system improvements.

5.19.3 Impacts of Project Alternatives

5.19.3.1 Impacts of Construction

Due to the speculative nature of any potential changes in property values as a result of the proposed project, the impacts on government finances can only be addressed in general terms. It can reasonably be assumed that with significant population increases during the peak construction period, local governmental expenditures will generally increase to provide additional community services. However, the additional revenues from project-related activities (i.e., property taxes) and general economic development lag behind the increased expenditures that are induced by the project population influx. Accordingly, there can be a short-term imbalance between local revenues and expenditures until the expanding population drops during the project operation period.

During construction, the most evident source of revenue will be sales taxes from the increased sales volume associated with in-migration. Based upon a one percent local sales tax and the assumption that approximately 55 percent of individual family budgets is spent on retail, revenues stemming from increased consumer spending are estimated at $0.6 million during peak employment in 1988.

energy development throughout the East Texas region, commuter and truck traffic is likely to increase.

5.20.3 Impacts of Project Alternatives

5.20.3.1 Impacts of Construction

Construction of the Malakoff EGS/Trinity Mine will increase traffic along major access roads between the project site and local communities. State Highway 31 and Farm-to-Market Road 90 are the most immediate access routes to the site, and are likely to experience traffic increases as a result of both equipment movement and employee trips. In addition, U.S. 287 and State Highways 19 and 59 are expected to carry greater traffic volumes.

The 1,350 workers living within 48 km (30 mi) of the project site (existing residents plus in-migrants) are projected to generate approximately 2,080 vehicle trips per day during peak construction in 1988 (assuming 1.3 persons per vehicle making two trips per day). Furthermore, there will be another 450 workers who will commute from beyond 48 km (30 mi) from the project site, generating an additional 692 vehicle trips per day. Based upon the estimated in-migrant population distribution (Sec. 5.15.3) and potential origins of commuting workers (i.e., Tyler, southeast Dallas), State Highway 31 will carry the majority of the project-related employee trips, averaging an increase of approximately 25 to 45 percent (2,500 trips) over existing traffic volumes. Farm-to-Market Road 90 and State Highway 59, providing access to areas south of the project site (i.e., Cross Roads, Cayuga, Palestine), are likely to experience traffic volume increases of 20 to 35 percent (220 trips), while traffic along U.S. 287 out of Palestine could increase by 10 to 15 percent (220 trips). Peak construction traffic, however, will only occur during a six- to nine-month period in 1988.

In addition to project employee traffic, there will be additional traffic generated by delivery and service vehicles coming to the site. On the average, an estimated 30 to 60 one-way commercial truck deliveries will occur per day during construction activities. Also, there will be increased traffic between communities due to additional service workers and families travelling back and forth. These kinds of variables, however, are difficult to quantify with adequate reliability.

In general, the serviceability of farm-to-market roads may be affected due to increased traffic, particularly trucks. These roads are not constructed for large volumes or particularly heavy loads. Therefore, an increase in heavy wheel loads will affect the flow of traffic along these routes, as well as contribute to road surface deterioration more quickly than would otherwise occur.

Apart from increasing traffic volumes, project construction will require a number of road improvements and/or relocations. Some of the limited use county roads at the project site will be relocated through void or reclaimed areas in advance of surface mining operations. Relocations of sections of State Highway 90, U.S. 287 and several farm-to-market roads will take place after 1990 during project operation. HL&P will upgrade the county road from Farm-to-Market Road 90 to the Antioch Cemetery.

Approval of the local county highway commissioner will be obtained prior to any road closures and/or relocations. In all cases, the new road structure will be built to meet or exceed construction standards of the original road surface.

Due to their proximity to the proposed mining area, the communities of Cross Roads and Cayuga are likely to be affected by increased truck traffic and equipment movement nearby.

5.20.3.2 Impacts of Operation

The 1,107 workers anticipated to travel between the project site and local communities over the project life will generate approximately 1,703 vehicle trips per day. The increased traffic volume during operation will not adversely affect local traffic flow once the larger construction traffic level diminishes. State Highway 31 will likely carry most of the operations period traffic amounting to a five to ten percent increase over existing flow along this route.

Relocation of sections of U.S. 287, Farm-to-Market Road 90 and several county roads during project operation will interrupt traffic movement temporarily.

5.20.3.3 Cumulative

The estimated 1,800 jobs associated with Forest Grove represent 2,750 vehicle trips per day in the project site vicinity in addition to the 2,750 during Malakoff EGS/Trinity Mine

The influx of up to 3,503 new residents into the project area will result in increased user demands on area recreational facilities. Greatest effects will probably occur in and near the City of Malakoff, which has only one municipal park. Some effect may occur in Trinidad, with one municipal park, and Athens, with five municipal parks. The abundance of public and private recrational resources in the region generally, however, should be able to absorb recreational user needs associated with population in-migration. In addition to the municipal parks in Athens, Trinidad and Malakoff, for example, Henderson County offers four other municipal parks, several public boat ramps, one municipal golf course, six rural parks and more than 20 commercial recreational facilities. Corsicana and Palestine and environs, where project-related user demands will be relatively less, also offer a variety of municipal, rural and commercial recreational resources.

5.21.3.2 Impacts of Operation

None of the area recreational resources will be directly affected by project operation. Potential impacts are similar to those during project construction.

5.21.3.3 Cumulative

No significant cumulative impact is expected to occur.

5.22 LAND USE

5.22.1 Existing Environment

The existing land uses are surveyed for a two-county area including Henderson and Anderson counties and for the 23,616-ha (57,600-ac) Malakoff Electric Generating Station and Trinity Mine sites located in Henderson and Anderson counties (Fig. 5-14). This comparative analysis facilitates evaluation of the site area in terms of overall suitability for the proposed activity by highlighting similarities and/or differences in local land use vis-a-vis the two-county trends.

5.22.1.1 Regional Land Use

The two-county project area land use description is based upon data provided by the U.S. Department of Agriculture, Soil Conservation Service (SCS); the Texas Forest

6.5 DISTRIBUTION LIST FOR FINAL EIS

Government offices and officials, local organizations and individuals who commented on the Draft EIS will receive a copy of the Final EIS.

(New page)

PART IV. EPA'S PREFERRED ALTERNATIVE

Alternatives evaluated by EPA included (1) the issuance of a new source NPDES permit to NACCO for the proposed Trinity Mine and issuance of a new source NPDES permit to HL&P for the proposed Malakoff EGS and (2) denial of the NPDES permits. Conditional requirements or provisions may be added to the permits, if necessary, to mitigate adverse environmental impact. Based on a review of the comments received on the Draft EIS, EPA has determined its preferred action. EPA's preferred alternative is to issue a new source NPDES permit with conditions to mitigate adverse impacts to cultural resources to NACCO for the proposed Trinity Mine and to issue a new source NPDES permit to HL&P for the proposed Malakoff EGS.

Construction and operation of the proposed Trinity Mine and Malakoff EGS will have beneficial and adverse effects on the area's existing physical, biological, cultural and socioeconomic resources. Some of the more notable effects are discussed in Table 1-1 of this Final EIS (pp. III-9 to III-11).

Shortly after, or concurrent with EPA's filing of this Final EIS with the EPA Office of Federal Activities, the draft NPDES permits for wastewater discharges from the Trinity Mine and the Malakoff EGS will go to public notice. EPA's final decision regarding permit issuance will not be made until after expiration of the 30-day review period on the Final EIS and expiration of the 30-day public notice period on the permits. Any additional comments received during these 30-day periods will be considered prior to a final decision being made. Specific comments on the NPDES permits must be addressed to Mark Satterwhite (6W-PS), USEPA, Region 6, 1201 Elm Street, Dallas, Texas 75270.

If no substantial comments are received, the NPDES permits will become effective 30 days from the date of the Public Notice provided for the permits. Any person may request an Evidentiary Hearing on this final permit decision. However, the request must be submitted within 30 days from the date of the Public Notice for the permits. This request should be in accordance with the requirements of 40 CFR 124.74 (Federal Register, Vol. 45, No. 98, Monday, May 19, 1980).

After the 30-day review of the FEIS and completion of the NPDES permit issuance process, a Record of Decision will be prepared which will document the end of the environmental review and EPA's action on the NPDES permits. This Record of Decision will be distributed to those who make comments on the FEIS and to those who request a copy.

APPENDIX A

DRAFT NPDES PERMIT FOR THE TRINITY MINE

Permit No. TX0092134
Application No. TX0092134

AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, as amended, (33 U.S.C. 1251 et. seq; the "Act"),

The North American Coal Corporation
13140 Coit Road, Suite 400
Dallas, Texas 75240

is authorized to discharge from a facility located

The Trinity Mine
Malakoff and Cross Roads
Henderson County, Texas

to receiving waters Trinity River

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II, and III hereof.

This permit shall become effective on

This permit and the authorization to discharge shall expire at midnight,

Signed this day of

Myron O. Knudson

Myron O. Knudson, P.E.
Director, Water Management Division (6W)

PART I
REQUIREMENTS FOR NPDES PERMITS

SECTION A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - Outfall 001

During the period beginning the effective date and lasting through the expiration date,

the permittee is authorized to discharge from Outfall(s) serial number(s) 001 through 012, sedimentation pond discharge.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic****	Discharge Limitations			
	kg/day(lbs/day)		Other Units (Specify)	
	Daily Avg	Daily Max	Daily Avg	Daily Max
Flow-m^3/Day(MGD)	N/A	N/A	(*)	(*)
Total Suspended Solids	N/A	N/A	35.0 mg/l	70.0 mg/l
Iron, total	N/A	N/A	3.0 mg/l	6.0 mg/l
Manganese, total	N/A	N/A	2.0 mg/l	4.0 mg/l

Effluent Characteristic	Monitoring Requirements	
	Measurement Frequency	Sample Type
Flow-m^3/Day(MGD)	1/day**	Estimate***
Total Suspended Solids	1/day**	Grab
Iron, Total	1/day**	Grab
Manganese, Total	1/day**	Grab

* Report
** During periods of discharge.
*** See Part III, Paragraph B.
**** During precipitation events, effluent limitation shall be in accordance with Part III, paragraph C; during reclamation effluent limitations shall be in accordance with Part III, paragraph E.

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored 1/day** by grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): At the flow monitoring device prior to discharge from the sedimentation pond.

PART I
REQUIREMENTS FOR NPDES PERMITS

SECTION A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - Outfall 101

During the period beginning the effective date and lasting through the expiration date,

the permittee is authorized to discharge from Outfall(s) serial number(s) 101, treated domestic wastewater (outfall 101 discharges to the sedimentation pond upstream of Outfall 001).

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations			
	kg/day(lbs/day)		Other Units (Specify)	
	Daily Avg	Daily Max	Daily Avg	Daily Max
Flow-m^3/Day(MGD)	N/A	N/A	(*)	(*)
Biochemical Oxygen Demand (BOD_5)	1.4(3)	2.7(6)	N/A	N/A
Total Suspended Solids	1.4(3)	2.7(6)	N/A	N/A

Effluent Characteristic	Monitoring Requirements	
	Measurement Frequency	Sample Type
Flow-m^3/Day(MGD)	1/week	Grab
Biochemical Oxygen Demand (BOD_5)	1/week	Grab
Total Suspended Solids	1/week	Grab

* Report
** See Part III, Paragraph G.

The pH shall not be less than N/A standard units nor greater than N/A standard units and shall be monitored N/A.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): Domestic Wastewater treatment plant effluent downstream of the final treatment unit.

SECTION B. SCHEDULE OF COMPLIANCE

The permittee shall achieve compliance with the effluent limitations specified for discharges in accordance with the following schedule:

None

PART II
STANDARD CONDITIONS FOR NPDES PERMITS

SECTION A. GENERAL CONDITIONS

1. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

2. Penalties for Violations of Permit Conditions

The Clean Water Act provides that any person who violates a permit condition implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Clean Water Act is subject to a civil penalty not to exceed $10,000 per day of such violation. Any person who willfully or negligently violates permit conditions implementing sections 301, 302, 306, 307, or 308 of the Clean Water Act is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than 1 year, or both.

3. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

4. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause including, but not limited to, the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

5. Toxic Pollutants

Notwithstanding paragraph A-4, above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Act for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be modified or revoked and reissued to conform to the toxic effluent standard or prohibition and the permittee so notified.

The permittee shall comply with effluent standards or prohibitions established under section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

6. Civil and Criminal Liability

Except as provided in permit conditions on "Bypassing" Section B, Paragraph B-3 and "Upsets" Section B, Paragraph B-4, nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

7. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.

8. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Act.

9. Property Rights

The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

10. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

SECTION B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or simi systems only when necessary to achieve compliance with the conditions of the pe it.

2. Duty to Halt or Reduce Activity

Upon reduction, loss, or failure of the treatment facility, the permittee shall, to the extent necessary to maintain compliance with its permit, control production or all discharges or both until the facility is restored or an alternative method of treatment is provided. This requirement applies, for example, when the primary source of power of the treatment facility fails or is reduced or lost. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

3. Bypass of Treatment Facilities

a. Definitions

(1) "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.

(2) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs c and d of this section.

c. Notice

(1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.

(2) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in Section D, Paragraph D-6 (24-hour notice).

d. Prohibition of bypass.

(1) Bypass is prohibited and the Director may take enforcement action against a permittee for bypass, unless:

(a) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(b) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if the permittee could have installed adequate backup equipment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

(c) The permittee submitted notices as required under paragraph c of this section.

(2) The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in paragraph d(1) of this section.

4. Upset Conditions

a. Definition. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of paragraph c of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

c. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(1) An upset occurred and that the permittee can identify the specific cause(s) of the upset;

(2) The permitted facility was at the time being properly operated; and

(3) The permittee submitted notice of the upset as required in Section D, Paragraph D-6.

(4) The permittee complied with any remedial measures required under Section A, Paragraph A-3.

d. Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

5. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

SECTION C. MONITORING AND RECORDS

1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring points specified in this permit and, unless otherwise specified, before the effluent joins or is diluted by any other wastestream, body of water, or substance. Monitoring points shall not be changed without notification to and the approval of the Director.

2. Flow Measurements

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to insure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated and maintained to insure that the accuracy of the measurements are consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than $\pm$ 10% from true discharge rates throughout the range of expected discharge volumes. Guidance in selection, installation, calibration and operation of acceptable flow measurement devices can be obtained from the following references:

a. "A Guide to Methods and Standards for the Measurement of Water Flow", U. S. Department of Commerce, National Bureau of Standards, NBS Special Publication 421, May 1975, 97 pp. (Available from the U. S. Government Printing Office, Washington, D. C. 20402. Order by SD catalog No. C13.10:421).

b. "Water Measurement Manual", U. S. Department of Interior, Bureau of Reclamation, Second Edition, Revised Reprint, 1974, 327 pp. (Available from the U. S. Government Printing Office, Washington, D. C. 20402. Order by Catalog No. I27.19/2:W29/2, Stock No. S/N 24003-0027).

c. "Flow Measurement in Open Channels and Closed Conduits, U. S. Department of Commerce, National Bureau of Standards, NBS Special Publication 484, October 1977, 982 pp. (Available in paper copy or microfiche from National Technical Information Service (NTIS), Springfield, VA 22151. Order by NTIS No. PB-273 535/5ST).

d. "NPDES Compliance Sampling Manual", U. S. Environmental Protection Agency, Office of Water Enforcement, Publication MCD-51, 1977, 140 pp. (Available from the General Services Administration [8FFS], Centralized Mailing Lists Services, Building 41, Denver Federal Center, Denver, CO 80225).

3. Monitoring Procedures

Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit.

4. Penalties for Tampering

The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

5. Reporting of Monitoring Results

Monitoring results must be reported on a Discharge Monitoring Report (DMR) form (EPA No. 3320-1). Monitoring results obtained during the previous 3 months shall be summarized for each month and reported on a DMR form postmarked no later than the 28th day of the month following the completed reporting period. The first report is due _____. Duplicate copies of DMR's signed and certified as required by Section D, Paragraph D-11, and all other reports required by Section D, Reporting Requirements, shall be submitted to the Regional Administrator and the State at the following addresses:

Myron O. Knudson, P.E., Director
Water Management Division (6W)
U.S. Environmental Protection Agency
Region VI
First International Building
1201 Elm Street
Dallas, Texas 75270

6. Additional Monitoring by the Permittee

If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR. Such increased frequency shall also be indicated.

7. Averaging of Measurements

Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless other wise specified by the Director in the permit.

8. Retention of Records

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time.

9. Record Contents

Records of monitoring information shall include:

a. The date, exact place, time and methods of sampling or measurements;

b. The individual(s) who performed the sampling or measurements;

c. The date(s) analyses were performed;

d. The individual(s) who performed the analyses;

e. The analytical techniques or methods used; and

f. The results of such analyses.

10. Inspection and Entry

The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit, and

d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

SECTION D. REPORTING REQUIREMENTS

1. Planned Changes

The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility.

2. Anticipated Noncompliance

The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

3. Transfers

This permit is nontransferable to any person except after notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Clean Water Act.

4. Monitoring Reports

Monitoring results shall be reported at the intervals and in the form specified in Section C, Paragraph C-5 (Monitoring).

5. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date. Any reports of noncompliance shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

6. Twenty-Four Hour Reporting

The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

The following shall be included as information which must be reported within 24 hours:

a. Any unanticipated bypass which exceeds any effluent limitation in the permit.

b. Any upset which exceeds any effluent limitation in the permit.

c. Violation of a maximum daily discharge limitation for any of the pollutants listed by the Director in Part III of the permit to be reported within 24 hours.

7. Other Noncompliance

The permittee shall report all instances of noncompliance not reported under Section D, Paragraphs D-1, D-4, D-5, and D-6 at the time monitoring reports are submitted. The reports shall contain the information listed in Paragraph D-6.

8. Changes in Discharges of Toxic Substances

The permittee shall notify the Director as soon as it knows or has reason to believe:

a. That any activity has occurred or will occur which would result in the discharge of any toxic pollutant which is not limited in the permit, if that discharge will exceed the "notification levels" described in 40 CFR 122.61.

b. That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant which was not reported in the permit application.

9. Duty to Provide Information

The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

10. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application should be submitted at least 180 days before the expiration date of this permit. The Director may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date.

11. Signatory Requirements

All applications, reports or information submitted to the Director shall be signed and certified.

a. All permit applications shall be signed as follows:

(1) For a corporation: by a principal executive officer of at least the level of vice-president;

(2) For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

(3) For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.

b. All reports required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

(1) The authorization is made in writing by a person described above.

(2) The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and

(3) Certification. Any person signing a document under this section shall make the following certification:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

12. Availability of Reports

Except for data determined to be confidential under 40 CFR Part 2, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the State water pollution control agency

and the Regional Administrator. As required by the Act, permit applications, permits and effluent data shall not be considered confidential.

13. Penalties for Falsification of Reports

The Clean Water Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

PART III
OTHER CONDITIONS

A. The "daily average" concentration means the arithmetic average (weighted by flow value) of all the daily determinations of concentration made during a calendar month. Daily determinations of concentration made using a composite sample shall be the concentration of the composite sample. When grab samples are used, the daily determination of concentration shall be the arithmetic average (weighted by flow value) of all the samples collected during that calendar day.

The "daily maximum" concentration means the daily determination of concentration for any calendar day.

B. Methods of flow estimating shall be by the "California Pipe Method" as described in section 7.4.2.2. of the Handbook for Monitoring Industrial Wastewater, August 1973, U.S. Environmental Protection Agency, Technology Transfer.

C. Effluent Limitations for Precipitation events

(a) Any discharge or increase in the volume of a discharge caused by precipitation within any 24-hour period less than or equal to the 10-year, 24-hour precipitation event (or series of storms or snowmelt of equivalent volume) may comply with the following limitations instead of the otherwise applicable limitations:

Effluent Limitations During Precipitation

Pollutant or Pollutant Property	Maximum for any one day	Average of daily values for thirty consecutive days
Settleable Solids	0.5 ml/l	N/A
pH	Within the range of 6.0 to 9.0 at all times	

(b) Any discharge or increase in volume of a discharge caused by precipitation within any 24-hour period greater than the 10-year, 24-hour event (or series of storms or snowmelt of equivalent volume) may comply with the following limitations instead of the otherwise applicable limitations:

Effluent limitations During Precipitation

Pollutant or Pollutant Property	Maximum for any one day	Average of daily values for thirty consecutive days
pH	Within the range of 6.0 to 9.0 at all times	

(c) The operator shall have the burden of proof that the discharge or increase in discharge was caused by the applicable precipitation event described in subsections (a) and (b).

D. 10-year 24-hour Precipitation Event

The term "10-year, 24-hour precipitation event" means the maximum 24-hour precipitation event with a probable recurrence interval of once in ten years as defined by the National Weather Service and Technical Paper No. 40, "Rainfall Frequency Atlas of the U.S., "May 1961, or equivalent regional or rainfall probability information developed therefrom.

E. Effluent Limitations for Reclamation Areas

The following standards apply to discharges from reclamation areas until SMCRA bond release

Effluent Limitations

Pollutant or Pollutant Property	Maximum for any one day	Average of daily values for thirty consecutive days
Settleable Solids	0.5 ml/l	N/A
pH	Within the range 6.0 to 9.0 at all times	

F. Determination of Settleable Solids

The following procedure shall be used to determine settleable solids:

Fill an Imhoff cone to the one-liter mark with a thoroughly mixed sample. Allow to settle undisturbed for 45 minutes. Gently stir along the inside surface of the cone with a stirring rod. Allow to settle undisturbed for 15 minutes longer. Record the volume of settled material in the cone as milliliters per liter. Where a separation of settleable and floating materials occurs, do not include the floating material in the reading.

The method detection limit for measuring settleable solids shall be 0.4 ml/l.

G. Initial Discharge Locations

Outfall No.	Pond/Purpose Identification	Receiving Waterway and Subsequent Flow	Proposed Start Date
001	Facilities sediment and sewage treatment	Unnamed tributary to Walnut Creek, Walnut Creek, Cedar Creek, then Trinity River	1985
002	Disturbed mining area, dragline erection	Same description as 001	1985
003	Disturbed mining area	Same description as 001	1985
004	Disturbed mining area	Same description as 001	1987

Outfall No.	Pond/Purpose Identification	Receiving Waterway and Subsequent Flow	Proposed Start Date
005	Disturbed mining area	Same description as 001	1991
006	Disturbed mining area	To Turkey Creek north of levee, Walnut Creek, Cedar Creek, then Trinity River	1986
007	Disturbed mining area	Same description as 006	1989
008	Disturbed mining area	Same description as 006	1991
009	Disturbed mining	Same description as 006	1988
010	Disturbed mining	Same description as 006	1988
011	Disturbed mining area	To Turkey Creek, south of levee, the cutoff then to Trinity River	1988
012	Disturbed mining area	Same description as 011	1989

H. Locations may be revised by the permittee if it becomes necessary to eliminate or establish new holding ponds. For any revision the permittee shall submit appropriate maps redesignating the holding pond location.

Any revised pond or outfall location should be consistent with and fall within the mining area boundary as defined in the applicant's State Mining Plan.

Any revised pond or outfall location shall be limited to discharging to the same receiving body of water.

I. The treated domestic wastewater effluent shall be disinfected equivalent to chlorination to achieve a chlorine residual of at least 1.0 mg/l after a dentention time of at least 20 minutes (based on peak flow) and shall be monitored once per week by grab sample. An equivalent method of disinfection may be subsituted with prior approval of the permitting authority.

J. The Memorandum of Agreement executed by EPA, the Advisory Council on Historic Preservation, and the Texas State Historic Preservation Officer for the lignite mine which is the subject of this permit is hereby incorporated by reference and expressly made a part of this permit. The permittee shall comply with the stipulations of such Memorandum of Agreement.

APPENDIX B

DRAFT NPDES PERMIT FOR THE MALAKOFF EGS

Permit No. TX0090981
Application No. TX0090981

AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, as amended, (33 U.S.C. 1251 et. seq; the "Act"),

Houston Lighting and Power Company
P.O. Box 1700
Houston, Texas 77001

is authorized to discharge from a facility located at

Malakoff Steam Electric Station
Malakoff, Henderson County, Texas

to receiving waters named

Trinity River

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II, and III hereof.

This permit shall become effective on

This permit and the authorization to discharge shall expire at midnight,

Signed this day of

Myron O. Knudson, P.E.
Director, Water Management Division (6W)

PART I
REQUIREMENTS FOR NPDES PERMITS

SECTION A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - Outfall 001

During the period beginning the effective date and lasting through the expiration date,

the permittee is authorized to discharge from Outfall(s) serial number(s) 001, intermittent flow, lignite pile runoff, commingled with cooling tower blowdown and low volume wastes****.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations			
	kg/day(lbs/day)		Other Units (Specify)	
	Daily Avg	Daily Max	Daily Avg	Daily Max
Flow-m^3/Day(MGD)	N/A	N/A	(Report)	(0.720)
Total Suspended Solids	N/A	N/A	30 mg/l	100 mg/l
Oil and Grease	N/A	N/A	15 mg/l	20 mg/l
Free Available Chlorine**	0.05(0.10)	0.11(0.25)	0.2 mg/l	0.5 mg/l
Temperature degrees*	N/A	N/A	N/A	33.9C(93°F)***
Selenium	N/A	N/A	N/A	0.10***

Effluent Characteristic	Monitoring Requirements	
	Measurement Frequency	Sample Type
Flow-m^3/Day(MGD)	1/day	Estimate
Total Suspended Solids	1/week	Grab
Oil and Grease	1/week	Grab
Free Available Chlorine**	1/week	Grab
Temperature degrees*	1/day**	In Situ
Selenium	1/month	Grab

* Pollutants applicable only to cooling tower blowdown.
** See Part III, paragraph 2.
*** Instantaneous Maximum.
**** See Part III, paragraph 5.
See Part III, paragraph 9.

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored 1/week by grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): At Outfall 001, at the discharge of the storm water treatment system clarifier prior to mixing with any other waste stream.

PART I
REQUIREMENTS FOR NPDES PERMITS

SECTION A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - Outfall 002

During the period beginning the effective date and lasting through expiration date, the permittee is authorized to discharge from Outfall(s) serial number(s) 002, intermittent flow, material storage* runoff and washdown water.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations			
	kg/day(lbs/day)		Other Units (Specify)	
	Daily Avg	Daily Max	Daily Avg	Daily Max
Flow-m^3/Day(MGD)	N/A	N/A	(Report)	N/A
Total Suspended Solids	N/A	N/A	50 mg/l	N/A
Selenium	N/A	N/A	N/A	0.1 mg/l**

Effluent Characteristic	Monitoring Requirements	
	Measurement Frequency	Sample Type
Flow-m^3/Day(MGD)	1/day	Estimate
Total Suspended Solids	1/week***	Grab
Selenium	1/week***	Grab

* See Part III, Paragraphs 6, 7, and 8.
** Instantaneous maximum.
*** When discharge occurs.

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored 1/week*** by grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): At Outfall 002, at the discharge of the runoff sedimentation pond(s) prior to mixing with any other waste stream.

PART I
REQUIREMENTS FOR NPDES PERMITS

SECTION A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - Outfall 003

During the period beginning the effective date and lasting through the expiration date,

the permittee is authorized to discharge from Outfall(s) serial number(s) 003, intermittent flow, (floor drainage treatment system) low volume wastewater*.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations			
	kg/day(lbs/day)		Other Units (Specify)	
	Daily Avg	Daily Max	Daily Avg	Daily Max
Flow-m^3/Day(MGD)	N/A	N/A	(Report)	(0.55)
Total Suspended Solids	N/A	N/A	30 mg/l	100 mg/l
Oil and Grease	N/A	N/A	15 mg/l	20 mg/l

Effluent Characteristic	Monitoring Requirements	
	Measurement Frequency	Sample Type
Flow-m^3/Day(MGD)	1/day	Estimate
Total Suspended Solids	1/week	Grab
Oil and Grease	1/week	Grab

* See Part III, Paragraph 5.

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored 1/week by grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): AT Outfall 003, where the low volume wastewaters are discharged from floor drainage treatment system prior to mixing with any other waste stream.

PART I
REQUIREMENTS FOR NPDES PERMITS

SECTION A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - Outfall 004

During the period beginning the effective date and lasting through the expiration date,

the permittee is authorized to discharge from Outfall(s) serial number(s) 004, intermittent flow, demineralizer regenerant and other low volume waste streams*.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations			
	kg/day(lbs/day)		Other Units (Specify)	
	Daily Avg	Daily Max	Daily Avg	Daily Max
Flow-m^3/Day(MGD)	N/A	N/A	(Report)	(0.173)
Total Suspended Solids	N/A	N/A	30 mg/l	100 mg/l
Oil and Grease	N/A	N/A	15 mg/l	20 mg/l

Effluent Characteristic	Monitoring Requirements	
	Measurement Frequency	Sample Type
Flow-m^3/Day(MGD)	1/day	Estimate
Total Suspended Solids	1/week	Grab
Oil and Grease	1/week	Grab

* See Part III, Paragraph 5.

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored 1/week by grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): At Outfall 004; where treated low volume wastewaters are discharged from the chemical waste treatment system prior to mixing with any other waste stream.

PART I
REQUIREMENTS FOR NPDES PERMITS

SECTION A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - Outfall 005

During the period beginning the effective date and lasting through the expiration date,

the permittee is authorized to discharge from Outfall(s) serial number(s) 005, intermittent flow, metal cleaning waste* commingled with low volume wastes* and ash transport water*.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations			
	kg/day(lbs/day)		Other Units (Specify)	
	Daily Avg	Daily Max	Daily Avg	Daily Max
Flow-m^3/Day(MGD)	N/A	N/A	(Report)	(0.216)
Total Suspended Solids	N/A	N/A	30 mg/l	100 mg/l
Oil and Grease	N/A	N/A	15 mg/l	20 mg/l
Selenium*	N/A	N/A	0.05 mg/l	0.10 mg/l

Effluent Characteristic	Monitoring Requirements	
	Measurement Frequency	Sample Type
Flow-m^3/Day(MGD)	1/day	Estimate
Total Suspended Solids	1/week	Grab
Oil and Grease	1/week	Grab
Selenium*	1/week**	Grab

* See Part III, Paragraphs 4, 5 and 3.

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored 1/week by grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): At Outfall 005, at the discharge of the metal cleaning waste treatment system prior to mixing with any other waste stream.

PART I
REQUIREMENTS FOR NPDES PERMITS

SECTION A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - Outfall 105

During the period beginning the effective date and lasting through the expiration date

the permittee is authorized to discharge from Outfall(s) serial number(s) 105, metal cleaning waste*.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations			
	kg/day(lbs/day)		Other Units (Specify)	
	Daily Avg	Daily Max	Daily Avg	Daily Max
Flow-m^3/Day(MGD)	N/A	N/A	Report	Report
Iron, Total	N/A	N/A	1.0 mg/l	1.0 mg/l
Copper, Total	N/A	N/A	1.0 mg/l	1.0 mg/l

Effluent Characteristic	Monitoring Requirements	
	Measurement Frequency	Sample Type
Flow-m^3/Day(MGD)	1/day	Estimate
Iron, Total	1/week	Grab
Copper, Total	1/week	Grab

* See Part III, Paragraph 4.

The pH shall not be less than N/A standard units nor greater than N/A standard units and shall be monitored.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): Prior to commingling with low volume wastes and ash transport water.

PART I
REQUIREMENTS FOR NPDES PERMITS

SECTION A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - Outfall 006

During the period beginning the effective date and lasting through the expiration date,

the permittee is authorized to discharge from Outfall(s) serial number(s) 006, sanitary waste treatment system.

Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations			
	kg/day(lbs/day)		Other Units (Specify)	
	Daily Avg	Daily Max	Daily Avg	Daily Max
Flow-m^3/Day(MGD)	N/A	N/A	(0.07)	(0.144)
Total Suspended Solids	5.3(11.7)	N/A	20 mg/l	45 mg/l
Biochemical Oxygen Demand (BOD_5)	5.3(11.7)	N/A	20 mg/l	45 mg/l

Effluent Characteristic	Monitoring Requirements	
	Measurement Frequency	Sample Type
Flow-m^3/Day(MGD)	1/day	Estimate
Total Suspended Solids	1/week	Grab
Biochemical Oxygen Demand (BOD_5)	1/week	Grab

The effluent shall contain a chlorine residual of at least 1.0 mg/l after a detention time of at least 20 minutes (based on peak flow) and shall be monitored daily by grab sample.

An equivalent method of disinfection may be substituted with prior approval of the permitting authority.

The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored 1/week by grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): At Outfall 006, at the discharge of the sanitary waste treatment system and prior to mixing with any other waste stream.

SECTION B. SCHEDULE OF COMPLIANCE

The permittee shall achieve compliance with the effluent limitations specified for discharges in accordance with the following schedule:

None

PART II
STANDARD CONDITIONS FOR NPDES PERMITS

SECTION A. GENERAL CONDITIONS

1. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

2. Penalties for Violations of Permit Conditions

The Clean Water Act provides that any person who violates a permit condition implementing sections 301, 302, 306, 307, 308, 318, or 405 of the Clean Water Act is subject to a civil penalty not to exceed $10,000 per day of such violation. Any person who willfully or negligently violates permit conditions implementing sections 301, 302, 306, 307, or 308 of the Clean Water Act is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than 1 year, or both,

3. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

4. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause including, but not limited to, the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

5. Toxic Pollutants

Notwithstanding paragraph A-4, above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Act for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be modified or revoked and reissued to conform to the toxic effluent standard or prohibition and the permittee so notified.

The permittee shall comply with effluent standards or prohibitions established under section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

6. Civil and Criminal Liability

Except as provided in permit conditions on "Bypassing" Section B, Paragraph B-3 and "Upsets" Section B, Paragraph B-4, nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

7. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.

8. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Act.

9. Property Rights

The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

10. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

SECTION B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

2. Duty to Halt or Reduce Activity

Upon reduction, loss, or failure of the treatment facility, the permittee shall, to the extent necessary to maintain compliance with its permit, control production or all discharges or both until the facility is restored or an alternative method of treatment is provided. This requirement applies, for example, when the primary source of power of the treatment facility fails or is reduced or lost. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

3. Bypass of Treatment Facilities

a. Definitions

(1) "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.

(2) "Severe property damage" means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs c and d of this section.

c. Notice

(1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.

(2) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in Section D, Paragraph D-6 (24-hour notice).

d. Prohibition of bypass.

(1) Bypass is prohibited and the Director may take enforcement action against a permittee for bypass, unless:

(a) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

(b) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if the permittee could have installed adequate backup equipment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

(c) The permittee submitted notices as required under paragraph c of this section.

(2) The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in paragraph d(1) of this section.

4. Upset Conditions

a. Definition. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of paragraph c of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

c. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(1) An upset occurred and that the permittee can identify the specific cause(s) of the upset;

(2) The permitted facility was at the time being properly operated; and

(3) The permittee submitted notice of the upset as required in Section D, Paragraph D-6.

(4) The permittee complied with any remedial measures required under Section A, Paragraph A-3.

d. Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

5. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

SECTION C. MONITORING AND RECORDS

1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge. All samples shall be taken at the monitoring points specified in this permit and, unless otherwise specified, before the effluent joins or is diluted by any other wastestream, body of water, or substance. Monitoring points shall not be changed without notification to and the approval of the Director.

2. Flow Measurements

Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to insure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated and maintained to insure that the accuracy of the measurements are consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than $\pm$ 10% from true discharge rates throughout the range of expected discharge volumes. Guidance in selection, installation, calibration and operation of acceptable flow measurement devices can be obtained from the following references:

a. "A Guide to Methods and Standards for the Measurement of Water Flow", U. S. Department of Commerce, National Bureau of Standards, NBS Special Publication 421, May 1975, 97 pp. (Available from the U. S. Government Printing Office, Washington, D. C. 20402. Order by SD catalog No. C13.10:421).

b. "Water Measurement Manual", U. S. Department of Interior, Bureau of Reclamation, Second Edition, Revised Reprint, 1974, 327 pp. (Available from the U. S. Government Printing Office, Washington, D. C. 20402. Order by Catalog No. I27.19/2:W29/2, Stock No. S/N 24003-0027).

c. "Flow Measurement in Open Channels and Closed Conduits, U. S. Department of Commerce, National Bureau of Standards, NBS Special Publication 484, October 1977, 982 pp. (Available in paper copy or microfiche from National Technical Information Service (NTIS), Springfield, VA 22151. Order by NTIS No. PB-273 535/5ST).

d. "NPDES Compliance Sampling Manual", U. S. Environmental Protection Agency, Office of Water Enforcement, Publication MCD-51, 1977, 140 pp. (Available from the General Services Administration [8FFS], Centralized Mailing Lists Services, Building 41, Denver Federal Center, Denver, CO 80225).

3. Monitoring Procedures

Monitoring must be conducted according to test procedures approved under 40 CFR Part 136, unless other test procedures have been specified in this permit.

4. Penalties for Tampering

The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

5. Reporting of Monitoring Results

Monitoring results must be reported on a Discharge Monitoring Report (DMR) form (EPA No. 3320-1). Monitoring results obtained during the previous 3 months shall be summarized for each month and reported on a DMR form postmarked no later than the 28th day of the month following the completed reporting period. The first report is due _____. Duplicate copies of DMR's signed and certified as required by Section D, Paragraph D-11, and all other reports required by Section D, Reporting Requirements, shall be submitted to the Regional Administrator and the State at the following addresses:

Myron O. Knudson, P.E., Director
Water Management Division (6W)
U.S. Environmental Protection Agency
Region VI
First International Building
1201 Elm Street
Dallas, Texas 75270

6. Additional Monitoring by the Permittee

If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR. Such increased frequency shall also be indicated.

7. Averaging of Measurements

Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless other wise specified by the Director in the permit.

8. Retention of Records

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time.

9. Record Contents

Records of monitoring information shall include:

a. The date, exact place, time and methods of sampling or measurements;

b. The individual(s) who performed the sampling or measurements;

c. The date(s) analyses were performed;

d. The individual(s) who performed the analyses;

e. The analytical techniques or methods used; and

f. The results of such analyses.

10. Inspection and Entry

The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit, and

d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act, any substances or parameters at any location.

SECTION D. REPORTING REQUIREMENTS

1. Planned Changes

The permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility.

2. Anticipated Noncompliance

The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

3. Transfers

This permit is nontransferable to any person except after notice to the Director. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Clean Water Act.

4. Monitoring Reports

Monitoring results shall be reported at the intervals and in the form specified in Section C, Paragraph C-5 (Monitoring).

5. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date. Any reports of noncompliance shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

6. Twenty-Four Hour Reporting

The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

The following shall be included as information which must be reported within 24 hours:

a. Any unanticipated bypass which exceeds any effluent limitation in the permit.

b. Any upset which exceeds any effluent limitation in the permit.

c. Violation of a maximum daily discharge limitation for any of the pollutants listed by the Director in Part III of the permit to be reported within 24 hours.

7. Other Noncompliance

The permittee shall report all instances of noncompliance not reported under Section D, Paragraphs D-1, D-4, D-5, and D-6 at the time monitoring reports are submitted. The reports shall contain the information listed in Paragraph D-6.

8. Changes in Discharges of Toxic Substances

The permittee shall notify the Director as soon as it knows or has reason to believe:

a. That any activity has occurred or will occur which would result in the discharge of any toxic pollutant which is not limited in the permit, if that discharge will exceed the "notification levels" described in 40 CFR 122.61.

b. That they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant which was not reported in the permit application.

9. Duty to Provide Information

The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

10. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application should be submitted at least 180 days before the expiration date of this permit. The Director may grant permission to submit an application less than 180 days in advance but no later than the permit expiration date.

11. Signatory Requirements

All applications, reports or information submitted to the Director shall be signed and certified.

a. All permit applications shall be signed as follows:

(1) For a corporation: by a principal executive officer of at least the level of vice-president;

(2) For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

(3) For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.

b. All reports required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

(1) The authorization is made in writing by a person described above.

(2) The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and

(3) Certification. Any person signing a document under this section shall make the following certification:

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

12. Availability of Reports

Except for data determined to be confidential under 40 CFR Part 2, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the State water pollution control agency

and the Regional Administrator. As required by the Act, permit applications, permits and effluent data shall not be considered confidential.

13. Penalties for Falsification of Reports

The Clean Water Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

PART III
OTHER CONDITIONS

For the purpose of Part I of this permit, the following definitions shall apply in lieu of those under "Part I, Section C, 'Monitoring and Reporting'", where limitations are expressed in concentration:

a. The "daily average" concentration means the arithmetic average (weighted by flow value) of all the daily determinations of concentration made during a calendar month. Daily determinations of concentration made using a composite sample shall be the concentration of the composite sample. When grab samples are used, the daily determination of concentration shall be the arithmetic average (weighted by flow value) of all the samples collected during that calendar day.

b. The "daily maximum" concentration means the daily determination of concentration for any calendar day.

1. There shall be no discharge of polychlorinated byphenyl transformer fluid.

2. The term "free available chlorine" shall mean the value obtained using the amperometric titration method for free available chlorine described in the latest edition of "Standard Methods for the Examination of Water and Wastewater".

Neither free available chlorine nor total residual chlorine may be discharged from any unit for more than two hours in any one day and not more than one unit in any plant may discharge free available or total residual chlorine at any one time unless the permittee can demonstrate to the permitting Agency that the units in a particular location cannot operate at or below the limitations specified in this permit.

3. The term "ash transport water" shall mean water used in the transport of either fly ash or bottom ash.

4. The term "metal cleaning wastes" shall mean any cleaning compounds, rinse waters, or other waterborne residues derived from cleaning any metal process equipment including, but not limited to, boiler tube cleaning, boiler fireside cleaning and air preheater cleaning.

5. The term "low-volume wastesources" means wastewaters from, but not limited to: wet scrubber air pollution control system, ion exchange water treatment system, water treatment, evaporator blowdown, laboratory and sampling streams, floor drainage, cooling tower basin cleaning wastes and blowdown from recirculating house service water systems.

6. The term "area runoff" means discharges resulting from material storage runoff and construction runoff.

The term "material storage runoff" means the rainfall runoff from or through any coal, ash or other material storage pile.

7. Any untreated overflow from facilities designed, constructed and operated to treat the volume of "material storage runoff" and "construction runoff" which is associated with a 10 year, 24-hour rainfall event shall not be subject to the limitations specified in Part 1, area runoff, of this permit.

8. The term "10 year, 24-hour rainfall event" shall mean a rainfall event with a probable recurrence interval of once in ten years as defined by the National Weather Service in Technical Paper No. 40, "Rainfall Frequency Atlas of the United States", May 1961, and subsequent amendments, or equivalent regional or state rainfall probability information developed therefrom.

9. The 226 priority pollutants (Appendix A of Part 423) contained in chemicals added for cooling tower maintenance, except chromium and zinc, shall be limited in the discharge to "no detectable amount." If used, total chromium shall be limited to 0.2 mg/l maximum at any time and total zinc shall be limited to 1.0 mg/l maximum at anytime.

APPENDIX C

GROUND-WATER INFORMATION

WILLIAM F. GUYTON
WILLIAM L. GUYTON
RALPH A. SCALAPINO
MERVIN L. KLUG
JOSEPH K. LONGACRE
WILLIAM J. SEIFERT, JR.

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October 8, 1982
LX-GA-HL-00102

Mr. James B. Henley
Lead Civil Engineer
Power Plant Engineering
Houston Lighting & Power
Company
12301 Kurland Drive
Houston, Texas 77034

Re: Malakoff Electric Generating Station.
Results from Test Drilling and Recommendations for Production Wells.

Dear Mr. Henley:

This letter summarizes the results of our review of data obtained from drilling and testing three test holes at the site of Houston Lighting & Power Company's proposed Malakoff Electric Generating Station in Henderson County, Texas. Locations of the test holes are shown on an accompanying map. This letter also presents our recommendations for production wells.

The test holes were drilled through the entire thickness of the Wilcox Formation, which outcrops at the site, and into the underlying Midway Formation. The test holes encountered two distinct and areally continuous sand zones in the Wilcox, a shallow sand zone and a deep sand zone. Only the deep sand zone was tested and studied as a source of a water supply for the generating station since the shallow sand zone provides a limited amount of available drawdown for water production and the water produced from it is reported to contain an excessive amount of iron. Houston Lighting & Power Company personnel report high iron contents for water produced from piezometers constructed in the shallow sand zone, and water well drillers report that they do not ordinarily construct wells in it because of the high iron content of the water.

A compilation of the basic data on the drilling and testing of the test holes is to be submitted to you by the drilling

contractor, Andrews & Foster, Inc., and has not been duplicated here. For ease of discussion, though, a summary of the test hole data and the results of Pope Testing Laboratories' chemical analyses of water samples collected from the test holes are presented in tables attached to this letter.

General Conditions

Calculations of the elevation of the base of the Wilcox Formation show that the Wilcox dips to the east-southeast at a rate of about 65 feet per mile in the vicinity of the test holes. Information from the test holes indicates that the net thickness of sand in the deep sand zone increases downdip. Also, the top of this sand zone generally becomes lower in elevation in the downdip direction. In all three of the test holes, the sand in the deep sand zone was not found to be massive, but it was interbedded with clay layers of varying thicknesses. The character of the sand itself is very fine to fine grained with the finest sand being found in Test Hole 2. The cleanest sand in the deep zone was found in the lower part of the zone of Test Hole 3.

Static water-level data for the test holes indicate that the elevation of water levels in the deep sand zone becomes progressively higher in a southward direction across the station property. It is believed that this reflects the cone of depression that has been created by the City of Malakoff's pumpage from wells approximately two to three miles northeast of the test holes. As a result, Test Hole 3, which was farthest to the south and farthest away from Malakoff, had the highest static water-level elevation and the shallowest depth to static water level. Due to the combined effects of the lower elevation of the deep sand zone to the east and south, and the higher elevation of water levels to the south, the amount of drawdown available to a well completed in this sand zone is greater to the east and south. Available drawdowns at the time the three test holes were tested are shown at the bottom of the attached summary table of test hole data.

Pumping Tests

Analysis of pumping tests of a few hours duration that were performed on temporary small-diameter wells constructed in the test holes indicates a transmissivity of the deep sand zone of about 1,200 gallons per day per foot. This

value is about one-half of that calculated from tests of the City of Malakoff's wells. However, the water-level decline near the City resulting from the City's pumpage indicates that the transmissivity may be more in line with that found at the test holes. Thus, the higher values indicated by tests of the City's wells may reflect aquifer conditions near the wells themselves.

The specific capacity of the City of Malakoff's well drilled in 1981 was 2.1 gallons per minute per foot of drawdown. The specific capacities of the temporary wells constructed in the test holes were found to be lower than this value. At Test Hole 1, the 2-1/2-hour specific capacity was about 0.9 gallon per minute per foot of drawdown. The 2-1/2-hour specific capacities at Test Holes 2 and 3 were both about 0.6 gallon per minute per foot of drawdown. These low values may be due to local aquifer conditions or to incomplete well development since the temporary wells were designed primarily for the collection of water samples. Production wells constructed at the sites of the test holes can probably be expected to have specific capacities equal to or better than these values.

Chemical Quality

For the constituents determined, the results of the chemical analyses of water from the test holes indicate that the water meets the Texas Department of Health's recommended Secondary Constituent Levels for public water supplies. With the exception of one iron analysis of water from Test Hole 2, which shows a possibly erroneous value of 0.38 milligram per liter, the iron concentration of water from the three test holes ranged from 0.08 milligram per liter to 0.23 milligram per liter. The total dissolved solids concentration ranged from 495 milligrams per liter at Test Hole 2 to 568 milligrams per liter at Test Hole 3, when expressed as a calculated residue on evaporation. Due to the low calcium and magnesium concentrations, the values of hardness were also low and ranged from 12 milligrams per liter to 18 milligrams per liter.

Estimates of Pumping Rates and Effects on Water Levels

The rates at which production wells in this locality may be pumped are very sensitive to specific capacity, local

transmissivity, well spacing, available drawdown, and recharge conditions. The following estimates of expected pumping rate are based on calculations which consider wells located at the sites of the three test holes, and specific capacity and transmissivity values determined from the pumping tests made at those sites. The calculations also assumed that water levels would stop declining when increased recharge from the outcrop four miles away becomes equal to the discharge from the wells. Calculated pumping levels were allowed to decline to the top of the uppermost producing sand at each pumped well. Thus, these estimates do not include any appreciable safety factors.

It is estimated that a two-well system would have a combined pumping rate of from about 110 to 130 gallons per minute. The larger combined pumping rate is obtained with wells located at the sites of Test Holes 1 and 3. This provides the greatest spacing between wells and the least amount of interference. A three-well system with a well located at the site of each of the three test holes is estimated to have a combined total pumping rate of about 150 to 160 gallons per minute. Calculations based on the addition of a fourth well in the extreme southeast corner of the property, assuming the aquifer conditions there are similar to those at the Test Hole 3 location, indicate a combined total pumping rate of between 180 and 200 gallons per minute. If the final production wells are found to have higher specific capacities than the temporary small-diameter wells that were constructed in the test holes, or if the formation's transmissivity is greater than was determined from the short-term pumping tests, higher pumping rates might be obtained.

Just as pumpage by the City of Malakoff has affected water levels at the test hole locations, pumpage from wells constructed for the generating station can be expected to cause water-level declines in the City's wells. Calculations based on the same assumptions presented above indicate that pumpage at a rate of 100 gallons per minute from Houston Lighting & Power Company's proposed wells would cause about 20 to 25 feet of water-level decline in the City's wells. Since the effect on water levels is proportional to the pumpage, a pumping rate of 200 gallons per minute would cause about 40 to 50 feet of decline in the City's wells. Such declines would probably reduce the City's pumpage capacity.

It should be noted that an increase in pumpage by the City or others in the area will cause additional water-level declines at the Houston Lighting & Power Company's proposed well locations and reduce the available drawdowns determined from the test holes. This would result in a reduction of the rates at which the proposed wells could be pumped.

Recommendations

It is our understanding that Houston Lighting & Power Company estimates a minimum projected water requirement of 100 gallons per minute. Unless aquifer conditions determined from the drilling and testing of production wells or changes in estimated water requirements dictate otherwise, a three-well system with a well located at or near each of the three test hole locations should be able to meet the minimum projected requirement and allow for some backup or peaking capacity.

Specifications for the construction and testing of production wells are now being prepared in accordance with instructions given by Mr. John Klumpyan during his telephone conversation with Mr. Ted Harriger on September 27, 1982.

The wells are being designed with 12-inch surface casing, 8-inch blank liner to the top of the screen, and a 6-inch screen in a 24-inch underreamed gravel-packed hole. The first well should be considered a pilot production well, so that, depending upon aquifer conditions encountered and the performance of the well, the total number of wells and successive well designs can be modified if necessary. With this in mind, the specifications are being written for a base number of two wells with an "add or deduct" provision for adding or deleting wells.

If you have any questions concerning the results of the test drilling or our recommendations for the production wells, please do not hesitate to contact us.

Sincerely,

WILLIAM F. GUYTON ASSOCIATES, INC.

Ted L. Harriger

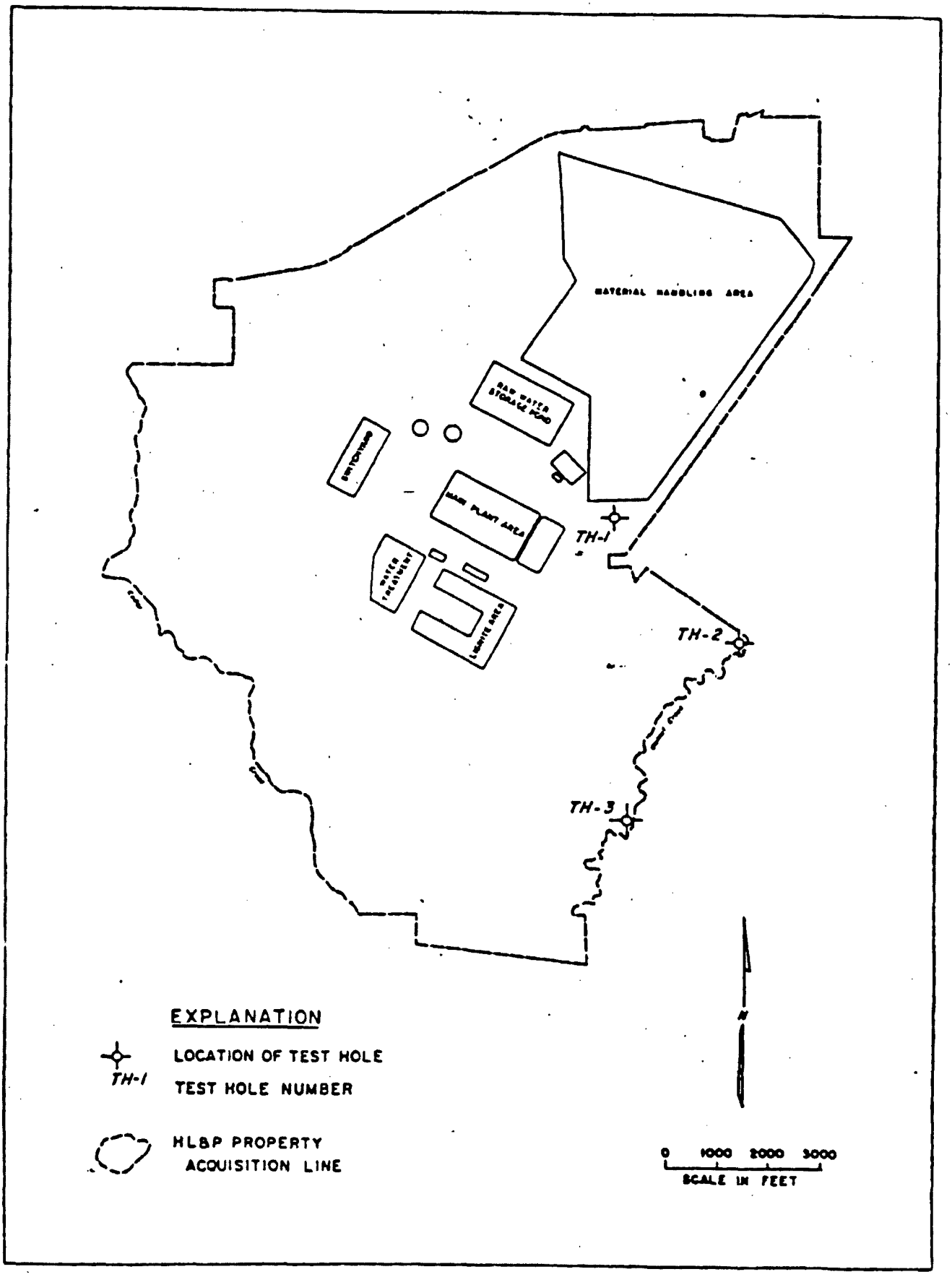
Ted L. Harriger

Joseph K. Longacre

Joseph K. Longacre

TLH/JKL/par

CC: John Klumpyan
R. J. Klapper
W. J. Seifert, Jr.
Attachments



LOCATIONS OF TEST HOLES

SUMMARY OF TEST HOLE DATA

Test Hole	Test Hole 1	Test Hole 2	Test Hole 3
Surface Elevation, feet above sea level	341.9	276.8	272.2
Depth to Base of Wilcox Formation, feet	345	318	304
Total Depth of Hole, feet	432	342	362
Depth Interval of Shallow Sand Zone, feet	45-132	22-96	66-84
Depth Interval of Deep Sand Zone, feet	245-306	197-276	216-270
Net Sand Thickness in Deep Sand Zone, feet	35	46	44
Intervals Screened for Testing, feet	245-265 285-305	198-218 236-246 258-268	216-236 248-268
Static Water Level, feet below surface	110.7	44.2	27.8
Available Drawdown Above Top of Sands at the Time of Testing, feet	134	153	188

RESULTS OF CHEMICAL ANALYSES OF WATER SAMPLES
(Reported by Pope Testing Laboratories, Inc.)

	Test Hole 1	Test Hole 2	Test Hole 3
Calcium, ppm	4.0	2.4	4.0
Magnesium, ppm	1.9	1.5	1.9
Sodium, ppm	219.1	194.8	222.0
Iron, ppm	0.11	0.08	0.17
Manganese, ppm	0.01	0.0	0.02
Carbonate, ppm	14.4	14.4	16.8
Bicarbonate, ppm	290.4	273.3	287.9
Sulfate, ppm	0.0	0.0	4.0
Chloride, ppm	166.0	133.0	165.0
Fluoride,ppm	0.2	0.3	0.3
Nitrate, ppm	0.0	0.0	0.0
Total Silica, ppm	12.0	14.0	12.0
Dissolved Residue (Calculated), ppm	696.1	619.8	702.1
Dissolved Residue Corrected for Loss of Bicarbonate upon Evaporation, ppm*	560.6	494.9	567.8
Phenolphthalein Alkalinity as $CaCO_3$, ppm	12.0	12.0	14.0
Total Alkalinity as $CaCO_3$, ppm	262.0	248.0	264.0
Total Hardness as $CaCO_3$, ppm	18.0	12.0	18.0
Specific Conductance, micromhos/cm	1,000	900	1,000
pH	8.3	8.4	8.3
Range of Iron Values from additional analyses, ppm	0.14-0.18	0.10-0.38	0.17-0.23

* Correction applied by William F. Guyton Associates, Inc. includes silica.

ESPEY, HUSTON & ASSOCIATES, INC.

Engineering & Environmental Consultants

P O BOX 402305

DALLAS, TEXAS 75240

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February 9, 1983
LX-EH-HL-00155

Mr. Steve S. Davies
Environmental Protection Department
Houston Lighting & Power Company
Baybrook
P. O. Box 1700
Houston, TX 77001

Subject: Transmittal of the Results of the Pump Test Conducted to Determine the Impact of Ground-water Withdrawal on the City of Malakoff's Wells During Construction at the Malakoff EGS

Dear Mr. Davies:

The purpose of this letter is to transmit the results of the long-term pumping test to determine the potential impact of proposed withdrawal of 200 gallons per minute (gpm) of ground water during construction and 50 gpm during operation of the Malakoff EGS. A brief description of the test procedures and the results of the impact assessment follow.

The impacts of pumping the proposed plant wells on the Malakoff supply wells were assessed by conducting a 21-day pumping test at the site. One six-inch production well and three four-inch observation wells were installed to collect drawdown data, and to determine the aquifer coefficients at the site. The pumping test consisted of pumping the production well at 50 gpm for about 15 days, and a six-day recovery period. The aquifer coefficients for the plant area derived from the test are as follows:

Transmissivity = 1,300 gpd/ft

Storage = 4×10^{-4}

Leakage = 0.0

To assess the potential drawdown on the Malakoff wells, these same coefficients for the Malakoff wells are also important. These coefficients are based upon analysis of Malakoff historical pumping drawdown records, and are as follows:

Transmissivity = 2,100 gpd/ft

Storage = 1×10^{-3}

Leakage = Minor

This gives the following average aquifer coefficients for the area of the plant site and Malakoff:

Transmissivity = 1,700 gpd/ft

Storage = 7×10^{-4}

Leakage = 0.0

The drawdown assessment consisted of calculating the drawdown at Malakoff using these average aquifer coefficients. Drawdown was calculated for a worst case assuming four plant wells pumping 50 gpm each continuously for six years. After this six-year period, one well at 50 gpm was used to assess drawdown at Malakoff for an additional 30 years. The results of the drawdown analysis are summarized in Table 1.

The drawdowns given in Table 1 will reduce the available drawdown in the City of Malakoff wells. The effect of this will be to reduce the potential yield of these wells.

The amount of reduction in capacity is estimated to be on the order of 18 to 20 gpm per well based upon a specific capacity of 0.8 gpm/ft of drawdown. The calculated reduction for each well is given below:

Well No. 1	16.2 gpm
Well No. 2	19.4 gpm
Well No. 3	17.2 gpm

Therefore, the short-term, maximum estimated reduction in potential yield of the City's three wells is estimated to be 54.8 gpm, or approximately 10 percent of the potential yield of 530 gpm (provided to EH&A by Mr. John Lott, City Manager of Malakoff), assuming a continuous pumpage rate (24 hours per day, 365 days per year, for 6 years) of 200 gpm. Once construction is completed, and the pumping rate is decreased to a maximum of 50 gpm during operation, the reduction in water level will be reversed. By the end of the operating life of the power plant (assumed to be 30 years) the maximum estimated reduction in potential yield of the City's wells is estimated to be 21 gpm or approximately 4 percent of the potential yield assuming a continuous pumpage rate (24 hours per day, 365 days per year, for 30 years) of 50 gpm.

Should you have any questions regarding the pump test or the drawdown analyses conducted, please contact me.

Sincerely,

Charles T. Jasper
Associate

TABLE 1

SUMMARY OF DRAWDOWN ANALYSIS

Pumping at Plant Site	Aquifer Coefficients			Elapsed Time (Years)	Drawdown (ft) in Malakoff Wells		
	Transmissivity gpd/ft	Storage	Leakage		Well No. 1	Well No. 2	Well No. 3
Four Wells at 50 gpm each	1,700	7×10^{-4}	0.0	6	22.8	24.3	21.5
One Well at 50 gpm	1,700	7×10^{-4}	0.0	36	8.7	9.2	8.3

WILLIAM F. GUYTON ASSOCIATES, INC.
CONSULTING GROUND WATER HYDROLOGISTS
AUSTIN HOUSTON

WILLIAM F GUYTON
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May 10, 1983
LX-GA-HL-00105

Mr. Steve S. Davies
Environmental Protection Department
Houston Lighting & Power Company
Post Office Box 1700
Houston, Texas 77001

Re: Malakoff Electric Generating Station - Results of Analysis of Pumping Test Data from the Malakoff EGS Test Well and Observation Wells.

Dear Mr. Davies:

As requested by Mr. John Klumpyan of Houston Lighting & Power Company's Engineering Department, this letter gives the results of our analysis of the pumping test data obtained from the test well and observation wells drilled and tested by Espey, Huston & Associates, Inc. at the Malakoff Electric Generating Station and new estimates of the drawdowns that might occur at the City of Malakoff wells as a result of pumping at the plant site. The pumping test was made to obtain better information on the transmissivity of the Wilcox Formation underlying the Malakoff EGS site than that obtained from short-term pumping tests of temporary wells constructed to obtain water samples from three test holes drilled in August and September 1982.

The pumping test by Espey, Huston & Associates, Inc. was conducted with a 6-inch production well and three 4-inch observation wells which were drilled in November 1982. The production well was pumped at a rate of about 50 gallons per minute from 3:22 PM on December 7, 1982 until 3:30 PM on December 22, 1982. Water levels were measured in the production and observation wells to determine the drawdown of water level during the pumping period. After pumping ceased at 3:30 PM on December 22, 1982, water levels were measured in the production well and observation wells until 3:00 PM on December 28, 1982 to determine the recovery of the water levels.

The water-level data for all wells were plotted on graphs in our office, and the plotted data were analyzed to calculate transmissivities and coefficients of storage. The data from the production well and only two of the observation wells were used to calculate transmissivities and storage coefficients. The data from the third observation well were considered to be insufficient for this purpose because of problems in obtaining good measurements. One of the observation wells for which data were used to calculate the transmissivity and storage coefficient was about 299 feet east of the production well and the other was about 3,450 feet northeast of the production well.

The average transmissivities determined from data from the production well, the nearby observation well, and the distant observation well were 1,350, 1,320, and 1,520 gallons per day per foot, respectively. The average for the three wells is approximately 1,400 gallons per day per foot. The average coefficient of storage determined from the observation well data is 4×10^{-4}.

Our firm made a short-term pumping test of the City of Malakoff's Production Well 3 (abandoned and plugged in 1981) in September 1970 to determine the transmissivity of the Wilcox screened in wells at Malakoff. The transmissivity calculated from that test was 2,600 gallons per day per foot. Data from the pumping test of the well constructed by the City of Malakoff in July 1981 to replace Well 3 were obtained and analyzed, and a transmissivity of about 3,000 gallons per day per foot was calculated from the data. Additionally, an analysis of long-term drawdown in Well 3 that was based on historical water-level measurements and historical pumpage by the City of Malakoff indicates that the long-term effective transmissivity of the Wilcox at Malakoff probably is about 2,000 gallons per day per foot. It is believed that the transmissivity at Malakoff is larger than that at the plant site because the sand zone is thicker and slightly more permeable at Malakoff.

Based on the transmissivity of 1,200 gallons per day per foot calculated from the data obtained from the test holes drilled in August and September 1982, we had estimated that a drawdown of 40 to 50 feet could be experienced in the city wells at Malakoff under equilibrium conditions as a result of pumping a total of 200 gallons per minute continuously

from four wells on the plant site. This value was given to Mr. James B. Henley in a letter dated October 8, 1982. In consideration of the transmissivity and storage coefficient obtained from the Espey, Huston & Associates, Inc. pumping test and the transmissivity from the analysis of the long-term drawdown at Malakoff, we have made new calculations to estimate drawdowns at Malakoff. The new estimated drawdowns at Malakoff's Wells 1, 2, and 3, based on calculations using an average transmissivity of 1,700 gallons per day per foot, a storage coefficient of 7×10^{-4}, and four wells pumping 50 gpm each for six years, are 22, 23, and 21 feet, respectively.

We trust that this letter contains the information which you need from us, and if you have any questions about it, please do not hesitate to contact us.

Sincerely,

WILLIAM F. GUYTON ASSOCIATES, INC.

Joseph K. Longacre

JKL:sds

cc: Mr. James B. Henley
Mr. R. J. Klapper
Mr. John Klumpyan

ESPEY, HUSTON & ASSOCIATES, INC.

Engineering & Environmental Consultants

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DALLAS TEXAS 75240

(214) 669 9600

April 22, 1983

Mr. Clinton B. Spotts
Chief, Federal Activities Branch (6ES-F)
United States Environmental Protection Agency
Region 6
1201 Elm Street
Dallas, TX 75270

Subject: Response to questions posed in your letter dated March 18, 1983

Dear Mr. Spotts:

The following discussion is submitted in response to the questions raised in your letter of March 18, 1983 regarding the impact of ground-water withdrawal of 200 gpm for construction of the Malakoff Electric Generating Station. This discussion is based largely on information regarding ground-water yields and historic and projected demands that were obtained from a variety of sources. Some of the data appear to be inconsistent and EH&A has no way to determine the accuracy of the data, and therefore relies on the data in the files of local, state and Federal agencies.

In response to your question regarding the presence of other wells in the area and what effect they may have on the City's potential yield, the following information is provided. EH&A has collected data from the records of the Texas Department of Water Resources and the U. S. Geological Survey on water wells occuring in the vicinity of the Malakoff EGS site. These data were previously submitted to EPA as a part of the geology and ground-water hydrology baseline report for the Malakoff Electric Generating Station, and are included as Attachment 1 to this letter. A review of Table 4-3 and Figure 4-6 contained in Attachment 1 shows the location of several wells in proximity to City's wells that can and probably do affect the yield of the City's wells. It is assumed that the effect, if any, that these wells have on the City's wells is reflected in the baseline assessment, i.e., the yield of the City's wells is already being affected. Installation of any new wells in proximity to the City's wells and completed in the same water-bearing units will potentially result in further reduction of the potential yield of the City's wells. However, the degree of impact will be a function of location, depth, interval screened, capacity and pumping schedule. Without knowledge of these unknown factors, the impact on the City's wells cannot be quantified.

In response to your query regarding the significance of the potential reduction by approximately 55 gpm to the City's wells, EH&A offers the following. According to information provided by the former City Manager of Malakoff, Mr. John Lott, the

three wells owned by the City have a potential yield of 530 gpm at present. Assuming continuous yield of 530 gpm for a 24 hour period, the City's maximum potential daily yield from these three wells would be approximately 763,200 gallons. According to Mr. Lott, the daily maximum peak demand faced by the City occurred in August 1982 when the demand reached 503,000 gallons. The maximum monthly demand also occurred in August 1982 for a total demand of 12,300,000 gallons. Again, assuming full production of the three wells, 530 gpm for 24 hours per day for 31 days, the maximum potential yield would be approximately 23,659,200 gallons for the month of August.

Therefore, to date the City's available supply of water, based on the potential capacity of its three existing wells has surpassed the maximum demand for water. Excess capacity of approximately 180 gpm existed for the peak daily demand and approximately 254 gpm existed for the peak monthly demand.

Assuming that the calculated reduction of approximately 55 gpm associated with ground-water withdrawal during construction of the Malakoff EGS were to be superimposed on the historical peak daily and peak monthly demands on the City's wells, potential excess capacity of approximately 125 gpm and 200 gpm, respectively, would have precluded well production shortages.

As noted in Section 5.18.3.3 of the DEIS, the demand for potable water during 1987, the year of projected population peak attributed to project related in-migrants, will consume most of the City of Malakoff's excess capacity. Superimposing the previous historical peak demand and using the values for estimating peak demand in Section 5.18.3.3 of the DEIS, the projected peak demand for the City of Malakoff in 1987 would be approximately 1.007 mgd which currently exceeds the maximum potential yield of the City's three wells by approximately 243,395 gpd or approximately 170 gpm x 60 min/hr x 24 hr/day. Additional reduction of 55 gpm estimated due to ground-water withdrawal due to construction requirements at the Malakoff EGS site would increase this deficit to approximately 225 gpm of production.

The well currently being leased by the City has the potential to reduce this deficit by approximately 90 gpm (current yield as provided by Mr. John Lott). However, the City would still face a potential shortfall of approximately 135 gpm.

The projected short-fall is considered a conservative assessment given the fact that according to data from the Texas State Department of Health, 1982, the source of information for DEIS Table 5-42, the maximum daily use of 573,000 gallons for Malakoff amounts to approximately 222.6 gallons per person per day consumption as compared to the 465 gallons per person per day estimated for the in-migrants. If in-migrant consumption was based on the 222.6 gallon figure, total demand for the projected peak day would be 241,076 gallons, or approximately 332,000 gallons less

than calculated above. This 332,000 gallons per day represents approximately 230 gpm x 60 min/hr x 24 hr/day. Even assuming that historical consumption is a more accurate basis for projection, the total excess capacity available to the City would be only 5 gpm, relying on maximum potential production of the City's three existing wells and only 95 gpm, relying on the maximum potential production of the three City wells and the well currently being leased by the City. Any reduction in well production due to well malfunctions, or increased demand would result in the inability of the City to meet daily peak demand. In such a case, the City would be forced to employ conservation measures or secure additional water supplies.

It should also be noted that the assessment refers to peak daily demand. Average daily water use as shown in DEIS Table 5-42 is approximately one-half of the maximum daily use. The assessment also does not take into consideration existing water storage facilities, which provide a buffer for short-term demands.

Any additional costs to the City for the water supply would result from a need to meet increased demand either from the need for additional supplies and/or additional storage requirements, and increases in energy costs to drive the pumps due to the anticipated increase in the cost of electricity per kilowatt-hr and cost increases due to increasing the dynamic head, due to projected water level reductions resulting from ground-water withdrawal at the Malakoff EGS site. The pumping cost due to the estimated additional drawdown (increase in the dynamic head) caused by ground-water withdrawal during construction at the Malakoff EGS was calculated to increase approximately seven percent.

I trust that this information is responsive to your needs. However, should you have any questions regarding this transmittal or if EH&A can be of further assistance, please contact me.

Sincerely,

Charles T. Jasper
Associate

cc: Elaine Pickle

Water Well Inventory

A water well inventory was undertaken to locate and obtain information on domestic, stock irrigation, and municipal wells located within the site survey area and adjacent area which may be potentially affected. The data collected, to the extent available, included well owner location, depth, usage, method of completion, and water level. The data presented were collected from the records of the Texas Department of Water Resources and the U.S. Geological Survey. Data are presented in Table 4-3 and well locations are plotted on Fig. 4-6.

TABLE 4-3

PRELIMINARY WATER WELL INVENTORY

HENDERSON COUNTY

EH&A Well Number*	State Well Number	Well Owner	Driller	Year Completed	Depth of Well in feet	Diameter of Casing in inches	Water Bearing Unit	Altitude of Land Surface in feet	Static Water Level Depth in feet	Static Water Level Date	Method of Lift	Use of Water
1	33-56-5A	E. Allen	Rehkop	1971	220	4.5	EWI	3[illegible]0	107.0	7-30-71	S	D
2	33-56-5E	Henderson Co.	Litchfield	1995	313	4.5	EWI	330	40.0	10-10-75	S	D
3	33-56-5H	J. Hafertepe	Curtiss	1979	10	4.0	QAL	350			S	D
4	33-56-6A	C. Lewis	Hampton	1965	36	40.0	QAL				B	D
5	33-56-6F							380			U	U
6	33-56-6G	C. Roberson	Ramsey	1978	315	4.0	EWI	380	75.0	11-9-78	S	I
7	33-56-6H							380			U	U
8	33-56-6K							355			U	U
9	33-56-6L	R. Speed	Ramsey	1978	120	4.0		340	18.0	11-10-78	S	D
10	33-56-8A	R. Yates	Hampton	1968	26	30.0	QAL	260			U	D
11	33-56-8B	R. Yates	Hampton	1968	26	30.0	QAL	260			U	D
12	33-56-8L	A. Rainwater	Rehkop	1977	127	4.5	EWI	340	98.0	12-29-79	U	D
13	33-56-9A	S. Swindle	Litchfield	1974	289	4.0	EWI	355			S	D
14	33-56-9B	R. Etheridge	Ramsey	1975	210	4.0	EWI	340	95.0	9-20-75	S	D
15	33-56-9C	R. Taaffe	Ramsey	1978	165	4.0	EWI	325			S	I
16	33-56-505	Cedar Creek Ent.	Rehkop	1970	82	7.0	EWI	345	30.0	8-14-70	S	P
17	33-56-507	A. Roberts	Goodgame	1910	16	36.0	QAL	360	13.4	1936	N	N
18	33-56-601	City of Malakoff	Tex. Water Well	1949	371	11.75	EWI	350	153.0	1949	T	P
19	33-56-603	T.P.L.	Layne	1928	377	10.0	EWI	375	101.3	1961	T	P/S
20	33-56-604	City of Malakoff	Layne	1926	358	12.0	EWI	360	85.0	1926	T	P
21	33-56-606	Pool		1934	100	9.0	EWI	380	89.5	1936	N	N
22	33-56-705	Trinidad School	Moore	1925	30	36.0	QAL	300	20.0	1936	N	N
23	33-56-706	Sharp	Hay	1903	29	8.0	QAL	300	24.5	1936	N	N
24	33-56-707	M. Peoples		1916	30	36.0	QAL	300	28	1916	N	N
25	33-56-801	T. Abbe			240	4.0	EWI	340	86.2	1970	U	U

TABLE 4-3 (Concluded)

EH&A Well Number*	State Well Number	Well Owner	Driller	Year Completed	Depth of Well in feet	Diameter of Casing in inches	Water Bearing Unit	Altitude of Land Surface in feet	Static Water Level Depth in feet	Static Water Level Date	Method of Lift	Use of Water
26	33-56-802	Lone Star Gas		1935	205	10.0	EWI	290	23.4	1970	J	N
27	33-56-803	Lone Star Gas		1935	198	10.0	EWI	290	8.9	1970	N	N
28	33-56-804	C. Carpenter		1922	15	36.0	QAL	295	12.8	1936	N	N
29	33-56-901	Malakoff Lions			380	4.0	EWI	375	91.0	1970	S	D
30	33-56-902	J. Faulk	Pierce	1960	402	4.0	EWI	360	90.0	1960	S	D
31	33-56-903	Malakoff		1925	360	6.0	EWI	350	64.0	1943	T	P
32	33-56-904	R. Surls	Barlon	1901	43	36.0		310	36.3	1936	N	N
33	33-56-905	W. Edmundson	Goodgame	1935	68	6.0		370	57.5	1936	N	N
34	33-56-906	Yarrabee			32	36.0		345			N	N
35	33-64-1A	Creslenn	Rehkop	1971	105	4.5	EWI	290	30.0	1971	S	D
36	33-64-3A	J. Lewis	Rehkop	1972	280	4.5	EWI	360	90.0	1972	S	D
37	33-64-3B	J. Faulks	Ramsey	1979	240	4.0	EWI	365			S	D
38	33-64-3C	K. Welch	Ramsey	1979	340	4.0	EWI	340			S	D
39	34-49-4A	H. Dow	Rehkop	1971	425	4.5	EWI	380	136.0	1971	S	D
40	34-49-402	A. Williams			36	36.0	QAL	360	32.3	1936	N	N
41	34-49-704	Carson		1927	21	6.0	QAL	325	14.9	1936	N	N

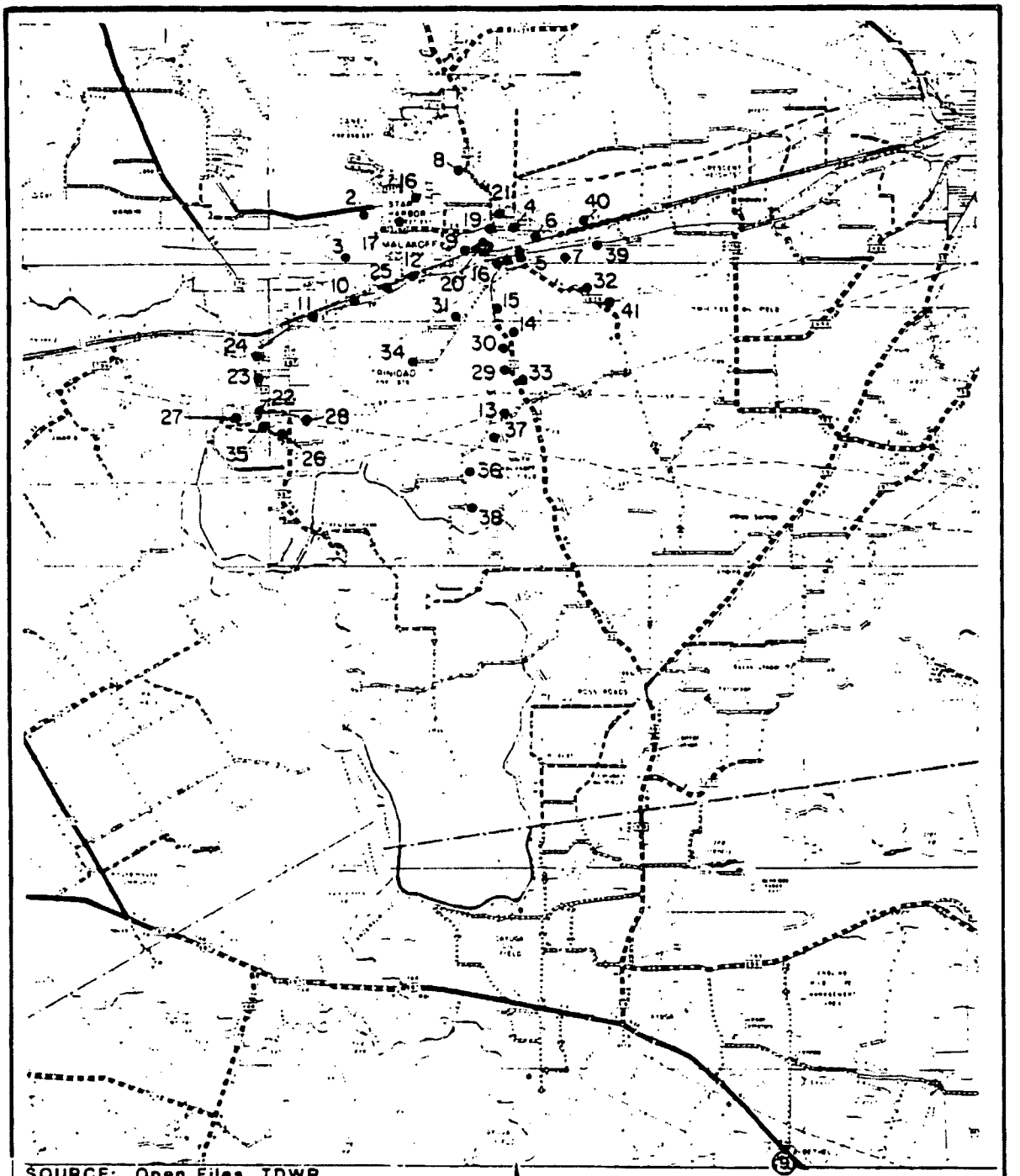
Legend:

Water-bearing Unit: QAL - Quartenary Alluvium; EWI - Eocene Wilcox Group.
Method of Lift: B - bucket; J - jet; N - none; S - submersible; T - turbine; U - unknown.
Use of Water: D - domestic; Irr. - irrigation; N - not used; P - public; S - stock; U - unknown.

Notes: Static water levees: measurements are the most recent available.
Depth to water level: measuring point was usually the top of pump base, top of casing, or top of well curb.

Source: U.S. Geological Survey (USGS), Texas Department of Water Resources, Water Oriented Data Bank (TWODB), and Texas Board of Water Engineers misc. pub. 115 Records of Wells, Henderson County, 1936.

* EH&A well numbers correspond to those numbers shown on Fig. 4-6.



SOURCE: Open Files, TDWR

eh ESPEY, HUSTON & ASSOCIATES, INC.
ENGINEERING & ENVIRONMENTAL CONSULTANTS

Fig. 4-6
Preliminary Water Well Inventory

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ESPEY, HUSTON & ASSOCIATES, INC.

Engineering & Environmental Consultants
333 W. CAMPBELL, SUITE 400
RICHARDSON, TX 75080
(214) 669-9600

August 26, 1983

Mr. Clinton B. Spotts
Regional EIS Coordinator
US Environmental Protection Agency
1201 Elm Street
Dallas, Texas 75270

EH&A Job
No. 2301

Subject: Revised Ground-water Withdrawal Impact Assessment based on Revised Project Schedule and Estimated Peak Population

Dear Mr. Spotts:

The purpose of this letter is to present a revision of the impact assessment on the ground-water supply of the City of Malakoff due to a combination of estimated peak project-related in-migration and the estimated decline in ground-water levels due to ground-water withdrawals at the Malakoff EGS site. The initial assessment was presented in my letter to you dated April 22, 1983. However, since that time, changes in the project schedule and corresponding revisions to the anticipated project-related, peak population in-migration have occurred.

The assessment of projected future impacts is presented in the April 22 letter beginning in the third paragraph on page 2. The following paragraphs are provided as the revised discussion.

As noted in Section 5.18.3.3 of the FEIS, the demand for potable water during 1990, the year of projected peak population attributed to project-related in-migrants, will consume most of the City of Malakoff's excess capacity. Superimposing the previous historical peak demand of 503,000 gpd and using the values for estimating peak demand in Section 5.18.3.3 of the FEIS, the projected peak demand for the City of Malakoff in 1990 would be approximately 0.845 mgd, which exceeds the current maximum potential yield of the City's three wells by approximately 81,800 gpd or, approximately 67 gpm x 60 min/hr x 24 hr/day. The well currently being leased by the City has the potential to offset this deficit based on a current yield of 90 gpm (Mr. John Lott, personal communication).

The major factor leading to the potential shortfall of water in Malakoff is the projected population growth. However, with the additional estimated reduction of 55 gpm due to ground-water withdrawal resulting from on-site uses during construction of the Malakoff EGS, the City of Malakoff is projected to experience a peak-day deficit of approximately 112 gpm in 1990, based on existing capacity of the City's three wells. Even when considering the production from the leased well, a peak-day deficit of 22 gpm is projected. A short-fall could resul[illegible] the inability of the City to meet projected daily peak demand in 1989 and 19[illegible]

It should be noted that this assessment refers only to peak daily demand. Average daily water use as shown in DEIS Table 5-42 is approximately one-half of the maximum daily use, and peak demand for project in-migrants is estimated at three times average daily demand. The assessment also does not take into consideration existing water storage facilities which provide a buffer for short-term demands.

Any additional costs to the City for the water supply would result from a need to meet increased demand and increases in energy costs to drive the pumps. Increased demand requirements include costs associated with additional supplies and/or storage facilities. Increases in energy costs are associated with the anticipated escalation in the cost of electricity per kilowatt-hr, and cost increases due to increasing the dynamic head due to projected water level reductions resulting from ground-water withdrawal at the Malakoff EGS site. The pumping cost due to the estimated additional drawdown (increase in the dynamic head), caused by ground-water withdrawal during construction at the Malakoff EGS, was calculated to increase approximately seven percent.

I trust that this information is responsive to your needs. However, should you have any questions regarding this transmittal or if EH&A can be of further assistance, please contact me.

Sincerely,

Charles T. Jasper

Charles T. Jasper
Associate

CTJ:m

cc: Elaine Pickle

APPENDIX D

CULTURAL RESOURCES INFORMATION

PRELIMINARY CASE REPORT

TRINITY MINE

1. Description of the agency's involvement with the proposed undertaking with citations of the agency's program authority and applicable implementing regulations, procedures and guidelines:

Issuance of a new source National Pollutant Discharge Elimination System permit is under consideration by the Environmental Protection Agency, Region 6. Section 402 of the Clean Water Act (33USC et seq.) authorizes EPA to administer these NPDES permits to industries that discharge to waters of the United States. New source regulations were published in the Federal Register on September 30, 1982.

2. Status of this project in the agency's approval process:

A draft Environmental Impact Statement (EIS) is being prepared for use in making decisions on a permit. A proposed permit will be prepared, and distributed to the public with a Final EIS. EPA will make a final decision on a permit after a 30-day public review period.

3. Status of this project in the agency's National Environmental Policy Act compliance process and the target date for completion of environmental responsibilities:

The draft EIS is in preparation and is planned to be made public sometime in early 1983. A final EIS is projected for the second half of 1983 with a Record of Decision in the third quarter of 1983.

4. A description of the proposed undertaking including, as appropriate, photographs, maps, drawing and specifications:

The Trinity Lignite Mine consists of an available 38,100 acres of lignite (Figure 1), a portion of which will be used to fuel the Malakoff Electric Generating Station (EGS). The current requirement for lignite supply for the Malakoff EGS will involve mining 8,774 surface ha (21,400 surface ac). If a market becomes available at some future date during the life of the project, additional lignite may be mined to recover the majority of the available resource.

Over the proposed 35-year life of the project, an average of 250.5 surface ha (611 surface ac) will be mined each year. Land reclamation operations will begin with mining operations and continue through a complete soil reconstruction and revegetation sequence. Considering the area cleared prior to mining, the active pit area and the area of ungraded overburden, a total of 410 ha (1,000 ac) may be disturbed at any one point in time.

In the area to be mined, vegetation will be removed prior to actual mining operations. During mining the surface soil and overburden will be removed to the level of the lowest recoverable lignite seam. The material removed during mining will be placed in a previously mined pit and graded. Thus, all cultural resources sites within the direct impact area, not previously mitigated, will be destroyed.

Mine facilities will be located in four separate areas: two for equipment erection, one for lignite handling, and the other for storage, permanent mine personnel and

maintenance facilities (Fig. 1). The proposed equipment erection sites include an access road, a graded area for erection of the dragline, a warehouse and shop building, trailers for temporary office and bathhouse, parking areas for equipment and vehicles, and an area for utilities.

The permanent mine facilities will include an office with bathhouse, a shop and warehouse building, parking areas for equipment and vehicles, an outside storage area, a diked fuel storage area, a fueling area, a truck hopper with crusher and conveyor to live storage. Another conveyor will transport lignite from live storage to the Malakoff EGS plant site.

The lignite handling facilities will consist of a truck dump, coal breakers, conveyors, live storage and a dead storage pile. The lignite handling facility will have a total capability of 3,640 metric tons (4,000 tons) per hour. Haul trucks will dump lignite into one of two hoppers, each having a 136.5-metric ton (150-ton) capacity. The coal will fall by gravity into one of two Stamler feeder breakers which consist of chain conveyors and lignite breakers. The breakers crush the lignite from run-of-mine size to the required 0 to 15.24 cm (0 to 6 in.) size. The lignite will move from the breaker onto one of two 3/4 enclosed belt conveyors leading to the live storage.

Various pipeline and powerlines which currently cross the mine property will be relocated during the life of the mine. The relocations will be required to allow the recovery of lignite resources under and adjacent to these encumbrances. Figure 1 shows these existing lines and the proposed relocations.

5. A description of the National Register or eligible properties affected by the undertaking, including a description of the properties' physical appearance and significance:

The National Register presently includes no properties listed or eligible for listing that are located in this mine area.

Surveys of varying levels of intensity conducted on approximately 12 percent of the proposed mine site have identified 35 cultural resource sites (Richner and Lee, 1977; Richner and Bagot, 1978; Hays and Larson, 1978a and 1978b). Of these 35 sites, 15 cultural resource sites have been listed as having good or questionable potential for further work. A brief description of each of these sites is provided below.

X41HE100. This historic site is located on a remnant terrace east of Stephens Lake in Henderson County. It is the former location of a plank house built in 1900 for the caretaker, Will Hendrix, of the Island Fish and Game Club (X41HE102). The house consisted of a kitchen and bedroom with a porch across the front and a shed attached to the back. The structure fronted on the Palestine-Corsicana Road. The only remaining structural evidence is a well and an historic scatter. Potential for further work (in situ analysis) at this site is listed as good (Richner and Bagot, 1978).

X41HE101. This historic site is located north of X41HE100 on a remnant terrace east of Stephens Lake in Henderson County. A split log cabin was constructed on the site in 1863 as part of the Stephens Lake Ranch cotton plantation. The structure, a split log cabin consisted of one room 4.9 x 4.9 m (16 x 16 ft), has a fireplace on the west side and a shed room on one side constructed of lumber that had been added after the original construction. The structure fell into disrepair with the enactment of the Emancipation Proclamation and the subsequent failure of the plantation system. All that remains on the site now is an historic scatter.

Potential for further work (in situ analysis) at this site is listed as good (Richner and Bagot, 1978).

X41HE102. This historic site is situated on a remnant terrace due east of Stephens Lake in Henderson County. The site consists of a standing two-story frame structure with a well and a fence and is in use today as a vacation dwelling. It was constructed in 1912 as a club house for the Island Fish and Game Club. Since 19[illegible] the land has changed hands a number of times. The land is presently being used for the production of hay and beef. The area of this site is 100 x 100 m. Potential for further work (in situ analysis) at this site is listed as good (Richner and Bagot, 1978).

X41HE103. This historic site is situated on a remnant terrace due east of Stephens Lake in Henderson County. The site is the former location of a barn built in 1915 by the Island Fish and Game Club. All that remains on the site is an historic scatter. The barn is not standing. Potential for further work on this site is questionable (Richner and Bagot, 1978).

X41HE104. This historic site is situated on a remnant terrace due east of Stephens Lake in Henderson County. It is the former location of a plank house constructed in 1891 on the Stephens Lake Ranch for recreational use in conjunction with a boat house (X41HE105). The original structure contained only one room; however, subsequent additions expanded it to four rooms and a screened-in porch. The house was torn down in 1972. Potential for further research on the site is questionable (Richner and Bagot, 1978).

X41HE105. This historic site, Ramsey Ferry Crossing, is located on the flood plain adjacent to "the cut off" at its intersection with the old Palestine-Corsicana Road in Henderson County. It was established in the first half of the 19th century to provide a land service route for a plantation located on the east side of the Trinity River. During post-civil war times, the ferry serviced the tenant cotton farming industry. It ceased operation in 1925 with the construction of a highway bridge. Two cottonwood trees that served as anchor posts for the ferry cables and the road leading to the ferry are all that remain of the site. Potential for further research on the site is questionable (Richner and Bagot, 1978).

X41HE135. This prehistoric site is located on a flood plain rise on the old Trinity River Channel at the north end of Stephens Lake in Henderson County. The site covers an area 20 x 25 m and 120 cm in depth. Ceramic materials recovered from a midden area indicate an early Neo-American occupation. Potential for analysis on this site is considered good (Richner and Bagot, 1978).

X41AN53. This prehistoric site is located on a cut bank on the eastern shore of the Trinity River in Anderson County. The site, measuring 200 m in length and 500 cm in depth, contains nine shell lenses exhibiting no visible lithic material. Extensive testing was conducted at this site as part of the Trinity River Survey; however, at that time the horizontal extent of the lenses was not determined and it is possible that there may be in situ cultural materials in the unexposed portions. Cultural affiliation is undetermined. Potential for analysis is good. Excavation and/or protection is recommended (Richner and Bagot, 1978).

X41AN55. This prehistoric site is located on a cut bank on the first terrace above the Trinity River south of X41AN53 in Anderson County. The site is a shell midden made up of several shell lenses 50 m in length. Two test units, totaling 28.5 m^2, were excavated as part of the survey in an attempt to determine the research

potential of shell middens in the area. The situ deposits contained chipped stone, fire-cracked rock and faunal materials. Cultural affiliation has not been determined. Potential for analysis is good (Richner and Bagot, 1978).

X41AN56. This prehistoric site is situated in a cut bank on the east side of the Trinity River in Anderson County. It consists of a shell lense 3 m in length and 5 to 7 cm in depth. The lense contained no lithic material; however, charcoal remains are present. Cultural affiliation has not been determined. Potential for analysis is good (Richner and Bagot, 1978).

X41HE78. This prehistoric site is situated on the north edge of a second terrace above the Trinity River flood plain east of Stephens Lake in Henderson County. Lithics, ceramics, charcoal and faunal materials were recovered from the site. The northern portion is deflated with clay at 6 cm; however, there is a midden on the western hill with 100 cm of deposition. The total size of the scatter is 133,000 m^2. Cultural affiliation is Archaic, Neo-American and Historic. Good research potential exists in the midden and on the knoll east of Stephens Lake (site form on file at TARL).

X41HE81. This prehistoric midden site is located on a terrace edge of the Turkey Creek drainage in Henderson County. The site contains a wide and fairly dense lithic scatter (100 m^2) with a depth of 100 cm. The cultural affiliation is Archaic and Neo-American. Sand quarrying activities have caused moderate disturbance to the site.

X41HE82. This prehistoric site is located on a sandy rise at the edge of a terrace west of Turkey Creek in Henderson County. Lithics, ceramics and fire-cracked rocks were observed over a 2,500-m^2 area to a depth of 120 cm. The site has been subjected to moderate disturbance by oil wells. Cultural affiliation is Neo-American. Research potential is good (site form on file at TARL).

X41AN17. This multicomponent prehistoric-historic site is situated on a terrace edge 2.4 km southeast of the confluence of Wildcat Creek and the Trinity River in Anderson County. The historic component contains a log cabin with a fireplace. Lithic material, fire-cracked rocks and charcoal were collected from the prehistoric component. The cultural affiliation of the prehistoric component is Neo-American. Site size is undetermined, depth of cultural material is 60 cm. Site disturbance is low; the area is wooded.

X41AN18. This prehistoric midden site is situated on a terrace edge east of the Trinity River in Anderson County. Lithic and ceramic materials collected from the site indicate an Archaic to Neo-American occupation. The scatter size is 40,000 m^2, the depth of the cultural material is 400 cm. A large area of the site has been destroyed by a quarry; however, it appears that the site may extend north and testing is recommended (site form on file at TARL).

There is a good potential that additional survey work will uncover sites eligible for the National Register. Under the Proposal for Agreement, determinations of eligibility would be made as each intensive survey by permit areas is conducted.

6. A brief statement explaining why any of the Criteria of Adverse Affect (800.3) apply:

For properties that may occur in the mining area, 800.3(b)(1) applies due to the nature of the project. Where an area is mined, all vegetation would be uprooted and moved and earth removed from depths up to 175 feet. This activity could destroy entire sites and alter specific properties. 800.3(b)(2) applies where a property may be avoided, but mined around. It cannot be determined whether 800.3(b)(3) and (b)(4) may apply without a survey of the area.

7. Written views of the State Historic Preservation Officer concerning the effect on property:

See attachment.

8. The views of other Federal agencies, state and local governments and other groups or individuals, when known:

9. A description and analysis of alternatives that would avoid the adverse effects:

Alteration of the mining plan, including omitting certain areas to be mined, and the placement of sediment ponds, diversions, and haul roads and other facilities to avoid disturbing earth of any sites discovered during surface and sub-surface surveys could be done.

10. A description and analysis of alternatives that would mitigate the adverse effects:

Due to the nature of the project proposed, and because no intensive survey has been carried out on the mine area, specific mitigation measures for unknown properties cannot be described. However, data recovery, photographing of resources, excavation and curation of objects and information to be accessible to the public would be the minimum expected. Possibly excavation and reassembling of historic structures would be required.

11. An estimate of the cost of the undertaking, identifying Federal and non-Federal shares:

No Federal funds are involved.

TEXAS HISTORICAL COMMISSION

CURTIS TUNNELL
EXECUTIVE DIRECTOR

P.O. BOX 12276
AUSTIN, TEXAS 78711
(512) 475-3092

March 3, 1983

RECEIVED
MAR 4 1983
SED

Clinton B. Spotts
Regional EIS Coordinator (6ES-F)
U.S. Environmental Protection
Agency
Region VI
1201 Elm Street
Dallas, Texas 75270

Dear Mr. Spotts:

The SHPO's office has complied the enclosed addendum to be attached to the Proposal for Agreement and the Preliminary Case Report as comments of the SHPO.

When we received the map of the project area and began review, we found several problems with the Preliminary Case Report. These are summarized below.

1. There is no overview of the cultural history of the area, or discussion of previous work, results, recorded sites, and tested sites. The bias of previous surveys toward prehistoric sites is not mentioned, nor is the value of the resources when considered as a whole.

2. The estimate of the area surveyed is inaccurate. According to our calculation between 30 and 40 percent of the mine lease area has been surveyed.

3. Sites listed in the Preliminary Case Report are located within the affected mine area and outside the area to be mined but within the mine lease area. Sites information is not keyed to the map of the project area, (Figure 1), so it is difficult to evaluate the effects of the proposed project on National Register or eligible properties. For example, the reader cannot determine whether a site is in an area to be mined or is located on the banks of the Trinity River, and will not be mined.

4. Several sites located in the affected mine area which must have testing or other evaluation measures before eligibility can be assessed are omitted.

We have attempted to address these points as adequately as time limits would allow.

We hope that the addendum will provide additional information which will aid in assessing the proposed project.

Sincerely,

LaVerne Herrington

LaVerne Herrington, Ph.D.
Deputy
State Historic Preservation
Officer

LH/lft

Enclosure

TEXAS HISTORICAL COMMISSION

CURTIS TUNNELL
EXECUTIVE DIRECTOR

P.O. BOX 12276
AUSTIN, TEXAS 78711
(512) 475-3092

March 1, 1983

Addendum to Preliminary Case Report for Trinity Mine

The following site descriptions, cultural-historical background and recommendations have been prepared by the office of the State Historic Preservation Officer to augment the draft EIS and Preliminary Case Report, and to serve as the comments of the State Historic Preservation Officer in initiating consultation with the Advisory Council on Historic Preservation.

The addendum has been organized into sections which correspond to the appropriate USGS Quadrangle on which the sites described below are located. Progressing from north to south, the following quadrangles include portions of the proposed Trinity Mine (Fig. 1):

Athens 15', Section 1
Tennessee Colony 15', Section 2
Malakoff 7.5', Section 3
Creslenn Ranch, 7.5', Section 4
Roustabout Camp 7.5', Section 5

Each of these sections is further divided according to the proposed impact. Cultural properties are discussed according to geographic section and by mining and related impacts. The impact areas are:

a) The Operations area and Malkoff Generating Station;

b) The affected mine area, or those areas which will be actually mined;

c) The mine lease boundary, or those areas within the boundaries of the mine lease that will not be mined but may be subjected to other or indirect impacts;

d) Outside the mine lease boundary, or those areas which are immediately adjacent to the mine property boundary. Sites occurring in these areas are summarized and provide an indication of the density and general settlement pattern for the area. These data are provided for comparative purposes.

Previous Investigations

Various stages of investigation have been conducted for two major projects located in the region; these projects overlap boundaries. The first project, Tennessee Colony Lake, was completed in four stages. Predictive surveys were conducted three seasons, and testing was conducted the fourth (Richner and Lee 1976, 1977; Richner 1982). A second reconnaissance, a study of the Trinity River Basin, was conducted in 1976 and 1977, with limited testing conducted at selected sites in order to provide assessments and statements of significance (Richner and Bagot 1978).

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Various smaller scale projects have occurred within, overlapped with, or bordered the mine lease. In 1978 a survey of portions of the Trinity River floodplain adjacent to and north of Turkey Creek was conducted (Hays and Larson 1978a). Seven sites were identified, and all were tested later that year (Hays and Larson 1978b). All of these sites lie within the affected mine area; however, only one is considered eligible for the National Register of Historic Places. In 1982 a 100% survey of the Malakoff Generating Station and Operations Area was conducted and resulted in the recording of more than 40 sites (Espey, Huston and Associates 1982).

A sampling survey was conducted in 1981 in the Forest Grove and Big Rock areas north and east of the proposed Malakoff Generating Station and resulted in the identification of more than 100 sites (Guderjan et al 1981). Additional investigations have been conducted south of the project area in Freestone County for the Big Brown Lignite Project (Wooldridge 1979; Pliska, Nightengale and Jackson 1980); west of the project area in Anderson, Henderson and Navarro counties for the proposed Richland Chambers Reservoir (Raab 1982); and immediately north of the Malakoff Generating Station for Cedar Creek Reservoir (Davis 1961, Story 1965). These investigations have resulted in the identification of more than 800 historic and prehistoric sites.

Thirty-seven recorded sites are located within the lease boundaries; 25 of these lie within areas to be mined while the remainder are outside the affected mine area. It is estimated that between 30 and 40 percent of the mine lease has been subjected to survey. Many of the 37 known sites, however, have not been assessed for significance according to National Register criteria. In addition many have been subjected to negative impacts since their discovery. It is desirable to relocate and reassess the prehistoric sites which have potential to meet eligibility criteria.

Although the surveys referenced above have emphasized prehistoric resources, a vast array of historic resources are located in and around the proposed mine area.

Tennessee Colony, in northwestern Anderson County, was settled in 1847. The town of Cayuga, named by one of the early Tennessee Colony settlers, is immediately east of the proposed mine boundary. Athens, in Henderson County, was established in 1850 and soon became established as a pottery and brick manufacturing center. Malakoff was also established in 1850, and became a commercial center for cotton and river commerce. Mining for lignite began in the early 1900's, and the area contains historic mines. Numerous ranches, whose holdings have remained in the same family for over 100 years, are located immediately proximate to the project area.

As noted above an intensive pottery industry flourished in Henderson County in the 1800's. Documentation has been found which traces the industry's beginning to 1857 in Athens, Texas. Athens became a center for the industry. housing

such companies as the Athens Pottery Company, Miller Pottery, and Holloway Pottery. A branch of the industry moved to Malakoff, where various others began business. Clay was mined from pits within the Athens-Malakoff area; brickmaking still continues there today (from the files of the State Archeologist, Henderson County).

The combined results of the Tennessee Colony and Trinity River Basin surveys identified 87 historic sites which date prior to 1930; some have historical references which indicate occupation as early as 1800. This portion of Texas has been intensively occupied for over 5,000 years; the historic period plays an important part in the land use patterns and settlement and adaptive strategies through time for the area.

Additional work in the region should consider resources of the historic period as well as those of the prehistoric period. Sites of the historic period should be relocated and evaluated. Historic accounts, records and documents should be searched to determine if significant properties are present before additional surveys are conducted.

Athens USGS 15' Quad; EIS, Figure 1, Section 1

Survey, Affected Mine Area

Surveys for two previous projects, Tennessee Colony Lake (Richner and Lee 1977) and the Trinity River Basin Study (Richner and Bagot 1978) have been performed in the mine area. The areas surveyed are about 5 percent of the total mine area located in Section 1. No sites were recorded in the area surveyed. Using information included in the Guderjan survey described below, it can be predicted that additional sites will be present in the affected mine area.

Survey, Outside the Mine Lease Boundary

To the north of the mine area a sampling survey for a lignite mine has been conducted. The area surveyed was approximately one-third the size of the mine impact area in Section 1 and resulted in identification of 45 sites (Guderjan et al 1981). One prehistoric site, Big Rock Shelter, was determined to be significant and recommended for mitigation of adverse impact (Guderjan et al 1981:93)

Small areas to be modified to decrease erosion by the Soil Conservation Service, and one area to be used as a waste treatment facility, have been surveyed with negative results.

Tennessee Colony 15' USGS Quad; EIS, Figure 1, Section 2

Survey, Affected Mine Area

Approximately 30 % of Section 2 has been surveyed in conjunction with the proposed Tennessee Colony Lake (Richner and Lee 1977) and the Trinity River Basin Study (Richner and Bagot 1978). No sites were recorded in this area during these surveys. Parts of the mine area have been disturbed by the Cayuga Oil Field and related development. The mine area is also located in an upland area at a distance of a mile or so from a major water source. The potential for prehistoric sites is somewhat lower than in other mine areas. The potential for historic sites is high.

Survey Areas Outside Mine Lease Boundary

Directly east at a distance of 1/2 mile from the mine area boundary, five sites were identified during the Trinity River Study. To the south at a distance of 1½ miles, ten sites have been recorded in the course of the same study.

Malakoff USGS 7.5' Quad; EIS, Figure 1, Section 3

Portions of two previous surveys intersect the mining operations area which was subjected to 100 percent survey by Espey, Huston and Associates in 1982. Tennessee Colony Lake Project (Richner and Lee 1977) and Trinity River Basin Survey (Richner and Bagot 1978) intersected the northwest portions of the operations, but no sites were identified within the area.

Areas Outside Affected Mine Area Boundary

Survey for the proposed Tennessee Colony Lake (Richner and Lee 1977), for the Malakoff Electric Generating Station (Espey, Huston and Associates 1982), Cedar Creek Reservoir (Davis 1961, Story 1965) and in the Forest Grove and Big Rock areas (Guderjan et al 1981) have resulted in the recordation of more than 80 sites which are located on the Malakoff Quad.

Survey for the Malakoff Generating Station resulted in recordation of 28 sites in an area approximately the same size as Section 3. The mine area is located at higher elevations than the electric generating station, so there may be somewhat fewer sites present in the mine area.

Directly north of Section 3, the Forest Grove survey recorded 48 sites in an area of similar size and topography to mine area 3.

Creslenn Ranch USGS Quad; EIS, Figure 1, Section 4

Survey, Affected Mine Area

Surveys conducted for the proposed Tennessee Colony Lake (Richner and Lee 1977) and for the Trinity River Basin Study (Richner and Bagot 1978) have resulted in 40 to 45 percent of the affected mine area being surveyed. Survey conducted for North American Coal in 1978 overlapped some of the areas surveyed earlier.

Sites located in the affected mine area are X41HE77, 79, 80, 81, 89, 100, 101 and field numbers F1-F7. These sites are described as follows.

Site X41HE77 is 17,000 square meters in size and contains 40 centimeters of material from the prehistoric period, as well as a historic component dating between 1850 and 1925. It is eroded to the clay subsoil. Faunal remains are present (Richner and Lee 1977:158,170).

Site X41HE79 is 250 square meters in size and dates to the late Neo-American period. Deposits are 30 centimeters in depth. The site has been moderately disturbed, and has poor potential for the recovery of carbon materials, faunal remains and in situ deposits (Richner and Lee 1977:158,170).

Site X41HE80 is 1,000 square meters in size and contains material 40 centimeters in depth which dates to the prehistoric period. The site has been moderately disturbed and has poor potential for the recovery of carbon samples and in situ materials (Richner and Lee 1977:158,170).

Site X41HE81 is described in the Preliminary Case Report. The published references are Richer and Lee 1977 and Richner 1982. This site was tested by Southern Methodist University during the third season at Tennessee Colony Lake (Richner 1982), and determined to be a badly disturbed Neo-American campsite. Although deposits were up to 1 meter in depth in some areas, recent bioturbation apparently has destroyed the integrity of the subsurface desposits at this site.

Site X41HE82 is described in the Preliminary Case Report. The published reference, Richner and Lee 1977, should be cited in place of the "site form, TARL" reference.

Site X41HE89 consists of a scatter of cultural materials. It is disturbed, with only fair potential for recovery of carbon material, faunal remains or in situ materials (Richner and Bagot 1978:261).

Sites X41HE100 and 101 have good research potential. Both 100 and 101 are located on remnant terraces and have been subjected to minimal disturbance. There is a high potential for the presence of in situ deposits (Richner and Bagot 1978:261). Both sites are listed in the Preliminary Case Report.

Sites X41HE81, 82, 100 and 101 are potentially eligible for the National Register of Historic Places and merit further evaluation. Sites X41HE77, 79, 80 and 89 apparently have a low information yield potential and are probably not individually eligible for the National Register of Historic Places.

Survey, Within Mine Lease Boundary

Sites located near or on the boundary of the affected mine area are X41HE74, 78, 85, 88, 90, 91, 92, 102, 103, 104 and 105. These sites are described as follows.

Site X41HE74 is 1,200 square meters in size and contains deposits 40 centimeters in depth. Materials have been assigned to the prehistoric period (Middle to Late Archaic). Also present is an historic component which dates between 1840 and 1925. The potential for research is apparently low in that the site is highly eroded and has a low potential for recovery of in situ remains, including carbon and faunal materials (Richner and Lee 1977:170).

Site X41HE78 is 133,000 square meters in size and has 100 centimeters of deposits. The time of occupation ranges from Late Archaic to Late Neo-American; an historic component dating between 1850 and 1925 is also present. In situ materials, carbon materials and faunal remains are present; there has been low to moderate disturbance (Richner and Lee 1977:158:170). The site merits additional evaluation to determine its significance.

Site 41HE85, dating from the Middle to Late Archaic, consists of 10 centimeters of deposits over a 2,000 square meter area. The site has very high erosional disturbance and a low potential for the recovery of in situ remains (Richner & Lee 1977:170)

Site X41HE88 contains prehistoric materials and has a low potential to yield additional information. The site is deflated and the potential for datable material in situ is negligible (Richner and Bagot 1978:261).

Site X41HE90 consists of a building dating to the 1880's. It has been minimally disturbed and is judged to have fair potential for in situ materials. The building is important for its style of construction (Richner and Bagot 1978:261). It is potentially eligible for the National Register of Historic Places.

Site X41HE91 is the location of a building dating to 1920-1926 (Richner and Bagot 1978:261). The site is deflated, and there is low potential for in situ materials; however, historic ceramics are present.

Site X41HE92 is a small prehistoric site situated on the first terrace above the Trinity River. The site has a poor potential for recovery of faunal and radiocarbon materials. There is a fair potential for in situ remains, although the site depth is unknown at this time. Additional evaluation is necessary to determine eligibility.

Site X41HE102 is listed in the Preliminary Case Report. Further evaluation is required to determine eligibility.

Site 41HE103 is listed in the Preliminary Case Report. Additional evaluation is necessary to determine eligibility.

Site X41HE104 dates to 1881. Because of the early date of this historic site, it is potentially eligible for the National Register of Historic Places. Further evaluation to determine eligibility is desirable as the site may contain additional significant information. The site is listed in the Preliminary Case Report.

Site X41HE105, listed in the Preliminary Case Report, is located on the Cutoff of the Trinity River. Mining generally does not occur adjacent to a body of water of this size; however, if the site will be impacted, further evaluation may be necessary to determine eligibility.

Testing, Affected Mine Area

Six prehistoric sites, F1, F2, F3, F4, F6, and F7, were tested to determine if they meet the criteria of eligibility on the basis of the information they contain (Hays and Larson, 1978b).

Only F3 is potentially eligible for nomination to the National Register. The site contains faunal and lithic materials, but no features were encountered during testing. The site is located in a geologic setting similar to X41HE81 (Hays and Larson 1978b:72). Site F3, located in an area planned for mining in 1988, should be reevaluated if it cannot be avoided.

One historic site, F5, was also tested, but did not meet the criteria for eligibility on the basis of information contained in the site. However, at F5 a log cabin, in use as a barn at the time of survey, is recommended for reconstruction (Hays and Larson 1978b). Additional evaluation will be desirable if the area is to be mined as proposed for 1991.

Roustabout Camp, USGS 7.5' Quad; EIS, Figure 1, Section 5

Survey, Affected Mine Area

No sites have been recorded within the affected mine area on the Roustabout Camp quadrangle, although two surveys have been conducted in approximately 40 percent of the affected area on this quad (Richner and Bagot 1978, Richner and Lee 1977). The reasons that sites have not been recorded in this area are unknown and merit further study.

Survey, Areas Within Mine Lease Boundary

Eight sites have been identified within the mine lease boundary adjacent to the Trinity River in Anderson County. Although these sites will not be directly impacted by mining, indirect impacts are possible. Five of these sites -- X41AN17, X41AN18, X41AN53, X41AN55, X41AN56 -- are described in the Preliminary Case Report. It should be noted, however, that trinomial designations assigned by Texas Archeological Research Laboratory are available for four of these sites and should be used. The following list is a correlation of TARL numbers with the previous designations: X41AN17 = 41AN77; X41AN18 = 41AN78; X41AN55 = 41AN80; X41AN56 = 41 AN83. The TARL designations will be referenced hereafter.

Three sites (41AN79, 41AN81, X41AN70) not included in the Preliminary Case Report which lie within the mine lease are described below.

41AN79 (previous designation X41AN54)

This prehistoric site is situated on the first left bank terrace above the Trinity River on the southern slope of Lindsey Bluff. It was originally recorded in 1976 during the survey conducted for the Trinity Basin Survey (Richner and Bagot 1978:263). The site is a midden deposit approximately 1 meter in depth, and is being eroded by the Trinity River. The site was recommended by the investigators in order to assess the deposits on the basis of National Register of Historic Places criteria. The potential for dateable remains and functional information is presently unknown; however, the remaining deposits appear to be intact and the site may be eligible for inclusion on the National Register of Historic Places.

41AN81 (previous designation X41AN48)

This Neo-American campsite is situated on the left bank second terrace above the Trinity River. Native American sherds were recovered from the surface of the midden. The site is minimally 35 centimeters deep, and has been disturbed by recent oil drilling activities. It was originally recorded in 1976 during the course of the Trinity River Basin Survey and, although disturbed, was assessed as having a moderate potential to yield in situ deposits, charcoal and faunal materials. This site may be eligible for inclusion on the National Register of Historic Places.

X41AN70

This site consists of a shell midden, with the areal and vertical extent undetermined at this time. It was recorded in 1976 during the course of the Trinity River Basin Survey (Richner and Bagot 1978:263) and, at that time, had only minimal disturbance. It is situated on a low, left bank first terrace 1.5 meters above the Trinity River, and contains prehistoric materials. The investigators assess the information yield potential as high; there is a high probability that intact charcoal and faunal remains and in situ deposits may be recovered. The site may be eligible for inclusion on the National Register of Historic Places.

Discussion

The area contained within and surrounding the proposed Trinity Mine represents a transitional zone between three cultural areas. The counties of Anderson, Freestone, Henderson, Houston, Leon, Madison and Navarro represent the area where the North Central Plains, Northeast Texas and Southeast and Central Coastal Texas culture areas merge. These areas are associated with time periods and/or developmental stages (Brown et al 1982). A flourescence of cultural remains from one area, then another, is expected to occur; this has been documented in recent investigations. For example, results of the survey of the proposed Millican Reservoir demonstrated that cultural affinities in the Neo-Archaic (Late Prehistoric) period in Leon and Madison counties closely resemble the Wylie Focus defined for Northcentral Texas. The Late Archaic, however, appears to be more closely tied to eastern areas (Kotter 1982:33).

A cultural transition zone contains information which is significant in many aspects. Interregional and intraregional exchange can be addressed using material remains from sites within these areas. This, in turn, presents an opportunity to study, for example, socio/political and religious mechanisms for a larger area. An understanding of social organization, societal interaction and developmental aspects of social groups can be gained through documentation and analysis of regional exchange and interaction. In addition, the history of land use patterns for a geographical transition zone may be addressed, and utilized as a comparative data base for surrounding areas. Raab (1982) has compiled a preliminary data base which can be used to address these problems. The studies conducted to date for the Richland Chambers project have provided significant settlement pattern and social organizational data for a portion of this transitional zone. Continuing studies for this project may well result in a development of a comprehensive cultural history for this area. The retrieval of data from the Trinity Mine area is necessary in order to provide a valid areal base.

The seven counties listed above contain deep basin and near-surface lignite deposits. The proposed long-term mining plans for this area will adversely affect cultural properties in this important area, and result in a loss of information. The loss of this information should be carefully considered. Perhaps a means of mitigating the loss of this data should include a comprehensive study of all work performed to date, individual detailed site summaries and an extensive report detailing the cultural-historical implications of land use patterns through time. This may include relocating and reevaluating known sites.

Table 1 presents all known sites which are located within the mine lease property boundary, excluding the Malakoff Generating Station and Operations areas. All sites for which assessments of unknown potential or good potential have been made should be relocated and reevaluated if they will be adversely affected. Because six to eight years have passed since these sites were recorded, the present condition may differ and thus the information yield potential of a site may be altered. A current status report of those sites which may contain significant information is often a prudent and cost-effective step in the investigation of an area such as this. Changes in

TABLE 1

Assessments of Known Sites Within Trinity Mine Lease Boundaries

Sites Within Affected Mine Area		Sites Within Mine Lease Boundary	
X41HE77	potential unknown	41AN77	good potential
X41HE79	low potential	41AN78	potential unknown
X41HE80	low potential	41AN79	good potential
* X41HE81	low potential	41AN80	good potential
* X41HE82	good potential	41AN81	good potential
X41HE89	potential unknown	41AN83	good potential
* X41HE100	good potential	X41AN53	good potential
* X41HE101	good potential	X41AN70	good potential
		X41HE74	low potential
Sites F1	low potential	* X41HE78	good potential
F2	low potential	X41HE85	low potential
F3	good potential	X41HE88	low potential
F4	low potential	X41HE90	good potential
F5	potential unknown	X41HE91	potential unknown
F6	low potential	X41HE92	potential unknown
F7	low potential	* X41HE102	good potential
		* X41HE103	good potential
		* X41HE104	good potential
		* X41HE105	good potential
		* X41HE135	good potential

* denotes sites described in the Preliminary Case Report

site integrity and potential were found, as an example, during the recently completed survey of the proposed Richland Chambers Reservoir. These changes often alter management plans and mitigation responsibilities. Current assessments are necessary in order to determine eligibility, implement long range plans, and initiate mitigation measures.

The Preliminary Case Report states that approximately 12 percent of the mine lease property has been surveyed. The State Historic Preservation Officer calculates that approximately 30 to 40 percent of the mine lease property has been surveyed. Further work should define the exact percentage of project lands already surveyed.

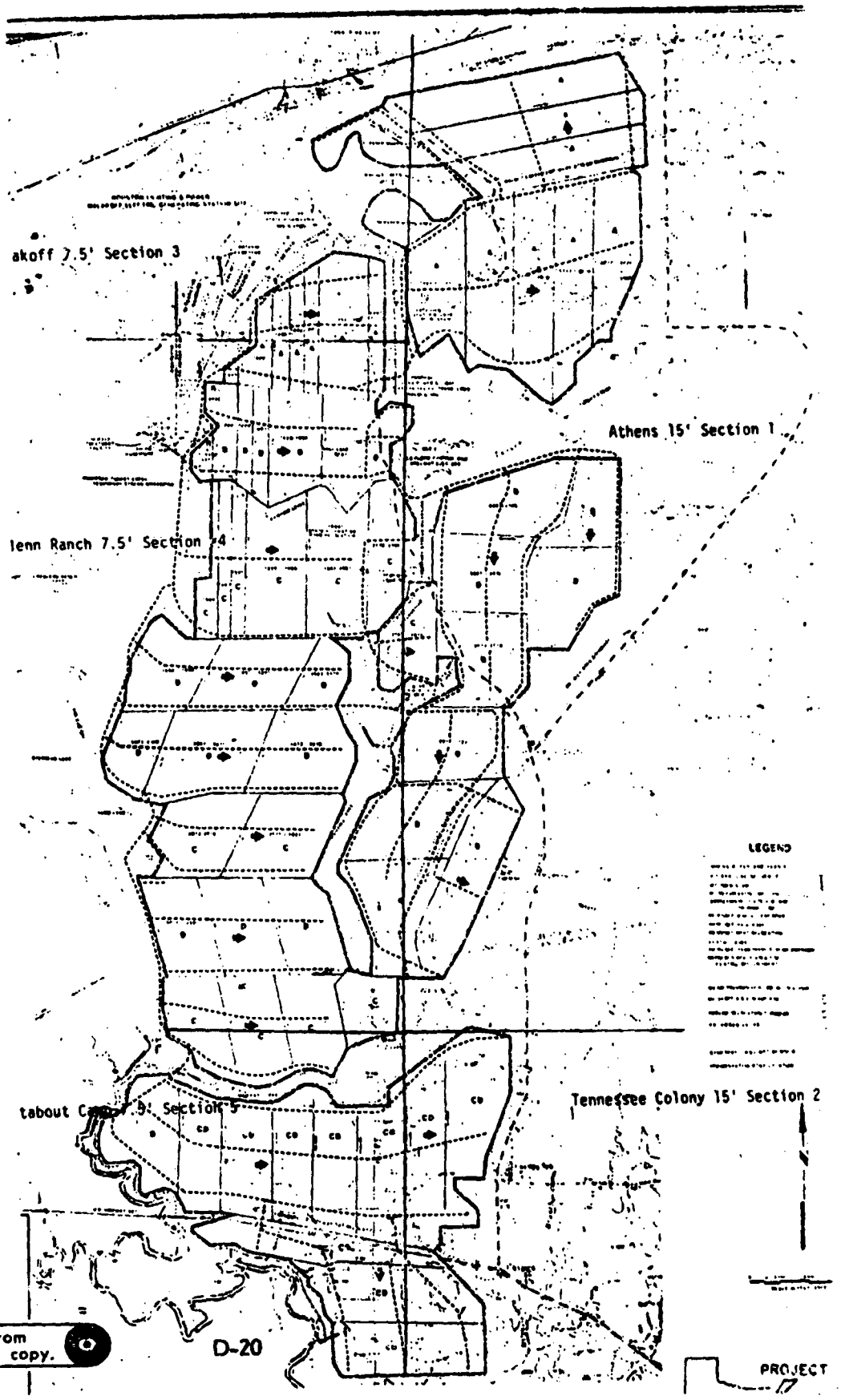
Trinomial designations provided by the Texas Archeological Research Laboratory (TARL) of The University of Texas should be obtained for site numbers prefixed by an X or F. Further work must include obtaining site numbers from TARL for those sites.

Conclusions

Although no sites located within the affected mine area or between this area and the mine lease boundary are listed or determined eligible for listing on the National Register of Historic Places, some sites have good potential to contain important information, and others require further evaluation to determine significance. (Table 1).

No survey has been performed specifically for the lignite prospect; all information concerning the region is gained through previous investigations for other projects conducted several years past. Prior survey methodologies and criterion of evaluation may not be entirely appropriate for the proposed project. In addition, the condition of the sites may have changed since they were recorded. The SHPO recommends that sites which have potential to be eligible, or for which further evaluation is necessary to assess significance, should be relocated and reevaluated through field inspection. Recommendations for additional surveys should be formulated after sites are relocated and additional data are complied as additional survey may be unnecessary for some areas. A study of work performed to date, individual detailed site summaries, and synthesis of information will be valuable in determining future survey strategies, and assessing significance of historic properties.

Sites eligible for listing on the National Register of Historic Places are thought to be present in the proposed project area, but additional evaluations are necessary before requests for determinations of eligibility can be submitted.



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Advisory Council On Historic Preservation

1522 K Street, NW
Washington, DC 20005

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Mr. Clinton B. Spotts
Chief
Federal Activities Branch
Environmental Protection Agency
Region VI
1201 Elm Street
Dallas, TX 75270

Dear Mr. Spotts:

The enclosed Memorandum of Agreement has been ratified by the Chairman of the Council. This document constitutes the comments of the Council required by Section 106 of the National Historic Preservation Act and the Council's regulations. A copy of the ratified Agreement has also been sent to the Texas State Historic Preservation Officer.

The Council appreciates your cooperation in reaching a satisfactory resolution of this matter.

Sincerely,

Thomas F. King
Director, Office of Cultural
Resource Preservation

Enclosure

Advisory
Council On
Historic
Preservation

1522 K Street, NW
Washington, DC 20005

MEMORANDUM OF AGREEMENT

WHEREAS, the Environmental Protection Agency (EPA) has determined that the issuance of a National Pollutant Discharge Elimination System permit to the North American Coal Corporation for the Trinity Mine will have an effect upon properties incuded in or eligible for inclusion in the National Register of Historic Places pursuant to Section 106 of the National Historic Preservation Act (16 U.S.C. 470) and its implementing regulations, "Protection of Historic and Cultural Properties (36 CFR Part 800),"

NOW, THEREFORE, EPA, the Texas Historic Preservation Officer, and the Advisory Council on Historic Preservation agree that the undertaking shall be implemented in accordance with the following stipulations in order to take into account the effect of the undertaking on historic properties.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
1201 ELM STREET
DALLAS, TEXAS 75270

PROPOSAL FOR AGREEMENT

1. EPA will incorporate by reference the following conditions into the original and appropriate subsequent NPDES permits for the Trinity Mine operated by North American Coal Corporation (NACCO) in Henderson and Anderson Counties, Texas.

   a. Prior to any ground disturbing activities in any area, NACCO will complete intensive historic and cultural surveys of all acreages to be disturbed in such area including a sufficient buffer zone of 50 feet whenever possible to ensure the identification of all National Register or eligible properties that may be affected directly, or indirectly, by mining and related activities in accordance with the proposed guidelines for the Recovery of Scientific, Prehistoric, Historic and Archeological Data; Methods, Standards and Reporting Requirements published in the Federal Register on January 28, 1977, unless SHPO has recommended in writing to NACCO that a survey is unnecessary. NACCO will develop an investigation strategy plan for the survey(s) in consultation with the Texas SHPO, for review and approval. Unless the Texas SHPO notes an objection within 15 working days after receipt, the survey(s) may proceed. If the SHPO notes an objection, the matter will be resolved promptly by the SHPO and NACCO before a survey proceeds.

   b. NACCO shall provide documentation including site forms, location map, photographs and survey reports to the Texas SHPO about the historic and cultural properties identified by the survey(s) to enable the SHPO to assess the eligibility of the property for inclusion in the National Register of Historic Places. Site forms which include location information shall be provided to the SHPO on a weekly basis as field surveys proceed.

   c. Should the Texas SHPO determine that a property does not meet the criteria for inclusion in the National Register, NACCO will identify the property on its detailed construction plans and no special protection need be afforded the property when encountered during construction or mining.

   d. Should a property be found to meet the criteria for inclusion in the National Register, and where it is not possible to avoid or to protect it from subsequent construction and related actions, NACCO will, prior to any ground disturbing activity in the vicinity of the property, treat the property as follows:

(1) If the property is significant (as defined by the criteria listed in 36 CFR Section 60.6 for the nomination to or determination of eligibility for the National Register) primarily in the data it contains so that retrieval of the data in an appropriate manner may preserve this significance, NACCO, in consultation with the Texas SHPO, will develop and implement a data recovery program in accordance with the Advisory Council on Historic Preservation Handbook for the Treatment of Archeological Properties, as published in the Federal Register on November 26, 1980. NACCO will submit a data recovery plan to the Texas SHPO for review and approval prior to its implementation and prior to initiating any action that would affect the property.

Unless the Texas SHPO notes an objection within 15 working days after receipt, the data recovery plan may be implemented. If the SHPO notes an objection, the matter will be resolved promptly by the SHPO and NACCO before the data recovery proceeds.

(2) If the property is significant (as defined by the criteria listed in 36 CFR Section 60.6 for the nomination to or determination of eligibility for the National Register) primarily for architectural or historical values, NACCO will consult with the Texas SHPO to develop a mutually acceptable program which is to be implemented by NACCO, to ensure preservation, relocation, and/or recordation of the property. If the property is to be relocated or otherwise rehabilitated and preserved, the mitigation program will conform to the Secretary of the Interior's Standards for Rehabilitation.

Prior to demolition or alteration of any such property, NACCO will record the property on the Inventory Nomination Form, NPS 10-900 as provided by the USDOI, National Park Service, National Register of Historic Places so that there will be a permanent record of its present appearance and history. NACCO will first contact the Historic American Buildings Survey (HABS) or the Historic American Engineering Record (HAER), National Park Service, Department of the Interior by telephone, in emergency situations or in writing otherwise to determine what documentation will be required prior to the demolition or alteration of the property. NACCO will provide the documentation in writing to HABS or HAER and to the Texas SHPO.

e. NACCO will ensure that all survey, evaluation, data recovery, mitigation measures and monitoring will be conducted under the direct supervision of person(s) who meet, at a minimum, the applicable professional qualifications set forth in the Recovery of Scientific, Prehistoric, Historic and Archeological Data; Methods, Standards and Reporting Requirements (proposed guidelines) as published in the Federal Register on January 28, 1977. NACCO's archeologist will be present during ground disturbing activities in areas where the archeologist in consultation with SHPO's office has predicted that significant subsurface cultural material is likely to occur. The archeologist will train appropriate personnel such as equipment operators or shift foremen

to recognize cultural properties should they be encountered in areas where they were not predicted.

f. NACCO will stop activities that would adversely affect a historic or cultural property that is discovered during construction related operations until the Texas SHPO has been given an opportunity to inspect the property, and whatever preservation or recovery measure that is agreed upon has been completed. Two working days from telephone notice by NACCO will be allowed to commence and complete this inspection. Recovery measures will require additional time.

g. NACCO will provide a draft copy of all reports required by this agreement to the Texas SHPO for review and comment. All such reports of work accomplished will meet, in content and form, standards generally expected by historic preservation professionals as portrayed in proposed guidelines for the Recovery of Scientific, Prehistoric, Historic and ARcheological Data; Methods, Standards and Reporting Requirements published in the Federal Register on January 28, 1977.

h. NACCO will provide at least two copies of final reports of the data recovery to the Texas SHPO. A copy of any final technical reports will also be furnished to Interagency Resource Management Division Department of the Interior, Washington, D.C. 20240, for possible submission to the National Technical Information Service (NTIS). Any precise locational data must appear in a separate appendix and will be withheld from NTIS publication pursuant to Section 11 of the General Authorities Act of 1970, as amended (Public Law 94-453).

i. NACCO will ensure that all notes, photographs, negatives, and processed data (tables, maps, etc.) will be stored in good order and in a manner that makes them available for future study at an appropriately equipped institution that meets the standards set forth in the Recovery of Scientific, Prehistoric, Historic and Archeological Data; Methods, Standards and Reporting Requirements (proposed guidelines) as published on January 28, 1977, and that makes these data available to other parties for research or other appropriate purposes.

j. North American Coal Corporation, on its own initiative, may develop a preservation plan which meets the stipulations of this memorandum of agreement. Such a plan, if developed, must meet the approval of the SHPO.

2. Upon written notice from any of the signatory parties that any of the conditions of this Agreement are being violated, EPA, the Texas SHPO, NACCO, and the Council shall consult to determine how the concern should be resolved.

3. If a signatory party determines that the terms of this Agreement cannot be met or believes a change is necessary, the signatory shall immediately request the signatory parties to consider an amendment of the Agreement. Amendments will be executed in the same manner as the original Agreement.

4. If any of the Stardards, guidelines, principles, regulations, laws, or form cited in this Proposal for Agreement are revised or replaced the most current standard, guideline, principle, regulation, law or form will be used as the basis for fulfilling the terms of this Agreement.

Francis E. Phillips 7.6.83
Environmental Protection Agency (Date)

22 April 1983
Texas State Historic Preservation Officer (Date)

Execution of this Memorandum of Agreement evidences that EPA has afforded the Council a reasonable opportunity to comment on the issuance of NPDES permit to the North American Coal Corporation for the Trinity Mine and its effects on historic properties and that EPA has taken into account the effects of its undertaking on h storic properties.

Robert Bauer May 20, 1983
Executive Director, (date)
Advisory Council on Historic Preservation

Alexander Aldrich 5/25/83
Chairman (date)
Advisory Council on Historic Preservation

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
1201 ELM STREET
DALLAS, TEXAS 75270

August 30, 1983

Dr. LaVerne Herrington
Texas Historical Commission
P.O. Box 12276
Austin, Texas 78711

Dear Dr. Herrington:

Based on cultural resource surveys of the Malakoff power plant site, transmission lines and water intake structure, EPA has determined that there will be no effect on cultural properties listed in or eligible for listing in the National Register of Historic Places due to construction and operation of the Malakoff Electric Generating Station.

If you concur with our determination of no effect we would appreciate receiving a letter stating your concurrence. It is our intent to incorporate your letter of concurrence into the Final Environmental Impact Statement for the Malakoff Electric Generating Station/Trinity Mine.

Sincerely yours,

Clinton B. Spotts

Clinton B. Spotts
Chief, Federal Activities Branch (6ES-F)

cc: Steve Davies, HL&P

SEP 6

APPENDIX E

SOIL RECONSTRUCTION PLAN FOR THE TRINITY MINE

A detailed assessment of the prime farmland resource within the project area is presented in the Draft Environmental Impact Statement (DEIS) in Section 5.3 Prime Farmland. The impact analysis presented in the DEIS is premised upon a worst-case basis. Out of a total of 5,188 ha (23,796 ac) of prime farmland, an estimated 3,829 ha (9,338 ac) are to be reconstructed during the life of the mine.

The North American Coal Corporation's (NACCO) preferred soil reconstruction alternative for the project area's prime farmland is the utilization of: (1) mixed overburden as a soil substitute for upland mining blocks, and (2) selectively segregated overburden as a soil substitute for alluvial mining blocks. NACCO will employ the following chemical and physical criteria to further selectively handle overburden during soil reconstrution operations:

1. If (total alkalinity - total acidity) greater than minus 10.0 tons of $CaCO_3$ equivalent per 1,000 tons of sampled interval and the sampled interval is projected to occupy greater than 10.0 percent of reconstructed surface 48-inch increment by volume, the interval will be selectively handled and placed below the 0-to 48-inch reconstructed surface layer; and

2. If gravel-sized fragments (2.0 mm to 762 mm) would comprise greater than 35 percent by volume and/or cobble-sized fragments (762 mm to 25.4 mm) would comprise greater than ten percent by volume of the projected reconstructed surface 48-inch increment due to a sampled interval, then that interval will be selectively handled and placed below the 0- to 48-inch reconstructed surface layer.

The procedures and operational measures that NACCO will employ to mitigate mining impact on land productivity include:

1. Research Studies. NACCO is conducting extensive field research studies to evaluate the suitability of using overburden as a substitute for the premining solumn (topsoil and subsoil). The field studies are designed to evaluate the treatment effects of rotating soil building 'green-manure' crops such as rye, hairy vetch, subterranean clover and sorghum-sudangrass on productivity. The field studies include the two most productive SCS prime farmland soil units, the Freestone and Kaufman series, as productivity reference standards.

2. Overburden Characterization. NACCO extensively samples, analyzes and models projected surface characteristics of project overburden for recognized productivity correlated characteristics.

3. Selective Handling of Overburden: NACCO is developing operational procedures to selectively handle in-place overburden based upon the previously defined selection criteria.

4. Recovery of Premining Contours. NACCO will return the land back to its approximate original contour. Thus, the topographic benefits of less than ten

percent slopes on productivity will be recovered during soil reconstruction operations.

5. Organic Matter Amendments. NACCO is currently evaluating the treatment effects of incorporating 'green-manures' into the reconstructed soil surface as a measure to recover soil productivity as required by the RRC.

6. Permanent Vegetation. NACCO will reestablish a final cover of permanent vegetation of the amounts and kinds required by the RRC and landowners. The final cover is anticipated to provide relative economic returns from investment as was attained prior to mining (Note: investment return relative to cost of production and market value of product).

7. Extended Responsibility. NACCO will manage each reconstructed surface acre for a minimum period of five years to ensure that productivity levels are stable and not subject to fluctuations, except as influenced by weather, pest and other environmental stresses unrelated to mining-reclamation operational influences.

The measures which NACCO routinely practice that will assure the incorporation of 'current best technology' into the operation are:

1. Literature Review. NACCO continually evaluates soil reconstruction-revegetation procedures as available through published journals, such as The Soil Science Society of America Proceedings, The Agronomy Journal, The Journal of Environmental Quality, The Journal of Soil Tillage Research, and The Journal of Soil and Water Conservation, etc.

2. Research Studies. As previously stated, NACCO conducts scientific studies on preferred reclamation procedures.

3. Advanced Overburden Characterization. As previously stated, NACCO conducts extensive premining studies to characterize and model the recognized productivity charactistics of the project schedules.

4. Topsoiling Default. NACCO is developing operational procedures designed to segregate and redistribute topsoil in the event that (1) NACCO's field research results are inconclusive or indicate that overburden is not a suitable soil substitute, and/or (2) other available research results cannot technically support NACCO's preferred soil reconstruction alternatives.

Lastly, NACCO contends that reconstructed soil characteristics should not be quantitatively diminished with respect to undisturbed soil characteristics of SCS prime farmland. Table 1.0 presents information supporting our contention. Table 1.0 is based upon:

1. Technical discussions with Texas SCS personnel (Temple, TX) regarding soil characteristics in Texas which correlate with Texas prime farmland.

2. Comparison of project overburden characteristics with respect to (i) general SCS soil characteristics correlated to SCS prime farmland, (ii) SCS prime farmland laboratory data for project SCS prime farmland, and (iii) SCS laboratory data of mixed overburden via the tentative Bigbrown series (randomly-mixed Wilcox Formation).

The information presented in Table 1.0 shows that the Trinity Project and/or similar (Bigbrown) overburden fall in the range of (based upon available information) the general soil characteristics correlated to Texas' prime farmland, with the exception of the available water capacity (AWC) data of some intervals of cores TRCC-1, TRCC-4, and MC-81-11CC (Note: not all intervals, within 0-40" increment, of the Freestone series fall within the general SCS AWC range for prime farmland). This information illustrates our contention that there may not be a significant loss of SCS prime farmland characteristics since project overburden falls within the range of acceptable characteristics (as defined by Texas prime farmland).

TABLE 1.0

COMPARATIVE UNIT CHARACTERISTICS FOR SCS PRIME FARMLAND AND TRINITY PROJECT/RELATED OVERBURDEN

	Texas SCS Correlated Soil Characteristics Paramters										
Unit Name	AWC in./in.	Temp.[2] F°	pH	Drain-age Class	Elec. Cond. mmhos/ cm.	Na Sat. Pct.	Flooding	Slope Pct.	Wind[4] Eroda-bility	Perme-ability in./hr	Coarse Frag. Pct. Volume
General SCS Prime Farmland Levels	≥ 0.15	≤ 32°	4.5-8.4	1-3	≤ 4.0	≤ 15	≤ 0.5 Prob	≤ 5.0	N.A.	≥ 0.06	≤ 35.0
Freestone: Upland SCS Prime Farmland	0.10-0.18	≤ 32°	4.5-7.8	2	≤ 4.0	< 15	0.5 Prob.	0-5	N.A.	0.06-6.0	< 5.0
Kaufman: Alluvial SCS Prime Farmland	0.15-0.20	≤ 32°	5.6-8.4	1	≤ 4.0	≤ 15	Cond. on[7] Levee	0-3	N.A.	< 0.06-0.2	0.0
TRCC-1: Project Overburden	0.10	≤ 32°	6.6-6.8	-[6]	-	-	0.0 Prob.	0-5	N.A.	-	<35.0
MC81-10CC: Project Overburden	0.15-0.18	≥ 32°	5.2-5.7	-	≤ 4.0	< 15	0.0 Prob.	0-5	N.A.	-	<35.0
TRCC-4: Project Overburden	0.12-0.13	> 32°	6.1-7.0	-	-	-	0.0 Prob.	-	N.A.	-	<35.0
MC81-11C: Project Overburden	0.13-0.16	≤ 32°	7.6-7.8	2-3	-	-	Cond. on Levee	0-3	N.A.	-	<35.0
Bigbrown Series[5]	0.10-0.18	> 32°	5.6-8.4	3	-	-	0.0 Prob.	1-60	N.A.	0.06-2.0	< 1.0

[1]Based upon information determined from SCS, Temple, TX.

[2]Based upon yearly climatological data and air temperature effects on soils.

[3](1) = somewhat poorly drained; (2) moderately well drained; (3) well drained.

[4]Not applicable in East Texas.

[5]Big Brown series is a mixed overburden characterized by SCS. Material is mixture of the Wilcox Formation.

[6]Data unavailable.

[7]Conditional upon levee location with respect to site.

APPENDIX F

FISH AND WILDLIFE HABITAT PLAN FOR THE TRINITY MINE

A detailed assessment of the fish and wildlife resource base within the project area is presented in the Draft Environmental Impact Statement (DEIS) in Section 5.7, Wildlife Resources; Section 5.8, Aquatic Resources; and Section 5.10, Endangered Species. The findings of impact upon the project area's fish and wildlife resources were based upon two alternatives as follows: (1) return to existing land use and (2) conversion to 100 percent improved pasture. The North American Coal Corporation (NACCO) has elected to return the postmining land use to approximate the existing premining land use as the preferred alternative for the Trinity Mine. All of the land in the project area is privately owned, with the majority of the land leased by NACCO rather than owned in fee. Therefore, the landowner preferences and lease agreements will be a major consideration in planning postmining land use. NACCO will work with the landowners so that landowners will understand the importance of mitigating and planning for wildlife habitat. Additionally, postmining land use must be approved by the Railroad Commission of Texas if the postmining land use is different from the premining land use.

NACCO will incorporate the best technology currently available by establishing reclamation plans that are capable of restoring diverse, well-balanced fish and wildlife populations. The implementation of the plan will depend upon numerous factors, including the ecological requirements of the affected species, planned land use, and the benefits sought. Improvements in water quality, spawning habitats, and streamflows will be the primary concerns in habitat reclamation for fish. Reclamation for wildlife will include the development of food, cover, and reproductive habitat. The development of wetlands will also be a favored enhancement feature and is discussed in detail in NACCO's wetlands habitat plan. Mining will be avoided in rivers and streams, whenver possible; however, if avoidance is not possible, proper reclamation techniques will be used.

NACCO's final reclamation plans will incorporate the following objectives:

1. develop management goals for the wildlife and vegetation which were present on the site or in the immediate area before mining;

2. design the revegetation plan to meet established management goals in terms of the basic ecological requirements of target species, preferences of landowners, and physiochemical and biological relationships of the site;

3. create habitat diversity that will attract and support wildlife, based upon food, water, cover, and range;

4. include wildlife mitigation measures as a secondary land use in a way to acquire wildlife benefits, even on those sites where reclamation will be oriented primarily toward agricultural purposes; and

5. consult with U.S. Fish and Wildlife Service, Texas Parks and Wildlife Department, and Soil Conservation Service to obtain planting and maintenance informa-

tion and expertise on the reclamation and enhancement of fish and wildlife habitat and to ensure compliance with regulatory requirements.

The fish and wildlife plan for the preferred alternative includes specific mitigation measures that are currently being considered for wildlife habitat as a primary use and/or secondary use. These measures are discussed in the following:

1. The first objective of a revegetation plan at a surface mine site will be the stabilization of soils and prevention of erosion. The planting of cover crops of grasses and legumes will be implemented immediately following regrading of an area. Coastal bermudagrass can be limited in value to wildlife, but is needed to minimze erosion of reconstructed soil material. Therefore, improvements will be made if coastal bermudagrass is employed in reclamation plans for wildlife habitat. Considerations to enhance wildlife areas in coastal bermudagrass plantings include: (1) overseeding legumes in bermudagrass stands, (2) deploying coastal bermudagrass or steeper slopes while more moderate slopes are planted to grasses, perennials and forbs more useful to wildlife, or (3) initially installing coastal bermudagrass to stabilize overburden material followed by spot eradication with chemical treatment in less erodable areas to final installation of desired wildlife plants. Brush piles will also be established on regraded and revegetated sites. Following stabilization, consideration will be given to the seeding and planting of grasses, shrubs, and trees in a planned manner to provide food and cover for wildlife as well as the ability to support fish and wildlife habitat after the release of bonds. The design of these plantings will be determined cognizant of the physical aspects of the site, postmining land use goals, needs of desired wildlife, and future management objectives.

2. Annual, herbaceous species, such as rye and sorghum sundangrass, (from native, introduced, or agricultural sources) that yield heavy seedcrops will be planted. Small, strategically located cover plots intermingled with these plantings will encourage more widespread use by wildlife. The Railroad Commission and the Soil Conservation Service have proposed standards for herbaceous cover on tracts designated where wildlife habitat is the primary land use which require 3 to 5 perennial grasses, 3 to 5 perennial legumes, and at least 2 forb species. The standards also call for 25% woody cover on tracts reclaimed primarily for wildlife habitat and 10% woody cover when wildlife habitat is designated as the secondary land use.

3. Revegetation with woody species valuable to wildlife (such as autumn olive and bicolor lespedeza) will be promoted along draws, drainageways, restored streams, reestablished fencelines or other wildlife corridors, in addition to strip plantings, border plantings and clump plantings of woody species in and around open areas planted to grasses to create edges for food and cover.

4. The use of shrub plantings will be considered in lieu of tree plantings on some sites to include a view toward small game or nongame species in the reclamation plan.

5. Alternating rather than solid plantings of herbs, trees, or shrubs will be utilized. Strips of grasses and legumes 100 to 150 feet wide alternating with strips of shrubs and/or trees 30 to 50 feet wide will be planted on expansive sites. Zigzag patterns will enhance edge effect on reclaimed sites. Open areas will be at least one-half acre in size.

6. Buffer zones will be set aside between the outmost reaches of the mining activities and the next adjacent use to provide interconnections to be used as runways for wildlife or provide food plots near cover on adjacent lands. These tracts will remain as they were when acquired, be planted as necessary, or be improved through management. Such buffer zones will provide edge, cover, and native seed sources for better wildlife distribution. More importantly they will provide means for natural succession.

7. Reclamation plans will be designed to maximize diversity and interspersion for the benefit of wildlife species. Heterogenity in the landscape will be examined for efficiency, (for example, wildlife tracts can be more easily improved through natural invasion by woody species if he tract is adjacent to wooded fence rows, then if the tract was surrounded by tame pasture).

8. Logging or land clearing operations will be minimized in advance of the mining operations.

9. Travel lanes for wildlife may be provided by planting one row of dense growing shrub such as bristly locust or multiflora rose or two rows of shrubs such as wild plum, sericea lespedeza, or honeysuckle. Row plantings, although they may appear artificial, create runways for many ground dwelling birds and mammals, because a random planting pattern creates gaps in the cover that some birds and mammals are unwilling to cross. Escape cover can be created artifically from boulders, logs, slash, and brush. Brush and other post logging vegetative cover deemed suitable for use as a brush pile will be salvaged and piled in advance of the operation until such time that it will interfere with the active operation. Such materials will be piled in odd areas, travel lanes, or other places when natural cover is lacking.

10. Sufficient brush cover will be left along water courses which usually serve as wildlife travel lanes. The width of the strips to be left for most wildlife will be determined by visual inspection. The strips of brush to be left will be wide enough to prevent seeing through them at most points from December through February when most species have lost their leaves. When cleared strips extend for great distances, a belt or block of brush will be left every 200 to 300 yards to break up the open spaces and provide covered travel lanes for wildlife connecting these strips. Where cleared areas tend to be excessively large, islands of brush will be left interspersed within the cleared areas to provide escape cover. Alternate strips of cleared areas and brush or clearing in an irregular pattern also will be done to allow sufficient cover and food.

11. NACCO will fence roadways where necessary to guide locally important wildlife to roadway underpasses. No new barrier will be created in known and important wildlife migration routes.

12. Food plots also will be planted to help sustain wildlife populations. However, food plots will not serve as substitutes for permanent food-bearing plants. A food plot is any cultivation of domestic food plants reserved for wild animal usage. Plots will be approximately one-eighth acre in size, spaced intermittently at one patch per approximately 40 acres, except when expressly disallowed by private landowners. Long narrow food patches may be installed near cover and commonly will include rye, wheat, oats, corn, peanuts, millet, partridge pea, and singletary peas.

13. If contamination of a known wildlife water source becomes apparent, wildlife access to the water source will be restricted by fence, cover or other appropriate methods.

14. Persistent use of pesticides will not be practiced in the reclamation process unless approved by the Railroad Commission.

15. NACCO will ensure that the design and construction of electric power lines and other transmission facilities used for or incidental to the surface mining activities on the project area are in accordance with the guidelines set forth in Environmental Criteria for Electric Transmission System (USDI, USDA (1970)), or in approved alternative guidance manuals. Distribution lines will be designed and constructed in accordance with REA Bulletin 61-10, Powerline Contacts by Eagles and Other Large Birds, or in approved alternative guidance manuals.

16. Newly reclaimed areas will be fenced to prevent cattle from grazing or stomping newly established plants.

17. The reclamation plan will address the recovery of white-tailed deer habitat. Initially, the prime concern in this activity will be directed toward offsetting forage losses from the annual increment of mined acreage. As the mined area increases in extent, measures to meet demands for cover will become more important. Hunting can be employed as a management tool to prevent overpopulation and deterioration of range.

18. Raptor populations will be encouraged on nongame tracts by erecting poles or towers topped with nesting platforms.

19. Basic wildlife management principles will also be incorporated into other land use options. Where tracts are to be revegetated for pasture or crops, tracts of extensive seeding will be diversified by planting a strip, not over 20 feet in width, of shrubs such as bristly locust, autumn olive, or sumac. Strip plantings will also serve as woodland/field borders at the edge of proposed pastures or cropland. Shrubs will be useful as hedges and living fences extending across future croplands or along cropland and pasture boundaries. These hedges usually consist of one or two rows of shrubs laid out on the contour. Two or three rows of red cedar planted along one side of a single row of autumn olive, multiflora rose, or black locust may be used to provide an effective windbreak for a future pasture or cropland while improving nesting, escape, and winter cover for wildlife. One to ten rows of trees and shrubs, or shrubs only, at right angles to the direction of the prevailing winds may also be used to provide an effective windbreak. Scattered clump plantings of trees and shrubs in an open field will provide needed food and cover.

20. In order to counteract the natural process of change, some maintenance procedures will be necessary. Open areas that have become overgrown will be cut, disced, or burned in a controlled manner to preserve cover type.

Based upon the information contained in the DEIS, the North American Coal Corporation does not anticipate the necessity to establish control measures, management techniques and monitoring methods to protect or enhance: (1) threatened or endangered plants or animals, (2) protected species, and (3) habitats of unusually high fish or wildlife value. However, NACCO shall report the presence of critical habitat of a threatened or endangered species, plant or animal listed as threatened or endangered, or any bald or golden eagle.

Tables 1 and 2 present information relating to specific wildlife species and/or land uses. Table 1 lists examples of high value wildlife food plants by species preference. Table 2 lists general helpful and harmful practices for wildlife species for specific land uses. Management practices for specific wildlife species were reviewed in the USDOI Fish and Wildlife Service publication entitled Revegetating Surface Mined Lands for Wildlife in Texas and Oklahoma (FAS/08S-81/25, August 1981, Appendix B, pages 77-98). Due to the length, this information was not included in this plan. However, these practices will be incorporated during reclamation operations and management of fish and wildlife areas.

TABLE I

EXAMPLES OF HIGH VALUE WILDLIFE FOOD PLANTS BY SPECIES PREFERENCE[a]

	White-tailed deer	Bob-white quail	Mourning dove	Cotton-tail rabbit	Water-fowl	Wild turkey	Non-game birds
Coniferous Trees							
Pines	X	X				X	X
Eastern red cedar	X					X	X
Hardwood Trees							
Maples	X						X
Black walnut	X						
Blackgum	X						X
Persimmon	X						
Black willow	X						
Hackberries	X					X	X
Elms	X					X	X
Sycamore	X						X
River birch							X
Oaks	X	X			X	X	X
Hickories	X				X	X	X
Shrubs							
Sumac	X	X		X		X	X
Yaupon holly	X						X
Elderberry						X	X
Serviceberry	X					X	X
Waxmyrtle		X					X
Coral berry	X						
Multiflora rose	X					X	X
Vines							
Blackberry	X			X		X	X
Greenbriar	X						X
Wild grape						X	X
Virginia creeper							X

TABLE I (Continued)

	White-tailed deer	Bob-white quail	Mourning dove	Cotton-tail rabbit	Water-fowl	Wild turkey	Non-game birds
Leguminous Forbs							
Common lespedeza	X	X				X	
Korean lespedeza		X					
Partridge pea		X	X			X	X
Cowpea	X	X	X			X	
Red clover	X	X		X		X	
Sweet clover	X	X		X		X	
White clover	X	X		X		X	
Non-Leguminous Forbs							
Doveweed		X	X				X
Common sunflower		X	X			X	X
Common ragweed		X	X				X
Beggarweed		X					
Spurge			X				
Pokeweed			X				X
Knotweed			X				
Grasses							
Paspalum		X	X			X	X
Saltgrass					X		
Bromegrass					X		
Panicgrass			X		X	X	X
Bristlegrass		X	X		X	X	
Marsh & Aquatic Plants							
Bulrush					X		X
Pondweeds					X		
Cattails					X		
Smartweeds		X			X		X
Cordgrass					X		
Spikerush					X		

TABLE I (Concluded)

	White-tailed deer	Bob-white quail	Mourning dove	Cotton-tail rabbit	Water-fowl	Wild turkey	Non-game birds
Chufa					X		
Duckweeds					X		
Japanese millet		X	X		X		X
Cultivated Food & Cover Crops							
Wheat	X	X	X		X	X	X
Barley	X	X	X		X		X
Corn	X	X	X		X	X	X
Oats	X	X		X			X
Grain sorghum		X	X		X	X	X

[a]Adapted principally from American Wildlife and Plants, A Guide to Wildlife Food Habits, by Alexander C. Martin, Herbert S. Zim and Arnold L. Nelson, 1951. McGraw-Hill, New York.

TABLE 2

LAND USE OPTION: CROPLAND

Practices Helpful to Wildlife, which will be implemented when appropriate:

- o Food and cover plantings along fence rows, roads, drainageways
- o Planting legumes with crops
- o Liming and fertilizing
- o Stripcropping
- o Cover crops
- o Stubble/mulch tillage
- o Delaying mowing of headlands, roadsides, and watercourses until after the nesting season
- o Leaving unharvested 1/8 to 1/4 acre of grain next to good cover

Practices Harmful to Wildlife, which will be avoided when possible:

- o Clean fall plowing
- o Mowing of watercourses and headlands before ground-nesting birds have hatched
- o Indiscriminant burning of ditchbanks, fence rows, and crop residues.

LAND USE OPTION: PASTURELAND

Practices Helpful to Wildlife, which will be implemented when appropriate:

- o Food and cover plantings along fence rows, roads, drainageways, and steep slopes
- o Grazing within the carrying capacity of the pasture
- o Liming and fertilizing
- o Reseeding, renovating, or overseeding with legumes
- o Building ponds for wildlife and livestock water
- o Controlled burning

Practices Harmful to Wildlife, which will be avoided when possible:

- o Uncontrolled burning
- o Overgrazing
- o Complete clean mowing early in the season

TABLE 2 (Concluded)

LAND USE OPTION: RANGELAND

Practices Helpful to Wildlife, which will be implemented when appropriate:

- o Food and cover plantings along fence row, roads, drainageways, and steep slopes
- o Proper grazing and salting
- o Watering places for wildlife and livestock
- o Reseeding with grasses and legumes
- o Adequate cross-fencing
- o Partial brush removal

Practices Harmful to Wildlife, which will be avoided when possible:

- o Overgrazing
- o Complete brush removal
- o Uncontrolled burning

LAND USE OPTION: WOODLAND

Practices Helpful to Wildlife, which will be implemented when appropriate:

- o Protection from unwanted fire and harmful grazing
- o Selective cutting in small woodlands
- o Leaving den trees when cutting timber
- o Piling brush near the edge of the woods
- o "Release" cuttings to increase production of acorns, nuts, and other tree seeds useful for wildlife food
- o Cutting trees out of woodland borders to increase the growth of shrubs for food and cover
- o Creation of "green tree" reservoirs in bottomlands

Practices Harmful to Wildlife, which will be avoided when possible:

- o Uncontrolled burning and grazing
- o Cutting of all den trees

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APPENDIX G

WETLANDS HABITAT PLAN, INCLUDING RIPARIAN AREAS, FOR THE TRINITY MINE

A detailed assessment of the wetlands resource base within the project area is presented in the Draft Environmental Impact Statement (DEIS) in Section 5.11 Wetlands. The impact analyses presented in the DEIS were based upon (1) sedimentation basin removal (100%) or retention (80%); and (2) flood protection levee retention or removal in the southwestern portion of the mining area. The impacts for these alternatives were assessed on a worst-case basis. Out of the total 3,560 acres of wetland determined by the USCOE in the project area, only 1,405 acres or 40% of the total wetland habitat will, potentially, be adversely affected due to mining activities.

The North American Coal Corporation's (NACCO) preferred alternative includes two actions. The first action is to avoid wetland areas whenever possible. However, since total avoidance may not be possible, NACCO's second action is to mitigate wetland acreages that may be disturbed by (1) retaining 80% of the sedimentation basins after mining operations have ceased, and (2) breaching the flood protection levee after mining activities in the southwestern mine area have ceased.

Under this alternative, an estimated 754 surface acres of ponds will be retained in the alluvial portion of the project area and an estimated 647 surface acres of ponds will be retained in the upland portion, totaling approximately 1,401 surface acres of water bodies. In order to avoid the potential for these areas to resemble existing stock ponds, these basins will be planted and managed for wetland areas so that the quality of wildlife habitat, currently found in the project area, will be present after mining. Particular emphasis will be directed in the alluvial areas where wetlands are presently more abundant. Additionally, as succession occurs, the quality of wildlife habitat will improve to resemble the current premine habitat. Given the technical difficulties in restoration of wetland habitats, NACCO believes that a 60% success rate is a reasonable assumption for restoration of wetlands in the project area. However, NACCO's goal will be aimed at 100% success.

The 783 acres of wetland to be mined in the southwestern portion of the project area, which are included in the total 1,405 wetland acres to be disturbed by mining activities, will be protected by a flood protection levee. The levee will be constructed prior to mining to divert flood flows, and will be breached after mining operations have ceased. Therefore, with the postmining soil and topographic relief expected after mining, the wetland character of this area will potentially return to premining conditions. However, NACCO's preferred alternative, as initially stated, is to avoid wetlands whenever possible, not only from regulatory constraints, but also from operational and economical concerns. These 783 acres are located in an area planned for mining if a market becomes available in the future, as the lignite in this area is presently not needed to meet the fuel requirements of the Malakoff EGS and may never be mined.

The following table is a summary of premining acreages of wetland which current plans indicate to be in areas of disturbance versus postmining wetland areas that will be reclaimed by NACCO.

	Premining Wetland Acreage in Disturbed Areas	Postmining Wetland Acreages Reclaimed
Southwestern Mine Block	783	783
Other Areas	622	841 to 1,401
TOTAL	1,405	1,624 to 2,184

NACCO will prepare a final wetland management plan which will incorporate a program of habitat management in which most of the results will be accomplished by nature. All lands have the property of producing vegetative cover in successive steps toward a climax or final stage. When appropriate, plant succession will be arrested at a stage that is most useful to fish, wildlife and waterfowl. This disclimax will be maintained through the control and regulation of water levels, burning, or grazing, or a combination.

During reclamation operations, sedimentation basins and end cut lakes, which are normal products of mining operations, will provide the basis for pond reclamation toward wetland habitat. Although regulatory approval is necessary to retain the ponds, NACCO does not anticipate any problems in obtaining the necessary permission for pond retention.

A combination of the following mitigation measures presently being considered will be incorporated in NACCO's final wetland management plan as appropriate for specific sites.

1. Attention will be given to providing shallow-water impoundments conducive to waterfowl and will include emphasis on food, water, and nesting places. These impoundments will be graded for uniform water depths of 18-24 inches with depressions five to six feet deep interspersed at approximately 100-yard intervals.

2. In selecting a suitable pond site, consideration will be given to (1) adequate, but not excessive, amounts of water; (2) a subsoil that contains sufficient clay; and (3) "the lay of the land."

3. Ponds will be designed and constructed so that under normal conditions enough water is available to fill the pond and maintain a water level that does not fluctuate more than a few feet during the dry months, but not such a volume of water as to cause a large , continuous overflow from the pond. A diversion ditch may be needed to carry excess water from heavy rains around the pond if heavy overflow occurs.

4. Shallow water will be avoided as it encourages troublesome plants, leads to overpopulation of some fish, and restricts pond management. The pond or lake edge will be at least two feet deep. Excess dirt will be removed while shaping

the shoreline and used on the dam or placed above the waterline to give higher banks. The deeper edges will permit the larger predators to stay near the shoreline and thus allow a better harvest.

5. Water control devices suitable for complete drawdown will be employed as necessary. These features will allow for management of either natural or cultivated marshes. Since the maximum growth and production of food plants can be achieved in shallow waters of less than three feet in depth, a pond, lake, or impoundment having a broad zone of shallow water will be designed and constructed so that high productivity will be achieved with proper management. NACCO will manage the waterfowl habitat such that the water levels of an impoundment can be drawn down in the spring or early summer months. This drawdown will expose the shallow water area to air and sunlight, permitting the rootstocks to make new growth and seed to germinate. The spring drawdown will reduce the invasion of undesirable plant species to ensure the continued growth of valuable plants. An adequate water supply will be available to increase water levels at the proper time in order to realize the full value of a controlled drawdown. Water levels will be raised slowly after seeds have germinated and rootstock has made new growth. Both the reduction of water levels in the spring and the raising of water levels in the summer will be slow and gradual. Refilling of the impoundment will be controlled so that the new growth is never completely inundated. There is a definite possibility that a properly timed drawdown will result in the control of certain species. However, until additional information has been collected, drawdown will be delayed until June 1, as most game fish have completed spawning activities by that date. If game fish are not being produced in the impoundment, then the water levels will be lowered in April so that the plants will have a longer season and a better opportunity to mature a seed crop. Another important consideration in determining the use of a planned and controlled drawdown will be the slope or gradient of the impoundment at water's edge. For example, the drawdown of one foot will expose ten feet or more of edge, and a large area will be opened to plant growth.

6. Subsoil containing clay will be used in the construction of the pond in order to reduce seepage to a minimum. The subsoil within the dam site will be checked to be certain sufficient clay is present. Clay products may be used to seal a pond where needed.

7. Impounding waters on hardwood flats is a method widely used in several southeastern states. There are numerous river bottom sites in the eastern portion of Texas where this type of management will yield excellent results, and NACCO will encourage landowners in its use. River bottom lakes, sloughs, or other low sites which are normally inundated in the early fall will be selected. Small levees with simple and inexpensive water control devices will be constructed so as to impound these rising waters on hardwood flats. Generally, these sites will be flooded about mid-October. The impoundment will be designed for water depths of six to eight inches, but there may be deeper water in parts of the impoundment as a result of varying elevations. The gradient or slope of the site will be very gradual so as to flood a maximum area with as little effort and expense as possible. Mixed hardwood stands of oak, gum, and pecan will be more desirable than a pure oak stand. Mallards and wood ducks will be

the primary species attracted to the river bottom sites. These timbered sites will be recommended to be drained as soon as possible after February 15 as serious damage to the timber is likely to occur.

8. For shallow excavation, the sites will be chosen on the basis that the water table is close to the soil surface in the areas adjacent to the river. Topsoil will be removed to a depth of about two to three feet to penetrate the water table, so that the shallow pond will fill with water. In the event that these ponds dry up during summer months, various plants will be introduced to increase the food supply for ducks. Wild duck millet, smartweed, and sedges are well adapted to growing conditons and will be used to supply food for ducks.

9. Before filling the lake, a fast-growing crop will be planted in the basin. If construction is completed in the fall and the lake is not expected to fill completely for two or three months, rye grass or oats will be broadcast over the lake bottom. This will benefit the fertility of the water and serve to stabilize the bottom to aid in preventing turbid water.

10. The planting will be conducted at the proper period of the year, usually during spring or early summer months. The site will be selected to be of a nature that will promote growth. If the site is already supporting a cover of vegetation, plants growing on the site will be much more adapted and suited for the existing growth than for an introduced species.

    The following is a distribution of some of the more important waterfowl food plants for the Blackland Prairie Region No. 4:

    a. Small patches of 50 to 100 pondweeds, smartweeds, duckpotato, spikerushes, and water primroses plants will be planted at intervals around the water's edge. If adapted, the plants will spread to other areas of the pond, marsh, or lake where circumstances are favorable. Both the collection site and planting site will be examined for similar water levels and conditions.

    b. Wild duck millet, if used, will be established by seeding at the rate of 20 to 25 pounds of seeds per acre. The seed will be broadcast on mud flats or in less than one inch of water. Seedbed preparation may not be necessary, but, if needed, will be conducted to ensure a better germination and stand of plants. Successful growth will be increased by light plowing or disking of the soil. Spot plantings will be made. Millet reseeds itself each year and wind and wave action will spread the seed to other parts of the area. Thus, the species will become established at other sites where growth conditions are favorable. Seeding will be done during the late spring or summer months and completed at least 60 to 90 days prior to the danger of an early frost.

    c. Duckweed will be established by transplanting entire plants. The small plants will be collected by use of a seine, fine mesh dip net, bushel basket, or tin can. A galvanized tub or basket may be used for transplanting the plants. Planting will be completed by scattering the plants on the water's surface. Two to three bushels of plants per acre will be sufficient to get the plants established. Wooded river bottoms or impoundments or sites where cane or tall rushes offer protection will be selected for this plant.

d. Salt grasses and paspalums are native grasses adapted to a particular site and set of conditions. These plants will not be established under artificial conditions, but if the species are present in an area, then the habitat will be manipulated to increase their usefulness to waterfowl.

11. The fertility of land or impounded waters determines the plant species which will be grown. Aquatic plants may make a satisfactory growth without the application of commercial fertilizers. However, proper use of fertilizers will be applied as needed. Generally, the nutrients lacking in the soil will also be absent in water; therefore, the same fertilizer formula will be applied to the water as to the soil. Application will be made during the spring and summer months. The rate of application will depend upon the formula used.

12. Competing plants will be eliminated, where necessary, to ensure a better growth of desired plant species. If planting is to be done in new impoundments or on mud flats, site preparation will not be necessary.

13. High turbidity and algae reduce plant growth in impoundments by preventing sunlight from reaching the submerged vegetation. Tubid waters will be corrected by the application of fertilizers, barnyard manure, or gypsum, or by the construction of levees. Algae growths will be controlled and eliminated by the application of coppper sulfate to the water. (Directions for the use of copper sulfate are given in Bulletin No. 24, "Utilizing Stock Tanks and Farm Ponds for Fish." This bulletin will be obtained from the Texas Parks and Wildlife Department at Austin, Texas.)

14. During the period that water levels are reduced, controlled grazing will be considered. If the shallow edge has been invaded by low value grasses or aquatic plants, then grazing, shallow disking, burning, or any combination will reduce the existing stand of plants and open additional areas to the desired species. The site can potentially be grazed at any time, but burning will be done only during periods of low water levels.

15. Manual or mechanical means of plant control will be employed under certain conditions. One method is to mow noxious species during periods of reduced water levels and reduce the vigor of plants growing in the shallow edge. This will result in an improved opportunity for those plants of a desirable nature. Many undesirable plants are shallow water invaders and mowing will give satisfactory reesults if followed by flooding to sour and will kill the rootstock. The freshly cut stalks will be covered with not less than 12 to 18 inches of water.

16. Plant control through the use of chemical herbicides will be employed as needed. Methods are being revised and new chemicals are being developed. The data on the most recent developments and methods will be secured from the various chemical manufacturing companies.

17. Brush, logs and rocks will be used to construct shelters. Large trees, when pushed over with the tops removed and the roots left anchored, will be used to provide cover. Shelters will be placed at various depths of water ranging from two feet to the deepest water.

18. Several milk cans, concrete road culvert pipes or crocks will be placed around the lake to be used as spawning aids by channel catfish. These spawning devices will be placed at a level that will not be over four feet deep after the lake fills. If the lake bottom does not contain sand or gravel, gravel beds will be 10 to 15 feet in diameter and at a depth of two to four feet. If the bottom is soft mud, automobile tires laid on their side and filled with sand or gravel may be used for spawning beds.

19. Wood duck nest box programs will also be employed. This may involve erection of nest boxes and establishment of suitable rearing habitat. The assessment for proper management of these areas will include adequate nesting and rearing cover, adequate supply of fresh surface water, adequate supply of food, control of predators, and an adequate breeding population.

Additionally, Preliminary Guide to Wetlands of the Gulf Coastal Plain (1978) and Food Tolerance in Plants: A State-of-the-Art Review (1979) as prepared for USCOE and Classification of Wetlands and Deepwater Habitats of the United States (1979) performed for USDOI, Fish and Wildlife Service have been reviewed in preparation of this plan. The recommendations and suggestions contained in these reports will be incorporated into the reclamation operations and management activities, whenever possible.

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APPENDIX H

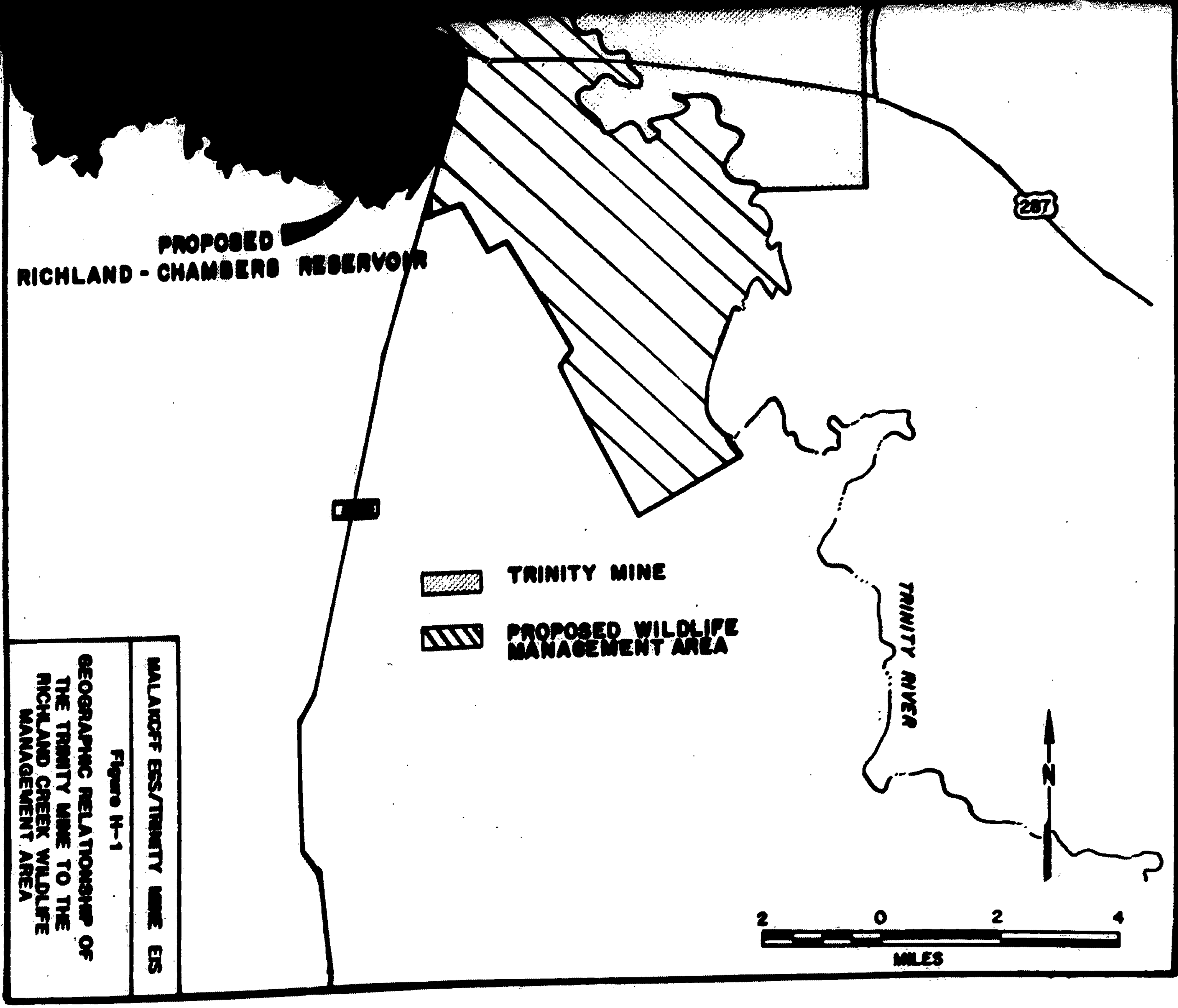
INFORMATION ON THE PROPOSED RICHLAND CREEK WILDLIFE MANAGEMENT AREA

During the review of the Draft EIS, Texas Parks and Wildlife Department called attention to the proposed Richland Creek Wildlife Management Area. This proposed wildlife management area, once established, will comprise approximately 13,000 acres which is being acquired as compensation for wildlife losses resulting from construction and operation of the Richland - Chambers Reservoir. Based on the available information obtained from Texas Parks and Wildlife Department and the Tarrant County Water Control and Improvement District Number One, approximately two-thirds of the area has been purchased in fee. Currently, efforts are continuing to acquire the additional acreage involved. The proposed location of the Richland Creek Wildlife Management Area and its relationship to the proposed Trinity Mine is shown on Figure H-1.

Although the Trinity River provides a buffer between the proposed wildlife management area and the Trinity Mine, it is anticipated that mining and mine related activities in the southern portion of the mine could have indirect effects on the wildlife management area. As discussed in Draft EIS Section 5.7.3, loss of habitat during construction and operation of the project will displace wildlife into the surrounding areas, including the wildlife management area. The displacement of mobile wildlife into adjacent areas will temporarily increase local wildlife population densities. Assuming that the adjacent habitats are at or near their normal carrying capacities, population stresses will occur. These stresses will activate density dependent population regulating mechanisms, e.g., reduced fecundity and increased mortality, which will reduce wildlife populations in areas adjacent to the mine to pre-mining levels.

Increased noise and activity within the mine should have little affect on wildlife populations within the wildlife management area, given the physical separation of the two areas by the Trinity River. In addition, wildlife populations within the wildlife management area are accustomed to the noise and human activity associated with ongoing oil and gas production within the proposed wildlife management area and the existing traffic volumes of 1,400 to 1,900 vehicles per day on US 287 which presently traverses the proposed wildlife management area.

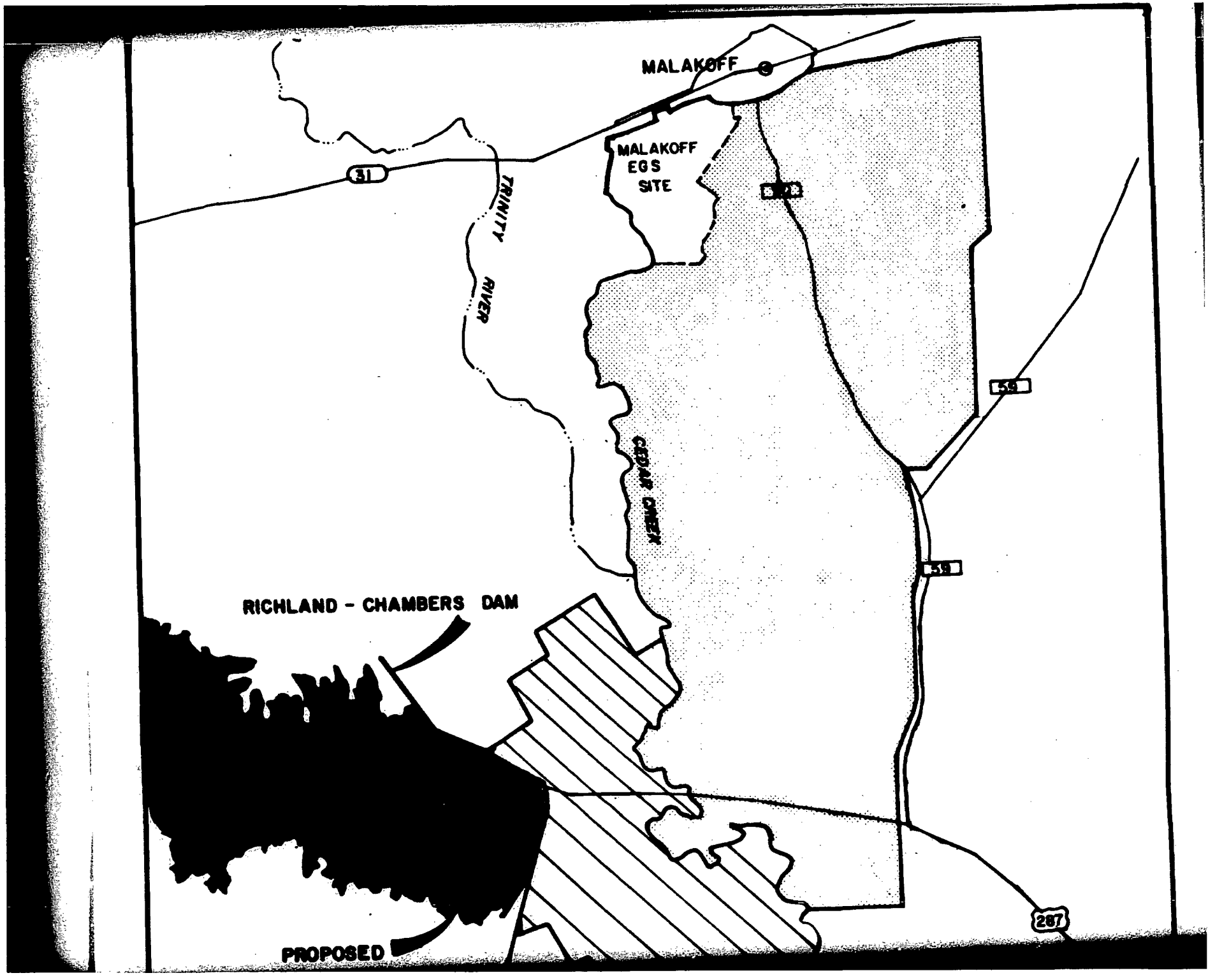
NACCO has developed a fish and wildlife habitat plan and a wetlands habitat plan for the Trinity Mine. These documents are included in this Final EIS as Appendix F and Appendix G, respectively. Implementation of the procedures outlined in these plans and coordination with Texas Parks and Wildlife Department should ensure mitigation of adverse impacts to fish and wildlife resources on areas of the mine reclaimed primarily or secondarily as wildlife habitat, as well as adjacent areas including the proposed Richland Creek Wildlife Management Area.



MALAKOFF ESS/TRINITY MINE EIS

Figure H-1

GEOGRAPHIC RELATIONSHIP OF THE TRINITY MINE TO THE RICHLAND CREEK WILDLIFE MANAGEMENT AREA


MALAKOFF
MALAKOFF EGS SITE
31
TRINITY RIVER
CEDAR CREEK
59
59
RICHLAND - CHAMBERS DAM
PROPOSED
287

APPENDIX I

SECTION 7 CONSULTATION FOR THE TRINITY MINE

IN REPLY REFER TO:
2-12-83-F-12

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Ecological Services
9A33 Fritz Lanham Building
819 Taylor Street
Fort Worth, Texas 76102

RECEIVED
FEB 24 1983
6 ES

February 23, 1983

Mr. Clinton B. Spotts
Regional EIS Coordinator (6ES-F)
U.S. Environmental Protection Agency
1201 Elm Street
Dallas, Texas 75270

Dear Mr. Spotts:

This responds to your request of January 6, 1983, for formal Section 7 consultation, as provided by the Endangered Species Act, on the Trinity Mine Project, Henderson and Anderson Counties, Texas. Based on an analysis of your biological assessment, you conclude that the mining project "may affect" the bald eagle (Haliaeetus leucocephalus) and American alligator (Alligator mississippiensis). Separate biological assessments were previously conducted by your agency on the Malakoff Electric Generating Station and the Upper Neches River intake structure and pipeline, indicating that there will be no effect on listed species.

Current plans at the Trinity Mine Project call for the surface mining of lignite on 21,400 acres. An additional 16,700 acres are available for mining and the construction of ancillary facilities. Typical fish and wildlife habitats on the project area include upland and bottomland forests, rangelands, pasturelands, croplands, ponds, lakes, streams, and wetlands.

Henderson and Anderson Counties historically have been utilized by wintering bald eagles. The National Wildlife Federation's 1981 Midwinter Bald Eagle Survey noted 41 bald eagles for Henderson County, predominately on larger bodies of open water such as Palestine Lake, Cedar Creek Lake, Athens Lake, Coon Creek Lake, and Trinidad Reservoir. Bald eagles utilize these bodies of water because of the availability of fish and waterfowl prey and roost sites. No nesting bald eagles have been reported from this two county area. Recent aerial surveys (January 1983) by the Texas Parks and Wildlife Department (TPWD) also found no evidence of nesting bald eagles within the two counties. One bald eagle was observed in the project area on the Trinity River north of Highway 287.

American alligators commonly occur in Henderson and Anderson Counties in swamp and marsh habitats associated with ponds, lakes, streams, and the Trinity River. The Trinity Mine Project is on the westernmost range of

the alligator, and population densities of the species are much lower than in more favorable habitats (i.e., coastal marshes and streams). The Fish and Wildlife Service (FWS) and TPWD believe that the Texas population of alligators has increased in numbers and is no longer biologically endangered or threatened. Therefore, the FWS has proposed the reclassification of the American alligator throughout the State of Texas to "Threatened Due to Similarity of Appearance."

Our evaluation of the impacts of the Trinity Mine Project on the bald eagle and alligator is based on data and literature in our files, your biological assessment, the preliminary draft environmental impact statement, and interviews with National Wildlife Federation and TPWD personnel. Three site inspections of the project area have been conducted by this office, the last on January 18, 1983, in response to your request for formal consultation. During this recent site visit, particular attention was directed toward the potential impact of mining activities on wetlands adjacent to the Trinity River, the areas most likely to support bald eagle and alligator populations.

Discussions with project personnel and evaluation of the current mining plan now available indicate that mining will generally be restricted to areas outside of the existing levee system, except in the southern portion of the project area where an additional levee will be required. Thus, the majority of high quality wetlands in the project area should not be adversely impacted by the mining project. The levee proposed in the southern portion of the project will require Corps of Engineers' Section 404 authorization; therefore, measures to ease adverse wetland impacts will be considered prior to project construction. It is likely that some adverse impacts to bald eagles and alligators could occur through the direct physical loss of habitats; however, the effects of the project on these species should be negligible.

BIOLOGICAL OPINION

Based on the preceding discussion, it is my biological opinion that the proposed Trinity Mine Project is not likely to jeopardize the continued existence of the bald eagle or American alligator. Further consultation is not required unless new information becomes available on these species which indicates they might be affected in a manner not considered here, new species are listed that may be affected by the proposed project, or project plans are modified in a manner not consistent with this opinion.

CONSERVATION RECOMMENDATIONS

We suggest consideration of the following recommendations for the enhancement of listed species:

1. Wetlands, including ponds, lakes, streams, and their associated riparian vegetation, should be avoided and protected whenever feasible during the mining process.

2. If adversely impacted, wetlands should be reclaimed in order to restore their natural biological productivity.

3. Powerlines and other transmission facilities should be designed to avoid accidental electrocution of bald eagles through the application of appropriate construction criteria (Texas Railroad Commission, Surface Mining Regulations Section 380(c)).

4. Powerlines should avoid spanning large bodies of open water or wetlands which often serve as endangered and threatened species' migratory flyways, thus minimizing the potential for bird/powerline collisions.

5. If a bald eagle nesting site is located during project development or thereafter, the FWS should be notified immediately in order to work with the project sponsors in identifying measures necessary to protect the site.

Please let us know if we can be of further assistance on this project. Your interest in the conservation of endangered species is appreciated.

Sincerely,

Jerome L. Johnson

Jerome L. Johnson
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (SE) (AEV)
Director, Fish and Wildlife Service, Washington, DC (OES)
Executive Director, Texas Parks and Wildlife Department, Austin, TX