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**FEASIBILITY STUDY REPORT
FOR THE
IMPERIAL VALLEY ETHANOL REFINERY;
A 14.9-MILLION-GALLON-PER-YEAR
ETHANOL REFINERY
UTILIZING GEOTHERMAL ENERGY**

March 1981

**Prepared by
U.S. Alcohol Fuels
and
Ultrasystems, Inc.**

**For the U.S. Department of Energy
Office of Alcohol Fuels
Under Grant No. DE-FG07-80RA50308**

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IMPERIAL VALLEY ETHANOL REFINERY
EAST MESA, CALIFORNIA

U.S. ALCOHOL FUELS
PROJECT NUMBER 1013

OVERALL TABLE OF CONTENTS

I	PROJECT DESCRIPTION
II	GEOHERMAL RESOURCE
III	ENGINEERING
IV	MARKETING
V	FINANCIAL
VI	MANAGEMENT
VII	ENVIRONMENTAL
VIII	PERMITS AND APPROVALS

PROJECT DESCRIPTION

PROJECT DESCRIPTION

Table of Contents

<u>Section</u>		<u>Page</u>
1.0	INTRODUCTION	1
2.0	GEOTHERMAL RESOURCE	4
3.0	ENGINEERING	5
4.0	MARKETING	6
5.0	FINANCIAL	8
6.0	MANAGEMENT	8
7.0	ENVIRONMENTAL	9
8.0	PERMITS AND APPROVALS	11

Table of Figures

<u>Figure</u>		
1.1	IMPERIAL VALLEY ETHANOL REFINERY Preliminary Model Study	2
1.2	PROPOSED SITE OF ETHANOL REFINERY	3

1.0 INTRODUCTION

U.S. Alcohol Fuels, a California limited partnership, proposes to construct and operate a 14,980,000 gallon per year fuel grade ethanol from grain refinery in the Imperial Valley of California. The Imperial Valley Ethanol Refinery (Refinery) will use hot geothermal fluid from

geothermal resources at the East Mesa area as the source of process energy. A photograph showing a preliminary model of the proposed facility is provided in Figure 1.1 on the following page.

The Project was originally conceived by Ultrasystems Incorporated, General Partner of U.S. Alcohol Fuels, as a way to provide a much needed liquid transportation fuel to the Southern California market. It was decided that the Refinery should be located in the Imperial Valley where it would be possible to utilize, as a source of process heat for the Refinery, one of the many proven geothermal resources, and where the Project would be close to the intended market for both the primary fuel product and the animal feed by-product.

In order to evaluate the economic viability of the proposed Project, exhaustive engineering, cost analysis, and financial studies have been undertaken. The conclusion of these studies, as discussed in this Feasibility Study Report (Report), is that the Project is economically viable. U.S. Alcohol Fuels is proceeding with its plans to construct and operate the Refinery.

The Imperial Valley of California is endowed with extremely favorable conditions for diversified agricultural production. In addition to vegetable and fruit production, the area is well suited for grain production, and a large amount of grain is grown there every season. The Imperial Valley is also known for extensive geothermal resources. A number of high-temperature resources are currently dedicated to electrical power generation. These resources generally produce hydrothermal fluids in the high-temperature level.

However, the use of geothermal resources in the 320°F range has not been extensively defined.

If a viable industrial use of these resources can

✓ 1

Contract

FIGURE 1.1
IMPERIAL VALLEY ETHANOL REFINERY
PRELIMINARY MODEL STUDY

Pending finalized contractual relationships

be found, the resources will be able to support extensive beneficial industrial development. U.S. Alcohol Fuels believes that it has found a use for these resources. It is because of these reasons that Ultrasystems, as General Partner to U.S. Alcohol Fuels, has decided to move forward to engineer, design, construct and operate the Refinery. The facility will use locally grown and imported milo, and the geothermal energy available in the low-temperature range to convert an essentially nonmobile source of energy to a liquid fuel. This liquid fuel produced will help provide automotive fuel needs of Southern California in the coming decades.

In order to proceed with the Project, it is expected that a Project Financing type of funding arrangement will have to be developed. In addition, to the risks associated with a Project Financing, even though the economics of the proposed Project are demonstrated to be extremely favorable, institutional lenders have been historically reluctant to invest in new ventures of this type. For these reasons, U.S. Alcohol Fuels intends to seek financial support under the various Loan Guaranty Programs of the federal government.

To date, U.S. Alcohol Fuels, in conjunction with Ultrasystems Incorporated, the General Partner, has expended over \$225,000 in conducting engineering and cost studies and economic and financial analyses to demonstrate economic viability to the proposed Project. As summarized in the remainder of this Project Description and as discussed in detail in the body of this Report, the approach to this Project is technically sound, and the Project is economically viable.

2.0 GEOTHERMAL RESOURCE

U.S. Alcohol Fuels has investigated the known geothermal resources in the Imperial Valley, and has evaluated each of them for their suitability with respect to the primary criteria of being a proven resource and commercially available within the time frame of the Project. At this time, the only area that meets these criteria is located in the Imperial Valley.

U.S. Alcohol Fuels has obtained a commitment to supply the energy needs of the Project from a geothermal resource in the area. U.S. Alcohol Fuels is proceeding with the Project on the basis of using this resource and is continuing to negotiate the terms and conditions of a detailed Geothermal Energy Supply Contract.

The Refinery will be placed near the center of the highest temperature portion of the KGRA within one-half to one mile of developed wells nearby. The terms under which the geothermal resource will be committed and the characteristics of the resource itself are discussed in detail in the Geothermal Resource section of this Application.

3.0 ENGINEERING

In order to document the technical feasibility of the Refinery and to serve as a basis for cost and profitability analyses of the Project, Ultrasystems Engineers and Constructors, Incorporated, on behalf of U.S. Alcohol Fuels, has conducted a thorough preliminary engineering feasibility study of the facility. The basis of the engineering study has been the proprietary fuel alcohol production technology of Chemapec, Inc., of Woodbury, New York, as modified and supplemented by Ultrasystems Engineers and Constructors' own considerable ethanol process design capability. In addition, it was necessary for Ultrasystems Engineers and Constructors to integrate the alcohol production process with the geothermal steam production technology developed with the assistance of Ben Holt Company of Pasadena, California.

The process energy for the Refinery will be provided by steam produced from hot geothermal brine provided under contract. The spent brine, along with condensate, will be reinjected. Electric power is the other major source of energy utilized in the facility, and it is to be provided by the Imperial Irrigation District, which will also provide the Project's water requirements.

The Refinery will produce 14,980,000 gallons per year of fuel alcohol using approximately 152,000 tons per year of grain sorghum (milo). In the process for this Project, the milo is received by truck, then is cleaned and ground to a fine milo grit. This grit is then cooked using geothermal steam and treated with enzymes to liquify and saccharify the starch content of the grain. The insoluble solids from the "sweet mash" are separated at this point and dried to produce approximately 45,000 tons per year of animal feed by-product. The remainder proceeds to the fermentation unit where alcohol is produced in two continuous cascading fermentation trains designed on the basis of Chemapec technology. The alcohol is recovered in the distillation unit which uses cyclohexane in an azeotropic distillation process to produce 99.2 percent pure ethanol which is then denatured in accordance with the regulations of the Bureau of Alcohol, Tobacco and Firearms and sold as a liquid fuel product.

The proposed Refinery is estimated to have a capital cost of approximately \$48.9 million. Operating costs (in 1981 figures) are estimated to be \$25.2 million per year or \$1.68 per gallon of product (feedstock included). Without feedstock, operating costs are estimated at \$8.3 million per year or \$0.556 per gallon of ethanol demonstrating that the grain sorghum is the most important determinant of production costs.

The Refinery will be engineered and constructed by Ultrasystems Engineers and Constructors which is a leading West Coast process plant designer and builder with unique capabilities in the field of fuel alcohol technology. The standard Ultrasystems' task force approach will be utilized in the engineering and procurement of this Project, and construction will be performed by direct-hire field labor supervised by Ultrasystems' seasoned construction staff, with a minimum of subcontracting. U.S. Alcohol Fuels is currently negotiating with Chemapec, Inc., who, if they are selected, will provide the process design package for the ethanol-production portion of the Refinery, and who will guarantee their process as part of the licensing arrangement with U.S. Alcohol Fuels.

4.0 MARKETING

U.S. Alcohol Fuels has undertaken in-depth investigations of the markets for both the fuel alcohol product and the animal fodder by-product

from the Refinery. In addition, the availability and the sources of grain sorghum have been reviewed in detail.

The fuel grade ethanol from this Refinery will be marketed as a liquid fuels product as a supplement for liquid motor fuel. It is envisioned that the product will be used initially as an additive to regular unleaded gasoline and marketed as Gasohol or as an unleaded premium. Eventually a significant portion of the product will be used in pure form as a substitute for petroleum based motor gasoline.

U.S. Alcohol Fuels has projected that the market for fuel grade ethanol in California will be on the order of 259 million gallons per year, of which the output of the proposed Refinery represents only 5.8 percent. U.S. Alcohol Fuels believes that this market share is easily attainable at prevailing price levels. U.S. Alcohol Fuels is currently negotiating a long-term purchase contract for the denatured ethanol output of the Refinery.

Discussions of a more preliminary nature are being held with other potential distributors. The basis of the contract being negotiated is a pricing formula based upon the Los Angeles rack wholesale price of regular unleaded gasoline.

There is a very strong demand currently for the feed by-product from distillation of alcohol from grain. It is U.S. Alcohol Fuels' assessment that an unlimited market for this material exists at a price which will provide a very generous return to the Project. Long-term arrangements for distribution of this by-product are currently being negotiated.

The primary supply of feedstock is expected to be U.S. Number 2 Grain Sorghum. Attempts will be made to develop local sources of feedstock, but it will take some time to induce local growers to switch to grain sorghum from other higher value crops. It is demonstrated that through careful grain purchase planning and procedures the feedstock is available at price levels that make it quite economical to produce fuel grade ethanol. The grain sorghum will be purchased from major grain trading firms.

Negotiations are currently

underway with these firms. Other major grain trading firms are also being interviewed. The grain will be purchased on forward contracts and hedged with open-market transactions.

5.0 FINANCIAL

The financial structure necessary to complete the Project requires \$16.4 million in partnership equity and \$42.4 million in debt capital, which is expected to be covered by U.S. Government loan guarantees. It is estimated, based on our financial analysis of the Project's capital and operating costs and revenues from the sale of ethanol and animal fodder, that the Project will result in a return on equity after taxes of thirty-six (36) percent. Further, this return results in a payback of the equity of the limited partners within a period of thirty-one (31) months from the start of the Project. As can be determined from the Financial Section of this Report, the Refinery generates more than sufficient cash to meet the annual principle and interest on the debt for the life of the Project. To raise the necessary partnership equity and to place the guaranteed debt, the Partnership has engaged Blyth Eastman Paine Webber Incorporated as Investment Banker.

6.0 MANAGEMENT

The geothermal ethanol Refinery will be controlled by U.S. Alcohol Fuels, a California limited partnership whose General Partner will be Ultrasystems Incorporated. The ownership of the Refinery was structured in the manner of a partnership to expedite the raising of equity capital by allowing partners to utilize the energy and investment tax credits available to this Project.

In order to avoid the appearance of a conflict of interest during the period of the engineering and construction of the Project, the limited partnership will engage an independent engineering organization to oversee the engineering and construction contract entered into with Ultrasystems Engineers and Constructors, Incorporated. It is contemplated at this time that the independent engineering organization will be directly responsible to the General Partner with guaranteed access to the Limited Partners should the need arise.

It is the intention of the General Partner to appoint Dr. James L. Prouty as the Acting President and Chief Operating Officer of U.S. Alcohol Fuels during the engineering and construction phase and to consider his appointment as President and Chief Operating Officer upon successful start-up of the plant. To the extent that Dr. Prouty is not appointed the President and Chief Operating Officer, the General Partner will undertake, through a nationally-recognized executive search firm to locate an individual with comparable qualifications and experience.

Prior to successful start-up of the Refinery, the marketing, sales and accounting functions will be maintained by the staff of the General Partner's organization. Several months prior to the successful start-up of the Refinery, the President and Chief Executive Officer will appoint his management team responsible for finance, sales, purchasing and plant operations.

The Partnership has engaged Blyth Eastman Paine Webber as its investment bankers, Price Waterhouse & Co. as its independent accountants, Gibson Dunn & Crutcher as its legal counsel, Alexander & Alexander as its insurance agent, and Bank of America as its primary bank.

7.0 ENVIRONMENTAL

The Environmental Section of this Report identifies the socioeconomic-physical-biological impacts anticipated from the construction and operation of the proposed ethanal Refinery. Baseline data has also been gathered which describes the environmental setting of much of the local area and the Project site. This information has not been included in the Environmental Section, but will be made available to the Department of Energy to facilitate preparation of the Environmental Assessment at the appropriate time.

The ethanol Refinery will employ geothermal energy from a production well to be drilled in the near future. This well will tap a known geothermal field and will be located on the Project site. Application will be made to the Department of the Interior, Geological Survey (USGS) for a Geothermal Drilling Permit; if the timing of this application is such that a Plan of Utilization covering construction and operation of the Refinery is also available, both the Drilling Permit and the Utilization Permit will be processed simultaneously through

USGS. The environmental impacts associated with the production well are not addressed in this Report inasmuch as they will be covered during the process of obtaining a Geothermal Drilling Permit. It is believed, however, that a minimal amount of additional environmental data will be required in light of the substantial amount of data and analysis already acquired by USGS.

The environmental impacts associated with the proposed Refinery are minor in nature since it is first of all a non-labor-intensive industry

and, secondly, ethanol refineries are relatively pollution-free. Additionally, the isolated location of the Project site minimizes conflicts in the areas of odor, visual aesthetics, traffic congestion, and incompatible land uses, merely because there are no urban developments within several miles of the site. The minor impacts which have been identified thus far are:

- Air Quality - Trace amounts of ethanol (30 lb./hr.) and light ends (2 lb./hr.) will be released to the atmosphere. A carbon dioxide scrubber is used to remove the major portion of ethanol prior to release to the atmosphere. Carbon dioxide emissions total 12,722 lb./hr.
- Water Consumption - Makeup water for process and cooling purposes and for non-potable use by employees amounts to about 585 gpm, equal to 840 acre-feet per year, or .028 percent of the 3 million acre-feet per year that flows through the Imperial Valley irrigation system.

Canal water will require minimal filtration treatment prior to its use in the Refinery system.

- Visual Aesthetics - The physical presence of the Refinery will represent a visual intrusion on the undeveloped desert landscape. Appropriate landscaping and the use of earthtone paints to blend with the natural surroundings will lessen this visual impact.

- Socioeconomics - The maximum population increase due to this Project would be about 160 persons. The only identifiable impact is the questionable availability of rental housing, particularly apartments. This may result in unusually long waiting periods to obtain rental units. Governmental services and facilities, including public schools, will not be impacted as the 160 additional population will be dispersed throughout several communities.

While not a part of the Project at this point in time, it is possible that a railroad spur line might ultimately be installed to transport feedstock and ethanol to and from the Refinery. Environmental impacts associated with this spur line have been cursorily addressed in the Environmental Section of this Report; however, the collection of baseline data for each of the properties along the spur route has been deferred until the need for this rail line and its exact routing has been determined.

8.0 PERMITS AND APPROVALS

Included in the Permits and Approvals Section of this Report is a detailed listing and explanation of the permits and approvals required for construction and operation of the ethanol Refinery. This includes all levels of government (local, state and federal) as well as other regulatory agencies which have permit-issuing authority with respect to the proposed Project. Application forms for most of the permits have been obtained and are included as an Appendix to the Permits and Approvals Section of this Report.

A timetable for obtaining the required construction and operating permits has been prepared. The key permit is the Geothermal Utilization Permit from the Department of the Interior, Geological Survey; the estimated processing time is ten (10) months followed by review of the prestart-up test results. Upon approval of these test results, final permission to operate is given by the Department. It is important to note that construction of the Refinery may proceed with the issuance of Geothermal Sundry Notices that allow for phased construction as final engineering design drawings are approved by the Department.

GEO THERMAL RESOURCE

TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
1.0	INTRODUCTION	1
2.0	IMPERIAL VALLEY GEOTHERMAL RESOURCES	1
2.1	General	1
2.2	Resource Selection Criteria	3
2.3	Description of Resource Area	5
3.0	(Proprietary)	10
3.1	Location and Characteristics	10
3.2	Agreement	11

LIST OF FIGURES

<u>Number</u>		<u>Page</u>
1	Locations of Principal Known Geothermal Resource Areas in California	2
2	Imperial Valley KGRA's	4
3		12

LIST OF APPENDICES

1	(Proprietary)	15
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1.0 INTRODUCTION

California is situated directly astride the East Pacific Rise and has several areas of high geothermal heat flow and seismicity. The map in Figure 1 shows the location of the major geothermal areas within the State of California. Many of these areas represent geothermal resources which are capable of being developed so that the energy contained can be made available to do useful work. In certain areas where the geothermal resource can be readily utilized for electric power production, such as The Geysers, such development is proceeding. In other cases the geothermal resource has not been so readily utilized for power production. Geothermal resources such as these represent an opportunity for the utilization of geothermal energy for other industrial uses.

It is this situation which has prompted Ultrasystems, as General Partner for U.S. Alcohol Fuels, to initiate the proposed Project. The basic concept of this Project is to obtain the use of a low temperature hydrothermal energy source, of which there are many in the Imperial Valley, which is not readily usable for power generation, and to utilize this resource to produce ethanol from grain for use as a liquid fuel. To accomplish this, U.S. Alcohol Fuels has undertaken an exhaustive review of the characteristics and availability of the known geothermal resources in the Imperial Valley. As a result of these investigations, U.S. Alcohol Fuels has obtained the use of a suitable resource in the area

and is proceeding with its plans to construct the fuel alcohol from grain facility which will utilize geothermal energy for process heat.

This Geothermal Resource section of the Report describes the selection process by which U.S. Alcohol Fuels has obtained the use of the resource. In addition, the characteristics of the East Mesa KGRA will be described.

FIGURE 1
LOCATIONS OF PRINCIPAL KNOWN
GEOTHERMAL RESOURCE AREAS
IN CALIFORNIA

2.0 IMPERIAL VALLEY GEOTHERMAL RESOURCES

2.1 General

The hydrothermal energy areas of the Imperial Valley and Baja California occur within the geological formation known as the Salton Trough. This basin, which is also known as the Mexicali-Imperial Rift Valley, is an area of active tectonic movement, characterized by high heat flows and significant seismicity. The trough is bounded on the east by the San Andreas fault zone and on the west by the San Jacinto fault zone.

The trough floor consists of sediments deposited by the Colorado River and other streams over the past four million years, with a maximum thickness of approximately 20,000 feet. These sediments are saturated with as much as ten billion acre feet of very hot water which is insulated by a cap of impermeable silts and clays which constitutes the hydrothermal resource of the region. It has been estimated that the heat energy in the Valley is sufficient to generate 2,000 megawatts of power. Heat flow surveys have identified numerous areas of very high gradients at shallow depth. The California Division of Oil and Gas recognizes eleven known geothermal resource areas (KGRA's). These KGRA's are shown in Figure 2 on the following page.

2.2 Resource Selection Criteria

In its efforts to locate a suitable resource to use for the proposed Project, U.S. Alcohol Fuels has investigated and evaluated the characteristics and availability of the geothermal resources of the Imperial Valley. In conducting this investigation, two criterion have been of primary importance in determining the suitability of a site (geothermal resource).

First, the geothermal resource must be proven in terms of reliability and quality. U.S. Alcohol Fuels does not intend to increase the technological risk of the undertaking by relying upon a geothermal resource whose reliability or characteristics are not demonstrated. It was decided as a matter of policy that the resource must have proven characteristics, either from actual testing of production wells, or by inference from nearby wells augmented by other test data, with a full test of a production well being completed within a reasonable time prior to actual construction of the Refinery.

FIGURE 2
IMPERIAL VALLEY KGRA'S

Secondly, but of equal importance, is the criterion of availability. Time is of the essence in this Project, and therefore the geothermal resource must be developed to a point where it is commercially available within the time frame of the Refinery (in full production by fourth quarter of 1983). The resource owner-developer must be willing and able to negotiate and finalize geothermal energy sales contract by the second quarter of 1981.

It was further decided that the other, more usual, site selection criteria would be considered of secondary importance to these primary criteria. However, the secondary criteria are still of importance in choosing among otherwise equal alternatives, as well as influencing the final economic feasibility of the Project. A list of some of these secondary criteria follows:

- Proximity to feedstock (grain) sources
- Proximity to markets for Product and By-product
- Proximity to highway and railroad networks
- Sources of process and cooling water: availability and cost
- Sources of power: availability and cost
- Availability of labor for maintenance and operations
- Taxes
- Property values
- Seismic conditions
- Required environmental mitigation measures and regulatory requirements, including permits and application fees
- Special process requirements
- Construction access problems
- Construction labor conditions and availability

2.3 Description of Resource Areas

2.3.1 Salton Sea Geothermal Area

The Salton Sea reservoir is classified as being of high temperature and high salinity. The bottom hole temperatures vary from 500°F to 700°F and salinities vary from 200,000 to 300,000 ppm. Severe scaling and serious corrosion problems exist in processing this unique resource. However, management of these problems has been proven technically feasible, and Magma Power Company (Magma) has announced plans to build a 28 MWe power plant using a steam flash process.

Because of the high temperature of this resource, the production wells are self-flowing and typically a mixture of steam and hot water is produced at the well head at a pressure of about 200 psig and a temperature of about 390°F. Special problems exist in utilizing the heat energy, since the steam contains suspended solids which would foul heat exchangers unless cleaned up. A specially designed scrubber, developed by The Ben Holt Company, has been demonstrated on a substantial scale and does an excellent job in producing clean steam. Because of the high salinity, the spent hot water contains suspended solids which must be removed prior to reinjection.

The major developers in the area are Magma, New Albion Resources (a subsidiary of San Diego Gas and Electric) and a group consisting of the Union Geothermal Division of Union Oil Company of California (Union), Southern California Edison and Southern Pacific Land Company.

All of the developers were contacted and questioned on resources in the Niland and Salton Sea area. The response was that all resources are committed to the generation of electric power, and therefore this resource is not available to U. S. Alcohol Fuels.

2.3.2 North Brawley Geothermal Area

2.3.2.1 Characteristics - The North Brawley resource is similar to the Salton Sea area in characteristics although the salinities and temperatures are somewhat less. This fluid is being used in the 10 MWe power plant recently completed by Union and Southern California Edison at Brawley. The problems associated with scaling, reinjection and production of clean steam are similar to the problems in the Salton Sea area. For instance, Westec, who operates the 10 MWe plant for Southern California Edison, reports that the plant normally runs below 5 MWe because of problems with reinjection wells. A spent brine pretreatment system is being planned, in order to remove the precipitates prior to reinjection.

In addition to the main resource, it has been found that a shallower resource exists within this KGRA that has temperatures in the 300°F to 400°F range and a slightly lower salinity (50,000 to 100,000 ppm).

2.3.2.2 Union Oil Company - The Union Oil resources are located in an area that has many advantages. It is close to El Centro and Brawley, offering excellent labor availability. Rail and highway access is also excellent. The site is also close to the Southwest Marketing Corporation grain handling and storage facilities which are being constructed just north of the new power plant.

At the present time, Union has signed contracts which commit all geothermal resources to public utilities for power generation. These contracts were written when the existence of the shallower, lower temperature, resources was not known. Even though these resources are not suitable for power generation, and thus will never be used unless in a direct utilization project such as the proposed Refinery, in order to sell energy from this fluid Union will have to negotiate a contract change with the utilities involved. Union is unwilling to approach the public utility at the present time, and has not encouraged our interest in this area. This resource must be considered unavailable.

2.3.3 Westmoreland Geothermal Area

This reservoir has characteristics similar to North Brawley. Less well testing and reservoir engineering work has been done on this reservoir than on the others. The site does not meet the primary selection criterion.

2.3.4 El Centro Geothermal Area

The City of El Centro was awarded a sizable grant by the Department of Energy to develop a geothermal heat source for heating and cooling public buildings and attracting industry.

The development work has been subcontracted to Westec, Inc., a San Diego based engineering firm. Westec plans to drill one reinjection and one supply well. The supply well is expected to reach 8,500 feet where it is believed that 250°F water exists. This is the temperature required for heating and cooling purposes. Westec intends to stop drilling when the 250°F resource is reached. They are willing to search for higher temperature resources, but would need additional funding. Westec's drilling program is scheduled to be completed in January 1981.

There is not sufficient data to indicate that there is any prospect of a suitable resource being discovered in this area. This site does not meet the preliminary selection criterion.

2.3.5 Holtville Geothermal Area

Union is currently involved in a test program in this relatively new geothermal area. Test drilling at East Highline Unit No. 1 is completed, but the total test program is not projected to be finished until the end of February 1981. At that time, Union will know exactly what they have to offer in the way of a resource, and will have a schedule for drilling production wells. The area is believed to have characteristics similar to the East Mesa KGRA.

Advantages of this area are that rail and road access are readily available to serve the Refinery. In addition, the proposed site is adjacent to a large cattle feedlot, owned by the Orita Land and Cattle Company.

Testing completed by Union in November 1980 on East Highline No. 1 is not conclusive at this point, as testing of the well was primarily directed towards the type of resource required for power generation. Although Union was very confident that they could provide U. S. Alcohol Fuels with the type of geothermal fluid required, they are unwilling to warrant availability.

2.3.6 Heber Geothermal Area

Heber is classified as a medium temperature, medium salinity reservoir. The bottom hole temperature is about 360°F and the salinity is about 15,000 ppm. Extensive testing has shown that the hot water may be used directly in heat exchangers. Because of the relatively high temperature, the geothermal fluid might be used directly in the heating process, rather than in a flash unit.

Chevron Resources Company (Chevron) and Union are the developers in the area and Chevron is the operator. Chevron was contacted, and a meeting held to discuss resource availability. The results were that all deep resources (10,000 feet) at Heber are committed to electric utilities, and there is nothing left for sale that has been developed. Chevron and Southern California Edison Company are planning to construct a 45 MWe power plant in the Heber KGRA in the near future.

Chevron's plans are to drill test wells in the shallower (2,000 foot) geothermal zones to evaluate the usefulness of this resource for direct utilization projects such as the proposed Refinery. If this lower temperature resource checks out, it will be available for sale. The test program will not be complete until the end of 1981. In addition, Chevron is not putting a high priority on this test program due to the emphasis on resource for power generation. Therefore, the resource must be considered both unproven and unavailable within the time frame of the Project and is therefore unsuitable.

2.3.7 East Mesa Geothermal Area

East Mesa is classified as a low temperature, low salinity reservoir. Bottom hole temperatures vary from 325°F to 350°F and salinities from 2,000 to 7,000 ppm. Scaling and corrosion are minimal because of the low salinity. Republic Geothermal, Union Oil Company and Magma Power Company own the principal leases in the area.

2.3.8 Summary

U.S. Alcohol Fuels has thoroughly investigated the geothermal resources of the Imperial Valley and evaluated each for their suitability with respect to the primary criteria of being a proven resource commercially available within the time frame of the Project.

3.0 (Proprietary)

3.1 (Proprietary)

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Pages 11 through 15

Pending finalized contractual relationships for purchase of the geothermal steam, this information is proprietary. Please contact Ultrasonics for further details.

APPENDIX 1

Pending finalized contractual relationships for purchase of the site, the information contained in this appendix is proprietary. Please contact Ultrasystems for further details.

ENGINEERING

TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
1.0	INTRODUCTION AND SCOPE	1
2.0	DESIGN BASIS	1
2.1	Scope	1
2.2	Annual Plant Capacity	1
2.3	Production Days Per Year	2
2.4	Feedstock	2
2.5	Plant Site Characteristics	2
2.6	Product Storage and Shipping	2
2.7	Chemicals Storage	5
2.8	Milo Processing	6
2.9	Ethanol Recovery	8
2.10	Utility Systems	9
3.0	PRELIMINARY ENGINEERING FEASIBILITY	9
3.1	Process Selection	9
3.2	Plant Description	10
3.3	Plant General Arrangement	27
3.4	Railroad Spur	32
3.5	Future Expansion and Retrofit	33
4.0	PROJECT COST ESTIMATES	33
4.1	Introduction	33
4.2	Capital Cost Estimate	33
4.3	Operating Cost Estimate	34
5.0	ENGINEERING AND CONSTRUCTION OF PROJECT	38
5.1	Ultrasystems Engineers and Constructors, Inc.	38
5.2	Project Organization	43
5.3	Project Scope, Schedule and Execution Plan	44

LIST OF TABLES

<u>Number</u>		<u>Page</u>
2.1	Average Composition of Feedstock	3
2.2	Quality of Water from Imperial Irrigation District	4
3.1	Fuel Alcohol Energy Balance	22
4.1	Project Capital Cost	35
4.2	Operating Cost Estimate	36
4.3	Operating Labor	37

LIST OF FIGURES

3.1	Heat and Material Balance	21
3.2	Proposed Routing of Railroad Spur Line	32
5.2	Abbreviated Form of Lists	53

LIST OF APPENDICES

<u>Number</u>		<u>Page</u>
1	Imperial Valley Ethanol Refinery Drawings	59
2	Equipment List	60
3	Geothermal Steam Processing Unit - Technical Data and Drawings	61

ENGINEERING

1.0 INTRODUCTION AND SCOPE

U.S. Alcohol Fuels, in conjunction with Ultrasystems Engineers and Constructors, Incorporated, has conducted extensive preliminary engineering and cost feasibility analyses. These analyses and studies have been designed to demonstrate the technical feasibility of the proposed Refinery and evaluate the capital and operating costs associated with the Project. In addition, the studies have prompted both U.S. Alcohol Fuels and Ultrasystems Engineers and Constructors to undertake the detailed planning and organization that is necessary to execute a Project of this sort.

The results of these analyses are described in this Engineering section of the Report. The Engineering section is divided into four parts, in addition to this Introduction. Section 2, the Design Basis, presents the basic data upon which the Preliminary Engineering Feasibility, Section 3, is founded. The Project Cost Estimates, including both operating and capital costs, are presented in Section 4. In Section 5 the management and organizational approach to the engineering, procurement and construction of the Refinery is described, including the project task force organization, the project schedule, and a preliminary project execution plan.

2.0 DESIGN BASIS

2.1 Scope

The design basis for the Refinery as presented herein includes the design parameters that have been used as the basis for investigating the preliminary engineering feasibility of the proposed Refinery.

2.2 Annual Plant Capacity

The Refinery will produce 14,290,000 gallons per year of 99.2 percent purity ethanol. When the fuel alcohol has been denatured with regular unleaded gasoline, in accordance with Bureau of Alcohol, Tobacco and Firearms formula CDA-20, the Refinery will have an actual output of 14,980,000 gallons per year.

2.3 Production Days Per Year

The Refinery will operate on the basis of a 330 day (7,920 hour) operating year. This allows for sufficient down time for maintenance, repairs and system upsets.

2.4 Feedstock

The Refinery will consume 38,395 pounds per hour (pph) or 152,044 short tons per production year, of U.S. Number 2 Yellow Grain Sorghum (milo) with the average characteristics given in Table 2.1.

2.5 Plant Site Characteristics

- Location --
Imperial Valley, California
- Land area required -- approximately 25 acres
- Transportation access -- highway
- Elevation -- 50 feet above mean sea level
- Design barometric pressure -- 14.86 psia
- Topography -- flat, level, sandy desert ground
- Mean annual temperature -- 72.4° F
- Mean annual precipitation -- 2.82"
- Mean wind speed -- 2-4 mph
- Ground water -- available from Imperial Irrigation District Canal
- Geothermal water quality --

pH = 7.1

Total Dissolved Solids = 2,000 ppm

Temperature = 325° F at Refinery
battery limits

2.6 Product Storage and Shipping

2.6.1 Alcohol Storage

Ten (10) days storage; shipping via tank
cars and tank trucks.

2.6.2 Denaturant (regular unleaded gasoline)

Ten (10) days storage; receiving via tank truck.

TABLE 2.1

Average Composition of Feedstock

U.S. Number 2 Yellow Grain Sorghum		
COMPONENT	AS RECEIVED lb/cwt.	DRY BASIS %
Protein	11.8	13.1
Fat	3.4	3.8
Fiber	2.4	2.7
Ash & Non-Fermentable		
Carbohydrates	8.9	9.9
Fermentable Carbohydrates	63.5	70.5
Water	9.9	0.0

Quantities Consumed (as delivered)

Per Hour: 38,395 pounds (698.1 bushels)
 Per day: 921,480 pounds (16,754 bushels)
 Per Year: 304,088,400 pounds (5,592,000 bushels)

TABLE 2.2

Quality of Water From Imperial Irrigation District

<u>QUALITY</u>	<u>ppm</u>
pH	8.0
TDS	930.0
Li ⁺	0.064
Na ⁺	150.0
Mg ⁺⁺	33.0
K ⁺	5.6
Ca ⁺⁺	94.0
Mn ⁺⁺	0.007
Fe ⁺⁺	0.013
Sr ⁺⁺	1.4
Ba ⁺⁺	0.10
Cl ⁻	140.0
SO ₄ ⁼	350.0
HCO ₃ ⁻	140.0
B	0.28
SiO ₂	9.4

Source: Imperial Irrigation District

2.6.3 Enzyme I (Alpha Amylase)

Two 6,000 gal. tanks

2.6.4 Enzyme II (Amyloglucosidase)

Two 6,000 gal. tanks

2.6.5 Fodder Storage

Twenty (20) days storage in two bins having a capacity of approximately 100,000 cubic feet (c.f.) each; bulk density of 30 lb/c.f.; ship via top loading tractor trailers and rail cars.

2.6.6 Grain Storage

Twenty (20) days storage in 2 bins having a capacity of 224,000 c.f.; assumes bulk density of 68.45 lb/c.f. (or 55 lb/bushel). Receive via trucks and rail cars.

2.7 Chemicals Storage

2.7.1 Sulfuric Acid (66 Be)

Minimum storage in concentrated form.

2.7.2 Ammonium Sulfate (bulk, dry)

Minimum storage in concentrated form.

2.7.3 Ammonium Phosphate (bulk, dry)

Minimum storage in concentrated form.

2.7.4 Defoaming agent (liquid)

Minimum storage in concentrated form.

2.7.5 Cyclohexane

Minimum storage in concentrated form.

2.7.6 Caustic Soda (fifty percent by weight solution)

Minimum storage in concentrated form.

2.7.7 Dispersant & anti-scale agents (solutions)

Minimum storage in concentrated form.

2.8 Milo Processing

2.8.1 Milo Receiving and Storage

- Receiving periods -- 1 shift/day -- 7 days/week;
- Carriers -- road -- 40-ton net end-dump tractor trailers
 - rail -- 100-ton net bottom discharge rail cars;
- Weigh in -- 1 truck scale and 1 rail scale;
- Milo storage capacity -- 20 days capacity;
- Milo handling -- Conveyors, bucket elevators, trash catchers, dust collection system

2.8.2 Milo Cleaning

Screens, magnetic separator, destoners

2.8.3 Milo Grinding

Three (3) Hammermills, conveyor and surge.

2.8.4 Milo Weighing

Continuous weigh belt feed to mix tank.

2.8.5 Mixing and Precook

Premix tank for process water with backset of distillation stillage water; provision for pH adjustment. Agitated mix tank for suspending ground milo and adding pph of Enzyme I (alpha amylase).

2.8.6 Cooking

Direct steam injection in 4 stages.

2.8.7 Liquefaction

Add pph of Enzyme I (alpha amylase). Three agitated tanks in series.

2.8.8 Saccharification

Heat Exchange via Process water to mix tank. Add pph of Enzyme II (amyloglucosidase). Three agitated tanks in series.

2.8.9 Decantation of Gluten

Two parallel centrifuges. Solids are washed by resuspending and recentrifuging via single secondary centrifuge. The decanted gluten solids are pressed, then combined with the dewatered yeast cream, pressed, and dried. Press water and centrifuge liquid effluents are combined and sent to fermentation.

2.8.10 Animal Fodder Drying

The pressed gluten and yeast cream animal fodder is dried to ten (10) percent moisture in a rotary steam tube dryer.

2.8.11 Fermentation (Chemapec Technology)

Multiple-stage continuous cascade fermentation.

Two parallel chains of four fermentors in series with external heat exchangers. Yeast recovery, reconditioning, and recycle from effluent. Start-up yeast grown aseptically in the prefermentor.

2.8.12 Fermentor Gas Scrubbing

Water scrubbing column to condense ethanol vapors.

2.8.13 Carbon Dioxide Recovery

Option A -- No recovery, column vent gas to atmosphere.

Option B -- Package liquefaction plant on carbon dioxide from scrubber.

2.8.14 Yeast Prefermentation

Two yeast prefermentors for the aseptic propagation of the yeast inoculum, for use in aseptic inoculation. Fermentor air from oil free compressor, coarse filtered, then ultra-fine filtered to produce sterile air.

2.8.15 Yeast Recovery

Fermentation effluent to be centrifuged producing a concentrated yeast cream and clarified beer. Yeast is suspended with diluted acid for five minutes, then recycled to the first fermentors.

2.8.16 Beer Well

The clarified beer is neutralized in the beer well.

2.9 Ethanol Recovery

2.9.1 Mash Column

Sieve trays are used in the stripping section and valve trays are used in the rectifying section. Overhead vapor compression is provided. A supplemental (and start-up) reboiler is geothermal steam heated. Column has a condensing section to prevent light ends buildup and also has a fusel oil take off. The light ends and fusel oils are mixed into the final ethanol product. A ninety-one (91) percent by weight liquid ethanol product stream at $^{\circ}\text{F}$ is sent to the dehydration column. The bottoms product is heat exchanged and split in two streams, with one being sent to mash mix tank, and the other stream going to waste treatment.

2.9.2 Dehydration Column

Valve tray column using cyclohexane as dehydrating agent. Primary reboiler is geothermal steam heated, while secondary reboiler is heated with liquid from the mash column primary reboiler ethanol discharge. The percent ethanol bottoms product is sent to denaturation and storage.

The top product is blended with the cyclohexane recovery column overhead, condensed, and phase separated. The light, ethanol-rich phase is refluxed in the dehydrator. The heavy water-rich phase is refluxed in the cyclohexane recovery column.

2.9.3 Cyclohexane Recovery Column

This column, which is equipped with valve trays, to be driven by a geothermal steam heated reboiler; bottoms liquid product consisting of seventy-nine (79) percent ethanol and twenty-one (21) percent water is recycled to the mash column.

2.9.4 Stillage Waste Treatment

Two stages of activated sludge treatment (aeration basin and gravity clarifier) is followed by automatic backwash gravity filters, cartridge micro-filtration and deepwell reinjection along with spent geothermal brine. Excess sludge from the gravity clarifiers are centrifuged and land applied as fertilizer, then disked into soil after drying.

2.10 Utility Systems

2.10.1 Process Steam

Steam .

flashed from geothermal hot water obtained from geothermal resource operator. Spent brine to be returned, along with treated effluent, for reinjection to prevent subsidence of the geothermal zone.

2.10.2 Electric Power

Plant will require service of 4160 VAC; Phase 3, to be obtained from Imperial Irrigation District.

2.10.3 Process Water

Imperial Irrigation District canal water will be used.

2.10.4 Cooling Water

Cooling Tower circulation at 80°F.

2.10.5 Instrument Air

Air to be provided in a 150 psig Plant Air System.

2.10.6 Chilled Water

Chilled water required at 50°F; available at 1,000 GPM.

3.0 PRELIMINARY ENGINEERING FEASIBILITY

3.1 Process Selection

Over the past year, U.S. Alcohol Fuels and Ultrasystems Engineers and Constructors have reviewed the capabilities of the major fuel alcohol process engineering firms, and evaluated their process technology. Although Chemapec, Inc. (Chemapec) of Woodbury, New York (see Section 5.1.3.1) was unwilling to provide sufficient information to allow a detailed engineering evaluation, U.S. Alcohol Fuels and Ultrasystems Engineers and Constructors were provided assurances that the proprietary Chemapec technology represented a highly advanced yet proven process for fuel alcohol production. Furthermore, Chemapec provided assurances that the representations made regarding their process technology during the study phase would be backed up by process guarantees that would take effect during the actual licensing and engineering phase. Based upon the representations of Chemapec regarding their proprietary technology, and upon

the evaluation of other process licensors in the fuel alcohol field, Chemapec was selected to provide a process engineering feasibility study package as part of the engineering feasibility analyses being conducted for the proposed Refinery.

Due to the alleged proprietary nature of the fuel alcohol process developed by Chemapec, the process package that was provided as part of their feasibility study was deficient in that it lacked essential engineering details that were considered of prime importance in evaluating the technological feasibility of the Project. Consequently, U.S. Alcohol Fuels requested that Ultrasystems Engineers and Constructors use its own considerable fuel alcohol process design capability to significantly modify and supplement the Chemapec design while retaining the basic Chemapec process as the basis for the design. For the most part, these modifications consist of developing the essential details of the process operation. In addition, it was also necessary to ensure that the Refinery process was properly integrated with other aspects of the Project, particularly the geothermal steam processing element of the plant. It must be emphasized, however, that the fuel alcohol production process, upon which this preliminary engineering feasibility is based, is essentially a Chemapec process.

3.2 Plant Description

3.2.1 Scope

This portion of the Engineering section of the Report presents a general description of the operation of the facility in accordance with the process design developed by Ultrasystems Engineers and Constructors, and, as described in Section 3.1, is based upon the preliminary process engineering feasibility study package provided by Chemapec, Inc.

3.2.2 Process Description

3.2.2.1 Process Flow Diagrams - The discussion of the plant process presented herein is a narrative description of the process described in the Process Flow Diagrams (Drawing Numbers 1013-100 through 1013-800), reduced copies of which are presented in Appendix 1 to this Engineering section.

3.2.2.2 Drawing 1013-100 -- Grain Receiving and Storage - Milo is received by end dump tractor trailer trucks and, with possible future addition of rail service to the site, by bottom dump rail hopper

cars (possible 50-car unit trains). Deliveries are weighed in by truck (or rail) grain weigh scales (Y-101,2), then dumped or unloaded into underground grain hoppers (Y-103,4). A series of conveyors followed by a bucket elevator (Y-108) transports the grain to two grain silos (T-101,2). Unloading for one day's production can be accomplished in a six (6) hour period. Grain is reclaimed by bottom screw conveyor, which feeds belt conveyors (Y-109, 110) which transport the milo through an underground passageway to the Milo Milling unit (Drawing 1013-200). This area is protected from explosion hazards by a blower cyclone dust collection system (P-101, Y-113), which returns the dust to the process at the conveyors to Milo Milling.

3.2.2.3 Drawing 1013-200 -- Milo Milling - Grain is transported by a bucket elevator (Y-201) to a dump scale (Y-202) feeding the rotary shaker (Y-203) and the destoners (Y-204,5). Screenings are rejected to fodder storage bins (T-704 A, B) shown on Drawing 1013-700. Following destoning, the grain is transported by bucket elevator (Y-206) and a distributing screw (Y-207) to a surge bin (T-208) over the hammermills (Y-209, 10, 11). One of the three hammermills is a spare. The hammermills reduce the milo to a finely ground milo grit. The finely ground milo grits are pneumatically conveyed to a surge bin (T-215) over the belt feeder shown in Drawing 1013-300. Unit 200 is also protected from dust explosion hazard by an exhaust fan cyclone and baghouse system which returns dust to the weight belt feeder surge bin.

3.2.2.4 Drawing 1013-300 -- Mash Preparation - Milo grits from Unit 200 are measured by a gravimetric moving belt (M-301) into the slurry mix tank (T-303). Process water is first combined in mash water mix tank (T-305) with backset stillage water stream returning from the distillation mash column (C-502 on Drawing 1013-500). The pH is adjusted with Sulphuric Acid as necessary. The mash water is then pumped to T-303 to suspend the finely ground milo in the slurry tank.

The milo slurry is then heated with geothermal steam. Following a hold in a continuous plug flow standing pipeline cooker (R-353), the now partially liquified slurry is flashed in a series of flash vessels (V-354, 5, 6). As an energy conservation measure, the flashed steam is recaptured in the steam injector system and reused to heat the slurry. The slurry is degassed in a mash deaerator (V-352) to remove the liberated dissolved gases which would otherwise accumulate in the cooker section.

The injection of steam into the starch slurry hydrates (gelatinizes) the starch. Because an amount of Enzyme I (alpha amylase) was added to the slurry tank prior to cooking, the small amount of soluble starch present before cooking will be partially hydrolyzed, and the viscosity of the stream reduced, making it easier to handle.

After cooking, the temperature of the cooked mash is approximately °F, which is optimal for enzyme activity. At this time the fully gelatinized starch stream is again treated with Enzyme I (alpha amylase) to complete the liquefaction process. Additional Enzyme I is added to the partially liquefied slurry in three liquefaction vessels. Following liquefaction, the pH of the liquid mash stream is lowered to the first (R-311 D) of the saccharification vessels (R-311 D, E, F). Enzyme II (amylglucosidase) is added in line prior to reaching R-311 D.

During saccharification, the oligosaccharides are completely hydrolyzed to maltose and glucose, the fundamental sugars. Because there is a chemical gain of one mole of water per mole of glucose unit liberated, there is an increase in the solids content during the saccharification process. The saccharification process is carried out under conditions which are optimum.

The amount of fermentable sugar is sufficient to sustain the beginning of the fermentation process. The remaining soluble oligosaccharides will be saccharified during the fermentation process, resulting in the complete utilization of the available carbohydrate to produce ethanol.

The insoluble solids in the product stream are removed in a centrifuge (S-317 A, B, C). The decanted solids are washed in a series of wash and centrifugation steps to recover the maximum amount of liquefied starch and sugars for conversion in the Fermentation unit. The washed insoluble solids are then blended with a dewatered yeast cream. The insoluble milo protein and fiber recovered from the saccharified mash stream, and the yeast cream from Fermentation (Drawing 1013-400) are combined in a screw conveyor blender (M-323), and the combined slurry is pressed in a continuous screw press (S-363) to recover maximum dissolved solids and water for fermentation. This Animal Fodder is then dried in a steam-heated indirect rotary disc-type dryer (D-329 A, B). The dried solids (Animal Fodder by-product) are then pneumatically conveyed to the Product Storage unit (Drawing 1013-700).

The combined washings and centrifuge effluent from the decantation section are brought from the protein meal wash water tanks (R-338 A, B) and blended in the sweet mash buffer tank (T-330) with diammonium phosphate and ammonium sulfate nutrients, press water from S-363 and process water from the CO₂ scrubber (C-430) in the Distillation unit which contains recovered alcohol. The combined sweet mash is cooled in sweet mash cooler (E-333) and is conveyed to the Fermentation unit (Drawing 1013-400).

3.2.2.5 Drawing 1013-400 -- Fermentation - Sweet mash from the Mash Preparation unit is divided into two equal streams and each stream is charged to a series of continuous fermentors

Maximum heat release occurs in the first fermentor (R-407 A, H), with reduced heat release in downstream fermentors, reflecting the decrease in the rate in which the saccharification of the broth is completed.

During start-up of the process, starter yeast is used to inoculate a small sterile two-stage seed system (R-401, 403) for preparation of the yeast inoculum to the first continuous fermentor (R-407 A, H).

The yeast are grown aerobically with sterile air provided by an oil-free compressor (K-405), and air pre-filter (F-405), and a sterile air filter (F-406).

During continuous operation the final fermentor effluent is pumped to surge tank (R-448) where the material is cooled to prevent contamination. The chilled fermented beer passes a rotary sieve (S-414 A, B), for removal of extraneous material before it is centrifuged by a continuous

yeast separator (S-434 A, B). The yeast from each set of continuous fermentors is acid washed in yeast cream tank (T-420 A-D) and reconditioned to serve as inoculum to the first fermentor in the cascade. The other yeast is dewatered in a centrifuge (S-435 A, B) and then blended with the solids going to the fodder dryer in the Dryer unit (Drawing 1013-300).

The fermented mash, free of yeast, is neutralized and then sent to the beer well (T-416) which serves as a surge vessel feeding the Distillation unit (Drawing 1013-500).

3.2.2.6 Drawing 1013-500 -- Distillation - The fermented mash is then heat exchanged with stillage (E-501), degassed (V-534) and fed to the mash column (C-502). The fermented mash is stripped in the lower section of the mash column as it passes down through twenty-seven (27) sieve trays. The rectifying section of the column utilizes valve trays. The vapors pass upward through a geothermal steam-driven condensing centrifugal compressor (K-503) which recompresses them to permit heat exchanging against the bottoms product.

The bottoms product is heated by a supplemental geothermal steam heated reboiler (E-506) and through a falling film reboiler heated by the condensing vapors (E-505). Fusel oils are removed mid-column, separated (V-509) and combined with the alcohol product. Overhead vapors are routed through a degassing system to maximize light end separation.

Alcohol-rich draw from the mash column is fed to a mash column product drum (V-508) which in turn feeds to the dehydration column (C-519) which produces an anhydrous alcohol bottoms product. The anhydrous system

utilizes the cyclohexane-alcohol-water azeotrope system. Overhead product from C-519 is combined with the overhead stream from the cyclohexane recovery column. Makeup cyclohexane is added back to the dehydration column with the cyclohexane-rich stream from V-521. The bottoms product from the cyclohexane recovery column is rich in water and ethanol and is returned to the mash column. The dehydration column is heated by recompressed beer column overhead and a geothermal steam-driven reboiler (E-523). The cyclohexane recovery column is heated with a geothermal steam-driven reboiler (E-529). Alcohol is combined with fusel oil and the combined stream is cooled in the final product chiller (E-523).

Light ends are chilled in the mash column vent condensor (E-515), collected in the light ends receiver (V-516), and are combined with the anhydrous alcohol, then pumped to the Product Storage unit (Drawing 1013-700).

3.2.2.7 Drawing 1013-600 -- Chemical Receiving and Storage - Sulphuric acid, caustic, antifoam, Enzymes I and II, and cyclohexane are received via tank truck and stored in tanks (T-601; T-606; T-622 A, B; T-623 A, B; T-624 A, B and T-610, respectively) prior to use in the process. Ammonium sulfate and diammonium phosphate are received via truck as powders and must be dissolved in water in mixing tanks (T-653, 656) prior to use in the process.

3.2.2.8 Drawing 1013-600 -- Water Chilling Unit - A water chiller package system (R-633 A, B) is provided which utilizes lithium bromide as the absorbent. Two units are provided, which are capable of providing refrigeration

The units are driven with

geothermal steam.

Cooling tower

water is required. Chilled water usage is predominantly in the Fermentation unit (Drawing 1013-400) for fermentor cooling and yeast chilling, and in the Distillation unit (Drawing 1013-500) for product cooling and vent condensing.

3.2.2.9 Drawing 1013-700 -- Product Storage - Denaturant and alcohol are stored in a diked storage area. Alcohol day tanks (T-701 A, B)

are used to provide time for analysis of the product prior to addition to the main alcohol storage tanks (T-702 A, B). Denaturant (unleaded regular gasoline) is stored in two tanks (T-703 A, B) prior to blending with

the product alcohol following release of product from day tank, at the rate of five (5) percent by volume (BATF formula CDA-20), and the denatured alcohol is pumped to the storage tanks. The area is equipped to ship by tank truck, and will accommodate future expansion for railroad transport. The Animal Fodder storage bins (T-704 A, B) are fed by pneumatic feed system and a pneumatic truck loading system which will also accommodate future rail shipment of Animal Fodder.

3.2.2.10 Drawing 1013-800 -- Waste Treatment - Stillage containing Total Suspended Solids (TSS) is combined with process water and is treated in two consecutive stages of activated sludge. Each stage consists of an aeration basin (Z-801, Z-802) with a gravity clarifier (Y-802 A, B and Y-804 A, B). The sludge from the clarifier is recycled to the aeration basins in each stage. The primary stage basin is aerated by submerged turbine aerators (Y-801 A-I), and the secondary basin is aerated by surface aerators (Y-803 A-F). Clarified effluent from the activated sludge system contains 30 ppm five-day BOD and approximately 5 ppm TSS. Water overflow from the second clarifier passes through an automatic backwash gravity filter (Y-805 A, B) and through additional filter cartridges (Y-806), then is pumped to the geothermal unit for makeup water to the spent geothermal brine for reinjection. Waste bio-sludge from the two clarifiers is dewatered in a solid bowl centrifuge (Y-808) and can be land applied and disked into the soil as a fertilizer. The centrifuge effluent is recycled to the second stage aeration basin (Z-802).

3.2.2.11 Cooling Tower - The cooling tower provides cooling water at 100 psia.

3.2.2.12 Geothermal Steam Production - The geothermal element of the Refinery includes the equipment necessary for generating clean steam at the desired pressure levels and handling the brine during this process. Not included in the scope of the unit are brine production, treating and transportation facilities, spent brine treating, and brine reinjection facilities, which are the responsibility of the geothermal brine supplier.

This portion of the preliminary engineering feasibility analysis was conducted by the Ben Holt Company of Pasadena, California. Ben Holt Company has a great deal of experience in the area of geothermal fluid processing and utilization and has provided U.S. Alcohol Fuels with consulting support throughout the preliminary stages of the Project.

● Process Description - This plant is designed to utilize the moderate temperature, low salinity brine. This fluid is available at the plant battery limit. The total dissolved solids are around 2000 ppm. The brine may contain sulphuric acid as an inhibitor to reduce the formation of carbonate scale. There will still be some evolution of carbon dioxide gas in the steam which can accumulate in the ethanol plant. Boron may also be present in trace quantities. Geothermal fluid will be needed to produce the ethanol plant steam requirements. The Process Flow Diagram in Appendix 1 illustrates the system which is described below.

Brine is admitted to the plant through a control valve and enters the first stage flash separator (V-1). The pressure in this vessel is maintained by controlling the amount of brine admitted to the system. If sufficient steam is produced, the pressure drops, causing the inlet valve to open. The increased brine flow will then cause more steam to be produced. If excess steam is produced, the opposite will occur. The steam flashed from the low salinity brine will not contain significant amounts of solids. However, a mist eliminator is included in the vessel to assure the quality and cleanliness of the steam. A small amount of wash water is sprayed onto the mist eliminator to remove any salts that may build up on the mist eliminator.

This system is the same in all three separator vessels.
An emergency brine pond will be located adjacent to the geothermal plant. This will allow the diversion of the feed brine in the case of a plant upset or shutdown. This will allow for an orderly shutdown of the producing wells or allow time for the upset to be remedied.

The brine from the first stage will then pass through a level control valve to the second stage separator (V-2). Mechanically this separator is identical to the first stage separator. In this stage, the steam pressure is maintained by a let-down valve. If the second stage steam produced is inadequate to maintain the desired pressure then additional steam is drawn (this in turn may result in more brine being supplied to the system).

The third stage (V-3) is in most respects identical to the second stage. Pressure control is maintained by letting steam down from the second stage. This will prevent the steam pressure from dropping below the desired pressure. However, if excess third stage steam is produced no control action is necessary. The system pressure is simply allowed to rise until it reaches equilibrium. As the pressure rises so will the flash temperature. As the brine temperature rises, there is less enthalpy differential and thus less steam will be produced.

The brine from the third stage is pumped back to the resource operator. The brine return pump is a booster pump and is not designed for reinjection purposes. The suction of this pump has a relatively low head. In order to avoid suction cavitation, a vertical multi-stage "can" pump is used. Two pumps and a fifty (50) percent spare are provided to allow for plant turndown and a less expensive spare.

The vessel and pump specifications are included for reference in Section 6.3. Also included is a plot plan to show how the equipment can be arranged in a compact but uncrowded layout.

• Utility Requirements - The geothermal plant uses the following utilities:

1)	Electricity	-	160 kw
2)	Condensate		3 gpm
3)	Instrument Air		10 scfm

● Plant Operations - The plant is designed to operate with a minimum of operator attention. The primary operator duties will be to lubricate the pumps and make periodic inspections for mechanical problems or leakage. In an emergency shutdown, the operator must divert the incoming brine to the temporary holding pond or shunt the brine to the reinjection lines. There is no fire hazard or noxious chemical hazard associated with this plant. The primary safety concern is exposure to live steam or hot brine, and protective equipment should be worn while dealing with any such leakage. Also, loose clothing or jewelry should not be worn while working around the pumps. No special materials beyond normal lubricants are required for operation or maintenance of the equipment. We estimate that normal operations will require about one hour of operator attention per eight (8) hour shift.

3.2.3 Heat and Material Balance

Figure 3.1 is included as a description and a general overview of the energy and materials requirements of the process. For a detailed description of material and energy flow, the Process Flow Diagrams (Drawings 1013-100 through 800) in Appendix 1 must be consulted. There are several side streams that are not shown and are therefore not reflected in the block flow diagram. For instance, the Fodder Separating and Drying Section actually requires three temperature levels of process steam, but the drying section has the maximum temperature and BTU requirement. For simplicity, this figure does not show the minor steam requirement broken out.

The energy flows shown in Figure 3.1 represent energy derived from the geothermal fluid, which is flashed to the three steam levels shown. The steam is used to provide process heat as well as producing chilled water for cooling. Note that there is no heat requirement in the Milling Operation, but significant heat is used in Mash Preparation for cooking. The Fodder Separation and Drying unit (see Drawing 1013-300 and Section 3.2.2.4) uses significant heat for drying the by-product. The Fermentation uses a significant amount of energy in the form of chilled water to cool the prefermentors and fermentors. The Distillation unit uses both heat and chilled water. The Refinery uses approximately 55,000 BTU per gallon of ethanol produced.

The steam is flashed from hot geothermal fluid. The spent brine is reinjected into the ground. Makeup water from the waste treatment unit is added to the spent brine in order that the amount reinjected is equal to the amount produced to prevent subsidence in the area.

The Refinery uses 3,040,880 hundredweights (cwt) per year of milo, or 461 tons per day (T.P.D.) as shown in Figure 3.1. This material is transformed by the Refinery into 14,290,000 gallons per year of anhydrous ethanol, or 43,303 gallons per day. When denatured in accordance with BATF formula CDA-20, the total product amounts to 14,980,000 gallons per year, or 45,395 gallons per day. In addition, 136 T.P.D. of animal fodder by-product is produced.

3.2.4 Utilities Summary

All utility systems for the proposed ethanol refinery have been included in the capital and operating cost estimate. These systems include steam (from geothermal brine), makeup water, electrical power, domestic water, and effluent waste treatment. Refer to Utilities Summary, Table 3.1, as discussed below.

3.2.4.1 Steam - Steam is obtained by flashing the geothermal brine in three pressure vessels at three different pressure and temperature levels.

These levels are balanced so that the maximum heat can be directed to the process where different levels of energy are required.

The total steam requirement will be 105,180 pph, necessitating a flow rate of 1,080,000 pph of geothermal brine.

3.2.4.2 Makeup Water - Makeup water is required in three areas: cooling tower makeup, process makeup, and domestic uses. This water is available from the Imperial Irrigation District's East Highline Irrigation Canal. It should be noted that the domestic water will not be used for drinking. The canal water is not potable without treatment. Rather than treat canal water, it is common practice in the Imperial Valley to use bottled or purified water (trucked in) for consumption.

FIGURE 3.1
HEAT AND MATERIAL BALANCE

TABLE 3.1

**IMPERIAL VALLEY GEOTHERMAL ETHANOL REFINERY PROJECT
UTILITIES SUMMARY**

UTILITY	QUANTITY
Geothermal Brine	1,080,000 Lb/Hr
Saturated Steam	105,180 Lb/Hr
Heat Requirement	98.9 Million BTU/Hr
Process Makeup Water	214 G.P.M.
Cooling Tower Makeup Water	366 G.P.M.
Domestic Water	2500 G.P.D.
Electrical Power	5313 kw/Hr
Wastewater Treatment	123,620 Lb/Hr

3.2.4.3 Electrical Power - Electrical power will be brought to the Refinery site at 4160 volts, three phase, four wire. It will then become U.S. Alcohol Fuels' responsibility to step down the voltage to 120/208 volts and 277/480 volts as required. The maximum power demand for the whole Refinery will be 5313 kw/hr.

This power level is not presently available, but the Imperial Irrigation District (IID) in Imperial, California, is presently conducting a study to determine when this service could be made available.

Discussions with the IID indicates that a time span of one year would be necessary after agreements are signed to supply sufficient electric power to the site for this Refinery.

3.2.4.4 Waste Water Treatment - The waste water treatment system described in detail in Section 3.2.2.10 processes 123,620 pph of effluent. It is a conventional treatment system that utilizes two aeration basins, two gravity clarifiers, and a series of filters. The treated water is then injected into the ground to replace the geothermal steam that was used in the process.

3.2.5 Operating Materials and Chemicals Summary

3.2.5.1 Scope - This section of the Engineering portion of the Report summarizes the materials and chemicals that are required to operate the Refinery.

3.2.5.2 Enzyme I - Alpha amylase is used in the Mash Preparation unit (Drawing 1013-300) for hydrolysis and liquefaction of the starch.

3.2.5.3 Enzyme II - Amyloglucosidase is used in the Mash Preparation unit to saccharify the gelatinized starch to produce fermentable sugars.

3.2.5.4 Sulphuric Acid (98 percent) - This chemical is used in adjusting pH of process streams in the process.

3.2.5.5 Water Treatment Chemicals - Allowance must be made for additives and inhibitors to reduce scale and corrosion in water systems.

3.2.5.6 Cyclohexane - This chemical is used as the azeotropic splitter in the Distillation unit (Drawing 1013-500). Although the cyclohexane is recovered, allowance must be made for makeup.

3.2.5.7 Regular Unleaded Gasoline - In accordance with the regulatory requirements of the Bureau of Alcohol, Tobacco and Firearms (BATF), the fuel grade alcohol must be denatured to BATF specification CDA-20 by the addition of five (5) percent by weight of regular unleaded gasoline.

3.2.5.8 Defoamer Agent - A silicone-based defoaming agent will be used to eliminate excessive foaming in the first and second stage fermentors (R-407 A, B, E, F) .

3.2.5.9 Diammonium Phosphate - Used in the Mash Preparation unit (Drawing 1013-300) as a yeast nutrient blended in the sweet mash buffer tank (T-330) prior to fermentation.

3.2.5.10 Ammonium Sulfate - Used in the Mash Preparation unit (Drawing 1013-300) as a yeast nutrient blended in the sweet mash buffer tank (T-330) prior to fermentation.

3.2.5.11 Sodium Hydroxide (NaOH) - Used in adjustment of pH in the plant process.

3.2.6 Design Engineering Criteria

This section describes the general criteria under which detail design of the Project will be accomplished. This description is not an exhaustive review of Ultrasystems Engineers and Constructors' standard design specifications and procedures. However, this discussion does provide an overview of the basis on which the detailed engineering of the Refinery will be conducted, and the design assumptions upon which the Project Cost Estimates are based.

- Concrete - Foundations for equipment, structures, supports, pipeways, drainage structures, and concrete for paving, pads, and ditch and pond linings will be designed in accordance with the recommendations contained in the soils and geology report to be prepared for the Project site. Equipment and structures will be supported on shallow mat or spread footing foundations. Piling is assumed not to be required. Lightly loaded foundations such as stair and ladder pads, small pumps, small pipe base ells, etc., will be supported on shallow foundations or directly on paving. Ground water has been assumed to be a sufficient depth so as not to create buoyancy problems.

All concrete work shall conform to ACI 301 Specifications for Structural Buildings. No indication of ground water pH is available, and Ultrasonics assumes the use of Type I or Type III Portland Cement for all concrete work. All concrete shall be minimum 3,000 psi ultimate strength at twenty-eight (28) days, with four to six (4-6) percent air entrainment. All steel reinforcing for concrete shall conform to ASTM A615, Grade 60 for rebar, and ASTM A185 for welded wire fabric.

All concrete shall be designed according to the recommendations of ACI 318, "Building Code Requirements for Reinforced Concrete," using either working stress or ultimate strength design. All concrete structures and foundations shall be designed for the loading conditions noted in Structures below. Foundations shall be designed with a factor of safety of 1.5 for erection or shutdown conditions, and 2.5 for normal operating loads. Hydrostatic testing of vertical vessels and columns on their foundations is included in design.

- Structures - Structural steel and miscellaneous steel will be furnished according to the requirements of ASTM A-36. Steel will be designed and detailed according to AISC Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings. Egress to platforms shall be by ladder, except as indicated otherwise. All platforming will be galvanized checker plate. All steel structures, platform framing, stairs, ladders, safety cages, handrails, and other miscellaneous iron shall be hot dip galvanized per ASTM A-123.

All steel and concrete structures and their foundations shall be designed for the following loads:

- Structure, piping and equipment dead loads;
- All live loads;
- Hydrostatic test loads on vessels;
- Wind loads per ANSI A58.1;
- Earthquake loads per Uniform Building Code.

● Vessels - The columns, drums, vessels, and tanks in this Project will be provided in accordance with the design requirements and codes specified by the process licensor. Items not specified by the process licensor will be supplied in accordance with Ultrasystems Engineers and Constructors Standard Specifications.

● Heat Exchangers - The heat exchangers on the Project will be provided in accordance with the design requirements and codes specified by the process licensor. Items not specified by the process licensor will be supplied in accordance with Ultrasystems Engineers and Constructors Standard Specifications.

● Mechanical Equipment - The pumps, compressors, blowers and drivers, grain handling equipment, and other mechanical components on this Project will be provided in accordance with the design requirements and codes specified by the process licensor. Items not specified by the process licensor will be supplied in accordance with Ultrasystems Engineers and Constructors Standard Specifications.

● Piping - All piping designs shall, as a minimum requirement, comply with all governing local codes. Where the process design drawings, or standard practices, call for materials or procedures of a higher quality than the minimum allowed by applicable codes, the former shall govern. All fabrication and erection of piping, including welding, shall conform to the latest revision of ASA 331.1 code for pressure piping, or equal.

It shall be specified that all welding of pressure parts of pipe, whether shop or field, shall be done by welders qualified in accordance with Appendix A to Section 6 of the code for pressure piping, or equal. It shall also be specified that all piping shall be fabricated and installed in agreement with dimensions and elevations shown on the drawings. Where slopes are indicated on the drawings, piping shall be carefully sloped to avoid pockets. Where apparent conflict exists between the specifications and the drawings, the Client's representative shall decide which is to govern.

- Instrumentation - Instrumentation will be provided as shown on the piping and instrument diagrams and the instrument specification sheets to be supplied as part of the process design package. Instrumentation will be from top quality manufacturers. Instruments will be selected on the basis of good engineering principles with the objective of providing a safe and economically operable plant.

- Electrical - All materials and equipment included in the electrical facilities and the manner in which the same are installed will be in accordance with at least the minimum recommendations of the National Electrical Code: the Standards of The Institute of Electrical and Electronic Engineers and the National Electrical Manufacturers Association.

- Painting and Insulation - Painting and insulation will be in accordance with specifications provided by the process licensor; those items not specified will be provided in accordance with Ultrasystems Engineers and Constructors Standard Specifications.

3.3 Plant General Arrangement

3.3.1 Site Description

The location of the proposed Refinery has previously been discussed in the Geothermal Resource section of the Report, and is shown in Appendix 1 to that section of the Report as well as in Drawing 1013-900, a reduced copy of which is included in Appendix 1 to this Engineering section.

The topography of the site is slightly rolling to flat, with a light growth of desert shrubs. The surface materials appear to be largely silts and sands. A more detailed description of the general characteristics of the site is provided in the Environmental section of this Report.

3.3.2 Plant Layout

Access to the twenty-five acre Refinery is from a road running North-South along the western project boundary.

The details of the plant layout are shown in Drawing 1013-900 and in Plant Section Drawing 1013-901 and 902.

In the first area encountered when entering the Refinery site are the administrative and maintenance building areas. Parking for these offices and shop are directly to the north.

The western one-half of the site is divided into approximately thirds, with the northern one-third being reserved for Grain Receiving and Storage. Provisions have been made to allow the milo to be received by either truck or rail. From this area the milo is conveyed to the milling section of the process plant. Directly to the east of the maintenance and administration buildings is the ethanol process area which occupies approximately 120,000 square feet. At the north end of this process area is located the chemical storage building and the cooling tower.

The milo from Grain Receiving and Storage is conveyed underground from the storage area to the eastern end of the production building, which occupies the northern portion of the process area and houses the Milo Milling unit. The milled milo is then conveyed to the Mash Preparation equipment housed in the northwest corner of the Production building. The saccharified mash is conveyed south into the Fermentation unit, and the fermented beer is then processed in the Distillation train which lies one hundred feet to the east of Fermentation. The Animal Fodder is conveyed to the Drying section which lies immediately to the east of Mash Preparation, south of the Milling unit, and north of the Distillation train. Product and co-product are then conveyed eastward to Product Storage.

The southern third of the plot contains the Waste Water Treatment section as well as the first and second stage aeration basins. In this area is also located the product rail car loading platform.

3.3.3 Buildings

3.3.3.1 Scope - The proposed Refinery will have five buildings, including a Production Building, Administrative, Maintenance-Laboratory, Chemical Storage Building, and a Control Gate House.

3.3.3.2 Production Building - This 25,200 square foot building will provide shelter to the Milo Milling and Mash Preparation areas of the process. The foundations will consist of spread concrete footings bearing on undisturbed soil. The structural frame to consist of structural steel beams, girders and columns. The exterior siding will be insulated factory assembled metal panels. The roof construction will be 3-ply built up roofing with gravel, 2-inch rigid insulation supported by 20 gauge-formed metal roof deck. The buildings will be sprinklered for fire protection.

The Grain Milling area of the building will be six stories high, adjacent to the Mash Preparation building and of fire resistive construction. The wall between the two sections of the building will be of explosive resistive construction and parapeted three (3) feet above the roof of the Mash Preparation building (FM and MFPA requirement). The remaining exterior walls of the milling building will be insulated metal panels. Roof shall be formed metal deck, rigid insulation, and built-up roofing.

A passenger elevator and two enclosed stairs will provide for personnel circulation through the building. A drop-out shaft and hoistway the full height of the building will allow for vertical transport of equipment. A MCC Room, Control Room and toilet facilities separated from the process area by a two-hour fire rated enclosure shall be provided on the second level. The MCC Room will be ventilated and pressurized, the Control Room air conditioned.

The Mash Preparation portion of the building shall be of fire resistive or non-combustible construction. Exterior walls and roof to

be insulated metal panels. The centrifuge and dry area shall be separated from the rest of the process area for dust control and sound isolation. The walls and ceiling shall be designed to reduce the noise level within this area and transfer of sound to the rest of the building. An overhead crane will be provided to move equipment within this area.

A three-level service area shall be provided, separated from the process area by two-hour fire rated partition walls. The first level will contain an MCC Room and Mechanical Equipment Room. The second level will contain locker, toilet and shower facilities and a small lunch room. The third level will contain a control room. The control room shall be provided with windows to overlook the process areas.

3.3.3.3 Administration Building - This building will enclose approximately 4,550 square feet. It will be constructed of masonry-bearing exterior walls and a roof of steel joists, metal decking with roofing bearing a rigid insulation. Interior partitions to be steel studs, gyp-board and vinyl wall fabric. Floors to be carpet in office areas and impervious floor covering in restrooms and vestibules, ceilings to be suspended acoustical tile. Windows and entrances to be thermo-glazed aluminum. Seventy-foot candle fluorescent lighting in office areas. Forced air heating and cooling system. Building will be fully air conditioned.

3.3.3.4 Maintenance and Laboratory Building - Approximately 5,600 square feet, this structure will be an insulated pre-engineered metal building with insulated overhead doors and thermo-glazed windows. Partitions which may be subject to hard abuse will be concrete block, while remaining partitions may be studs and gyp board. Laboratory section of this building and maintenance office will be fully air conditioned.

3.3.3.5 Chemical Storage Building - This is a 2,700 square foot insulated pre-engineered metal building. Where interior walls are subject to abuse from warehouse activities, the interior of the building will be lined with concrete block or other hard surfaces.

3.3.3.6 Control Gate House - A pre-engineered package unit created for this specific purpose will be provided.

3.4 Railroad Spur

3.4.1 Summary

Since the Refinery is largely dependent upon the importation of grain,

the construction of a railroad spur to the Refinery from the nearest line has been considered as an alternative. The proposed spur would have to originate north of Holtville. The preliminary alignment would stretch some twelve miles across private agricultural land, irrigation canals and Bureau of Land Management property.

Due to the capital cost of this spur, the difficulty of obtaining easements across private and public lands, and the regulatory problems associated with this new rail route, the railroad spur is not being included in the basis of our Project design. The proposed railroad spur will cost approximately \$7 million and take approximately four years due to regulatory problems. The additional cost associated with not having rail is only \$500,000 annually. However, the preliminary planning for the railroad spur is being preserved and the spur is being retained as a possible addition at a later date should the situation so dictate.

3.4.2 Proposed Railroad Alignment

As shown in Figure 3.2, the railroad spur would have to originate at a switch off of the line running north out of The spur would then proceed east along the Irrigation Canal to the Canal. Along this portion of the route the spur would cross all private property for which easements would have to be obtained. The spur crosses six public roads where at-grade crossings would have to be constructed. A bridge across the Canal would also be necessary.

Once across the canal the spur would be in federal lands administered by the U.S. Geological Survey for the Bureau of Land Management. This alignment is subject to previous property rights deeded to other geothermal developers, and to various regulatory restrictions that are covered in detail in the Environmental and Legal Sections of this Report.

**Figure 3-2 Proposed Routing of Railroad
Spur Line (Possible Future
Addition)**

Pending finalized contractual relationships for purchase of the site, this figure is proprietary. Please contact Ultrasonics for further details.

3.5 Future Expansion and Retrofit

As discussed elsewhere in this Engineering section of the Report, the Refinery is being planned to allow for possible future expansion of the facility to twice the present design capacity. This will be accomplished by the addition of a second complete process train, adjacent to the present process facilities.

In addition, design of the Project will make allowance for the future retrofit of the process units to accommodate changes in technology. U.S. Alcohol Fuels believes that materials other than grain may in the future prove to be more economical as a fuel alcohol feedstock. Such future feedstocks may be sweet sorghum, fodder beets, or cellulosic materials. Alternately, more energy efficient distillation or fodder drying concepts may be developed, making it desirable to install more advanced process equipment. By careful planning in the preliminary engineering feasibility stage, the plant general arrangement is developed such that future additions can be most economically accomplished.

4.0 PROJECT COST ESTIMATES

4.1 Introduction

This portion of the Engineering section of this Report covers the capital and operating cost information for the Refinery, based upon the preliminary design of the facility described in the previous sections. This cost information will, in turn, form the basis of the profitability analysis discussed in the Financial section of this Report.

4.2 Capital Cost Estimate

The capital cost of the facility is based upon the preliminary engineering feasibility study conducted by Ultrasystems Engineers and Constructors and represents an order of magnitude estimate of the actual cost of designing, procuring and installing, and constructing the facility. As shown in Table 4.1, the total estimated cost of the proposed Refinery is \$48.86 million in 1983 dollars.

4.3 Operating Cost Estimate

4.3.1 General

The following Operating Cost Estimate presents the manufacturing costs of the Refinery in first quarter 1981 figures as determined by Ultrasystems Engineers and Constructors. The Operating Cost Estimate is summarized in Table 4.2

4.3.2 Feedstock

For the purpose of analyzing the raw material cost of the Refinery, the price of U.S. Number 2 Yellow Grain Sorghum Feedstock (milo) was taken as the weighted average of the grain since October 1976. A detailed discussion of the pricing of this commodity is given in the Marketing section of this Report.

4.3.3 Operating Materials and Chemicals

Prices for the operating supplies, materials and chemicals delivered to the Refinery were obtained by Ultrasystems Engineers and Constructors and Chemapec, and applied to the requirements determined during the preliminary engineering feasibility of the Refinery.

4.3.4 Plant Utilities

A conservative allowance was made for the geothermal steam expense of the Refinery, based upon U.S. Alcohol Fuel's best estimate of the outcome of final negotiations of the Geothermal Energy Supply Contract.

Electricity and water expense is based upon actual rates in force today as provided by the Imperial Irrigation District.

4.3.5 Maintenance Supplies and Contract Maintenance

This item represents an allowance for maintenance supplies for the Refinery and for the expense of outside contract services for maintenance and repair. This amount is in addition to the allowance made for a full time maintenance staff which is included in the Operating Staff Estimate.

Table 4.1 Project Capital Cost
(1981 Dollars)

Field Construction Cost

Site Preparation	\$ 1,322,000
Concrete Structures	3,936,000
Buildings	1,951,000
Machinery and Equipment	3,456,000
Feedstock Handling & Storage Equipment	\$
Milo Milling Equipment	
Mash Preparation Equipment	
Fermentation Equipment	
Distillation Equipment	
Chemicals Receiving & Storage Equipment	
Product Storage Equipment	
Waste Treatment Equipment	
Geothermal Steam Production Equipment	
Equipment Installation Labor	
Total Machinery & Equipment	\$15,483,000
Piping	6,855,000
Electrical	2,309,000
Instrumentation	1,363,000
Painting & Insulation	<u>566,000</u>
Subtotal	\$37,238,000
Engineering, Procurement, Project Management	<u>4,419,000</u>
Total Estimated Cost	\$41,657,000
Contingency (at 10 percent)	4,166,000
Escalation (at 5 percent)	2,291,000
Construction Bond	500,000
Insurance During Construction	<u>250,000</u>
Total Project Capital Cost	\$48,864,000

Table 4.2

Operating Cost Estimate
(1981 Dollars)

<u>Description</u>	<u>Quantity Per Day</u>	<u>Unit</u>	<u>Unit Cost</u>	<u>Amount Per Day</u>	<u>Amount Per Year</u>	<u>Amount Per Gallon of Ethanol</u>
<u>Feedstock</u>						
	9,214.8	Cwt.	\$5.54	\$51,050	\$16,846,500	\$1.125
<u>Operating Materials and Chemicals</u>						
Enzyme No. I	1,320	Lbs.	\$1.66	\$ 2,191	\$ 723,096	\$0.048
Enzyme No. II	1,344	Lbs.	\$2.18	2,930	966,874	0.064
Sulphuric Acid	864	Lbs.	\$0.04	35	11,405	0.001
Water Treatment	-		-	363	119,790	0.008
Cyclohexane	17.74	Gal.	\$1.80	32	10,538	0.001
Denaturant	2,271	Gal.	\$1.10	2,498	824,373	0.055
Defoaming Agent	48	Gal.	\$3.02	145	47,837	0.003
Ammonium Phosphate	1,195	Lbs.	\$0.09	108	35,492	0.002
Ammonium Sulphate	1,673	Lbs.	\$0.03	50	16,500	0.001
NaOH	1,800	Lbs.	\$0.24	432	142,560	0.009
Total OM&C					\$ 2,863,022	\$0.191
<u>Plant Utilities</u>						
Steam (118 million BTU/hr)	2,832	10 ⁶ BTU		\$	\$	\$
Electricity	127,560	KWH				
Makeup Water	835.2	10 ³ Gal.				
Total Plant Utilities					\$ 2,388,238	\$0.159
<u>Maintenance Supplies and Contract Mnt.</u>					\$ 200,000	\$0.013
<u>General Works Expense</u>					\$ 1,230,000	\$0.082
Total Non-Payroll Items					\$23,527,760	\$1.571
<u>Operating Staff</u>						
Management, Sales and Administrative Staff					\$ 222,300	\$0.015
Operating and Quality Control Labor					1,263,600	0.084
Maintenance Labor					166,400	0.010
Total Operating Staff					\$ 1,652,300	\$0.110
Total With Feedstock Included					\$25,180,060	\$1.681
Total Without Feedstock Included					\$ 8,333,560	\$0.556

*14,980,000 gallons per year, denatured fuel grade ethanol

Table 4.3 - Operating Labor

	<u>Number Per Shift</u>	<u>Total Number</u>	<u>Annual Salary Each</u>	<u>Total Salary</u>
(1981 Dollars)				
<u>Administrative Staff</u>				
Plant Manager				\$
Sales Manager				
Secretary				
Bookkeeper				
Personnel Administrator				
Receptionist/Clerk				
Sub-Total				\$171,000
<u>Plant Operating Staff</u>				
Guard				
Dry Milling Operator				
Mash Prep, Yeast Separation				
Decanter-Drier Operator				
Ferm, Distillation Operator				
Geothermal Plant Operator				
Control Room Operator				
Production Superintendent				
Yard Labor				
Sub-Total				\$883,000
<u>Laboratory & Quality Control</u>				
Chemist				
Technicians				
Sub-Total				\$ 89,000
<u>Maintenance</u>				
Pipefitter Welders				
Electricians				
Sub-Total				\$128,000
Total Plant Payroll Costs - Unburdened	55		\$23,110*	\$1,271,000
Burdens and Fringe Benefits (estimated at 30%)				\$ 381,300
Total Plant Payroll Costs			\$30,040*	\$1,652,300

* Average figure.

4.3.6 General Works Expense

This item represents a conservative allowance for such items as insurance and taxes on the facility itself.

4.3.7 Operating Staff

The technical design of the Refinery, the practices and characteristics of the local labor pool, and the experience of other employers in the Imperial Valley were taken into consideration in determining the number of operating staff required to run the Refinery. The most important factor is the design of the Refinery, for which Ultrasystems Engineers and Constructors has determined a total staffing of 55 people will be required, including the administrative staff.

The key personnel in this Refinery operation are the Plant Manager, Chief Chemist and Production Superintendent. The qualifications for these positions are presented in the Management section of this Report.

It is also important that qualified people be employed in the plant operating and maintenance areas. The senior or lead personnel should have a minimum high school education with three to five years experience in chemical process manufacturing plants. Other operators should have the minimum of a high school education with an expressed desire and willingness to learn about the operation along with a mechanical aptitude. These people will receive training from Ultrasystems Engineers and Constructors' staff of experts.

5.0 ENGINEERING AND CONSTRUCTION OF PROJECT

5.1 Ultrasystems Engineers and Constructors, Incorporated

5.1.1 Relationship to U.S. Alcohol Fuels

The Engineering-Procurement-Construction (EPC) phase of the Project will be carried out by Ultrasystems Engineers and Constructors Incorporated, a wholly owned subsidiary of Ultrasystems Incorporated, General Partner to U.S. Alcohol Fuels, a California limited partnership. By using the Ultrasystems' engineering design and construction capabilities, U.S. Alcohol Fuels can ensure that this Project is engineered and erected in a manner consistent with

the highest standards of the industry and in the best interest of U.S. Alcohol Fuels. Due to its long experience in chemical process engineering and construction, and more recent experience in fuel alcohol projects, Ultrasystems Engineers and Constructors possesses unique qualifications for performing this Project.

5.1.2 Background and Capabilities

5.1.2.1 General Capabilities - Ultrasystems Engineers and Constructors, Incorporated is a leading engineering and construction organization in the western region of the United States involved in designing and building of ethanol synfuel plants. The company has assembled an unusual degree of expertise related to all aspects of designing and constructing ethanol plants. This expertise includes the ability to conduct comprehensive and detailed engineering studies and economic analyses, prepare planning documents defining all elements essential for ensuring the success of the plants, provide process engineering services and interface with process licensors, prepare detailed engineering design, procure all equipment and material, provide project management and control services, and actually construct and startup the plant. An important complementary capability is the firm's background and experience in conducting environmental impact studies. Over the past eight years, Ultrasystems Engineers and Constructors has performed over 700 environmental studies for all types of projects.

Ultrasystems Engineers and Constructors offers the full spectrum of engineering, procurement and construction services, from concept development to completion and operation of the Project. Ultrasystems' capabilities include the following:

- Economic Feasibility Studies
- Environmental Impact Analysis
- Site Evaluations
- Master Planning of Facilities and Sites
- Process Development and Design
- Complete Design Engineering
- Procurement and Subcontracts Administration
- Construction
- Startup and Commissioning
- Operations and Maintenance

5.1.2.2 Power Alcohol Projects - Ultrasystems recently completed a feasibility study for a twenty million gallon per year (gpy) ethanol plant in Boardman, Oregon. Ultrasystems performed this complete study under contract from Morrow Ag Energy Corporation of Boardman, Oregon. The plant will be located adjacent to the Columbia river. The study covered evaluation, selection and costing for the ethanol process, the agricultural feedstock, the steam power-plant and its fuel, the disposition of the plant by-products (stillage and CO₂), and supporting facilities such as a dock to load/unload barges on the Columbia River. It is proposed to utilize corn as the feedstock with process steam generated by a coal-fired boiler. Ultrasystems utilized the Vogelbusch Division of Bohler Bros. of America, Inc. as its subcontractor on this study responsible for the process design of the plant. An alternative of cogenerating electric power (20 MW) was evaluated and is planned for incorporation into the plant.

Ultrasystems has recently been awarded contracts for preliminary engineering feasibility and cost analysis and follow on engineering and construction services for two power alcohol plants to be located in California. One is for a fifteen million gallon per year alcohol-from-sugar beet refinery for Central Valley Bio-Energy Co. in Dinuba, California. The second contract is for a one and one half million gallon per year alcohol-from-cheese whey facility for Griswold Controls of Irvine, California.

A detailed listing of client references in the power alcohol industry as well as the petroleum refining and petro-chemical industries will be supplied upon request.

5.1.3 Process Licensor

As noted in Section 3 of this Engineering portion of the Report, the process engineering for the Imperial Valley Ethanol Refinery has been based upon the proprietary fuel alcohol production technology of Chemapec Incorporated of New York, New York. U.S. Alcohol Fuels is currently in the process of negotiating the terms and conditions under which Chemapec will license its proprietary technology to U.S. Alcohol Fuels, and perform process design services for this Project under subcontract to Ultrasystems Engineers and Constructors.

5.1.3.1 Chemapec, Inc., Background and Capabilities - CHEMAPAC, INC. is a New York Corporation having its principal place of business at Woodbury, N.Y.. Chemapec provides process engineering services for specialized plants such as the power alcohol from milo plant considered herein. The company is a member of the CHEMAP GROUP OF COMPANIES founded in 1946 by Dr. H. Mueller in Zurich, Switzerland, which has developed many highly specialized bio-conversion processes for which he holds world patent rights.

These processes are based on the use of many agricultural feed-stocks, ranging from sugar molasses to various cereals including corn and wheat. The CHEMAP GROUP entered the production field by providing development, project planning, engineering and construction services for human food, animal feed, biologicals and pharmaceuticals industries, and for the production of vaccine, potable alcohol and anhydrous power alcohol. These bio-engineering activities are supported by teams comprising bio-engineers, bio-chemists, process and design engineers and an appropriate staff of mechanical, electrical, civil and field engineers.

The CHEMAP GROUP has special experience in fermentation, distillation, waste recycling, and recovery processes. There is a worldwide exchange of expertise and services between the COMPANIES of the CHEMAP GROUP, its clients and contacts in industry and research as well as its subsidiaries, licensees and representatives in 53 countries.

Several plants for the production of grain alcohol have been built since the early 1960's in Argentina, Peru, Spain, Brazil, Italy, Thailand and Venezuela based on technology by Chemapec and its associated companies. Continued heavy involvement in the alcohol production program in Brazil led to the contract for a factory for the production of alcohol and oil from avocado fruits based on new technology developed by Chemapec. Under construction is a large power alcohol production plant in East Africa which will process agricultural wastes to produce enough alcohol to supply 8 percent of the country's car fuel needs.

5.1.3.2 Process Guarantee - The proprietary process which Chemapec has offered to U.S. Alcohol Fuels is offered in conjunction with a process guarantee, the details of which are presently being negotiated with Chemapec. It is expected that the guarantee will substantially comply with the following basic provisions:

5.2 Project Organization

5.2.1 Project Task Force

5.2.1.1 Task Force Approach - Ultrasystems Engineers and Constructors uses a Task Force approach to the design, procurement and construction of a major project such as this Refinery. With this method of project management and control, all of the technical disciplines which are working on this Project

will be organized within a Project Task Force group and located in one physical area, where they conduct the affairs associated with only that Project. This approach ensures that the key members of the Task Force are able to devote their full efforts to the Project on which they are assigned. In addition, the Task Force provides for the greatest ease of communication among the members of the group, ensuring the greatest efficiency.

5.2.1.2 Project Task Force - Figure 5.1 shows the organization of the Task Force for this Project. Note that the project organization establishes a direct line of communication between the Ultrasystems' Project Manager and the Owner's Project Director (see Management section of this Report for the internal details of the Owner's organization).

The Project Manager will be responsible for seeing that the Project for this Refinery is properly executed. He will have five people reporting to him directly. The Project Engineer will be responsible for all design engineering on the Project and will be in charge of all of the engineering disciplines working on the Refinery. The Process Engineering group will assign a man to oversee the work of the Process Subcontractor (Licensor) and integrate the process such that the design engineering forces can properly utilize the information. The Project Procurement Manager will be responsible for the purchasing and delivery of all equipment and materials. The Field Construction Manager will be responsible for installing and constructing the Refinery in the field in accordance with all drawings and specifications. In addition, the Project Manager will be assisted as required by the Cost and Scheduling Staff, who will provide support in the area of estimating, cost and scheduling control, and material control.

5.3 Project Scope, Schedule and Execution Plan

5.3.1 Scope

Ultrasystems Engineers and Constructors Scope of Work will include the engineering, procurement, construction and project management of the Project. In general, this work will be carried out in three steps as described below.

IMPERIAL VALLEY ETHANOL REFINERY
PROJECT NUMBER 1013

FIGURE 5.1
PROJECT TASK FORCE

U.S. ALCOHOL FUELS
EAST MESA, CALIFORNIA

5.3.3.1 Project Definition - Upon Notice to Proceed from the Owner, Ultrasystems will develop the engineering definition of the Project. The basis of this definition will be the following:

- Processor Licensor's package, including the engineering developed to date and previously presented in this Engineering section.
- Summary of the preliminary design and project planning concepts of the Owner, including the Owner's process standards and procedures relating to the construction of the facility.
- Any site data available from the Owner, other corporate participants and government agencies.

Included in the Project Definition phase are the following activities:

- The completion of engineering as required to apply for construction permits.
- Joint effort by Process Licensor, the Owner and Ultrasystems during the period required to complete the technical package for the design engineering basis of the Project.
- Completion of the detail engineering design of the Refinery, including plant general arrangement, full equipment and instrument lists, piping and electrical schematics, general specifications, and design criteria for site preparation, buildings, concrete and structures.
- Development of a Definitive Cost Estimate and detailed control schedules. A detailed critical path schedule will be developed as soon as major equipment and bulk commodity deliveries can be ascertained.
- Field Construction Manager investigation at the Project site to interview major local subcontractors, contractor associations, Building Trades Council, Chamber of Commerce and/or Economic Development Board, and other organizations

to ascertain local labor availability, productivity and to identify other projects which might compete for labor within the time frame of the Refinery schedule. The Field Construction Manager, along with the Project Manager and Project Procurement Manager, will then plan the method of constructing the Project. Preliminary information indicates the Owner's Project will be constructed by Ultrasystems own field forces on a direct hire basis, with a minimum of subcontracting.

- Field Construction Manager coordinates activities that will affect the overall construction schedule and the constructability of the Project design.

5.3.1.2 Final Engineering - The second general phase of the Project constitutes the final engineering and procurement of the Refinery, and includes the following activities:

- Completion of design drawings for construction issue.
- Preparation of final specifications and Bills of Material for equipment, instrumentation, and materials.
- Initiate procurement cycle with requisition and inquiry, evaluate bids and quotations, and issue purchase orders for all materials, equipment, and instrumentation.
- Finalize subcontract plan, prepare bid packages and solicit bids, and select subcontractors.
- Select members of the field construction staff.

5.3.1.3 Field Construction - The third phase consists of the actual construction of the Project. The construction forces in the field will be managed by an on-site Field Construction Manager who is thoroughly familiar with the requirements of the Project. The responsibilities of the Field Construction Manager are as follows:

- Supervise all craft labor and subcontractors,
- Execute field engineering and planning,
- Secure equipment, tools and material,
- Hire and terminate all construction personnel,
- Schedule, receive and store material and equipment,
- Forecast and control all field costs,
- Interpret drawings and specifications,
- Establish and implement safety program,
- Handle all labor grievances
- Maintain liaison with on-site client representatives,
- Maintain and update field construction schedule,
- Supervise proper test and inspection schedule,
- Establish standards of work quality and efficiency,
- Assure the adherence to all agency codes,
- Prepare and distribute field payroll,
- Field disbursement reports and other accounting functions,
- Responsibility for all field purchasing,
- Process invoices for payments for purchased items,
- Maintenance of all field records and "as built" drawings,
- Verify receipt of all materials delivered to job sites.

5.3.2 Project Schedule

As shown on the Project Master Schedule on the following page, startup of the Project will be complete, and the plant is expected to be operating at capacity, twenty-six months after Ultrasonics Engineers and Constructors receives Notice to Proceed on the Project. Although the schedule presentation is general in nature, all long lead time items have been taken into account, and the schedule is quite feasible. At the present time, Notice to Proceed is expected in the third quarter of 1981.

Basic controlling headings have been selected to cover all phases of the Project. They are as follows: Permit Processing, Process Engineering, Design Engineering, Definitive Estimate, Procurement, Construction, and Startup.

The vertical line at the end of the eighth month represents the beginning of field construction operations. The vertical line shown at the end of the twenty-fourth month represents mechanical completion of the Project.

R - Regulation
 I - Inquiry
 ▲ - Purchase Order
 △ - Subcontract Award
 V - Receive Vendor Drawings
 P - Preliminary
 D - Design Issue
 X - Construction Issue
 Work Period
 Management Decision
 Deliver Jobsite

ULTRASYSTEMS
 ENGINEERS AND CONSTRUCTORS
 INCORPORATED

CONTRACT: _____
 DATE: _____
 REVISION: _____

1. SEE THE ENVIRONMENTAL AND LEGAL SECTIONS OF THIS APPLICATION FOR DETAILS CONCERNING THESE ITEMS

IMPERIAL VALLEY ETHANOL REFINERY
 EAST MESA, CALIFORNIA

U.S. ALCOHOL FUELS
 PROJECT NUMBER 1013

PRELIMINARY MASTER PROJECT SCHEDULE

Several licenses and permits are required at different periods of time. The first shown on the schedule are the various Environmental Reports which are required so that construction permits may be obtained enabling field construction to begin. For a more detailed discussion of the time requirements of this portion of the Project, please refer to the Environmental and the Permits and Approvals sections of this Report.

Design engineering will begin immediately upon Notice to Proceed with the Project, with process design being initiated by the processor licensor, emphasizing design and specification of long lead time items. At the present time, it appears that the distillation unit vapor compressor (K-503) will be the longest lead time item, and will control the schedule critical path. Therefore it is planned to expedite the completion of distillation requirements from the process licensor, and detailed design by Ultrasystems Engineers and Constructors such that a purchase order for this item can be awarded within six months of contract award. Delivery will take approximately 13 to 16 months.

Design will also be expedited for other secondary long lead items. These include the Decanting Centrifuges, Stainless Steel Columns in the Distillation Unit, as well as the Cooling Tower and Electrical Transformers for the substation. These items are all expected to require approximately nine months for delivery.

Note that the schedule calls for the development of a definitive estimate. This important activity would be completed by the end of the seventh month.

Work on the Permit Processing activities will also begin immediately. As noted in the Environmental Section of this Report, all possible environmental effects of the Refinery have been fully mitigated with sound engineering solutions during the Preliminary Design phase of the studies. This approach is expected to allow the normal environmental review processes to be expedited somewhat, a view that has been confirmed by the Owner's investigations during these studies.

Construction will begin at the end of month eight, although site move-in could be moved up to the beginning of month eight in order to complete earth-moving and underground drainage activities during favorable weather. Design will be seventy to eighty percent complete when the Project moves to the field.

Although Mechanical Completion is scheduled for the end of month twenty-four, the bulk of the equipment and materials will be in place by the end of month twenty-two. Startup and testing will begin in month twenty-four as sub-units are completed, and full startup will be completed by the end of month twenty-six.

The schedule shown is not a control document, but is only intended to show the overall progress of events on the Project. Upon initiation of the Project, a complete set of control schedules will be developed for each Project function. These will be critical path method schedules and will provide the time control tools necessary to ensure that the Project is executed properly.

5.3.3 Project Execution

5.3.3.1 General - In order to perform the work for the Project, Ultrasystems will assemble its highly trained group of competent engineers, designers and field managers. Initially the Project will start with a sixty-day schedule. During that period a detailed engineering and construction schedule will be initiated. The initial sixty-day schedule will involve the following activities:

- Client kickoff meeting
- Jobsite visit
- Selection of task force personnel
- Ultrasystems' kickoff meeting
- Project Execution Manual
- Detailed Engineering Schedule
- Drawing List and Schedule
- Equipment list
- Specification list
- Preliminary plot layout
- Review and finalize process
- Start Piping and Instrumentation Drawings
- Initiate specifications

Those items established in the sixty-day schedule will be the lead criteria for the entire Project. It is essential that this criteria have the Owner's approval as quickly as possible.

5.3.3.2 Plant Design - Will include the following activities.

- Define Plant Design Basis - The information developed in this preliminary engineering feasibility phase will enable the Project Task Force to develop the basic engineering definitions of the plant. This Design Basis will consist of a set of criteria that define the desired operational characteristics and parameters of the Project. This work will form the design objectives for detailed process and design engineering of the plant.

- Develop Site Data - The site specific information that is necessary for engineering design will be generated immediately.

A consulting firm will be retained to make a thorough surface soils and geology survey, make soils borings, test laboratory samples, review available records concerning the geology of area, and to provide detailed design recommendations for the Project.

An engineering consultant with facilities in the area will be retained to make a detailed ground survey of the site, mark the ground for photogrammetry, and to take aerial photographs of the site and the surrounding area (where any offsites, or utility access facilities will be located). These aerial photographs will be used to produce a Topographic Plan of the site showing one-foot contours and detailed site maps of the property.

Any site specific data gaps discovered during the conduct of the previous tasks and not previously resolved will be resolved at this time. This may include data requirements in the areas of meteorological data or environmental monitoring.

- Process and Plant Systems Design - The project engineering team will design the overall process and plant systems for the plant. At this time the detailed process flows, material balances, and equipment and machinery requirements necessary to meet the Design Basis will be developed. The project engineering team will utilize the engineering information generated during the first phase of this Project to develop the final Design Basis for the overall process and plant systems for the plant. The results of this design activity will be process flow diagrams with utility and material balances, piping and instrumentation diagrams, and a final equipment list.

For the Ethanol Refining Process Units within the plant, this task may be performed by Chemapec, Inc.. If selected, Chemapec will license their technology directly to U.S. Alcohol and will conduct their design activities as an engineering subcontractor under Ultrasystems Engineers and Constructors, Incorporated.

- Plant Arrangement and Orientation - From the plant and systems process design information and preliminary equipment requirements, it is possible to design the detailed plant plot layout. In this activity the relative locations of all plant components are developed and the horizontal and vertical configuration of the plant is determined. The results of this phase of the design are plot plans and plant sections showing equipment locations, pipeways, vertical profile and plot grading requirements. The preliminary phase of this activity has been accomplished during the studies phase of this Project.

- Mechanical Design - The Mechanical Design phase of the process plant design will provide the details for all plant materials and equipment. The results of this phase of engineering design will include finalized plant Piping and Instrumentation Diagrams. In addition, the standard technical lists will be completed. Examples of these lists, including Equipment List (A), Instrumentation List (B), Valve List (C), and Line List Calculation Sheet (D), are shown in abbreviated form in Figure 5-2.

In addition to this data, the Mechanical Design phase will result in Equipment Data Sheets and Design Drawings and Detailed Specifications specifying each piece of equipment and each set of project materials.

This design activity can proceed in parallel with the Plant Arrangement and Orientation Design, but must usually follow Process and Plant Systems Design.

- Civil and Structural Design - Following the development of Site Data and the completion of the Process and Plant Systems Design and shortly after the beginning of Plant Arrangement and Orientation Design and Mechanical Design, the project team will be able to begin the Civil and Structural Design tasks.

These design elements will include developing drawings and specifications for grading and drainage requirements, foundations designs for equipments and structures, design of supports and structures, and layouts and designs for buildings and enclosures.

- Electrical and Instrumentation Design - Given the Process and Plant Systems Design and Mechanical Design of the plant, it will be possible to finalize plant power requirements, wiring and control and instrumentation requirements. The results of this design work will be Control Loop Drawings, Electrical One-Line Diagrams, Drawings and Specifications for electrical equipment (transformers, etc.), and completion of the Instrumentation Lists, including specifications for items such as motor control centers and control panels.

5.3.3.3 Definitive Estimate - As the design of the Refinery proceeds, Ultrasystems estimators will prepare a definitive estimate of the cost to complete the Refinery. This estimate will be based upon detailed specifications for materials and equipment, quantity takeoffs, and firm vendor quotations, and will thus be an accurate appraisal of the actual cost of the facility. This estimate will be completed by the end of the seventh month of the Project.

5.3.3.4 Procurement - As detailed design of equipment and bulk materials proceeds to the point where detailed specifications and drawings are available, the procurement function will begin. The procurement effort will include development of bid documents, prequalification of suppliers and subcontractors, bid evaluation, inspection and expediting, marshalling yard procedures, and shipping and documentation. The primary objective of Procurement is to ensure that all of the required material and equipments are purchased at the best possible terms, sent to the project site at the required time and as designed and specified by the design team.

As previously noted, the procurement function will be expedited in all possible ways for the long lead time items. This requires that very close attention be paid to the working interface between the design and procurement departments.

5.3.3.5 Construction - Ultrasystems will provide the Owner with complete Construction services to support the installation of the ethanol production facility through its construction subsidiaries. Ultrasystems Engineers and Constructors will perform the field construction work with its own construction forces. Ultrasystems has constructed many facilities in the Southern California area and is thoroughly familiar with local trade unions and labor practices.

However, there are several acceptable firms in the project area, and therefore, a significant portion of the project might be subcontracted to local firms. The preliminary subcontracting plan would include bid packages for site preparation work, buildings, insulation and painting. A detailed subcontracting plan will be developed early on in the project.

5.3.3.6 Start-up and Operator Training - The technical experts on the Project Task Force will offer complete support to the Owner during plant start-up testing. This support includes complete operator training, either at the constructed plant or in completed facilities in Europe or Latin America. This support will be maintained for as long a period as necessary, during the operating life of the plant.

5.3.3.7 Operation and Maintenance - The planning for Operation and maintenance of the plant will be initiated toward the end of the design phase of the Project in order that the development of operational and maintenance procedures are integrated into the design, procurement and construction of the plant. It has been Ultrasystems' experience that the training of the plant operators should begin during checkout and start-up testing of the plant. As the plant is "debugged," control of the operating facility can be turned over to the trained operators.

Another design activity will be assembling all design engineering data, including all process flow diagrams, and design drawings, all specifications and all vendor information into a Mechanical Catalog and Operator Manual for plant reference.

5.3.3.8 Performance Measurement and Evaluation - During the course of the design, procurement, and construction work on this Project, the progress on all activities and the resources consumed during the performance of the work will be monitored, as will the quality of the work itself. These performance parameters will be compared against the management objectives, variances will be identified and analyzed and corrective action taken.

During Design, the manhour expenditures by the various engineering disciplines against the design activities are accumulated bi-weekly into the cost control system during the payroll process. Percentage completion is also noted for each activity. The completion on each item is compared to planned completion to identify schedule variance. Budgeted cost of work performed is compared to actual cost to date for each item to identify cost variances. The same procedure is used to analyze overall design progress.

For Procurement, schedule performance is the most important criteria in managing this function. The time element for procurement of each class of material and equipment is bounded on the front end by design progress and on the other end by the needs of field construction. The major control procedure consists of identifying all items to be purchased as design progresses, and effectively performing each step of the procurement process such that the items reach the jobsite when needed. Particular attention is always directed towards long lead time items.

The primary tool for managing the procurement function is the Material and Equipment Status Report. A Materials and Equipment Status Report will be initiated, which will serve as the primary procurement control document. As design proceeds, all materials and equipment will be listed on the report and monitored as to inquiry, order, fabrication approval, and required delivery dates. Control is achieved by constant management review of this item. Cost control of the procurement function is achieved by maintaining planned overall staffing levels.

During Construction, in order to control cost and schedule on the jobsite, all activity completions are noted weekly, as are craft labor costs for each activity. Material costs enter the system when realized; field staff costs are noted bi-weekly. To obtain cost variances, budgeted cost of work performed is compared to actual cost. During construction, the overall network schedule showing construction will be augmented by a series of detailed sixty-day barchart schedules. Scheduled completion is compared to actual for schedule variance analysis. The quality of all field work is monitored by a team of inspectors following standard quality control procedures. The completion status of all subcontract activities is monitored and used to analyze schedule variance and develop progress payments.

All variances will be analyzed to determine if performance is the cause or if the baseline was incorrectly produced or must be updated to reflect changed conditions. Appropriate remedial action is then taken.

During design and procurement, a decision will be made on the basis of the work performed and knowledge of local conditions as to what elements of the actual construction will be subcontracted to local firms, and the basis upon which the contract will be awarded. The estimates and schedules, as well as drawings and specifications for each set of subcontract activities, will form the basis of contract bids and negotiations when they are conducted. The final contract terms in these areas will then become the management baselines for each subcontract.

APPENDICES

TECHNICAL DATA AND DRAWINGS

The following Appendices contain technical data and reduced copies of the drawings that have been developed by Ultrasystems Engineers and Constructors and its subcontractors to define the engineering feasibility of the Project. This material is divided into three sets. Appendix 1 contains the drawings developed by Ultrasystems Engineers and Constructors describing the Refinery as a whole. This is followed in Appendix 2 by the Preliminary Equipment List which gives a more detailed presentation of the process equipment noted on the drawings. Appendix 3 contains the drawings and data provided by Ben Holt Company describing the technical details of the Geothermal Steam Production unit to be constructed with the Refinery.

APPENDIX 1

Imperial Valley Ethanol Refinery Drawings

<u>Drawing No.</u>	<u>Title</u>
1013-000	Block Flow Diagram
1013-100	Grain Receiving and Storage Section
1013-200	Milo Milling Section
1013-300	Mash Preparation Section
1013-400	Fermentation Section
1013-500	Distillation Section
1013-600	Chemical Receiving and Storage Section
1013-700	Product Storage Section
1013-800	Waste Treatment Section
1013-900	Plant Location and Layout
1013-901	Plant Sections
1013-902	Plant Sections

G
 F
 E
 D
 C
 B
 A

IMPERIAL VALLEY 491MM GPM
GEOTHERMAL ETHANOL PLANT
MASH PREPARATION SECTION

ULTRASTYLE
PUMP AND MOTOR
1000
1000

1013 300

59h

SECTION "A"
ELEVATION LOOKING NORTH
NOT COMPLETE SHOWN IN SECTION

IMPERIAL VALLEY 14.3 MM GPY
GEOTHERMAL ETHANOL PLANT
SECTIONS

59m

APPENDIX 2

Pending finalized contractual relationships with the Process Licensor, the information contained in Appendix 2 is considered proprietary. Contact Ultrasystems for further details.

APPENDIX 3

Geothermal Steam Processing Unit -
Technical Data and Drawings

This section contains the technical data and drawings prepared by Ben Holt Company to describe the Geothermal Steam Processing Unit presented in the Process Description portion of this Engineering section of the Application. The following is a list of these items:

- Geothermal Element Plot Plan
- Process Flow Diagram
- Electrical Single Line Diagram
- Equipment List
- Centrifugal Pump Specification
- Vessel Data Sheet V-1
- Vessel Data Sheet V-2
- Vessel Data Sheet V-3
- Instrument Summary Sheet (3 sheets)

REFERENCE DRAWING	
DRAWING NO.	0112
DATE	
BY	
CHECKED	
APPROVED	

ISSUED FOR APPROVAL REVISION		THE BEN HOLT CO.	
		GEOTHERMAL ETHANOL PLANT GEOTHERMAL ELEMENT PLOT PLAN	
CUSTOMER ULTRASYSTEMS, INC.		STATE CALIFORNIA	
NOTICE PROPERTY OF THE BEN HOLT CO. NOT TO BE REPRODUCED WITHOUT PERMISSION TO BE RETURNED ON REQUEST		DRAWN BY J.B.	SCALE 3/4" = 1'-0"
		CHECKED DATE	DATE

ADDITION TO ETHANOL PLANT M.C.C.

LEGEND

- ↑ DRAW - T EQUIPMENT
- 100 CIRCUIT BREAKER (400A INDICATED)
- 5 FULL VOLTAGE NON-REVERSING MOTOR STARTER (SIZE 5 INDICATED)
- TRANSFORMER
- 125 MOTOR (H.P. INDICATED)
- 5 PUSHBUTTON STATION

A. DRAW FOR APPROVAL		THE BEN HOLT CO.	
		GEOTHERMAL ETHANOL PLANT	
		SINGLE LINE DIAGRAM	
		ULTRASYSTEMS, INC.	
DESIGNED BY: [Signature]		CHECKED BY: [Signature]	
DATE: 1/27/84		PROJECT NO: 0022-B-364	

THE BEN HOLT CO. EQUIPMENT LIST

SHEET 1 OF 1
REVISION _____ DATE 2/2/81

CONTRACT No. _____ CUSTOMER Ultrasystems, Inc.

[illegible]

THE BEN HOLT CO.
CENTRIFUGAL PUMP SPECIFICATION

CUSTOMER <u>ULTRASYSTEMS, INC.</u> PLANT <u>GEO THERMAL ETHANOL</u> NO. REQUIRED <u>3</u> LOCATION <u>IMPERIAL COUNTY, CA.</u> MOTOR DRIVE <u>3</u> SERVICE <u>BRINE RETURN PUMP</u> TURBINE DRIVE _____	JOB NO. <u>8022</u> ITEM NO. <u>P-1 A, B, C</u> REV. NO. <u>A</u> DATE <u>1/23/81</u> QUOTE NO. _____ REFERENCE _____
---	---

OPERATING CONDITIONS

LIQUID PUMPED <u>WATER</u> @ <u>225</u> °F CAPACITY, AT TEMP., NORMAL <u>840</u> GPM DESIGN <u>925</u> GPM AT TEMP., SP. GR. <u>.954</u> VISC. <u>0.59</u> CP VAP. PR. <u>18.9</u> P.S.I.A. N AVAILABLE <u>5.6</u> FT. (LIQUID) H REQUIRED _____ FT. (WATER) HYDRAULIC H.P. <u>62.0</u>	DISCH. PRESSURE <u>121</u> P.S.I.G. SUCT. PRESSURE <u>6</u> P.S.I.G. DIFF. PRESSURE <u>115</u> P.S.I. DIFF. HEAD <u>280</u> FT. CORR. MATERIAL <u>TRACE H₂S</u> CORROSIVE MATERIAL <u>TRACE</u> _____ % OR _____ P.P.M. _____ % OR _____ P.P.M.
--	---

PUMP SPECIFICATIONS

MANUFACTURER _____ SIZE & TYPE <u>VERTICAL MULTI-STAGE</u> R.P.M. _____ EFFICIENCY _____ BHP @ DESIGN _____ MAX. BHP. REQD. _____ CIRCULAR NO. _____ DIMENSION PRINT _____	NO. OF STAGES _____ PERFORMANCE CURVE _____ IMPELLER DIAM. BID _____ MIN. _____ MAX. _____ RECOMMENDED DRIVER HP. _____ SECTION DWG. _____
--	--

MATERIALS OF CONSTRUCTION

CASING & NOZZLE IRON
 IMPELLER IRON
 CASING RING _____
 IMPELLER RINGS _____
 SHAFT S.S.
 SHAFT SLEEVE _____
 PACKING GLAND _____
 PACKING _____
 SEAL CAGE _____
 BASE PLATE _____

CONSTRUCTION FEATURES

CASE SPLIT HORIZONTAL _____ VERTICAL _____
 SUPPORT C/L _____ FOOT _____ BRACKET _____
 IMPELLER OPEN _____ CLOSED _____ SEMI-ENG. _____
 STUFF. BOX WATER JACKET: ☐ YES ☒ NO
 MECH. SEAL X INTERNAL _____ EXTERNAL _____
 SINGLE X DOUBLE _____ BALANCED _____ UNBALANCED _____
 BEARINGS WATER JACKETED: ☐ YES ☒ NO
 LUBRICATION OIL _____ GREASE _____
 FLEXIBLE COUPLING: MAKE _____ TYPE _____
 COUPLING GUARD: ☐ YES ☐ NO

DRIVER DATA - MOTOR

MAKE _____ HP _____
 TYPE _____ R.P.M. _____
 PHASE 3 CYCLE 60 VOLTS 460
 FRAME TEFC

DRIVER DATA - TURBINE

MAKE _____ H.P. _____
 TYPE _____ R.P.M. _____
 WATER RATE @ DESIGN LOAD _____ LBS/HR. BHP.
 STEAM INLET _____ P.S.I.G. _____ OF
 STEAM EXHAUST _____ P.S.I.G. _____ OF

NET WEIGHT

PUMP, BASE, CPLG. _____ LB.
 MOTOR _____ LB.

SHIPPING WEIGHT

PUMP, BASE, CPLG. _____ LB.

Special Instructions or Features _____

REVISIONS		VESSEL DESIGN DATA		MATERIALS		REFERENCE DRAWINGS	
Mark	Date	DESCRIPTION	1. DESIGN BASIS	14. PAINT	NO.	DESCRIPTION	
			2. CODE STAMP	15. INSULATION & FIRE PROOFING, OTHER			
			3. OTHER SPECS.				
			4. DESIGN PRESS. & TEMP. PSIG @ °F				
			5. OPER. PRESS. & TEMP. PSIG @ °F				
			6. POSTWELD HEAT TREATMENT				
			7. WELD EXAMINATION				
			8. JOINT EFFICIENCY				
			9. CORR. ALLOWANCE				
			10. HYDRO TEST PRESS.				
			11. DIMENSIONS ARE FROM REFERENCE POINTS				
			LINE EXCEPT AS NOTED				
			12. WTS - FABR				
			(NIPS) OPER				
			EMPTY				
			TEST				

CONNECTION SCHEDULE							
18° ARC ON SHELL O.D. =							
NOZZLE PROJECTIONS ARE FROM EXTREME FACE OF FLANGE EXCEPT AS NOTED							
FOR A SMALLER							
FOR TO NOC							
FOR A FLANGE							
MANHOLE WITH (18°) COVER, STUDS & GASKET							
MANHOLE WITH COVER, STUDS & GASKET							
PURCHASE ORDER NO.							
FABRICATOR							
THE BEN HOLT CO.							
DES. & APPR. & DATE							
DRN. THE BEN HOLT CO.							
CHKD. CUST.							
SCALE NONE							
CONTRACT NO. DWG. NO. REV.							

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[illegible][illegible][illegible]

CONNECTION SCHEDULE

18° ARC ON SHELL O.D. =
NOZZLE PROJECTIONS ARE FROM 1/2 OF VESSEL TO
EXTREME FACE OF FLANGE EXCEPT AS NOTED
FOR TC 1MC
FOR 1MC
FOR 1MC

MANHOLE WITH (H-hood) (Revised) COVER, ST. 21.0 2-4-58

HANDHOLE WITH COVER, STUDS, & GASKET

PURCHASE ORDER No.

FABRICATOR

THE BEN HOLT CO

2nd - Capt. [redacted]

DES	APPL	DATE
DWN	THE BEN HOL	EE
CHKD	CUS	
SCALE	NONE	
CONTRACT NO.	DWG NO	REV

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REVISIONS		DESCRIPTION	
Mark	Date	Description	
A			

VESSEL DESIGN DATA			
1. DESIGN BASIS			
2. CODE STAMP	A-1111		
3. OTHER SPECS.			
4. DESIGN PRESS. & TEMP.	50 PSIG @ 50°F		
5. OPER. PRESS. & TEMP.	5 PSIG @ 50°F		
6. POSTWELD HEAT TREATMENT	N.D.		
7. WELD EXAMINATION	P.C.I.		
8. JOINT EFFICIENCY	85% (ASME SEC. VIII)		
9. CORR. ALLOWANCE	1/8"		
10. HYDRO TEST PRESS.	N.D.		
11. DIMENSIONS ARE FROM REFERENCE DRAWING	SEE		
L.W.E. EXCEPT AS NOTED.			
12. UTS = FABR.	EMPT	TEST	
(RIPS) OPER.			

MATERIALS	
SHELL	SA-240
HEADS	SA-240
LINING	
SUPPORT	SA-240
NOZZLE NECKS	
FLANGES	
INTERNAL (PLATE)	SA-240
INTERNAL (PIPE)	SA-240
BOLTS (FLANGE)	SA-240
BOLTS (INTERNAL)	
COUPLERS (STANDARD)	
GASKETS	

REFERENCE DRAWINGS	
14. PAINT	NONE
15. INSULATION & FIRE PROOFING	OTHER

CONNECTION SCHEDULE		
18° ARC ON SHELL O.D. =		
NOZZLE PROJECTIONS ARE FROM L. OF VESSEL TO		
EXTREME FACE OF FLANGE EXCEPT AS NOTED		
4'-2"	FOR	8" & SMALLER
4'-4"	FOR	TO 12"
4'-6"	FOR	14" & LARGER
HATCH HOLE WITH (11" & 12" DIA.) COVER, STUDS & GASKET		
HATCH HOLE WITH COVER, STUDS & GASKET		
PURCHASE ORDER NO.		
FABRICATOR		

THE BEN HOLT CO.		
DES.	APPROVAL	DATE
DWN.	THE BEN HOLT CO.	
CHKD.	CUST.	
SCALE	NONE	
CONTRACT NO.	DWG. NO.	REV.

NOTES

1. PROVIDE 1/8" THICK 1/2" DIA. BOLT HEADS FOR 1/2" DIA. BOLT HEADS.

2. PROVIDE 1/8" THICK 1/2" DIA. BOLT HEADS FOR 1/2" DIA. BOLT HEADS.

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TAG NO.	SERVICE	LINE SIZE & SPEC.	LOCATION	DESCRIPTION & REMARKS	MFG.	SPEC. NO.	INSTRUMENT DETAIL				FLOW DIAG.
					MODEL NO.	P.O. NO.	PROC. PIPING		PNEU. PIPING		INSTR PLAN
								SHT.		SHT.	
FR-1	Steam			1st Stage Steam Flow							
FR-2	Steam			2nd Stage Steam Flow							
FR-3	Steam			3rd Stage Steam Flow							
FR-4	Brine			Return Brine Flow							
FI-5	Water			1st Stage Wash Water							
FI-6	Water			2nd Stage Wash Water							
FI-7	Water			3rd Stage Wash Water							
TI-1	Steam			1st Stage Temperature							
TI-2	Steam			2nd Stage Temperature

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BY JRB DATE 2/2/81

APP. DATE

INSTRUMENT SUMMARY SHEET

 Geothermal Ethanol Plant
 Geothermal Element
 Ultrasonics, Inc.

DRAWING NUMBER

SHEET 1 OF 3

TAG NO.	SERVICE	LINE SIZE & SPEC.	LOCATION	DESCRIPTION & REMARKS	MFG.	SPEC. NO.	INSTRUMENT DETAIL				FLOW DIAG.
					MODEL NO.	P.O. NO.	PROC. PIPING		PNEU. PIPING		INSTR PLAN
								SHT.		SHT.	
TI-3	Steam			3rd Stage Temperature							
TR-4	Brine			Brine Inlet Temperature							
TR-5	Brine			Brine Return Temperature							
PRC-1	Steam			1st Stage Pressure Control							
PRC-2	Steam			2nd Stage Pressure Control							
PRC-3	Steam			3rd Stage Pressure Control							
LIC-1	Brine			1st Stage Level Control							
LIC-2	Brine			2nd Stage Level Control

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APP. DATE

INSTRUMENT SUMMARY SHEET

Geothermal Ethanol Plant
Geothermal Element
Ultrasystems, Inc.

DRAWING NUMBER

SHEET 2 OF 3

TAG NO.	SERVICE	LINE SIZE & SPEC.	LOCATION	DESCRIPTION & REMARKS	MFG.	SPEC. NO.	INSTRUMENT DETAIL				FLOW DIAG.
					MODEL NO.	P.O. NO.	PROC. PIPING		PNEU. PIPING		INSTR PLAN
								SHT.		SHT.	
LIC-3	Brine			3rd Stage Level Control							
PSV-1	Steam			1st Stage Relief Valve							
PSV-2	Steam			2nd Stage Relief Valve							
PSV-3	Steam			3rd Stage Relief Valve

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INSTRUMENT SUMMARY SHEET

 Geothermal Ethanol Plant
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SHEET 3 OF 3

MARKETING

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 INTRODUCTION AND SUMMARY	1
1.1 Scope	1
1.2 Summary	1
1.2.1 Ethanol	1
1.2.2 Animal Product By-Product	1
1.2.3 Feedstock Supply	2
1.2.4 Carbon Dioxide	2
2.0 ETHANOL	2
2.1 Scope	2
2.2 Market Description	3
2.2.1 Overview of Market Demand	3
2.2.2.1 General	3
2.2.1.2 Competition With Other Synthetic Fuels	5
2.3 Distribution System	11
2.3.1 Objectives	11
2.3.2 Form of Marketing Agreement	13
2.3.2 Marketing Arrangements	17
3.0 ANIMAL FODDER	19
3.1 General	19
3.2.1 Fodder Meal	19
3.2.2 Dried Solubles	23
3.3 Market Description	23
3.4 Pricing	25
3.5 Marketing Arrangements	25
4.0 CARBON DIOXIDE	26
4.1 Carbon Dioxide Recovery	26
4.2 Market	26
5.0 FEEDSTOCK SUPPLY	27
5.1 Feedstock Selection	27
5.2 Sources of Feedstock	28
5.2.1 Locally Grown	28
5.2.2 Imported Grain	28

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
5.3 Procurement Plan	30
5.3.1 General	30
5.3.2 Pricing Analysis	30
5.3.3 Hedging of Feedstock Costs	32

LIST OF TABLES

<u>Number</u>		<u>Page</u>
2.2	Retail Motor Gasoline Outlets in California	12
2.3	Ethanol Pricing Analysis	16
2.4	Wholesale Pricing Projection for Gasoline and Ethanol	18
3.1	Characteristics of Fodder Meal from U.S. Number 2 Yellow Grain Sorghum	20
3.2	Characteristics of Yeast Cream	21
3.3	Ingredients Analysis of Corn DDG & DDS	22
3.4	A. Cattle and Calves on California Farms B. Beef Feeder Cattle in Selected Southwest Areas	24
5.1	Pricing History of Grain Sorghum	33

LIST OF FIGURES

<u>Number</u>		<u>Page</u>
5.1	Sample Invoice for Grain Sorghum	31

LIST OF APPENDICES

Number

- 1 Letter of Intent
- 2 Pro Forma Ethanol Purchase Contract
- 3 Western Feedlot Report, February 23, 1981, by
California Cattle Feeders Association
- 4 Letter of Intent and Proposal
- 5 Correspondence
- 6 Correspondence
- 7 Grain Sorghum Market Data

1.0 INTRODUCTION AND SUMMARY

1.1 Scope

The potential profitability of the proposed Refinery is analyzed within the context of the overall economic system in which it will operate. The analysis considers the demand for product and co-products, and also considers the supply of feedstock that will be required. These items have been taken into account and described in this section of the Report.

1.2 Summary

1.2.1 Ethanol

U.S. Alcohol has projected that the market for fuel grade ethanol in California will be 259 million gallons per year, based upon actual 1979 motor gasoline consumption figures. The output of the proposed Refinery represents only 5.8 percent of this expanding market, a market share that U.S. Alcohol Fuels believes is easily attainable at prevailing price levels.

U.S. Alcohol Fuels is currently negotiating a long term purchase contract for the denatured ethanol output of the Refinery. Discussions of a more preliminary nature are being held with other potential distributors. The basis of the contract being negotiated is a pricing formula based upon the Los Angeles rack wholesale price of regular unleaded gasoline.

1.2.2 Animal Product By-product

A very strong market for corn DDG currently exists in Southern California and in the Imperial Valley, where there is a very high concentration of beef cattle. The current price of DDG is \$225 per ton. The animal fodder by-product of the plant is superior to corn DDG, and the market is perceived to be unlimited at a price of \$210 per ton. The price level will follow the general trend of all feed ingredients, such as soybean meal and feed grains.

1.2.3 Feedstock Supply

The primary supply of feedstock is U.S. Number 2 Yellow Grain Sorghum (milo) imported from Texas, Kansas and Oklahoma. Attempts will be made to develop local sources of feedstock, but it will be difficult to induce local growers to switch to grain sorghum from other higher value crops. Although the current price of milo is quite high due to the drought conditions in the lower midwest, it is demonstrated that through careful grain purchase planning and procedures, the feedstock is available at price levels that make it quite economical to produce fuel grade ethanol.

The milo will be purchased from major grain trading firms. Negotiations are currently underway with these firms. Other major grain trading firms are also being interviewed. The grain will be purchased on forward contracts and hedged with open-market transactions.

1.2.4 Carbon Dioxide

The market for carbon dioxide in Southern California does not currently justify the recovery and sale of this product. U.S. Alcohol Fuels is continuing its efforts to identify and develop a market for this by-product.

2.0 ETHANOL

2.1 Scope

The fuel grade ethanol (BATF Formula CDA-20) from this Refinery will be marketed in the near term as a supplement for liquid motor fuel. It is envisioned that the product will be used initially as an additive to regular unleaded gasoline and marketed as Gasohol or unleaded premium. It is likely that in the long term, a significant portion of the product will be used in pure form as a substitute for petroleum-based motor gasoline.

The primary consideration in analyzing the potential profitability of this Project is to obtain sufficient assurance that the demand for ethanol is adequate at a price that will sustain the production of the alcohol with a reasonable return on investment. In addition, U.S. Alcohol Fuels has attempted to define the form of the relationship that must be established with the actual retailer of the end product. To accomplish this, U.S. Alcohol

Fuels has expended considerable resources to investigate the market for alcohol fuels and to develop associations with the appropriate potential buyers of the product. The results of this investigation, and the extent to which commitments for product sale have been developed, are described in this section.

2.2 Market Description

2.2.1 Overview of Market Demand

2.2.1.1 General - The demand for fuel grade anhydrous ethyl alcohol as a fuel is derived entirely on the basis as a substitute for an extender for petroleum based liquid fuels. The demand for liquid fuels is derived from the need for energy for transportation, heating, and power generation.

The transportation market, which is the largest single application area for light petroleum based liquid fuels, is also the largest market opportunity for alcohol fuels. The characteristics of ethanol, which has a high octane, and is cool and clean burning, offer both the opportunity to substitute for motor gasoline, and to extend and supplement gasoline by upgrading it with alcohol blends. The latter case is, of course, what is being accomplished in the production of Gasohol, as a ten percent blend of ethanol and unleaded regular gasoline.

Ethanol has very high octane properties, 98-110 octane $((R + M)/2)$. In addition, ethanol has very high blending octane values of up to 117, so that it will enhance the octane value of the total blend more than proportionally. These properties not only benefit the motorist in the form of improved performance, but also the gasoline refiner, who can increase the gasoline yield of a barrel of crude oil, and undertake less severe reforming, if he can produce a lower octane unleaded gasoline. Because premium grade unleaded gasoline production involves expensive refinery modifications and lower yields of gasoline per barrel of crude, there has been a rather limited production of premium unleaded gasoline in the past. Ethanol provides a method of producing premium unleaded gasoline without these refinery modifications and without experiencing decreased yields.

The compatibility of ethanol produced from grain or other biomass with the existing auto fleet and with the existing marketing and distribution systems has been proven when the product is used as a blend as Gasohol. In that role alone, between 3/4 and 1-1/2 million barrels per day (10 to 20 billion gallons/year) of alcohol can potentially be substituted for gasoline produced from imported oil. This market, currently in its early stages of growth is expected to be developed as rapidly as plant investment can be made and fuel grade ethanol produced. This trend is being assisted by the creation of major investment incentives in the form of increased investment tax credits and accelerated depreciation.

The only national strategy to deal with excessive foreign energy dependence that emerged from the Carter administration as a result of the Oil Embargo of 1973, was a national policy to increase the production and use of alcohol fuels. According to the Energy Security Act of 1980, the current national goals are to provide 920 million gallons of alcohol fuel by 1982 and 10 percent of all automotive fuel by 1990 (approximately 11 billion gallons). The difference between this initiative and the other energy alternatives, including other synthetic fuels alternatives, is that this is a realistic short term program of achievement. It has the additional advantage of having broad political support due to the benefits that accrue to the farm bloc of rural America. It only remains to be seen how the Reagan administration will support and continue this policy of fostering and encouraging the development of alcohol fuels.

Since the demand for ethanol as a liquid fuel extender is enhanced by shortages or uncertainty in the supply of petroleum, any situation which threatens the supply of crude petroleum imports or imports of refined products must be seen as a positive factor for the emerging alcohol fuels industry. The foreign supply situation is so intertwined with the politics of OPEC and the Third World, that any projection in this area contains a substantial measure of uncertainty and risk. What is known is that the alcohol fuels industry is the only viable, short-term synthetic fuels alternative to imported petroleum.

2.2.1.2 Competition With Other Synthetic Fuels - It is generally accepted that there will be a shortfall of liquid fuels in the next two decades, and that the shortage will be most severe in liquid fuels for passenger vehicles and light trucks (currently, approximately one-sixth of the total energy consumption of the U.S. is for light vehicle usage). This predicted shortfall of liquid fuels has prompted the development of a number of new technologies to convert raw materials other than petroleum to produce light distillates for transportation uses. However, with the exception of ethanol, it is unlikely that any alternative liquid fuels will contribute significantly to relieve the shortage in this decade.

The various raw materials that are currently envisioned as sources for synthetic fuel liquids include tar sands, oil shale, coal and biomass. Tar sands are not found in large abundance in the U.S., and no major tar sands projects have been announced in this country. Large tar sands deposits are found in Canada where two major facilities are in operation. Products from these facilities are consumed in the Canadian market.

The development of oil shale reserves has been going on for a number of years. Until very recently, the economics could not justify the construction of commercial size facilities. Because of the potential environmental problems associated with these projects, the time frame necessary to achieve commercialization is much longer than other synthetic fuel projects. The schedule from project inception to fuel production is generally estimated to be approximately ten years. The extracted shale oil needs to be further refined in modified conventional petroleum refineries to produce the light distillates which form the actual end products.

Liquid fuels can be produced from coal either directly or indirectly. Liquid hydrocarbons are being produced from coal on a commercial scale at the Sasol plants in South Africa. This method of liquids production is expensive, and there are no current plans to duplicate such a operation in the U.S.. The gases which can be produced from coal can also be used to produce methanol. A number of this type of projects are being planned for this country. In order for these facilities to be economically competitive, the facilities must be very large to enjoy the benefits of the economy of

size. Many projects are planned in the range of 100,000 barrels per day. For a facility producing 104,000 barrels per day of methanol, the capital cost in 1980 dollars is approximately \$3 billion. Because of the size of the project and the risk associated with such high capital expenditure, most of these projects are being planned by consortiums of large integrated energy companies. The construction schedule for such a facility is approximately eight years. As of the first quarter for 1981, no methanol from coal projects have progressed past the planning stage.

Methanol can also be produced by gasifying biomass materials. Even though gasification processes have been employed on a commercial scale with coal, there are no commercialized processes to gasify biomass. Assuming gasification can be achieved without difficulty, the methanol synthesis is essentially the same as the methanol synthesis with gases produced from coal. The capital investment of such facilities has been estimated at approximately \$200 million or more (first quarter 1980), if constructed in the United States.

In contrast to the above technologies, fuel grade ethanol can be produced on a much smaller scale and with a much shorter construction period. The Imperial Valley Ethanol Refinery herein proposed will take approximately twenty-four (24) months to engineer and construct. In addition, the capital investment of an ethanol facility is an order of magnitude lower than that for other types of alternative liquid production discussed above. Since conventional fermentation technology is available today, there are no technical risks involved in the design and operation of such facilities.

The first generation of commercial fermentation ethanol facilities will be based on either grain or sugars produced from sugar beets or sugar cane. In the longer term, ethanol will most likely be produced from woody (lignocellulosic) substances. A number of innovative concepts are being developed to improve existing fermentation processes. Micro-organisms currently available at best can produce alcohol at about ten (10) percent concentration, thus considerable energy is required to dehydrate the ethanol to 199.7° proof for fuels use. Modern chemical process engineering techniques are being applied to existing fermentation and distillation operations, which result in significant reductions in the overall energy consumption to produce anhydrous ethanol.

Genetic engineering is being brought to bear to develop new micro-organisms which are thermophilic as well as having high alcohol tolerance. The projected time scale of such micro-organism development is generally in the range of five to ten years. When and if these micro-organisms are developed, they can be directly substituted for those that will be initially used in the Imperial Valley facility.

Considerable work is also being carried out to enable the use of lignocellulose feedstock for ethanol production. When the technology is well enough established, it is conceivable that U.S. Alcohol Fuels may want to adapt the facility to consume both grain and lignocellulose. The only modification necessary would be to establish a new front end processing scheme.

From the above discussion one can easily see that ethanol production by conventional means will probably dominate the synthetic fuel market for at least the next decade, with essentially no competition from other raw materials or technologies. Because of inflation, facilities constructed today will have capital investment frozen at current dollars, whereas facilities which will be built a decade hence must have significant economic edge before they can be competitive with facilities built today. Therefore, the time value of money acts greatly in favor of this ethanol project, which can be in production within a rather short period of time.

2.2.1.3 United States Motor Gasoline Market - In 1979 the total United States consumption of motor gasoline was approximately 112.7 billion gallons (see Table 2.1), which represented a decrease of 3.5 percent over the previous year. As Table 2.1 shows, consumption has grown steadily at an average annual rate of 3.52 percent since 1962. This steady increase has been interrupted as demand has responded to the price increases associated with the shortages during 1974 and 1979. This reduction in demand has extended to the present day.

At the present time, the proportion of this consumption represented by unleaded motor fuel is approximately thirty percent, as determined by the proportion of the U.S. auto fleet specifying unleaded fuel. Of course, as autos using leaded fuels are retired, this proportion

TABLE 2.1

Motor Gasoline Consumption in the United States

<u>Year</u>	Consumption (millions of gallons)	
	<u>California</u>	<u>United States</u>
1962	6174	62531
1963	6525	64779
1964	6914	67664
1965	7181	70337
1966	7534	73639
1967	7777	76139
1968	8247	80867
1969	8660	85416
1970	9059	89405
1971	9363	93907
1972	9996	100069
1973	10307	104579
1974	9888	101856
1975	10166	104517
1976	10684	109874
1977	11242	113102
1978	11755	116781
1979	11516	112678

Source: American Petroleum Institute (1962-1973), and the Federal Highway Administration (1974)

will increase. The average life of automobiles in the United States is eleven years. Also, as the fleet of autos using unleaded matures, the need for a premium unleaded fuel will increase. This will cause increasing demand for unleaded premiums, which provide an excellent opportunity to utilize the octane enhancing properties of ethanol. Recent test programs by Chevron and Shell have shown a strong demand for the unleaded premium motor gasoline which both firms have recently begun producing.

In addition to the market opportunities that exist for ethanol because of its chemical properties, the aspect of availability must be emphasized. As previously described, ethanol can be produced on a large scale within a reasonably short period of time in response to the threat of curtailments of crude oil supplies with which we have been living for the past decade.

2.2.1.4 Assumptions - The major assumption underlying this study is that the world energy situation will continue to exert an upward pressure on the prices of all energy sources, and on the prices of liquid fuels in particular. Real price increases have characterized the U.S. oil industry throughout its entire history with the exception of the post war period of regulation. Despite the recent flurry of exploration, it is plain that the domestic supply will not be sufficient to alter the impact of world price increases even with the decontrol of domestic crude oil prices. Virtually all long term forecasts of world and domestic prices that have been made as recently as a year ago have been exceeded. Any significant supply interruption will create the emergency conditions that will cause the price forecasts that are contained in this report to be surpassed. Although a precipitous denial of foreign oil and a crash synthetic fuels development program is not envisioned, the foreign oil situation must be considered crisis prone, with periodic curtailments or shortages probable.

It has also been conservatively assumed that ethanol, as a fuel, has a potential market, as a blend in Gasohol, of half of the unleaded premium market. It is estimated by U. S. Alcohol Fuels that fifty (50) percent of the motor fuel market will be unleaded by the time this Project is in production, and that fifty (50) percent of this amount will be unleaded premium. Therefore, the potential market for Gasohol represents 12.5 percent of the motor gasoline market, and ethanol would therefore represent 1.25 percent of total U.S. Motor Gasoline consumption. This does not take into account any utilization of alcohol as a fuel in pure form.

It is further assumed that, in order to ensure that this market share is captured, Gasohol must be priced at a level somewhat less than the price charged for premium unleaded. An amount over the level charged for regular unleaded gasoline will be allowable, based upon the octane characteristics of Gasohol.

The other major assumption is that the politically based incentives for the development of synthetic fuels will remain in place. Specifically, the four cents per-gallon federal excise tax exemption, and the ten percent energy tax credit are expected to remain in force during and after the Reagan administration.

These particular incentives are essentially free of major contentious variables due to the widespread political base that is reached by legislation which favors the farm sector to the degree that this program does. In addition, much of the legislation proposed by the Reagan administration, such as accelerated depreciation, will enhance the incentives available to these projects.

2.2.2 Southern California Market Description

2.2.2.1 General - California is the largest consumer of motor gasoline of the fifty states. As Table 2.1 shows, in 1979 motor gasoline consumption in California was 11.5 billion gallons, representing 10.2 percent of the total United States consumption. Based upon our assumptions in Section 2.2.1.4, and using the 1979 consumption figures, the total potential market for ethanol for fuels use is conservatively estimated at 144 million gallons per year.

Furthermore, the California Energy Commission is urging all fleet users of motor gasoline in California to operate on pure alcohol fuels. These fleet users, which include public utilities, other major corporations, and federal, state, and local government agencies, account for approximately ten percent of the motor gasoline market in the State. Based upon 1979 consumption figures, if ten percent of the fleet users began to operate on ethanol, this would represent an additional market of approximately 115 million gallons per year.

Therefore, the potential market in California for ethanol is conservatively estimated at 259 million gallons per year, based entirely upon 1979 consumption figures. The production capacity of the Refinery represents a mere 5.75 percent of this potential demand. With the pricing relationships that are described in Section 2.3.2, U.S. Alcohol Fuels is confident that the market described herein will absorb the entire output of the Refinery.

2.2.2.2 Distribution System - In 1979 there were approximately 14,253 branded retail motor gasoline outlets in California, operated by 29 companies. A list of the companies and distribution of these retail outlets is provided in Table 2.2 on the following page. Although many of these outlets are operated by major integrated oil companies, it can be seen that a significant portion of the outlets are independents, who are supplied by independent refiners or by jobbers who wholesale for the major refiners.

At least initially, the primary market for Gasohol will most likely be served by the independent retailers, who will buy gasoline from the majors and sell as a rebrand. Because of the growing demand for an unleaded premium, a major portion of this demand will be met by the independents selling Gasohol.

It should also be mentioned that the West Coast has several major petroleum refineries that supply many areas besides California. This would make it possible to utilize the octane enhancement capabilities of ethanol to produce an unleaded premium at the petroleum refinery and distribute the motor gasoline throughout the western United States, using the established distribution network of the major refiners.

2.3 Marketing Plan

2.3.1 Objectives

The first objective of the Marketing Plan for this Refinery has

been to review the liquid fuels market and determine the manner in which the ethanol produced by this plant will be handled by the industry. The findings of these investigations have been discussed in Section 2.2 of this marketing report, and have resulted in the assumptions and conclusions discussed therein.

The second major objective of the Marketing Plan at this phase of the project has been to determine, on a preliminary basis, the form and nature of the marketing agreements that U. S. Alcohol Fuels would seek to finalize with the parties to whom the ethanol would be sold. The important aspects of this objective are the pricing structure and the terms and conditions of sale. The results of this phase of the marketing plan are discussed in the following section.

The third objective of the Marketing Planning aspect of this project has been to initiate contacts with potential buyers of the alcohol, determine their degree of receptiveness to the proforma marketing arrangements, and to begin negotiations directed towards finalizing a long term ethanol purchase contract during the coming months. U. S. Alcohol Fuels has achieved significant success in this regard, as will be described in Section 2.3.3.

2.3.2 Form of Marketing Agreement

From a purely contractual viewpoint, the most favorable type of agreement would be a "take or pay" type of contract, where the Buyer would pay the Refinery for the design output of the product, regardless of whether the Refinery ever actually worked, or whether there actually developed the expected market for the product. However, it has been the experience of U. S. Alcohol Fuels that, in exchange for this degree of commitment so far in advance of actual production, a great deal would have to be given away in the form of pricing concessions, or equity interest in the Project, or both. The overall impact of this type of contract, if executed at the present time, would be to significantly decrease the potential profitability

of the Project in return for a reduction in market uncertainty which, under the circumstances, is not felt to be a significant problem.

U.S. Alcohol Fuels has therefore adopted a strategy of attempting to negotiate a long-term purchase agreement for the output of the Refinery. The price of ethanol (Eth) is established by a formula based upon the Los Angeles rack (wholesale) price of regular unleaded gasoline. The pricing relationship for unleaded regular is described by the following formula:

$$\text{Reg} = 1.06 (\text{Rck} + a + c + e + g + i) ; \text{ where,}$$

Reg = Pump price of regular unleaded gasoline;

Rck = Los Angeles rack price of regular unleaded gasoline (cost to wholesaler);

a = State road tax on regular unleaded gasoline;

c = Federal excise tax on regular unleaded gasoline;

e = Wholesaler's gross margin on regular unleaded gasoline;

g = Cost to deliver gasoline to station; and

i = Station gross margin on regular unleaded gasoline.

Similarly, the pricing for Gasohol is given by the following formula:

$$\text{Ghl} = 1.06 [0.9 (\text{Rck} + e) + 0.1 (\text{Eth} + f) + b + d + g + j] ; \text{ where,}$$

Ghl = Pump price of Gasohol;

Eth = Price of fuel grade ethanol (CDA 20) F.O.B. Refinery;

f = Wholesaler gross margin on ethanol;

b = State road tax on Gasohol;

d = Federal excise tax on Gasohol.

g = Cost to deliver Gasohol to station;

j = Station gross margin on Gasohol.

By stating that the pump price of Gasohol (Ghl) is equal to the pump price of regular unleaded gasoline (Reg) plus some margin (m), the equation can be combined and solved for the price of ethanol F.O.B. Refinery (Eth) with the following results:

$$\text{Eth} = \text{Rck} + (e-f) + 10(a-b) + 10(c-d) + 10(i-j) + 10m$$

Example:

$$\begin{aligned} \text{Eth} = & 1.055 + (.025-.035) + 10(.070-.020) + 10(.040-0) + \\ & + 10(.080-.090) + 10(0) = 1.845 \approx 1.900 \end{aligned}$$

A confirmation of the validity of this relationship is provided by the analysis in Table 2.3 wherein the formula yields the correct current relationships between and among the wholesale (rack) price of unleaded regular gasoline (as given by Platts Oilgram), the wholesale price of ethanol (at Publickers Los Angeles rack), and the pump prices of regular unleaded gasoline and Gasohol for the average independent retailer. The calculated price of ethanol using the relationship described on the previous page, is \$1.845 which approximates the current reported price of \$1.900.

Note that the pricing relationship between the Los Angeles rack price (Rck) of unleaded regular gasoline and the F.O.B. Refinery price of ethanol (Eth) is determined by the differences in parameters affecting the retail vs. wholesale price, more so than by the level of the wholesale prices themselves. There are five such margins that are significant.

The first margin, given by the expression (e-f), refers to the difference in gross margin that is charged to the station by the wholesaler. The extra one cent that is allowed for the ethanol over unleaded regular will cover the transportation and blending costs, as well as provide some incentive for the wholesaler to push Gasohol. This amount results in only a one cent reduction in the ethanol price.

The second margin refers to the State road tax incentive for Gasohol, currently five cents per gallon. This incentive is conservatively assumed to have been removed by the time this Refinery is in operation.

The third margin expression takes into account the Federal Excise Tax incentive for Gasohol, which is assumed to be \$0.04 per gallon of Gasohol throughout the economic life of the Refinery.

The fourth margin provides for an incentive to the station operator to sell Gasohol. He can either push the product and make more money or use the extra amount to make pricing concessions. It is believed that a one cent per gallon of Gasohol margin is appropriate here throughout the life of the Refinery. This amounts to a \$0.10 per gallon reduction in the price of Ethanol.

Table 2.3

Ethanol Pricing Analysis

Testing Applicability of Pricing Formula to Actual Conditions

<u>Symbol</u>	<u>Description</u>	<u>Actual Figure February 20, 1981</u>
a	State Road Tax - Reg Unleaded	\$ 0.070
b	State Road Tax - Gasohol	0.020
c	Fed Excise Tax - Reg Unleaded	0.040
d	Fed Excise Tax - Gasohol	0.000
e	Wholesaler Margin - Reg Unleaded	0.025
f	Wholesaler Margin - Ethanol	0.035
g	Cost of Delivery to Station	0.010
h	Cost of Delivery of Eth to Blending	included in f
i	Station Margin of Reg Unleaded	0.080
j	Station Margin on Gasohol	0.090
Reg	Pump (Retail) Price of Reg Unleaded	1.350
Ghl	Pump Price of Gasohol	1.350
Rck	L.A. Rack Price of Reg Unleaded	1.055
Eth	F.O.B. Refinery Price of Ethanol	1.900
m	Margin between Ghl and Reg	0.006
	State Sales Tax	6%

Because of the octane properties of ethanol, Gasohol will sell at a current premium level of \$0.03 per gallon over regular unleaded gasoline. This margin effects the price of ethanol by a factor of ten. The premium margin is expected to increase slightly at a rate roughly proportional to Rck.

Of course, the wholesale rack price of gasoline is expected to increase the basis for the ethanol formula over the coming years. Ultrasystems believes that sharp increases can be expected between now and 1985, such that the Los Angeles rack price of regular unleaded will reach approximately \$1.650 in 1983 and \$1.900 in 1985. It is then expected to increase at a rate of approximately eleven (11) percent per year throughout the remainder of the decade, with escalation dropping to a rate of nine (9) percent for the remainder of the economic life of the Refinery.* The projected price levels of unleaded regular gasoline, ethanol, and related parameters is given in Table 2.4.

As discussed in the Finance section of this Application, the Refinery shows a very strong profit potential under current price and operating cost levels. In addition, the strong upward price trend for ethanol shows that these revenues will be increasing at a rapid rate, as compared to operating costs.

2.3.3 Marketing Arrangements

U.S. Alcohol Fuels has received a great deal of interest in the proposed Refinery. However, it has been very difficult to obtain firm commitments for the purchase of a product from a plant that will not be in production until 1983, in an industry subject to such wide swings in product availability and pricing.

*Those projections correspond roughly to the results of a study by Wharton Econometric Forecasting, Associates, University of Pennsylvania, conducted for the U.S. National Alcohol Fuels Commission, and discussed in Fuel Alcohol (U.S. National Alcohol Fuels Commission, Washington, D.C., 1981) pg. 43.

Table 2.4
Wholesale Pricing Projection for Gasoline and Ethanol

<u>Year</u>	<u>Los Angeles Rack Price for Unleaded Regular</u>	<u>Retail Price Margin Between Reg Unl & Gasohol</u>	<u>F.O.B. Refinery Price of Ethanol</u>
1983	\$ 1.650	0.030	\$ 2.240
1984	1.775	0.033	2.395
1985	1.900	0.037	2.560
1986	2.109	0.041	2.809
1987	2.341	0.046	3.091
1988	2.598	0.051	3.398
1989	2.884	0.057	3.744
1990	3.202	0.063	4.122
1991	3.490	0.069	4.470
1992	3.804	0.075	4.844
1993	4.147	0.082	5.257
1994	4.520	0.089	5.700
1995	4.927	0.097	6.187
1996	5.370	0.106	6.720
1997	5.853	0.115	7.293
1998	6.380	0.126	7.930
1999	6.954	0.137	8.614
2000	7.580	0.149	9.360
2001	8.263	0.163	10.183
2002	9.006	0.177	11.066

Nevertheless, U.S. Alcohol Fuels is currently negotiating the terms and conditions of a long-term contract for the output of the Refinery. It is expected that a final agreement on the terms and conditions will be in place by the end of 1981 at the latest.

U.S. Alcohol Fuels is also in the process of contacting other potential distributors of the ethanol, in order to determine their level of interest in this product, and their willingness to negotiate towards a long-term purchase commitment.

3.0 ANIMAL FODDER

3.1 General

In addition to the ethanol product that is the primary output of the Refinery, the facility produces 45,021 short tons per year of food by-product that has a very high value in the feedstuff ingredients markets. This portion of the Marketing section of the Report will describe the characteristics of the coproduct and its market, as well as the arrangements that have been made to distribute this coproduct in the ingredients markets.

3.2 Product Description

3.2.1 Fodder Meal

As described in the Engineering section of this Report, the Refinery process provides that all of the insoluble solids in the mash stream are separated prior to Fermentation. This Fodder Meal is combined with the yeast cream which is separated after Fermentation, to produce an "Animal Fodder" which is very similar to Corn DDG (International Feed Number 5-02-842). The ingredients analysis of the Fodder Meal and the Yeast Cream are given in Tables 3.1 and 3.2 respectively. Ingredients analysis of Corn DDG is given in Table 3.3 for comparison.

Table 3.1

Characteristics of Fodder Meal From
U.S. Number 2 Yellow Grain Sorghum

Amino Acid Analysis

	<u>mg % Protein</u>	<u>g/100g sample</u>
Asparagine	7.26	2.25
Threonine	3.54	1.09
Serine	4.75	1.47
Glutamic Acid	19.52	6.04
Proline	5.88	1.82
Glycine	3.70	1.14
Alanine	10.26	3.17
Cystine (1/2)	0.93	0.29
Valine	5.37	1.66
Methionine	1.36	0.42
Isoleucine	4.37	1.35
Leucine	16.88	5.22
Tyrosine	3.71	1.15
Phenylalanine	5.67	1.75
Histidine	2.38	0.74
Lysine	1.19	0.37
Arginine	3.25	1.01
Protein Content		30.93%
		Total Amino Acid

Note that Protein Content is higher than Corn DDG.

Source: Chemapec, Inc. Feasibility Study Report, December 31, 1980 and subsequent correspondence; based upon laboratory fermentation tests at the CHEMAP Laboratory in Zurich, Switzerland.

Table 3.2

Characteristics of Yeast CreamCharacteristics90% Dry SubstancePercent D.S.

Protein	44.5
Fiber	-
Fat	7
Ash	8
N Free Extract	40

Vitamins

Vitamin A	iu/gm	-
Vitamin E	mg/kg	2.2
Thiamine	mg/kg	94.6
Riboflavin	mg/kg	38.5
Pantothenic Acid	mg/kg	114.0
Biotin	mg/kg	5.0
Folic Acid	mg/kg	9.0
Choline	mg/kg	4,800
Niacin	mg/kg	479

Minerals

Sodium	%	0.07
Potassium	%	1.72
Magnesium	%	0.23
Sulfur	%	N.A.
Manganese	ppm	5.7
Iron	ppm	100
Copper	ppm	33.0
Selenium	ppm	1.0-1.5
Zinc	ppm	38.7

Source: Chemapec, Inc., Feasibility Study Report, December 31, 1981, and subsequent correspondence; based upon laboratory fermentation tests at the CHEMAP Laboratory in Zurich, Switzerland.

Table 3.3
Ingredients Analysis of Corn DDG & DDS

		DDG ¹	DDS ²			DDG ¹	DDS ²
<u>General</u>							
Dry Matter	%	93.8	91.5	Ruminant T.D.N.	%	79	78
Crude Protein	%	27.0	27.0	Ruminant Digestible Protein	%	19.3	22.8
Crude Fat	%	9.0	9.0	Poultry P.E.	Cal/Kg	1450	2244
Crude Fiber	%	13.0	4.0	Poultry M.E.	Cal/Kg	2000	2970
Calcium	%	0.09	0.35	Swine M.E.	Cal/Kg	3673	2900
Total Phos.	%	0.41	1.30	Swine TDN	%	92	75
Ash	%	2.2	8.2				
<u>Amino Acids</u>							
Methionine	%	0.45	0.60	Valine	%	1.20	1.60
Cystine	%	0.32	0.60	Leucine	%	2.60	2.10
Lysine	%	0.90	0.90	Arginine	%	1.0	1.0
Tryptophane	%	0.21	0.20	Phenylalanine	%	0.6	1.5
Threonine	%	0.30	1.0	Glycine	%	0.49	1.1
Isoleucine	%	0.93	1.20	Poultry Amino Acid			
Histidine	%	0.60	0.60	Availability	%	75	95
<u>Vitamins</u>							
Vitamin A	IU/gm	3.1	1.2	Biotin	Mcg/Kg	400	1100
Vitamin E	Mg/Kg	30.5	55.8	Folic Acid	Mcg/Kg	-	1100
Thiamine	Mg/Kg	1.6	5.9	Choline	Mg/Kg	1850	4818
Riboflavin	Mg/Kg	2.8	11.4	Vitamin B-12	Mcg/Kg	-	-
Pantothenic Acid	Mg/Kg	5.9	21.8	Niacin	Mg/Kg	42.2	120.0
<u>Minerals</u>							
Sodium	%	0.9	0.3	Iron	ppm	200	600
Potassium	%	0.16	1.74	Copper	ppm	44.7	82.7
Magnesium	%	0.06	0.64	Zinc	ppm	-	-
Sulphur	%	0.43	0.37	Selenium	ppm	0.35	0.33
Manganese	ppm	22.6	73.5				

¹ International Feed Number: 5-02-842

² International Feed Number: 5-02-844

Source: "Feedstuffs Ingredient Analysis Table: 1980 Edition," compiled by Richard D. Allen, Feedstuffs, July 23, 1980 (Miller Publishing Company, Minneapolis, Minnesota).

3.2.2 Dried Solubles

At the present time the soluble proteins are not recovered from the process stream. The market for this material is currently being investigated in order to provide a basis for economic analysis of the recovery of the thin stillage. The material, which is very similar to Corn DDS (see Table 3.3), is likely to have a high value as a liquid feed supplement when dried to 50 to 70 percent solids content. The disadvantages are the higher capital cost of the evaporation equipment and the need for more energy to dry. Pending the results of this analysis, the material is being treated as a waste stream in the Refinery water treatment facility.

3.3 Market Description

The Animal Fodder coproduct from the Refinery is an ideal food for ruminant animals, which makes it highly marketable to feedlots and dairies. There are two very good markets for the product. One is the southern California feed ingredients market, and the other is in export to the Pacific Basin, particularly Japan. Although the location of the Refinery has put it at somewhat of a disadvantage due to freight costs of the feedstock, this same situation enables it to recover somewhat on the equally high value of the feed byproduct on the west coast.

The southern California feed market is expected to absorb the entire feed output of the Refinery. As shown in the following Table 3.4, over four and one half million calves and cattle were estimated in California on January 1, 1980. Of this total, approximately one to one and one half million are located south of Los Angeles, and approximately 360,000 within the Imperial Valley.

Table 3-4

A. Cattle and Calves on California Farms

1971 - 4,680,000	1976 - 5,000,000
1972 - 4,662,000	1977 - 4,750,000
1973 - 4,710,000	1978 - 4,430,000
1974 - 5,250,000	1979 - 4,700,000
1975 - 5,200,000	1980 - 4,550,000

Source: Crop Reporting Board, U.S. Department of Agriculture

B. Beef Feeder Cattle in Selected Southwest Areas

Imperial Valley

Calves	104,739
Steers	245,711
Heifers	<u>10,635</u>

361,085

Coachella Valley

20,000

Yuma-Welton Area, Arizona

95,000

Blythe

29,000

Total in Immediate Area

505,085

Source: California Cattle Feeders Association Report of February 23, 1981. See Appendix 3 for a copy of this document.

3.4 Pricing

Distillers products (i.e. Corn DDG) are currently selling at approximately \$225 per short ton.

U.S. Alcohol Fuels has been advised that the cattle finishing industry in Southern California would be able to absorb a tremendous amount of distillers product, up to 3 million tons per year, if it were priced on the basis of its protein content. In other words, at a price of \$200 per ton in first quarter 1981 figures, the market share of the product from this Refinery would be unlimited with respect to output.

3.5 Marketing Arrangements

U.S. Alcohol Fuels intends to market the Animal Fodder (and DDS if it is produced) through the established marketing and distribution systems of one or more of three firms with whom negotiations are being carried on at this time.

Because of the strong demand for this product, U. S. Alcohol Fuels intends to not enter into any long term relationship for the sale of this coproduct. Preferential consideration will be given to the entity which is chosen to supply the grain to this Refinery, as economics can be realized by utilizing the same trucks to haul out Animal Fodder as deliver the grain sorghum (every third truck would be loaded out on return).

4.0 CARBON DIOXIDE

4.1 Carbon Dioxide Recovery

Carbon dioxide can be recovered from the Fermentation unit of the Refinery and liquified for industrial use, rather than being scrubbed and vented as it is presently planned. According to Chemapec, Inc., this would require the installation of approximately \$3 million worth of equipment.

4.2 Market

Carbon dioxide is used widely in a variety of applications. Soft drink manufacturers use this material for carbonation. Oil and gas producers use it for enhanced recovery programs. Food packers use carbon dioxide for freezing and preserving for shipment. The material can be utilized in greenhouses to induce accelerated plant growth.

However, the economics of carbon dioxide are such that it will not withstand the capital cost of the recovery systems in conjunction with the

long transportation distance associated with this particular Refinery. Firms such as Liquid Air, and Liquid Carbonics have been contacted and are not interested at the present time. The haul distance is too great to serve the historic markets.

However, it is likely that a vegetable freezing plant or some other local use for this material may in fact develop in the future. Therefore, the recovery and sale of carbon dioxide is being retained as an alternative for future development.

5.0 FEEDSTOCK SUPPLY

The Refinery will consume 38,395 pounds per hour (pph) of milo during operation. During the design operating year of 7,920 hours, approximately 3,040,884 hundredweight (Cwt) or 152,044 short tons will be consumed.

5.1 Feedstock Selection

Several feedstocks were considered for the Imperial Valley Ethanol Refinery: sugar beets, fodder beets, potatoes, sweet sorghum, sugar cane and several types of grain. U.S. Number 2 Yellow Grain Sorghum was chosen as the design basis feedstock, although U.S. Number 2 Yellow Dent Corn can also be used without loss of efficiency.

Sugar beets were a primary feedstock candidate but were rejected for two reasons. Firstly, the high capital cost of the beet preparation unit of the plant is prohibitive. Secondly, the heat problems with storage of beet juice and molasses in the Imperial Valley provide that the plant must be shut down part of the year. The alternative of the multiple feedstock sugar beet and grain Refinery was rejected because of problems that Chemapec preceived in startup and running of the plant after a feedstock switch.

Potatoes were rejected because of lack of availability and storage problems. Fodder beets were rejected because of the lack of commercial experience in processing this crop and in growing it in the Imperial Valley.

Sweet sorghum and sugar cane have both been grown in the Imperial Valley. However, because of the expense of growing these crops and the seasonality of their growth, they are also cost prohibitive as a feedstock.

Of the cereal grains, corn, wheat, grain sorghum, and barley were reviewed. Barley was rejected due to lack of availability either locally or in import experience. Although a large amount of wheat is grown in the Valley, it is a high value food commodity making its use in the Refinery cost prohibitive.

The remaining two grains, U.S. Number 2 Yellow Dent Corn (Corn) and U.S. Number 2 Yellow Grain Sorghum (Milo) are the primary remaining alternatives. Milo was selected as the design basis feedstock for several reasons, although they are nearly interchangeable from a process standpoint.

Firstly, there has been a great deal of grower experience with milo in the Imperial Valley. Due to the high land costs in the Imperial Valley, growers have turned to such cash crops as hay, wheat, and cotton, and only 42,000 Short Tons of milo were produced in 1979, although in years past the amount grown has been much higher. Total production of milo in California was 330,000 short tons in 1979. In contrast, due to the heat and certain disease factors, corn has not fared so well locally. Therefore, it is believed that the likelihood of obtaining long term grower commitments for milo is much higher.

Secondly, milo is cheaper than corn. The February 9, 1981 issue of Feedstuffs (Miller Publishing Co., Minneapolis), gives Los Angeles corn and milo prices as \$7.65 and \$7.35 per hundred weight respectively. This is despite the drought conditions in the Mid West, which has affected milo areas more severely than corn areas. Note that all grain prices are currently inflated due to the drought.

An ingredients analysis of the Feedstock is provided in the Design Basis in Section 2.0 of the Engineering Section.

5.2 Sources of Feedstock

5.2.1 Locally Grown

The Imperial Valley is a high land cost agricultural area. It is intensely farmed with high cash value crops for the Los Angeles area. Land values are in the range of \$2,000 to \$5,000 per acre. For this reason, low value starch products such as milo are not the favored product in this area. It has been demonstrated that users of crops such as milo can pay for the

freight from the Mid West and get a lower cost item than if it were grown in the Imperial Valley. For instance, yields of wheat of from 3.5 tons per acre to as high as 5 tons per acre, can be obtained in the Valley, with growing costs being the same as for grain sorghum. By contrast, the yields of grain sorghum are from 2.5 to 3.5 per acre, with a market value averaging \$1.00 per hundredweight lower than for wheat. For the purposes of this analysis, therefore, it is assumed that it will be more cost effective to import grain for the Refinery than to induce growers to grow it locally.

However, the advantages of a local supply of some proportion of the crop cannot be ignored. U.S. Alcohol Fuels can offer two things to the grower, which might make it worth their efforts to grow milo at an economic price to the Refinery. The first is that they can grow milo as a rotation crop in some cases. In addition, U.S. Alcohol Fuels can contract forward for this amount of grain at a price based on some escalation factor, which would allow the grower to reduce his operational risk to some extent.

5.2.2 Imported Grain

California is the largest agricultural producer of the fifty states, but California is also a net grain importer. The lines of distribution are well established, and several firms do a continuing business in transporting grain to the West Coast. U.S. Alcohol Fuels is presently negotiating with those firms that do an active business importing grain into the Imperial Valley, for the purpose of establishing a long term business relationship for purchasing the milo (or corn) necessary to run the Refinery.

Because of the large amount of grain that is required to fill the needs of the Refinery, it will be possible to bring it into the Valley in 50-car unit trains and truck it to the Refinery from that point. The cost to U.S. Alcohol Fuels will be approximately \$3.50 per short ton over the cost delivered by rail to Holtville. On February 20, 1981, this would have totalled \$154.70 per ton*. If Southern Pacific proceeds to adopt the new 100-car unit train rates (as Santa Fe, Union Pacific, and Burlington Northern have done), it may be possible to reduce this cost slightly.

5.3 Procurement Plan

5.3.1 General

Although as noted earlier, U.S. Alcohol Fuels intends to continue to attempt to obtain local sources for at least some portion of the Feedstock, the procurement arrangements are almost certain to be limited to imports for the first several years of operation. It is U.S. Alcohol Fuels' intent, therefore, to establish a working relationship to procure the milo (or corn) on an F.O.B. Refinery basis. The relationship would allow U.S. Alcohol Fuels to reduce import requirements from the mid west in order to allow for local grain for which forward contracts are let.

5.3.2 Pricing Analysis

The price of the Feedstock for the Refinery will be the mid west cost of the grain, plus rail freight to the Imperial Valley, plus the handling charge to the Refinery. At February 1981 price levels, this would add up to \$154.70 per short ton as noted earlier, and as shown on the sample invoice on the following page.

*See Section 5.3.2.

**Figure 5.1 Sample Invoice for
Grain Sorghum**

**Pending finalized contractual relationships
for purchase of the feedstock, this figure
contains proprietary information. Please
contact Ultrasystems for further details.**

However, the current price level of milo is inflated due to the drought conditions that have prevailed during the past couple of seasons. These drought conditions have hit the lower Mid-West milo areas (Texas, Oklahoma, and Kansas) more severely than the areas that grow other feed grains predominantly. The current price is seen as the peak of an upward trend which will be coming down the next season, if the weather holds.

Conti Commodity Services, Inc., a subsidiary of Continental Grain Company, has advised that there is a very limited upside potential in the grain markets due to the expanding supply situation. Very tight world supplies have held prices firm this year. Very large corn and grain sorghum plantings are expected in response to this price situation.¹ In addition, Argentina and South Africa have also experienced excellent growing conditions and may have record crops this season.² The general trend seems to be softening of price over the next season or two in response to the price runups of the past two to three years.

With the partial deregulation of the railroad industry, it is expected that the freight costs associated with importing of the grain will also be reduced. Railroads realize significant cost savings when they can transport items in fifty car unit trains as is possible in this case. Preliminary information indicates that it may be possible to negotiate unit train freight rates that are as much as \$8.00 per ton lower than the current U.C.C. rates. Due to these considerations, it is believed that the milo price that is most realistic is the weighted average price going back to the 1976-77 season. This price level of \$107.30 per short ton is shown in Table 5-1. Added to this will be the \$3.50 per ton handling charge, making the total cost to the Refinery in 1981 figures for analysis equal to \$110.80 per short ton, or \$5.540 per cwt.

5.3.3 Hedging of Feedstock Costs

This Refinery will be subject to a significant degree of risk associated with fluctuation of grain prices. The Refinery with the aid of the grain trading firm chosen to supply feedstock to the Refinery, will seek to shift this risk through the purchase of future contracts in grain, otherwise known as hedging.

1 Quarterly Review of the U.S. Economy, January 1981. (Conti Commodity)

2 Fundamental Market Letter, February 13, 1981. (Conti Commodity)

Table 5-1 Pricing History of Grain Sorghum

<u>Year (Beginning October)</u>	<u>Average Kansas City \$ Per Cwt.</u>	<u>Quoted Price Los Angeles \$ Per Cwt.</u>
1970-71	\$2.42	\$2.99
1971-72	2.06	2.82
1972-73	3.81	4.16
1973-74	4.95	5.64
1974-75	5.04	6.12
1975-76	4.46	5.63
1976-77 ¹	3.49	4.68
1977-78 ¹	3.54	4.82
1978-79 ¹	4.00	5.32
1979-80 ²	4.32	5.75
1980-81 ³	5.68	7.50

Los Angeles weighted average from October 1970 - \$4.901 per cwt.

Kansas City weighted average from October 1970 - \$3.88 per cwt.

Los Angeles weighted average from October 1976 - \$5.365 per cwt.

Kansas City weighted average from October 1976 - \$4.01 per cwt.

Notes:

1 Preliminary

2 Estimate

3 Estimate for October 1980 through February 1981

Source: Commodity Yearbook 1980 (Conti Commodity) See Appendix 7
and Economic Research Service of the U.S. Department
of Agriculture and, Feedstuffs (Miller Publish-
ing Co., Minneapolis, Minnesota)

The concept of hedging is a reliable way to reduce the level of price risk because of the relationship between cash prices and futures prices for a given commodity. Futures prices are usually higher than cash prices because they reflect storage, insurance and interest costs. Cash and futures prices tend to fluctuate together because they respond to the same market conditions, although they do not usually fluctuate in precisely equal amounts. As the futures contract month approaches, the futures and cash prices converge, because the other costs mentioned above become less significant as the delivery time approaches.

The Refinery will use a Buying Hedge to protect against feedstock cost fluctuations. The hedge will be accomplished by buying corn futures in open market transactions on the Chicago exchange, or by buying future contracts for grain sorghum in the Kansas City exchange. The hedge is opened by buying futures contracts. In the event of any substantial price increases, the higher cost of the feedstock is offset by the profit made on the futures contract.

The hedging strategy, involving the timing and length of the forward contracts to be purchased will be developed on a weekly basis in planning and coordinating meetings that will be held with the grain supplier.

APPENDIX 1

Pending finalized contractual relationships for sale of the ethanol, the information contained in Appendix 1 is proprietary. Please contact Ultrasystems for further details.

APPENDIX 2

Pending finalized contractual relationships for the purchase of ethanol, the information contained in Appendix 2 is proprietary. Please contact Ultrasystems for further details.

APPENDIX 3

Western Feedlot Report, February 23, 1981, by
California Cattle Feeders Association

WESTERN FEEDLOT REPORT

SUBSCRIPTION PRICE \$120 PER YEAR;
PRICE OF ADDITIONAL SUBSCRIPTIONS ON REQUEST.

Compiled by

CALIFORNIA CATTLE FEEDERS ASSOCIATION

3040 10TH STREET, SUITE 6

BAKERSFIELD, CALIFORNIA 93301

Phone: (805) 327-3022

FEBRUARY 23, 1981

VOL. 30, No. 9

WEEKLY MEAT PRODUCTION AND LIVESTOCK SLAUGHTER

<u>PRODUCTION (MILLION POUNDS)</u>	<u>2/21/81</u>	<u>2/14/81</u>	<u>%CHG.</u>	<u>2/23/80</u>	<u>%CHG.</u>
Beef	390.7	411.7	- 5	351.2	+ 11
Calf/Veal	5.9	6.2	- 5	5.6	+ 5
Pork	230.0	257.8	- 3	277.9	+ 4
Total Red Meat	692.7	772.3	- 4	640.2	+ 8
<u>SLAUGHTER (THOUSAND HEAD)</u>					
Cattle	601	637	- 6	541	+ 11
Calves/Vealers	45	48	- 6	45	UNCH.
Hogs	1,670	1,715	- 3	1,642	+ 2
<u>AVERAGE WEIGHTS</u>	<u>LIVE</u>	<u>DRESSED</u>		<u>LIVE</u>	<u>DRESSED</u>
Cattle	1092	652		1096	652
Calves/Vealers	216	132		206	126
Hogs	244	174		238	169

PERCENTAGES OF TOTAL CATTLE SLAUGHTERED BY CLASS

WEEK ENDING	COWS	BULLS	HEIFERS	STEERS
2/09/80	17.2	1.9	27.5	53.4
1/31/81	19.8	2.0	27.9	50.3

THURSDAY, FEBRUARY 19, 1981, WHOLESALE DRESSED BEEF QUOTATIONS

CARLOT VOLUME		LOS ANGELES	SAN FRANCISCO
CARCASS STEER BEEF		LOCAL PRODUCTION	LOCAL PRODUCTION
Choice Y. G. 2	500-700#	\$110.00	---
" " " 2-3	500-700#	---	\$112.00-\$114.00*
" " " 3	500-700#	\$108.00	---
" " " 3	700-800#	\$104.00-\$106.00	\$102.00
" " " 2-3	700-800#	---	\$110.00-\$112.00*
" " " 3	700-900#	\$106.00	---
Good " " 2-3	500-700#	\$106.00	\$107.00(Select)
" " " 2-3	500-700#	---	\$106.00-\$109.00*
" " " 3	600-800#	\$100.00-\$104.00	\$100.00-\$102.00
CARCASS HEIFER BEEF			
Choice Y. G. 2-3	500-700#	\$97.00-\$100.00	\$110.00-\$112.00*
" " " 3	500-700#	---	\$100.00-\$101.00
Gppd " " 2-3	500-700#	---	\$108.00-\$110.00*
CARCASS COW BEEF			
Utility Brk. Y. G. 3-4	All Wgts.	\$82.00-\$83.00	\$83.00
" Bnr " " 1-3	" "	\$87.00-\$88.00	\$87.00-\$88.00
" Bnr/Brk Y.G. 2-3	" "	---	\$85.00-\$86.00
Cutter Y. G. 1-2	400# up	\$93.00-\$95.00	\$94.00-\$95.00
CALF (SKIN-ON)			
Mixed Good & Choice	200-325#	---	\$105.00 (grass)
" " " "	200-325#	---	\$109.00-\$110.00 (fed)
CALF (SKIN-OFF)			
Mixed Good & Choice	200-350#	\$138.00-\$154.00	----
BULL BEEF			
Yield Grade 1-2	800-1000#	---	\$107.00-\$109.00
" " 1-2	600-900#	\$103.00	---

*DISTRIBUTIVE

***SHIPPED IN

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APPENDIX 4

Pending finalized contractual relationships for the purchase of byproducts, the information contained in Appendix 4 is proprietary. Please contact Ultrasystems for further details.

APPENDIX 5

Pending finalized contractual relationships
for the purchase of grain, the information
contained in Appendix 5 is proprietary.
Please contact Ultrasystems for further details.

APPENDIX 6

Pending finalized contractual relationships for purchase of grain, the information contained in Appendix 6 is proprietary. Please contact Ultrasystems for further details.

IMPERIAL VALLEY ETHANOL REFINERY

U.S. ALCOHOL FUELS

PROJECT NUMBER 1013

APPENDIX 7

Grain Sorghum Market Data

Grain Sorghums

Page 1 of 2

The national average loan rate for 1980 crop grain sorghum is \$2.00 per bushel, and the target price is \$2.50 per bushel. (However, for those growers who exceed their normal crop acreage, the target price will be \$2.45 per bushel.

The reserve release price for sorghum is \$2.50 per bushel. The call price for sorghum entered into the reserve prior to January 7, 1980, is \$2.80 and for sorghum entered into the reserve after January 7, the call price is \$2.90 per bushel. The minimum price

at which the CCC can sell its inventory while the grain reserve is in operation (150 percent of current loan rates) is \$3.00 per bushel.

There are no set-aside or diversion requirements for 1980 feedgrain crops. Farmers who complied with the 1979 sorghum set-aside program were eligible to receive deficiency payments at the rate of 13 cents per bushel, representing the difference between the \$2.34 (revised) target price and the \$2.21 average market price.

Sallient Statistics of Grain Sorghums in the United States

Crop Year	Acreage Planted ^a for All Purposes 1,000 Acres	For Grain					For Silage			For Forage			Foreign Trade		
		Acreage Harv.	Pro- duction 1,000 Bushels	Yield Per Harv. Acre Bushels	Price Cents Per Bushel	Produc. Value 1,000 Dollars	Acreage Harv. 1,000 Acres	Pro- duction 1,000 Tons	Yield Per Harv. Acre Tons	Acreage Harv. 1,000 Acres	Pro- duction 1,000 Tons	Yield Per Harv. Acre Tons	Dom. Ex- ports Ths. Bushels	Imports for Con- sump- tion Ths. Bushels	
1969-0	17,231	13,437	729,919	54.3	107	771,510	798	9,360	11.7	2,600		3	3	105,510	5
1970-1	16,957	13,568	683,179	50.4	114	780,066	741	7,204	9.7	2,167				144,339	4
1971-2	20,756	16,142	867,997	53.8	105	904,748	1,011	10,998	10.9	2,675				103,915	—
1972-3	17,295	13,212	801,350	60.7	137	1,107,704	840	9,946	11.8	2,427				191,241	1
1973-4	19,231	15,700	923,224	58.8	214	1,995,150	836	9,520	11.4	2,093				244,314	21
1974-5	17,676	13,809	622,711	45.1	278	1,742,587	745	7,279	9.7	2,140				191,569	
1975-6	18,104	15,355	753,046	49.0	237	1,775,023	752	7,426	9.9	1,568				237,997	
1976-7	18,402	14,723	719,817	48.9	203	1,450,085	772	7,168	9.3	1,883					
1977-8	16,993	14,092	792,983	56.3	182	1,433,991	842	9,168	10.9	1,633					
1978-9 ¹	16,468	13,561	747,790	55.1	202	1,501,737	715	7,768	11.7	1,577					
1979-0 ¹	15,399	12,949	814,308	62.9	231	1,866,925	767	9,011		1,266					
1980-1 ¹	16,100														

¹ Preliminary. ² Grain and sweet sorghums for all uses including sirup. ³ Discontinued.
Source: Crop Reporting Board, U.S.D.A.

Production of All Sorghums for Grain in the United States, by States In Thousands of Bushels

Year	Iowa	Arizona	California	Colorado	Kansas	Missouri	Nebraska	New Mexico	No. Car-olina	Oklahoma	South Dakota	Texas	Arkansas
1970	1,771	11,410	21,460	10,000	145,960	12,826	75,480	15,456	2,756	23,310	8,398	329,616	
1971	8,700	9,417	21,016	9,600	233,550	47,700	123,420	20,474	6,240	23,400	12,250	303,004	
1972	2,460	8,346	17,424	10,030	217,000	26,980	118,080	19,305	4,400	20,855	13,536	319,780	
1973	1,606	7,992	20,090	9,100	218,400	30,800	136,000	19,602	4,292	26,400	11,266	417,000	
1974	736	8,580	15,120	7,685	132,800	23,750	62,700	11,000	4,320	19,080	5,616	312,000	6,720
1975	1,612	8,160	14,904	7,540	144,060	28,090	104,500	15,500	4,335	19,760	6,422	374,400	9,800
1976	1,690	6,643	14,910	7,252	169,850	39,600	119,700	11,940	4,590	16,950	3,496	292,900	15,500
1977	2,368	7,200	9,636	8,153	243,000	67,890	146,970	11,760	2,664	21,470	16,807	230,400	13,104
1978	1,800	5,694	13,135	8,680	209,040	68,000	137,250	12,282	4,472	17,460	17,000	227,850	12,000
1979 ¹	1,330	5,112	12,000	10,640	256,680	59,040	144,570	13,416	4,399	23,175	13,590	243,000	10,912

¹ Preliminary, December estimate. Source: Crop Reporting Board, U.S.D.A.

U.S. Exports of Grain Sorghums, by Country of Destination In Thousands of Bushels

Yr. Beg. October	Poland	Belg. & Luxem.	Portugal	Spain	Germany, West	India	Venezuela	Israel	Japan	Rep. of Korea	Netherlands	Norway	Mexico	United Kingdom	Total All Exports
1968-9	0	1,495		0	94	11,609		15,654	70,370	0	1,613	593	932	0	106,399
1969-0	0	6,444		0	11	104		21,177	83,908	0	5,702	0	1,078	0	125,444
1970-1	1,560	7,477		0	655	157		25,109	79,572	0	10,296	0	834	0	144,195
1971-2	—	390		—	1,284	298		19,863	68,069	1	5,155	—	6,629	2,475	122,932
1972-3	1,050	1,229		—	2,932	27,467		27,442	107,078	1,310	5,271	2,999	4,194	765	212,165
1973-4	1,000				2,100	12,100		23,100	117,700		22,300	3,800	10,600		234,100
1974-5	9,900	9,900		1,500	3,600	3,500		24,000	76,800		16,100	4,700	27,500	—	212,000
1975-6	22,700	18,900	6,300	3,000	3,100	19,600	16,300	25,600	88,000		13,500	4,400	1,600	700	229,000
1976-7	3,647	12,908	17,600	13,900	6	0	1,300	29,214	93,462		6,239	7,542	26,856	2,100	246,107
1977-8 ¹	15,090	3,427	16,100	10,100	10	—	11,500	24,956	96,051		264	4,988	18,423	100	213,490
1978-9 ²															207,000

¹ Preliminary. ² Estimate. Source: Grain & Feed Division, U.S.D.A.

From: Commodity Year Book 1980 (Commodity Research Bureau, Inc., New York, 1980).

FINANCIAL

TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
1.0	INTRODUCTION	1
2.0	PROJECT FINANCIAL PLAN	3
3.0	DESCRIPTION OF THE LENDER'S ORGANIZATION	11

TABLE OF FIGURES

<u>Number</u>		<u>Page</u>
1	FINANCING SCHEDULE	8

LIST OF APPENDICES

Number

- 1 Analysis of Profitability and Capital Structure of
 Proposed Refinery by Investment Banker
- 2 Limited Partnership Agreement
- 3 Financial Statements of General Partner
- 4 Correspondence From Price Waterhouse & Company
- 5 Institutional Lenders That Have Been Contacted By The
 Investment Banker
- 6 Resumes of Key Officials of Investment Banker

1.0 INTRODUCTION

1.1 Background

Ultrasonics, Incorporated has formed a California Limited Partnership, U.S. Alcohol Fuels, of which Ultrasonics will be the General Partner. The Partnership was established for the purpose of owning and operating the Project and has had no previous activity. The Partnership Agreement is enclosed as Appendix 2 to this Financial section of the Report. It is the intention of Ultrasonics to invest approximately \$1 million in the Partnership and to own approximately ten (10) percent of the interest of the Partnership. The financial statements of Ultrasonics, the General Partner, are included as Appendix 3 of this Financial section of the Report.

The financial statements of Ultrasonics have been examined by Price Waterhouse & Co. who will also be the independent accountants for the Partnership of U.S. Alcohol Fuels. The letter of engagement of Price Waterhouse & Co. to act as independent accountants of the Partnership is included as Appendix 4 to this Report.

The Limited Partnership has engaged Blyth Eastman Paine Webber, Incorporated as its Investment Banker for purposes of raising the necessary partnership equity and related permanent debt financing necessary for the construction and start-up of the Project.

1.2 Profitability of Proposed Project

The Investment Banker has undertaken a detailed analysis of the capital structure and potential profitability of the proposed Refinery. The results of these analyses are presented in Tables 1 through 9 which appear as Appendix 1 of this Financial section. A summary of the results of the profitability analysis are shown in Table 1 of Appendix 1. The equity investor payback period is estimated to be thirty-one (31) months, and the return on equity investment is expected to be thirty-six (36) percent.

1.3 Summary of Proposed Financing Plan

Based on total project costs of \$51,685,000, Blyth Eastman Paine Webber, Incorporated (the "Investment Banker") calculates that the total funds required to complete the financing, construction and start-up of the Project will equal \$71,611,000. The financing structure proposed by the Investment

Banker is equity capital equal to \$16,416,000 (approximately 22.9 percent of the total capitalization required, or 25 percent of aggregate project costs), and debt equal to \$42,357,000 (approximately 59.1 percent of the total capitalization required, or 75 percent of aggregate project costs). Interest earnings on construction funds, which are projected to equal \$8,534,000 (approximately 11.9 percent of the total capitalization required), will somewhat reduce the amount of debt and equity capital needed for the financing. Working capital for the Project will be provided under the terms of a separate working capital loan undertaken for that purpose with a commercial banking institution.

With respect to the equity portion of the financing, the equity capital will be contributed by a Partnership formed for the purpose of construction and operating the Project. Ultrasystems, Incorporated will serve as General Partner and will be responsible for construction and operating management of the Project on behalf of its own and the Limited Partners' interests in the Project. The Investment Banker will raise equity capital by marketing Limited Partnership investments to substantial individuals or institutional investors, enabling them to share in the anticipated cash flow, income and tax credits resulting from the Project. The liability of the General Partner with respect to the Project will be primary; the liability of the Limited Partners will be limited to their equity contribution to the Partnership.

With respect to the debt portion of the financing, U.S. Alcohol Fuels and the Investment Banker has applied to the Department of Energy under the DOE Geothermal Loan Guaranty Program to provide a 100 percent guarantee of the principal and accrued interest of the terms of a Security Purchase Agreement, and will be marketed to major institutional lenders (the "Lenders") as a long term, fixed rate investment. A major California commercial bank, as yet not selected, will serve as Trustee/Loan Servicer on behalf of the Lenders and the Guarantor, and will fulfill all usual responsibilities during the construction phase and operation of the facility.

2.0 PROJECT FINANCIAL PLAN

Assuming total project capital requirements of \$51,685,000, an analysis of which is presented in Table 3, the Project will be financed through contributions to equity equal to approximately 22.9 percent of total project capitalization, and approximately 59.1 percent through the issuance of long term debt, guaranteed by the DOE for 100 percent of the principal accrued interest. Table 2, Projected Sources and Uses Funds Statement, and Table 4, Allocation of Sources and Uses of Funds, both of which appear in Appendix 1, present a detailed description of the sources of funding for all of the costs of project development.

The equity portion of the financing will be contributed by U.S. Alcohol Fuels, a Partnership formed for the purpose of owning and operating the facility. Ultrasystems will be U.S. Alcohol Fuels' sole General Partner and will manage the facility on behalf of its interest in the Project and those of the Limited Partners. The Limited Partners will be individuals of substantial means, able to provide the "at risk" capital required to finance the Project and also be able to withstand the loss of same in the event of project failure. It is anticipated that each unit investment in the Limited Partnership will, in most cases, be greater than \$150,000, and that all potential limited partners will sign statements indicating their awareness of the risks involved in participating in this venture.

Blyth Eastman Paine Webber, Incorporated ("Investment Banker"), as investment banker to U.S. Alcohol Fuels, has indicated its ability and willingness to market equity participations (Limited Partnerships) in the Partnership to potential investors through its investor service activities. The Investment Banker is a wholly owned investment banking and security brokerage subsidiary of Paine Webber, Incorporated. The Investment Banker has structured and raised capital for approximately 400 limited partnerships during the last ten years, totaling over \$700 million in equity capital and over \$2.5 billion in total capital. The Investment Banker believes that Limited Partnerships in this Project will be sufficiently attractive and marketable investments because of the strong likelihood of positive cash flows from the

Project's operation, the availability of investment and energy tax credits, the presence of a 100 percent loan guarantee on the debt portion of the financing, and the generally heightened interest of investors in alternative energy ventures. The law firm of O'Melveny and Meyers, Los Angeles, California has been retained by the Investment Banker to advise both the Investment Banker and U.S. Alcohol Fuels as to the regulations affecting the formation and marketing of the limited partnerships which are anticipated to result from this financing. Based upon all of these factors, U.S. Alcohol Fuels is assured that equity capital will be raised to cover approximately 22.9 percent of projected capitalization, and that such equity will be available at the time the Guarantee Commitment is eligible for conversion to a Loan Guarantee.

With respect to the proposed allocation of risk among the General and Limited Partners, the General Partner will have management responsibility and primary liability with respect to the construction and operation of the Project. The liability of the Limited Partners will be limited to their equity investment in the partnership. With respect to the Limited Partners' financial statements and ability to contribute capital to the partnership, the Investment Banker believes the following:

First, the Investment Banker will be able to secure sufficient capital through the marketing of equity participations in a Limited Partnership formed with the purpose of funding and operating the proposed facility. Although it is not possible at this time to present financial statements for individuals purchasing the as yet to be marketed equity participations, the following information is provided, based upon the Investment Banker's past experience in structuring and marketing limited partnerships in oil and gas exploration ventures, conventional and historic rehabilitation real estate developments and equipment leasing partnerships. Based upon: (a) the availability of a 10 percent investment tax credit, a 10 percent energy tax credit for fuel alcohol equipment and a 15 percent energy tax credit for geothermal energy equipment; (b) the projected cash flows from the Project, and (c) the soundness of the Project's concept, design and plan of operation, the Investment Banker believes that limited partnerships in the proposed Project will be very attractive investments in comparison to typical limited partnership

investments of the types noted above. Therefore, the Investment Banker is confident that it will raise equity capital from prospective Limited Partners, subject to the Project receiving the loan guarantee discussed herein.

Second, the Investment Banker will market the equity participation only to investors: (a) whose business and investment experiences, either alone or together with a qualified investment representative (financial consultant, accountant, lawyer and/or other financial advisor), makes them capable of evaluating the merits and risks of their prospective investment in the Partnership; (b) who can afford to bear the economic risk of their investment for an indefinite period; and (c) who have no need for liquidity in this investment. The Limited Partnership will not be sold to any person unless the requirements described below are satisfied as to such person.

Each prospective investor will be required to represent that: (a) the investor has either: (i) a net worth (i.e. excess of total assets over total liabilities) of at least \$400,000 per Unit subscribed for, exclusive of home furnishings, automobiles, restricted securities and other assets which are not readily marketable, or (ii) an annual income of at least \$150,000 per Unit subscribed for and a net worth of at least \$300,000 per Unit subscribed for, exclusive of home, furnishings, automobiles, restricted securities and other assets which are not readily marketable; (b) the investor's overall commitment to investments which are not readily marketable is not disproportionate to his net worth, and the investment in the Limited Partnership will not cause such overall commitment to become excessive; (c) the investment has adequate means of providing for his current needs and personal contingencies and has no need for liquidity in his investment in the Limited Partnership; (d) the investor has substantial experience in making investment decisions of this type or is relying on his own tax advisor and/or other qualified investment representative in making the decision to invest in the Limited Partnership; and (e) any Limited Partnership subscribed for is being purchased for own account, for investment, and not with a view to resale.

The Investment Banker and the General Partner will require investors to complete a questionnaire relating to the suitability of the investment for them, will make or cause to be made such further inquiry as they deem appropriate, and will, in their discretion, determine which prospective investor or transferees may be admitted to the Partnership.

Finally, the Investment Banker's marketing offices will exercise great care in ensuring that all investors are able to withstand the potential loss of all or part of their investment and are thoroughly aware of the inherent risks of investing in the Project. The Investment Banker will require an "investment letter" from all Limited Partners, evidencing their understanding of the risks involved in their participation in the Project, and their financial ability to bear same.

With respect to the debt portion of the financing, the Investment Banker has assured U.S. Alcohol Fuels that, subject to the receipt of a commitment from DOE to provide a loan guarantee for 100 percent of the principal and accrued interest for the debt, it will underwrite the debt portion of the financing in its entirety, if necessary. The Investment Banker intends to place the debt with major investors as long term investments, having market rates of interest reflecting the 100 percent guarantee and the integrity of the fuel alcohol distillation process. The institutions listed in Appendix 5 have been contacted by the Investment Banker and have indicated their commitment to consider purchasing the debt of the project, subject to: (a) the receipt of the loan guarantee, as discussed herein; and (b) any additional terms and conditions included in that guarantee of which they are not presently aware.

Based upon the merits of the Project, the strength of a 100 percent guarantee of principal and interest by an agency of the United States, and its extensive pre-marketing efforts to date, the Investment Banker believes that it will be able to successfully place the debt portion of the financing, as discussed above.

Table 2, Projected Sources and Uses of Funds Statement, shows the precise amounts of the equity and debt portions of the financing. Table 4, Allocations of Sources and Uses of Funds, indicates clearly the project capital, organization, start-up and financing costs to which the equity and debt portions of the financing will be applied. Please note that the only uses to which the debt will be applied are for the costs of building, structures and equipment, and to the same's pro-rata shares of construction management, engineering, interest during construction, project contingency, escalation and financing costs. No debt capital will be used for working capital or

non-depreciable assets, which are payable solely from the proceeds of a working capital loan and the equity capital raised by the partnership.

2.2 Loan Agreements Pertaining to the Financing

The precise form of the loan agreement, the proposed repayment schedule and other terms and conditions of the debt financing will be negotiated with major institutional lenders at the time the debt financing is finalized and marketed. The Investment Banker anticipates that the form of the debt financing will be finalized and then marketed, subject to the provisions of a Security Purchase Agreement, subsequent to the receipt of a loan guarantee commitment from the Department of Energy.

For the purposes of completing the financing analysis and review of the Project, the Investment Banker has used the following terms which it believes are the prevailing projects of this type:

Total Amount of Debt Financing	\$47,357,000
Percentage Loan Guarantee Debt Requested to Total Debt	100 percent
Anticipated Loan Takedown	6-1-81
Anticipated Maturity of the Loan	1984/1996
Anticipated Interest Rate	15 percent
Anticipated Form of Principal Amortization	Mortgage Level

An anticipated financing schedule for the Project's debt and equity portions of the financing is presented in Figure 1, assuming the loan guaranty commitment is received under the terms substantively similar to those discussed in the Department of Energy's final rules of December 8, 1979. It should be noted that the schedule assumes the simultaneous placement of both equity and debt and that both are placed by means of private placement.

2.3 Assessment of Borrower's Loan Application

The financial analysis of the Project (Appendix 1) prepared by Blyth Eastman Paine Webber, Incorporated summarizes their examination of the operating economics and financing package for the Project. Based upon their knowledge of the fuel ethanol industry and their

FIGURE 1

Financing Schedule

<u>DAY</u>	<u>ACTION</u>
0	Applicant receives Conditional Commitment Letter from DOE
1	Draft begins of Private Placement Memoranda for equity and debt
30	First draft of Private Placement Memoranda completed and reviewed by Applicant and DOE
45	Amendments made to first drafts of Private Placement Memoranda
60	(1) Conditions outlined in Conditional Commitment Letter from DOE are constructively met (2) Final Private Placement Memoranda approved by Applicant and DOE
61	(1) Preliminary pricing of securities (2) Pre-sale effort begins
75	Final pricing date
78	Sale date and executive Security Purchase Agreements
89	Pre-closing
90	Closing

familiarity with the Applicant, they believe the project to merit consideration for a loan guaranty and they hereby indicate their willingness to work closely with the Department of Energy in structuring a loan guaranty for the debt portion of the Applicant's financing.

As Investment Banker to U.S. Alcohol Fuels, Blyth Eastman Paine Webber believes that the Project will require a 100 percent guarantee of the debt portion of the financing, requiring substantially the same form as that discussed herein, to obtain financing at reasonable rates of interest. It is the Investment Banker's opinion that a federal government loan guarantee is required to finance the Project at acceptable rates of interest for the following reasons:

First, the Investment Banker anticipates that the financing will be accomplished using project financing* techniques. As a result, the equity portion of the financing will be leveraged by a substantial amount of debt. The Investment Banker therefore anticipates that the balance sheet for the Project will show high debt-to-equity ratios in the first years of operation. Moreover, as the Project is a very substantial industrial venture in relation to the financial strength of U.S. Alcohol Fuels, the potential lenders to the Project will not have the comfort of an established and rated corporate credit underlying the debt. In view of the large amount of debt required in the financing, the high debt-to-equity ratio that will result and the absence of an established credit backing the Project, a loan guarantee by the United States government is considered of extreme importance to the acceptance of any debt capital by investors/lenders.

Second, in spite of the proven distillation process and feedstock handling technologies utilized in the Project and the favorable macro-economics of fuel alcohol production, the Investment Banker has found that institutional lenders are reluctant to commit capital to start-up ventures of any kind, particularly when associated with an "emerging" industry such as the domestic fuel ethanol industry.

* In general, a project financing can be defined as a transaction in which the lenders must depend principally on the cash flows and earnings generated by the operations of the project as the sole source of debt service payments and to the assets of the project as collateral for the loan. Project financings are frequently utilized in financing large energy and natural resource ventures.

In view of these risk factors which are perceived by major institutional lenders, it is the Investment Banker's opinion that debt capital for the Project would only be available, in the absence of a loan guarantee, at an extraordinarily high "penalty" rate of interest (i.e. prime + 200%), if at all. The Investment Banker notes that even rates at these high levels might be insufficient to induce lenders to commit capital to what they perceive to be very risky ventures. Further, even assuming that debt capital was available in the absence of a guarantee, the term of the debt would most likely not be in excess of five to seven years duration. Such short term maturities are one method used by institutional lenders to reduce the risk of their investment in "risk" securities. The amortization of the large amount of debt in such a short period of time would create a major obstacle to the financial viability of the Project. In addition, a maturity of seven years, which the Investment Banker has found to be the maximum obtainable without a loan guarantee, would be a period equal to 35 percent of the Project's conservatively calculated mechanical life. In summary, the effect of these inordinately stringent credit terms would be to render the Project virtually financially unfeasible.

Finally, the Investment Banker notes that the obvious financial strains caused by the credit terms noted above would severely impact its ability to raise the necessary equity for the Project. This is due to the increased risk to the equity investors of financial failure of the Project and the significantly reduced benefits if the Project survived.

2.4 Description of Management Plan of Servicing Agent

As noted earlier, servicing would be the responsibility of a California commercial bank, as yet not selected, serving as the Trustee. Essentially, the role of the trustee is to facilitate communication between U.S. Alcohol Fuels, the numerous bondholders and the guarantor. As legal representative of the bondholders and guarantor, it acts at all times for their protection and on their behalf.

The Trustee has three main responsibilities: (1) the Trustee certifies the issue of bonds. This duty involves making certain that all legal requirements for drawing up the bond contract and the indenture have been carried out; (2) the Trustee polices the behavior of the corporation in

its performance of the responsibilities set forth in the indenture provision; (3) the Trustee is responsible for taking appropriate action on behalf of the bondholders or guarantor if the corporation defaults on payment of interest or principal, or other provisions of the indenture/guarantee.

It is proposed that in the Ultrasystems, Incorporated financing, the Trustee will control and hold all funds raised through either debt or equity. It will thus act as Paying Agent throughout the construction period, making disbursements approved by the Company and the Engineers chosen to manage construction. Periodic reports will be made to the Department of Energy, on a schedule approved by the DOE.

After all funds have been disbursed, the Trustee may assume the role of Paying Agent for the principal and interest on the debt portion of the financing. This role may be performed by another paying agent; however, for purposes of simplicity it is anticipated that said role will be performed by the same Trustee.

The designated Trustee will need to meet the necessary SEC requirements through a filing of a Statement of Eligibility and Qualification. While Ultrasystems, Incorporated has yet to choose the specific Bank that will act as Trustee, there is no problem anticipated in making this selection, as it is a common and standard role in transactions of this type. Several large metropolitan banks in Los Angeles and San Francisco are under consideration.

The specific details and procedures involved with the Trustee will be clearly delineated in an Indenture based on the Trustee Indenture Act of 1939.

3.0 DESCRIPTION OF THE LENDER'S ORGANIZATION

3.1 Background

Blyth Eastman Paine Webber, Incorporated (BEPW) is one of the largest investment banking firms in the United States and is a leader in all phases of corporate, municipal, health care, international and real estate finance. BEPW is the successor to the investment banking business of Blyth Eastman Dillon & Company, Incorporated and Paine, Webber, Jackson & Curtis,

Incorporated and is a subsidiary of Paine Webber, Incorporated. Through its predecessor firms, BEPW traces its origin to 1864 and has a long tradition of innovation and creativity, having led the industry in the development of many new forms of financing and in the design of new types of securities.

BEPW employs in excess of 200 investment banking professionals, one of the largest staffs in the investment banking industry. In 1979, BEPW's predecessor firms managed, arranged or acted as financing advisor for financings in excess of \$23 billion. Of this amount, approximately \$10.5 billion was for corporate related tax-exempt financings, corporate real estate financings and international corporate financings.

3.2 Blyth Eastman Paine Webber's Experience in Project Financing

Blyth Eastman Paine Webber has in the past clearly demonstrated its capability to devise innovative financings to meet the requirements of its clients. Over the years, it has pioneered the development of several financing techniques which represent landmarks in the area of project financing. For example, BEPW assisted in the structuring and placement of:

- Over \$575 million of equity certificates and debt securities to finance on a leveraged lease/contract basis two coal-fired, steam electric generating stations (the largest lease financings of their kind ever arranged);
- Over \$400 million in short term construction financings arranged pursuant to "turnkey" contracts (the first of their kind and size ever arranged);
- Over \$200 million in lease financing for major projects in which a wholly-owned subsidiary of Blyth Eastman Paine Webber acted as owner/lessor; and
- Over \$75 million in external "credit supports" (i.e. lease guarantees, credit insurance and guarantees of commercial paper) used for the purpose of either (i) rendering the transaction financeable, or (ii) reducing the borrowing cost of the sponsors (the first of their kind ever arranged).

3.3 Key Personnel

Brief resumes of the key personnel of the Investment Banker who will be involved in this project financing are provided in Appendix 6 of this Finance section of the Report.

APPENDIX 1

ANALYSIS OF PROFITABILITY AND CAPITAL STRUCTURE

OF PROPOSED REFINERY BY INVESTMENT BANKER

TABLE 1

ULTRASYSTEMS IMPERIAL VALLEY ETHANOL PROJECT
MARCH 3, 1981

Economic Analysis Summary

Capital Structure

Equity	16,416,000
Debt Number 1	42,357,000
Debt Number 2	4,304,000

Cash Flow and Benefits

Total Cash Flow	375,692,000
After Tax Benefits	
(1) Total	183,850,000
(1) Discounted @ 9.0000%	46,941,000
(2) Discounted @ 12.0000%	33,383,000
(3) Discounted @ 15.0000%	24,055,000
Effective After Tax Yield	36.1422%

Equity Pay Back

31 Months

Table 2

ULTRA SYSTEMS, INC. IMPERIAL VALLEY FUEL ETHANOL PROJECTPROJECTED SOURCES AND USES OF FUNDS STATEMENT
(\$000's)Source of Funds

Equity (a)	\$16,416
Debt (100% Guaranteed) (b)	42,357
Working Capital Loan (b)	4,304
Interest Income (c)	8,534
	<u>\$71,611</u>

Uses of Funds

Project Capital Requirements (d)	\$51,685
Working Capital	4,304
Interest During Construction (e)	12,707
Financing Costs(f) Debt \$1,270	
Equity <u>1,645</u>	
	2,915
	<u>\$71,611</u>

Footnotes:

(a) Equity is 25.0% of estimated aggregate project costs.

(b) Debt Data:	<u>100% Guaranteed</u>	<u>Working Capital Loan</u>
Amount	\$42,357,000	\$4,304,000
Dated	6/1/81	3/1/83
Principal Due	1984-1996	1984-1986
Maturity Pattern	Mortgage Level	Mortgage Level
Interest Due	15%	20%

(c) Interest is earned on the construction fund from the date of loan takedown (6/1/81) to the projected "in-source" date (6/1/83), assuming a 15% interest rate and a lagged construction drawdown schedule.

(d) Project Capital Requirements, refer to Exhibit 1.3

(e) Interest During Construction is paid on the debt portion of the financing from date of loan takedown (6/1/81) to the projected "in-service" date (6/1/83) at interest rates indicated in footnote (b) hereof.

(f) Financing costs are equal to 3% of the debt and 10% of the equity portions of the financing.

Table 3

ULTRA SYSTEMS, INC. IMPERIAL VALLEY FUEL ETHANOL PROJECTPROJECT CAPITAL REQUIREMENTS

		(\$000's)
Site Preparation		\$ 1,322
Concrete		3,936
Structures		1,951
Buildings		3,456
Machinery and Equipment		
Feedstock Handling & Storage Equipment	\$	
Milo Milling Equipment		
Mash Preparation Equipment		
Fermentation Equipment		
Distillation Equipment		
Chemicals Receiving & Storage Equipment		
Product Storage Equipment		
Waste Treatment Equipment		
Geothermal Steam Production Equipment		
Equipment Installation Labor		
		<hr/>
		\$15,483
Piping		6,855
Electrical		2,309
Instrumentation		1,363
Painting & Insulation		566
Engineering, Procurement, Project Mgmt.		4,419
Construction Bond		500
Insurance During Construction		250
Contingency (10%)		4,166
Escalation (5%)		<hr/> 2,291
Subtotal		\$48,864
<u>Alcohol Fuels Performance Items</u>		
Process Licensing Fee	\$	
Startup Costs		
Legal Service Costs		
Accounting Service Costs		
Loan Guarantee Costs		
Permit Fees and Bond		
Engineering Services (Independent Consultant)		
Total Project Costs	<hr/> 2,821	\$51,685
Working Capital		4,304
Total Project Capital Requirements		<hr/> <hr/> \$55,989

Table 4

ULTRA SYSTEMS IMPERIAL VALLEY FUEL ETHANOL PROJECT

ALLOCATION OF SOURCES AND USES OF FUNDS
(\$000's)

	Land and Other Non- Depreciable Costs	Buildings	Structures and Equipment		Other		
			Alcohol Related	Non-Alcohol Related	Financing Costs (Debt)	Start-up Costs	Total
USES OF FUNDS							
Construction	\$	\$1,653	\$32,692	\$2,893	\$	\$	\$37,238
Engineering & Project Mgmt.		207	4,549	413			5,169
Interest During Construction		508	11,182	1,017			12,707
Project Contingency		167	3,666	333			4,166
Project Escalation		92	2,016	183			2,291
Financing Costs	1,645				1,270		2,915
Alcohol Performance Items	2,321						2,321
Start-up						500	500
Working Capital	4,304						4,304
TOTAL	<u>\$8,270</u>	<u>\$2,627</u>	<u>\$54,105</u>	<u>\$4,839</u>	<u>\$1,270</u>	<u>\$500</u>	<u>\$71,611</u>
SOURCE OF FUNDS							
Equity	\$3,966	\$ 478	\$10,516	\$ 956	\$ --	\$500	\$16,416
Debt	--	1,643	36,157	3,287	1,270	--	42,357
Working Capital Loan	4,304	--	--	--	--	--	4,304
Interest Income	--	506	7,432	596	--	--	8,534
TOTAL	<u>\$8,270</u>	<u>\$2,627</u>	<u>\$54,105</u>	<u>\$4,839</u>	<u>\$1,270</u>	<u>\$500</u>	<u>\$71,611</u>

Table 5

ULTRA SYSTEMS IMPERIAL VALLEY ETHANO: PROJECT
MARCH 3, 1981

MISCELLANEOUS INPUT DATA
(6000)

TAX ASSUMPTIONS

FEDERAL TAX RATE YEARS EFFECTIVE
00.0000% 1961-2005

EQUITY INSERTION

AMOUNT TIMING
16416. 6/ 1/1981

DEBT INFORMATION

NO	AMOUNT	RATE	DATED	CONSTANT
1	42357.	.15000	6/ 1/1981	.17911646
2	4364.	.20690	3/ 1/1983	.47472528

LOAN 1

NO	DATE	INTEREST	PRINCIPAL	DEBT SERVICE	BALANCE
1	6/ 1/1982	0.00	0.00	0.00	42357.00
2	6/ 1/1983	6353.55	0.00	6353.55	42357.00
3	6/ 1/1984	6353.55	1233.03	7586.58	41121.97
4	6/ 1/1985	6168.60	1417.99	7586.58	39705.99
5	6/ 1/1986	5955.90	1630.68	7586.58	38075.30
6	6/ 1/1987	5711.29	1875.29	7586.58	36200.01
7	6/ 1/1988	5435.00	2156.58	7586.58	34043.43
8	6/ 1/1989	5166.51	2480.07	7586.58	31563.37
9	6/ 1/1990	4734.50	2852.08	7586.58	28711.29
10	6/ 1/1991	4306.69	3279.89	7586.58	25431.40
11	6/ 1/1992	3814.71	3771.87	7586.58	21659.53
12	6/ 1/1993	3246.53	4337.65	7586.58	17321.88
13	6/ 1/1994	2598.28	4988.30	7586.58	12332.57
14	6/ 1/1995	1850.04	5736.55	7586.58	6597.03
15	6/ 1/1996	985.55	6597.03	7586.58	0.00

LOAN 2

NO	DATE	INTEREST	PRINCIPAL	DEBT SERVICE	BALANCE
1	3/ 1/1984	860.80	1182.42	2043.22	4304.00
2	3/ 1/1985	624.32	1418.90	2043.22	3121.58
3	3/ 1/1986	346.54	1702.68	2043.22	1702.68
					0.00

DEPRECIATION DATA

NO	AMOUNT	ACQUIRED	DEP METH	TYPE DR	LIFE	ITC
1	500.	6/ 1/1981	SL	-	0.00	5.00%
2	1279.	6/ 1/1981	SL	-	0.00	15.00%
3	2627.	6/ 1/1983	DB	-	1.50	10.00%
4	54105.	6/ 1/1983	DB	-	2.00	10.00%
5	4839.	6/ 1/1983	DB	-	2.00	10.00%

REVENUES/EXPENSES DATA SEE EXHIBIT 1.6

Table 6

ULTRA SYSTEMS IMPERIAL VALLEY FUEL ETHANOL PROJECTOPERATING ASSUMPTIONS(a)
(\$000's)

	Value per Unit (1983)	Units	Number of Units per. Annum	Value		Escalation
				1983	1984	
<u>Revenues</u>						
Ethanol	\$ 2.10	Gallon	14,980,000	\$ 15,729	\$ 33,975	8%
Animal Fodder	\$ 210	Ton	45,000	4,725	10,206	8%
Interest Income				(b)	(b)	
				<u>\$ 20,454</u>	<u>\$ 44,181</u>	
<u>Expenses</u>						
Milo	\$ 6.45	Hundredweight	3,040,000	\$ 9,804	\$ 21,177	8%
Chemicals & Enzymes	- - -	Various	- - -	1,670	3,610	8%
Plant Utilities	- - -	Various	- - -	1,393	3,010	8%
G&A				130	280	8%
Labor				737	1,592	8%
O&M				213	461	8%
Taxes & Insurance				717	1,549	8%
				<u>\$ 14,664</u>	<u>\$ 31,679</u>	

Table 7

ULTRA SYSTEMS IMPERIAL VALLEY ETHANOL PROJECT
MARCH 3, 1981

PRO-FORMA DERIVATION OF BENEFITS
(\$000)

-----FROM PROJECT-----							-----TO INVESTOR-----					
YEAR	PERIOD	REVENUES	OPERATING EXPENSES	INTEREST EXPENSE	PRINCIPAL PAYMENTS	CASH FLOW	CUMULATIVE CASH FLOW	INVESTMENT TAX CREDIT	CASH FLOW	TAX LIABILITY PAYABLE QTRLY	AFTER TAX BENEFIT	CUMULATIVE AFTER TAX BENEFITS
1981	1	5226.	0.	0.	0.	5226.	5226.	0.	5226.	3071.	2155.	2155.
1982	1	3232.	0.	0.	0.	3232.	8458.	0.	3232.	1828.	1404.	3559.
1983	1	20754.	14664.	6354.	0.	-264.	8194.	11305.	-264.	-15838.	15574.	15133.
1984	1	44466.	31679.	7214.	2415.	3097.	11292.	0.	3097.	-3267.	6364.	25497.
1985	1	47940.	34213.	6793.	2837.	4097.	15389.	0.	4097.	-1132.	5229.	30727.
1986	1	51758.	36950.	6296.	3333.	5178.	20567.	0.	5178.	876.	4301.	35028.
1987	1	55880.	39906.	5711.	1875.	8387.	28954.	0.	8387.	2775.	5612.	40640.
1988	1	60333.	43099.	5430.	2157.	9647.	38601.	0.	9647.	4360.	5289.	45928.
1989	1	65141.	46547.	5107.	2480.	11008.	49609.	0.	11008.	5899.	5109.	51037.
1990	1	70335.	50271.	4735.	2852.	12478.	62087.	0.	12478.	7429.	5050.	56086.
1991	1	75943.	54292.	4307.	3280.	14065.	76151.	0.	14065.	8978.	5099.	61175.
1992	1	82061.	58636.	3815.	3772.	15779.	91930.	0.	15779.	10573.	5206.	66381.
1993	1	88543.	63326.	3249.	4338.	17630.	109560.	0.	17630.	12760.	4970.	71251.
1994	1	95609.	68393.	2598.	4988.	19629.	129189.	0.	19629.	14729.	4910.	76161.
1995	1	103239.	73864.	1850.	5737.	21789.	150978.	0.	21789.	16464.	5324.	81485.
1996	1	111430.	79773.	990.	6597.	24121.	175099.	0.	24121.	18409.	5711.	87196.
1997	1	120381.	86155.	0.	0.	34226.	209324.	0.	34226.	20535.	13690.	100897.
1998	1	129953.	93047.	0.	0.	36946.	246270.	0.	36946.	22167.	14778.	115665.
1999	1	140375.	109491.	0.	0.	39883.	286153.	0.	39883.	23930.	15953.	131618.
2000	1	151587.	108530.	0.	0.	43056.	329210.	0.	43056.	25834.	17222.	148841.
2001	1	163695.	117213.	0.	0.	46483.	375692.	0.	46483.	27890.	18593.	167434.
TOTALS		1687851.	1201050.	64448.	46661.			11305.	375692.	208258.		

Table 8

ULTRA SYSTEMS IMPERIAL VALLEY ETHANOL PROJECT
MARCH 3, 1981

PRG-FORM: PROJECT OPERATING STATEMENT
(4000)

YEAR	PERIOD	REVENUES	OPERATING EXPENSES	INTEREST EXPENSE	DEPREC (FED)	DEPREC (STATE)	TAX INC (FED)	TAX INC (STATE)
1981	1	5226.	0.	0.	108.	0.	5118.	0.
1982	1	3232.	0.	0.	185.	0.	3047.	0.
1983	1	26754.	14664.	6354.	7291.	0.	-7555.	0.
1984	1	44406.	31679.	7214.	10958.	0.	-5445.	0.
1985	1	47940.	34213.	6793.	8921.	0.	-1857.	0.
1986	1	51759.	36950.	6296.	7051.	0.	1460.	0.
1987	1	55660.	39906.	5711.	5637.	0.	4625.	0.
1988	1	60333.	43099.	5430.	4538.	0.	7266.	0.
1989	1	65141.	46547.	5107.	3656.	0.	9832.	0.
1990	1	70335.	50271.	4735.	2950.	0.	12379.	0.
1991	1	75943.	54292.	4307.	2334.	0.	14961.	0.
1992	1	82001.	58636.	3815.	1930.	0.	17621.	0.
1993	1	88543.	63326.	3249.	702.	0.	21266.	0.
1994	1	95606.	69393.	2598.	85.	0.	24533.	0.
1995	1	103239.	73864.	1850.	85.	0.	27440.	0.
1996	1	111480.	79773.	990.	35.	0.	30682.	0.
1997	1	120391.	86155.	0.	0.	0.	34226.	0.
1998	1	129593.	93047.	0.	0.	0.	36946.	0.
1999	1	140375.	100491.	0.	0.	0.	39883.	0.
2000	1	151557.	108530.	0.	0.	0.	43056.	0.
2001	1	163695.	117213.	0.	0.	0.	46483.	0.
TOTALS		1687851.	1201050.	64448.	56415.	0.	365939.	0.

Table 9

ULTRA SYSTEMS IMPERIAL VALLEY ETHANOL PROJECT
MARCH 3, 1981

PRO-FORMA DEBT, DEPRECIATION AND TAX CREDIT DATA
(\$000)

YEAR	PERIOD	RESIDUAL	MORTGAGE BALANCE	DEPRECIABLE BASIS (ST)	RECAPTURABLE BASIS (ST)	DEPRECIABLE BASIS (FED)	RECAPTURABLE BASIS (FED)	CAPITAL OUTFLOW	INFLOWS	ITC RECAPTURE
1981	1	0.	42357.	0.	0.	9932.	9932.	0.	0.	0.
1982	1	0.	42357.	0.	0.	9748.	9748.	0.	0.	0.
1983	1	0.	46661.	0.	0.	64027.	67542.	0.	0.	11305.
1984	1	0.	44246.	0.	0.	53070.	61201.	0.	0.	11305.
1985	1	0.	41409.	0.	0.	44249.	53692.	0.	0.	11305.
1986	1	0.	38075.	0.	0.	37198.	45959.	0.	0.	7537.
1987	1	0.	36200.	0.	0.	31561.	38563.	0.	0.	7537.
1988	1	0.	34643.	0.	0.	27023.	31829.	0.	0.	3768.
1989	1	0.	31563.	0.	0.	23366.	26027.	0.	0.	3768.
1990	1	0.	28711.	0.	0.	20416.	21381.	0.	0.	0.
1991	1	0.	25431.	0.	0.	18033.	18033.	0.	0.	0.
1992	1	0.	21660.	0.	0.	16103.	16103.	0.	0.	0.
1993	1	0.	17322.	0.	0.	15401.	15401.	0.	0.	0.
1994	1	0.	12334.	0.	0.	15316.	15316.	0.	0.	0.
1995	1	0.	6597.	0.	0.	15232.	15232.	0.	0.	0.
1996	1	0.	0.	0.	0.	15196.	15196.	0.	0.	0.
1997	1	0.	0.	0.	0.	15196.	15196.	0.	0.	0.
1998	1	0.	0.	0.	0.	15196.	15196.	0.	0.	0.
1999	1	0.	0.	0.	0.	15196.	15196.	0.	0.	0.
2000	1	0.	0.	0.	0.	15196.	15196.	0.	0.	0.
2001	1	0.	0.	0.	0.	15196.	15196.	0.	0.	0.
1981	1	0.	42357.	0.	0.	9932.	9932.	0.	0.	0.

APPENDIX 2

Pending finalized contractual relationships with Limited Partners, the information contained in Appendix 2 is proprietary. Please contact Ultrasystems for further details.

 

IMPERIAL VALLEY ETHANOL REFINERY

U.S. ALCOHOL FUELS

PROJECT NUMBER 1013

APPENDIX 3

FINANCIAL STATEMENTS OF GENERAL PARTNER

REPORT OF INDEPENDENT ACCOUNTANTS

In our opinion, the accompanying consolidated balance sheet and the related consolidated statements of operations, of changes in financial position and of shareholders' equity present fairly the financial position of Ultrasystems Incorporated and its subsidiaries at January 31, 1981 and 1980, and the results of their operations and the changes in their financial position for each of the three years in the period ended January 31, 1981, in conformity with generally accepted accounting principles applied on a consistent basis after restatement for the change, with which we concur, in the method of accounting for the investment in a certain subsidiary as described in Note 5 to the consolidated financial statements. Our examinations of these statements were made in accordance with generally accepted auditing standards and, accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

Price Waterhouse & Co.
PRICE WATERHOUSE & CO.

Newport Beach, California
March 6, 1981

ULTRASYSTEMS INCORPORATED AND SUBSIDIARIES
CONSOLIDATED STATEMENT OF OPERATIONS

	Year Ended January 31		
	1979	1980	1981
Contract and Other Revenue:			
Contract Revenue (Notes 3, 4 and 5)	\$13,259,000	\$15,087,000	\$19,261,000
Equity in Net Income of Affiliated Company (Note 5)	60,000	110,000	67,000
	<u>13,319,000</u>	<u>15,197,000</u>	<u>19,328,000</u>
Costs and Expenses:			
Costs of Services and Products Sold	11,442,000	12,451,000	15,178,000
General and Administrative	2,141,000	2,184,000	2,516,000
Interest	204,000	215,000	93,000
	<u>13,787,000</u>	<u>14,850,000</u>	<u>17,787,000</u>
Income (Loss) Before Income Taxes and Extraordinary Item	(468,000)	347,000	1,541,000
Income Tax Provision (Note 9)	30,000	142,000	650,000
Income (Loss) before Extraordinary Item	(498,000)	205,000	891,000
Realization of Operating Loss Carry-Forward		205,000	
Net Income (Loss)	<u>\$ (498,000)</u>	<u>\$ 410,000</u>	<u>\$ 891,000</u>
Income (Loss) Per Share of Common Stock including Common Stock Equivalents:			
Before Extraordinary Item	\$(.19)	\$.08	\$.33
Extraordinary Item		.08	
Net Income (Loss)	<u><u>\$(.19)</u></u>	<u><u>\$.16</u></u>	<u><u>\$.33</u></u>
Number of Shares Used in Computing Per Share Data (Note 13)	<u>2,642,000</u>	<u>2,642,000</u>	<u>2,672,000</u>
Cash Dividend Declared Per Common Share			<u><u>\$.033</u></u>

See Accompanying Notes to Consolidated Financial Statements.

ULTRASYSTEMS INCORPORATED AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEET

	January 31	
	1980	1981
ASSETS		
Current Assets:		
Cash	\$ 376,000	\$ 169,000
Short-Term Investments at Cost which Approximate Market		1,100,000
Accounts Receivable (Notes 2 and 6)	3,006,000	2,722,000
Prepaid Expenses	182,000	249,000
Inventories (Note 6)	148,000	137,000
Total Current Assets	3,712,000	4,377,000
Equipment and Improvements, Net (Notes 2 and 10)	608,000	1,064,000
Investment in and Advances from Affiliated Company (Note 5)	(100,000)	58,000
	<u>\$4,220,000</u>	<u>\$5,499,000</u>
LIABILITIES AND SHAREHOLDERS' EQUITY		
Current Liabilities:		
Current Obligations under Capitalized Leases (Note 10)	\$ 54,000	\$ 56,000
Accounts Payable	1,658,000	1,381,000
Accrued Salaries and Related Expenses (Note 2)	893,000	1,133,000
Billings in Excess of Costs and Estimated Profits	329,000	
Cash Dividend Payable		93,000
Income Taxes Payable (Note 9)	3,000	652,000
Total Current Liabilities	2,937,000	3,315,000
Obligations under Capitalized Leases (Note 10)	170,000	147,000
Commitments and Contingencies (Note 11)		
Shareholders' Equity (Notes 8 and 13):		
Preferred Stock — \$1 Par Value; Authorized 1,000,000 Shares; None Outstanding		
Common Stock — No Par Value; Authorized 6,000,000 Shares; Outstanding 2,642,457 and 2,791,557 Shares	445,000	571,000
Retained Earnings	668,000	1,466,000
Total Shareholders' Equity	<u>1,113,000</u>	<u>2,037,000</u>
	<u>\$4,220,000</u>	<u>\$5,499,000</u>

See Accompanying Notes to Consolidated Financial Statements.

ULTRASYSTEMS INCORPORATED AND SUBSIDIARIES
CONSOLIDATED STATEMENT OF SHAREHOLDERS' EQUITY

	Common Stock		Retained Earnings	Total Shareholders' Equity
	Shares Issued			
	Number	Amount		
Balance at January 31, 1978	2,642,457	\$445,000	\$ 756,000	\$1,201,000
Net Loss			(498,000)	(498,000)
Balance at January 31, 1979	2,642,457	445,000	258,000	703,000
Net Income			410,000	410,000
Balance at January 31, 1980	2,642,457	445,000	668,000	1,113,000
Net Income			891,000	891,000
Exercise of Stock Options	57,000	34,000		34,000
Sale of Common Stock	92,100	92,000		92,000
Cash Dividend Declared			(93,000)	(93,000)
Balance at January 31, 1981	<u>2,791,557</u>	<u>\$571,000</u>	<u>\$1,466,000</u>	<u>\$2,037,000</u>

See Accompanying Notes to Consolidated Financial Statements.

ULTRASYSTEMS INCORPORATED AND SUBSIDIARIES
CONSOLIDATED STATEMENT OF CHANGES IN FINANCIAL POSITION

	Year Ended January 31		
	1979	1980	1981
Financial Resources were Provided by:			
Operations:			
Income (Loss) Before Extraordinary Item	\$ (498,000)	\$ 205,000	\$ 891,000
Depreciation and Amortization	188,000	227,000	191,000
Equity in Net Income of Affiliated Company	(60,000)	(110,000)	(67,000)
Deferred Income Taxes	(22,000)		
Working Capital Provided (Required) by Operations	(392,000)	322,000	1,015,000
Extraordinary Item		205,000	
Sale of Common Stock of Affiliated Company			50,000
Dividends from Affiliated Company	63,000		479,000
Advances from Affiliated Company		577,000	
Sale of Equipment and Improvements	29,000	12,000	10,000
Proceeds from Sale of Common Stock and Exercise of Stock Options			126,000
Proceeds from Long-Term Notes Payable	234,000		
	(66,000)	1,116,000	1,680,000
Financial Resources were Provided for:			
Purchase of Equipment and Improvements	86,000	380,000	657,000
Advances to Affiliated Company	54,000		620,000
Cash Dividend			93,000
Reductions of Long-Term Obligations		445,000	23,000
	140,000	825,000	1,393,000
Increase (Decrease) in Working Capital	\$ (206,000)	\$ 291,000	\$ 287,000
Working Capital Increase (Decrease) by Component:			
Cash	\$ (150,000)	\$ (259,000)	\$ (207,000)
Short-Term Investments			1,100,000
Accounts Receivable	1,429,000	(869,000)	(284,000)
Prepaid Expenses	25,000	23,000	67,000
Inventories		14,000	(11,000)
Deferred Taxes	(35,000)		
Note Payable under Credit Agreement	(620,000)	1,891,000	
Current Portion of Long-Term Debt	(36,000)	163,000	
Current Obligations under Capitalized Leases		(26,000)	(2,000)
Accounts Payable	(887,000)	(232,000)	277,000
Accrued Salaries and Related Expenses	102,000	(273,000)	(240,000)
Billings in Excess of Costs and Estimated Profit	(86,000)	(86,000)	329,000
Cash Dividend Payable			(93,000)
Income Taxes Payable	52,000	(55,000)	(649,000)
Increase (Decrease) in Working Capital	\$ (206,000)	\$ 291,000	\$ 287,000

See Accompanying Notes to Consolidated Financial Statements.

ULTRASYSTEMS INCORPORATED AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

NOTE 1 — Summary of Significant Accounting Policies

Consolidation

The consolidated financial statements include the accounts of Ultrasystems Incorporated and its wholly-owned subsidiaries (the Company). All significant intercompany transactions and balances have been eliminated in consolidation. The Company's interest in Energy and Environmental Research Corporation is accounted for on the equity method (Note 5).

Contract Revenue

The Company's revenue results principally from contracts in two major industry segments: energy-related engineering and construction and defense and space systems-related activities. The Company provides engineering and construction services to the petroleum, chemical, petrochemical and power-generating industries; and also provides professional engineering services to the United States Government related to research, development, design, testing and evaluation of complex weapon and space systems. Contract revenue is recognized as costs are incurred and include applicable fees or profit primarily in the proportion that costs incurred bear to estimated final costs.

The Company provides for all losses on contracts by a charge to income in the period in which they are first identified. Unbilled accounts receivable are stated at estimated realizable value and consist primarily of reimbursable costs of the prior month, retentions and costs and profits billable on contract completion or other specified events.

U. S. Government contract costs, including indirect expenses, are subject to audit and adjustment by negotiations between the Company and Government representatives. Contract costs have been agreed upon through fiscal year 1978. Contract revenue for the three years ended January 31, 1981 has been recorded in amounts which are expected to be realized upon final settlement.

Inventories

Inventories, principally raw materials, are stated at the lower of cost (first-in, first-out method) or market.

Equipment and Improvements

The cost of additions to equipment and improvements together with major renewals and betterments, is capitalized. Maintenance, repairs and minor renewals and betterments are charged to expense. When assets are sold or otherwise disposed of, the cost and related accumulated depreciation are removed from the accounts and any resulting gain or loss is recognized.

Depreciation of equipment and amortization of improvements are provided over the estimated useful lives of the assets, primarily using the straight-line method. The useful lives are three to ten years for equipment and the shorter of the useful lives or terms for leasehold improvements.

Income Taxes

Taxes are provided, at the appropriate rates, for all taxable items included in the statement of operations regardless of the period in which such items are reported for tax purposes. The principal timing difference arises from recognition of revenue for tax return purposes at the time of contract completion or billing entitlement rather than on the basis of percentage of completion which is used for financial statement purposes. Investment tax credits are recognized in the period in which the assets to which they relate are placed in service.

ULTRASYSTEMS INCORPORATED AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

Earnings Per Share

All share and per share information has been adjusted retroactively to reflect a three-for-one stock split effective March 2, 1981. Computations of earnings per share are based on the average shares of Common Stock outstanding increased by the net shares issuable on the assumed exercise of stock options using the treasury-stock method.

An active trading market for the Company's Common Stock does not exist; therefore, periodic determinations of fair value of the Common Stock are made by the Board of Directors.

NOTE 2 - Composition of Certain Financial Statement Captions

	January 31	
	1980	1981
Accounts Receivable:		
U.S. Government	\$ 770,000	\$1,303,000
Commercial	2,236,000	1,419,000
	<u>\$3,006,000</u>	<u>\$2,722,000</u>

Accounts receivable includes unbilled amounts of \$265,000 and \$471,000 at January 31, 1980 and 1981, respectively.

	January 31	
	1980	1981
Equipment and Improvements:		
Computer-Related Equipment	\$ 194,000	\$ 352,000
Machinery and Equipment	692,000	901,000
Transportation Equipment	84,000	139,000
Furniture and Fixtures	212,000	287,000
Leasehold Improvements	235,000	349,000
	<u>1,417,000</u>	<u>2,028,000</u>
Less Accumulated Depreciation and Amortization	<u>809,000</u>	<u>964,000</u>
	<u>\$ 608,000</u>	<u>\$1,064,000</u>
Accrued Salaries and Related Expenses:		
Salaries and Wages	\$ 338,000	\$ 373,000
Vacation	147,000	209,000
Performance Incentive	347,000	441,000
Pension and Profit Sharing Contribution	61,000	110,000
	<u>\$ 893,000</u>	<u>\$1,133,000</u>

ULTRASYSTEMS INCORPORATED AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

NOTE 3 — Business Segment Information

For purposes of analyzing and understanding the Company's financial statements, its operations have been classified into the following industry segments.

Engineering and Construction — Services provided in this area are principally associated with providing professional engineering and construction services to organizations engaged in the development and production of fuels, chemicals, and industrial goods.

Defense and Space Systems — Services provided in this segment are principally associated with engineering management and technical assistance to the U.S. Government related to military and space systems. The services provided relate to the definition and analysis of the requirements of such systems, the planning of the scope and content of the effort required to develop such systems, the conceptual design, operational analysis, development, production, deployment and test and evaluation of the systems.

Systems Engineering — Iran — Service, terminated in January 1979, provided in this area was systems engineering and computer analysis to the Government of Iran (Note 4).

ULTRASYSTEMS INCORPORATED AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

Industry segment information is as follows:

	Year Ended January 31		
	1979	1980	1981
Contract Revenues:			
Engineering and Construction	\$10,165,000	\$11,650,000	\$13,655,000
Defense and Space Systems	2,077,000	3,551,000	5,313,000
Systems Engineering — Iran	787,000	(315,000)	
Other	230,000	201,000	293,000
	<u>\$13,259,000</u>	<u>\$15,087,000</u>	<u>\$19,261,000</u>
Operating Profit (Loss):			
Engineering and Construction	\$ (317,000)	\$ 824,000	\$ 961,000
Defense and Space Systems	126,000	52,000	472,000
Systems Engineering — Iran	(56,000)	(353,000)	
	<u>(247,000)</u>	<u>523,000</u>	<u>1,433,000</u>
General Corporate (Expense) Income	(77,000)	(71,000)	134,000
Equity in Net Income of Affiliated Company (Note 5)	60,000	110,000	67,000
Interest Expense	<u>(204,000)</u>	<u>(215,000)</u>	<u>(93,000)</u>
Income (Loss) Before Income Taxes and Extraordinary Item	<u>\$ (468,000)</u>	<u>\$ 347,000</u>	<u>\$ 1,541,000</u>
Identifiable Assets:			
Engineering and Construction	\$ 3,459,000	\$ 2,808,000	\$ 2,407,000
Defense and Space Systems	678,000	1,061,000	1,575,000
Systems Engineering — Iran	392,000		
	<u>4,529,000</u>	<u>3,869,000</u>	<u>3,982,000</u>
Investment in Net Assets of Affiliated Company	420,000	(100,000)	58,000
Corporate	740,000	451,000	1,459,000
	<u>\$ 5,689,000</u>	<u>\$ 4,220,000</u>	<u>\$ 5,499,000</u>
Depreciation and Amortization Expense:			
Engineering and Construction	\$ 147,000	\$ 176,000	\$ 119,000
Defense and Space Systems	39,000	48,000	65,000
Corporate	2,000	3,000	7,000
	<u>\$ 188,000</u>	<u>\$ 227,000</u>	<u>\$ 191,000</u>
Capital Expenditures:			
Engineering and Construction	\$ 66,000	\$ 84,000	\$ 351,000
Defense and Space Systems	20,000	296,000	206,000
Corporate			100,000
	<u>\$ 86,000</u>	<u>\$ 380,000</u>	<u>\$ 657,000</u>
Contract Revenue from Federal Government Contracts and Subcontracts	<u>27%</u>	<u>35%</u>	<u>34%</u>

ULTRASYSTEMS INCORPORATED AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

NOTE 3 — Business Segment Information (continued)

Segment operating results reflect most general corporate expense allocations because all such expenses are allocated to individual cost objectives by the Company as required by Government Cost Accounting Standards. Identifiable assets by segment consist principally of accounts receivable, inventories and equipment and improvements. The Company's foreign operations and its revenue attributable to foreign customers other than Iran are insignificant.

NOTE 4 — Iranian Contract

Because of civil, political and economic conditions, a contract to provide systems engineering support to ISIRAN, an agency of the Iranian Government, was mutually terminated effective January 31, 1979. A settlement invoice for approximately \$655,000, representing amounts claimed under the terms of the terminated contract, was presented and approved for payment by ISIRAN on February 18, 1979. The claim included termination compensation and related amounts aggregating \$260,000. Because of the long period of time in which the invoice had gone unpaid and the profound uncertainty as to when payment would be received in the future, the Company elected to charge to operations in fiscal year ended January 31, 1980, the remaining amount of receivables, net of obligations to ISIRAN (\$315,000). On November 24, 1980, the Company filed suit against the Government of Iran in the United States District Court, Central District of California, for payment of its settlement invoice of \$655,000 plus interest thereon from February 18, 1979. Under the terms of the agreements entered into between the U.S. Government and the Government of Islamic Republic of Iran on January 19, 1981, pursuant to the release of the American hostages, the Company's suit may be stayed or otherwise affected. At the present time, it is not possible to determine whether the Company will be able to proceed with its litigation in the U.S. Courts, pursue its claims before the Arbitral Tribunal established by the Algerian Declarations or be relegated to the Iranian courts. Management and its legal counsel are awaiting further clarification in U.S. courts as to the constitutionality and the interpretations of the agreements. Management can give no assurance that any amount of the settlement invoice will ultimately be collected.

NOTE 5 — Energy and Environmental Research Corporation

During fiscal year 1978, the Company organized Energy and Environmental Research Corporation (EERC) as a wholly-owned subsidiary to conduct contract research and development for the Environmental Protection Agency relative to the use of alternative fuels in an environmentally acceptable way. At the time of its formation, the Company granted an option to the two principal executives of EERC to purchase two-thirds of the outstanding common stock of EERC for a purchase price equal to two-thirds of its net worth as of the close of business September 30, 1979. The executives exercised their option on October 1, 1979, and effective February 1, 1980, the Company sold two-thirds of its investment in the common stock of EERC to the executives. For the three fiscal years through January 31, 1980, the Company consolidated the financial statements of EERC in its consolidated financial statements. The accompanying consolidated financial statements of the Company have been restated retroactive to February 1, 1977, to account for the Company's investment in EERC using the equity method of accounting. The financial statements for fiscal year 1981 also include the Company's remaining 33 1/3% investment in EERC using the equity method. The Company believes that the foregoing restatement was required to render the consolidated financial statements more informative and to recognize the temporary nature of its majority ownership of EERC. Summary results of operations of EERC for each of the four fiscal years in the period ending January 31, 1981, and the financial position of EERC as of January 31, 1978, 1979, 1980 and 1981, are as follows:

ULTRASYSTEMS INCORPORATED AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

NOTE 5 - Energy and Environmental Research Corporation (continued)

	Year Ended January 31			
	1978	1979	1980	1981
Contract Revenue	\$1,791,000	\$2,467,000	\$4,028,000	\$5,679,000
Costs and Expenses:				
Costs of Services Sold	1,504,000	2,090,000	3,399,000	4,695,000
General and Administrative	225,000	274,000	416,000	587,000
Interest				40,000
	<u>1,729,000</u>	<u>2,364,000</u>	<u>3,815,000</u>	<u>5,322,000</u>
Income Before Income Taxes	62,000	103,000	213,000	357,000
Income Taxes:				
Federal	27,000	34,000	84,000	122,000
State	5,000	9,000	19,000	34,000
	<u>32,000</u>	<u>43,000</u>	<u>103,000</u>	<u>156,000</u>
Net Income	<u>\$ 30,000</u>	<u>\$ 60,000</u>	<u>\$ 110,000</u>	<u>\$ 201,000</u>
Percentage Owned by the Company	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>33 1/3%</u>

	January 31			
	1978	1979	1980	1981
Current Assets	\$ 480,000	\$ 702,000	\$ 845,000	\$1,241,000
Equipment and Improvements, Net	96,000	58,000	20,000	106,000
Advances to the Company	131,000	77,000	654,000	
	<u>\$ 707,000</u>	<u>\$ 837,000</u>	<u>\$1,519,000</u>	<u>\$1,347,000</u>
Current Liabilities	\$ 259,000	\$ 392,000	\$ 965,000	\$1,069,000
Shareholders' Equity:				
Common Stock	418,000	418,000	418,000	75,000
Retained Earnings	30,000	90,000	136,000	682,000
Dividend Paid to the Company		(63,000)		(479,000)
	<u>448,000</u>	<u>445,000</u>	<u>554,000</u>	<u>278,000</u>
	<u>\$ 707,000</u>	<u>\$ 837,000</u>	<u>\$1,519,000</u>	<u>\$1,347,000</u>

NOTE 6 - Notes Payable

The Company has an agreement with a bank for a maximum revolving line of credit of \$1,900,000. Loans under the line are evidenced by notes secured by accounts receivable and inventories and which require monthly payments of interest at the bank's prime rate (20% at January 31, 1981). Further, the Company has agreed to maintain a compensating balance equivalent to 5% of its unused revolving credit agreement commitment plus 10% of its usage.

The bank agreement requires that the Company maintain minimum net worth, working capital and current ratio, and a maximum debt-to-net worth ratio. Such agreement also prohibits the sale of assets without the prior consent of the bank. The Company had either complied with the terms of the agreement at January 31, 1981, or has obtained waivers from the bank.

ULTRASYSTEMS INCORPORATED AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

NOTE 7 - Pension and Profit Sharing Plans

Effective January 1, 1975, the Board of Directors adopted a purchase money insurance retirement plan for substantially all of Ultrasystems' employees. Permanent employees of a subsidiary participate in a profit sharing plan to which annual contributions are made based on determinations by the Board of Directors. The total pension and profit sharing expense for the year ended January 31, 1979, 1980 and 1981 was \$52,000, \$67,000, and \$137,000, respectively. The Company's policy is to fund pension costs accrued.

NOTE 8 - Stock Option and Incentive Compensation Plans

Pursuant to terms of a Qualified Stock Option Plan, the Company granted options to purchase shares of Common Stock to key employees at prices not less than fair value at dates of grant. Options were granted for periods not to exceed five years, and dates of exercise have been determined by the Board of Directors.

The Company makes no charges to income in connection with the Plan, and, when options are exercised, Common Stock is credited with the amount of the proceeds. The Qualified Stock Option Plan expired effective April 30, 1980.

A summary of changes in outstanding options under the Plan follows:

	Number of Shares	Price Per Share	Aggregate Amount
January 31, 1978	61,575	\$.58-\$1.00	\$ 52,000
Canceled	(10,800)	\$1.00	(11,000)
January 31, 1979	50,775	\$.58-\$1.00	41,000
Granted	57,000	\$.58-\$1.00	37,000
Canceled	(9,000)	\$1.00	(9,000)
January 31, 1980	98,775	\$.58-\$1.00	69,000
Canceled	(14,775)	\$1.00	(15,000)
Exercised	(57,000)	\$.58-\$1.00	(34,000)
January 31, 1981	<u>27,000</u>	\$.58-\$.75	<u>\$ 20,000</u>

At January 31, 1981, no further shares were available for grant and options for 27,000 shares were exercisable. All per-share data have been restated for the 3-for-1 stock split effected on March 2, 1981.

Certain officers and key employees of the Company and subsidiaries participate in a performance incentive compensation plan whereby bonuses are paid on a discretionary basis. The maximum bonus paid is determined under a formula based on net income. Bonus expense under this arrangement for fiscal years ending January 31, 1979, 1980 and 1981, aggregated approximately \$83,000; \$335,000; and \$424,000, respectively.

ULTRASYSTEMS INCORPORATED AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

NOTE 9 – Income Taxes

The provision for taxes on income includes the following:

	Year Ended January 31		
	1979	1980	1981
Federal	\$ (9,000)		\$ 632,000
State	(7,000)	\$ 21,000	119,000
Foreign	36,000		
Charge in Lieu of Federal Tax		121,000	
Investment and Job Tax Credits	10,000		(101,000)
	<u>\$ 30,000</u>	<u>\$ 142,000</u>	<u>\$ 650,000</u>
Currently Payable (Receivable)	\$ 30,000		\$ 134,000
Deferred		\$ 142,000	516,000
	<u>\$ 30,000</u>	<u>\$ 142,000</u>	<u>\$ 650,000</u>

The charge in lieu of Federal tax represents the amount that would have been payable in the absence of operating loss carry-forwards. For fiscal years ended January 31, 1979 and 1980, the Company elected to carryforward federal tax net operating losses of \$304,000 and \$1,143,000, respectively, to subsequent years. These net operating losses were fully utilized to offset taxable income for fiscal year ended January 31, 1981.

At January 31, 1981, income taxes payable included deferred income taxes of \$468,000 resulting from timing differences in the recognition of income and expense for tax and financial statement purposes.

The primary reasons for differences between the Federal income tax rate and the Company's effective income tax rate for the two years ended January 31, 1981, are as follows:

	Year Ended January 31	
	1980	1981
Provision for Federal Income Taxes Computed at Applicable Statutory Rate	\$159,000	\$709,000
Increase (Decrease) in Provision Resulting From:		
State Income Taxes, Net of Federal Benefit	11,000	64,000
Equity in Net Income of Affiliated Company	(51,000)	(31,000)
Investment Tax Credits		(62,000)
New-Jobs Tax Credit		(23,000)
Other	23,000	(7,000)
	<u>\$142,000</u>	<u>\$650,000</u>

NOTE 10 – Obligations Under Capital Leases

Obligations under capital leases represent the present value of future rental payments to be made to a bank for leased data processing equipment. Upon payment of the required rentals, the Company has the option to either extend the leases or purchase the equipment at the then fair value. The equipment is being depreciated using the straight-line method over its useful life.

ULTRASYSTEMS INCORPORATED AND SUBSIDIARIES

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

NOTE 10 - Obligations Under Capital Leases (continued)

Following is a schedule by year of future minimum lease payments under the capital lease obligations together with the present value of the net minimum lease payments as of January 31, 1981:

Fiscal Years Ending January 31:	
1982	\$ 69,000
1983	58,000
1984	52,000
1985	52,000
1986	2,000
Total minimum lease payments	233,000
Less amount representing interest	30,000
Present value of net minimum lease payments	<u>\$203,000</u>

At January 31, 1981, approximately \$291,000 was included in equipment and improvements and \$95,000 was included in accumulated depreciation related to assets acquired under capital leases.

NOTE 11 - Commitments and Contingent Liabilities

The Company occupies most of its facilities and rents various equipment under non-cancelable operating leases requiring minimum annual rental payments. Rental expense was \$461,000 for the year ended January 31, 1979; \$438,000 for 1980; and \$540,000 for 1981.

Minimum rentals for fiscal years ended January 31 are as follows:

1982	\$ 680,000
1983	617,000
1984	578,000
1985	562,000
Total minimum rentals	2,437,000
Less minimum rentals under subleases	256,000
	<u>\$2,181,000</u>

A former employee working in Iran filed an action against the Company in February 1978 alleging termination without proper cause. In the opinion of management, based in part on advice of legal counsel, this matter will not have a material adverse effect on the financial position or results of operations of the Company.

NOTE 12 - Supplementary Income Statement Information

The following items are included in costs and expenses:

	Year Ended January 31		
	1979	1980	1981
Maintenance and Repairs	\$179,000	\$171,000	\$204,000
Taxes, Other than Income Taxes:			
Property	35,000	28,000	28,000
Payroll	418,000	463,000	535,000

Inventories at January 31, 1978 and 1979 were \$113,000 and \$115,000, respectively.

NOTE 13 — Subsequent Events

Effective March 2, 1981 the Company's shareholders approved an increase in the number of shares of authorized Common Stock from 3,000,000 to 6,000,000 and a three-for-one split of the Common Stock. The financial statements give retroactive effect to these actions.

Also, effective February 28, 1981, the shareholders approved the adoption of nonqualified stock option plan (1981 Plan). Under the 1981 Plan, a maximum of 300,000 shares of Common Stock are reserved for issuance upon the exercise of nonqualified stock options which may be granted at prices not less than market value. The terms of the nonqualified options may not exceed five years from the date of grant.

APPENDIX 4

Pending finalized contractual relationships, the information contained in this appendix is proprietary. Please contact Ultrasystems for further details.

THE
OFFICE OF THE
ATTORNEY GENERAL
STATE OF NEW YORK
ALBANY

APPENDIX 5

Pending finalized contractual relationships, the information contained in this appendix is proprietary. Please contact Ultrasystems for further details.

IMPERIAL VALLEY ETHANOL REFINERY

U.S. ALCOHOL FUELS

PROJECT NUMBER 1013

APPENDIX 6

RESUMES OF KEY OFFICIALS OF INVESTMENT BANKER

Resumes of Key Officials of the Lender

Roy C. Turney

Managing Director - Corporate Finance Department

Los Angeles, California

Mr. Turney has been involved in the major financing for many of the larger corporations in the country since his graduation from Colgate University in 1941. In addition to his BA degree, he attended the University of California at Los Angeles where he attended classes in securities analysis and securities law as well as investment banking. His employment with Blyth Eastman Paine Webber has included 14 years as a Registered Representative and 20 years as a Vice President in the Investment Banking Department. Much of Mr. Turney's experience has been with companies in the energy field, and he has been active in project financing for oil and utility companies. During his 20 years as an investment banker, he also has been involved in the merger and acquisition area.

A. Hardy Eubanks, III

Vice President, Public Finance Department

New York, New York

Mr. Eubanks has been intimately involved in the administration and financing of public agencies since his graduation from North Texas State University (BBA - Banking and Finance) in 1965. Mr. Eubanks' experience includes not only senior responsibility as an investment banker, but executive decision-making for a major public agency. Prior to joining Paine Webber in 1978, his professional experience included two years as a municipal bond analyst, eight years as an investment banker to local governments and three years as a senior administrator (Acting General Manager and Chief Financial Officer) of the Texas Municipal Power Agency. Mr. Eubanks' prior involvement in the investment banking business included underwriting, financial advisory, trading, sales and private placements for a diverse strata of municipal issuers for all public purposes (such as education, utilities, entertainment, air and surface transportation, environmental, health care, etc.). As Chief Financial Officer of the Texas Municipal Power Agency, Mr. Eubanks acquired an understanding of the complexities facing an issuer. During his tenure with the TMPA, he was responsible for all non-technical functions of the agency and was centrally involved in its creation, legislation, organization and funding efforts. Additionally, Mr. Eubanks has served on the Finance Sub-Committees of the American Public Power Association, been a guest speaker on finance at many national, regional and local seminars (particularly in the area of joint-action public power) and is a member of major professional associations.

Jeffrey R. Zilka

Associate, Public Finance Department

New York, New York

Mr. Zilka has been involved in a wide range of corporate and tax-exempt financings for energy clients since joining the firm in 1979. Prior to his association with Blyth Eastman Paine Webber, he was employed as a commodity and foreign exchange trader with a British commodities house and was then associated with a major American commodities exchange as a financial futures specialist. Mr. Zilka holds a B.S. in Economics from Cornell University and an M.B.A. in finance from New York University.

MANAGEMENT

TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
1.0	ORGANIZATIONAL STRUCTURE AND ASSOCIATED FIRMS	1
2.0	MANAGEMENT PERSONNEL	1
3.0	U.S. ALCOHOL FUELS ORGANIZATIONAL CHART	2

1.0 ORGANIZATIONAL STRUCTURE AND ASSOCIATED FIRMS

The Imperial Valley Ethanol Refinery will be owned and operated by U.S. Alcohol Fuels, a California limited partnership whose General Partner will be Ultrasystems, Incorporated (Ultrasystems). The ownership of the Refinery is structured in the manner of a partnership in order to accommodate the raising of equity capital by allowing partners to utilize available energy and investment tax credits associated with the Project. Ultrasystems, Incorporated, as the General Partner, will receive five (5) percent of the ownership of the partnership. In addition, Ultrasystems will invest \$1 million (subject to the approval of the loan guarantee) for an additional six (6) percent equity in the partnership. The specifics of the organizational structure are treated in the Partnership Agreement, which has been included in Appendix 2 of the Finance section of the Report.

In order to avoid the appearance of a conflict of interest during the period of the engineering, procurement and construction of the Project, the limited partnership will engage an independent engineering organization to oversee the engineering and construction of the Project by Ultrasystems Engineers and Constructors, Incorporated. It is contemplated at this time that the independent engineering organization will be directly responsible to the General Partner, and will have guaranteed access to the Limited Partners should the need arise.

2.0 MANAGEMENT PERSONNEL

The Partnership has engaged Blyth Eastman Paine Webber as its Investment Banker, as described in the Finance section. Price Waterhouse & Co. will be the independent accountants. Gibson Dunn & Crutcher has agreed to serve as its legal counsel. Alexander & Alexander will be handling all risk management functions as its insurance agent. Bank of America will act in the capacity of its primary bank.

It is the intention of the General Partner to appoint Dr. James L. Prouty as the Acting President and Chief Operating Officer of U.S. Alcohol Fuels during the engineering and construction phase and to consider his appointment as President and Chief Operating Officer upon successful start-up of the plant. To the extent that Dr. Prouty is not appointed the President and

Chief Operating Officer, the General Partner will undertake, through a nationally recognized executive search firm, to locate an individual with comparable qualifications and experience.

Prior to successful start-up of the Refinery, the marketing, sales and accounting functions will be maintained by the staff of the General Partner's organization. Several months prior to the successful start-up of the Refinery, the President and Chief Operating Officer of U.S. Alcohol Fuels will appoint the management team members who are responsible for finance, sales, purchasing and plant operating functions.

The other key individuals of the staff are the Plant Manager, Chief Chemist, and Production Superintendent. The Plant Manager will have a technical degree, preferably a B.S. in Chemical Engineering, and extensive process operation experience in dealing with both the technical and personnel problems of such operations. The Chief Chemist will be responsible for the overall technical operation and quality control. He will have a B.S. degree in Chemistry or Chemical Engineering. He will have experience in operation of a process control laboratory with experience in integrating the lab work with the plant operation. Alternatively, he can be a Process Engineer who has worked in chemical plants "trouble shooting" the process. The Production Superintendent is responsible for the proper operation and maintenance of the physical plant. He will have a B.S. in Mechanical Engineering with experience supervising maintenance mechanics.

3.0 U.S. ALCOHOL FUELS ORGANIZATIONAL CHART

Table 1, the organization chart of U.S. Alcohol Fuels, follows, along with the resumes of Phillip J. Stevens, Chairman of the Board of Ultrasystems, Incorporated, and Dr. James L. Prouty.

Table 1

ORGANIZATIONAL CHART

U.S. ALCOHOL FUELS, A LIMITED PARTNERSHIP

Phillip J. Stevens . . . *President and Chief Executive Officer
Ultrasystems, Incorporated*

Mr. Stevens founded Ultrasystems, Inc. in February of 1969 and has served as the President and Chairman of the Board of the company since its date of incorporation.

He is a graduate of the University of California at Los Angeles, where he received both his Bachelor of Science and Master of Science degrees in Engineering.

Mr. Stevens has 29 years of experience in the fields of management, engineering design, and construction related to the design, fabrication, and construction of complex mechanical equipment, including oil refineries, steam plants, power plants, missile structures and other sophisticated types of equipment. His construction experience ranges from being a boilermaker, while employed at Southwest Welding and Manufacturing Company in Alhambra, California prior to his college career, to serving as the Responsible Managing Officer and holder of the company's engineering and contracting licenses with the State of California. As part of his broad engineering and management background, he has extensive experience related to the management, design, development, test and deployment of complex weapon systems.

During the past 12 years, he has been directly responsible for the growth and development of Ultrasystems, Inc., from a small group of technical specialists into a substantial \$20,000,000 business enterprise which has become known nationally and internationally for its exceptional engineering and managerial capabilities in the fields of energy-related engineering and construction, as well as in the fields of defense and space systems. Relative to the company's energy-related activities, Mr. Stevens anticipated the boom in the synthetic fuel business, and organized, staffed, and successfully built Ultrasystems into the leading engineering and construction company in the western region of the United States involved with the design and construction of ethanol synfuel refineries.

His extensive background in the defense and aerospace business has been instrumental in leading the company's growth in this important area of business. In this regard, prior to forming Ultrasystems, Inc. in 1969. Mr. Stevens served in a senior management capacity at TRW Systems, Inc. During the 12½ years he was at TRW Systems, he served as Director of the Minuteman III Weapon System; Associate Director of the Minuteman

Program, Director of Weapon System Project Management, Director of Minuteman Propulsion, as well as other positions of significant responsibility and involvement in the billion-dollar-a-year Minuteman Weapon System program.

Mr. Stevens is the holder of several patents for innovative concepts in the field of weaponry. He is also the recipient of numerous awards, including the Air Force Outstanding Achievement Award for "his technological and managerial excellence", and the Air Force Commander's Award for his leadership and skill in managing the Minuteman Weapon System. He is also the recipient of important philanthropic awards, including the highest civilian award issued by the U.S. Department of Interior, the Conservation Service Award; and the Jay Silverheels Award presented to him by the American Indian community for outstanding service to the nation's American Indians.

James L. Prouty . . . *Senior Vice President and Director
Alcohol Fuel Programs*

Dr. Prouty earned his Ph.D. in Bacteriology from Iowa State University. His Ph.D. program specialized in the genetics and physiology of microorganisms and his thesis was the result of an investigation into the effect of growth rate and nutrient concentration on the deoxyribonucleic acid (DNA) composition of select microorganisms. In addition to his Ph.D. program, Dr. Prouty has conducted research in several areas of biotechnology, namely, Microbial Genetics, Molecular Biology and Radiation Biology. His undergraduate and Master of Arts degrees were in Biology from Drake University.

Dr. Prouty is a full member of the American Institute of Chemical Engineers, American Chemical Society, Society for Industrial Microbiology, New York Academy of Sciences, Sigma Xi, and the Institute of Food Technology. In addition, he belongs to the Midwest Planning Association which is a high level management organization concerned with developing corporate strategies to enhance business opportunities.

Prior to joining Ultrasystems, Dr. Prouty was employed by Davy McKee Corporation serving first as a Staff Specialist to utilize his broad background and depth of experience in plant operations to lead in the basic process design development of commercial microbial and biochemical processes. With the recent liquid fuel shortage and the realization that fermentation ethanol could be an extender of liquid fuels, Dr. Prouty was assigned the major responsibility for developing the basic design criteria for fuel alcohol fermentation methods. This resulted in energy efficient methods for the production of fuel ethanol. He was then promoted to Technical Director and was responsible for and directed thirty-five feasibility studies and seven preliminary engineering designs for fuel alcohol plants. Dr. Prouty was then promoted to Director of Fuel Alcohol Programs where he had total management responsibilities of Davy McKee's fuel alcohol program. In this capacity he administered the marketing, sales, and technical activities on a worldwide basis.

GENERAL BACKGROUND

Dr. Prouty's professional activities encompass research, development and operation management assignments in both the food and fermentation industries. As Senior Research Microbiologist for Grain Processing Corporation, he applied the tools of microbial genetics and biochemistry in research and development programs to improve or develop new industrial fermentations. His experience included pilot plant and production operations in fermentation as well as corn wet milling operations. Later at Grain Processing, he became involved in the research, development and production of soy isolates and concentrates.

With Kraft, Inc. as Group Leader in Microbiology, Dr. Prouty managed a wide range of fermentation research programs in addition to managing the production of cultures used in the development of new food products and existing food products. At both Grain Processing and Kraft, he performed as internal consultant for microbiological and plant operational problems.

As Assistant Professor of Biology at Wartburg College, Dr. Prouty taught microbiology, genetics and human physiology, as well as being the recipient of a National Science Foundation research grant. At Iowa State University, his doctoral program was an intensive study on the biochemistry and genetics of microorganisms when grown under continuous cultivation, a procedure that is a basis for today's biotechnologies. Post graduate studies at the University of Chicago (Argonne), University of New Mexico and University of Indiana in radiation and molecular biology and bacterial viruses enabled him to pursue related field interests.

SPECIFIC EXPERIENCE

Fermentation

As a Senior Research Microbiologist at Grain Processing and later as Group Leader, Microbiology - Kraft R & D, Dr. Prouty's career has been deeply involved in the planning and execution of research programs employing techniques used in microbial physiology and genetics for the development of new or improved strains of microorganisms for industrial fermentations. His range of experience includes managing and directing laboratory investigations, pilot plant development programs, scale-up programs, production operations and long range planning. He has experience with utilizing corn wet milling and cheese by-products in the production of fermentation products in both stirred blade reactor and forced draft tube fermentors under batch and continuous culture conditions. In the area of process and recovery of fermentation products, Dr. Prouty has experience working with rotary vacuum filters, filter presses (leaf, plate and frame), several types of centrifuges, evaporators and condensers, reverse osmosis and ultrafiltration equipment, ion-exchange columns, and spray (horizontal and vertical), rotary and drum dryers.

As a result of Dr. Prouty's broad range of experience, he has performed research, process development, plan design and operations with the following fermentation products :

ethyl alcohol
gluconic acid
sodium gluconate
citric acid
itaconic acid
lactic acid

ammonium lactate
glucanase
xanthan gum
pullulan gum
riboflavin

calcium lactate
2-keto gluconic acid
lysine
glutamic acid
sodium glutamate (MSG)
neutral & alkaline
proteases
bacitracin
penicillin G
steriod intermediates
amyloglucosidase
acetone/butanol

microbial rennet
glucose oxidase
alpha amylase
glucose isomerase
cellulase
naringenase

yeast, bacterial &
fungal SCP
starter cultures
yeast & fungal
lactase

ENVIRONMENTAL

1.0

INTRODUCTION

The primary feature of the proposed project involves the construction and operation of an ethanol refinery using a geothermal production well for producing process steam and utilizing grain sorghum (milo) as a feedstock for producing 99.2 percent purity ethanol. The proposed Refinery would be constructed on approximately 25 acres. The site is within a designated Known Geothermal Resource Area (KGRA) near the city of Holtville in Imperial County, California. The project site is shown in Figure 1, indicating its relationship to existing roads and highways and other geothermal developments in the immediate vicinity. The environmental considerations for the production well are to be addressed separately as part of the permit process for obtaining a Geothermal Drilling Permit from the United States Department of the Interior, Geological Survey (hereinafter referred to as USGS).

An ancillary feature of this project includes a potential railroad spur line from the existing Southern Pacific Transportation Company's main line near to the project site - an approximate distance of 12 miles. The proposed route is shown in Figure 2. While the environmental impacts of the spur line are identified in this Loan Guarantee Application, it should be recognized that at the present time the railroad spur is an optional consideration. The ethanol refinery is to be operated initially without the spur line, using surface transportation (trucks) to deliver feedstock from the railhead at Holtville or Imperial to the Refinery. The spur line would be installed in the future if it is found necessary for an economically viable ethanol operation.

The intent of the environmental information presented herein is to provide the Department of Energy (DOE) with sufficient information to determine the overall impact of the Project and to enable expeditious preparation of a detailed environmental report once the Project proceeds to detailed design and construction. The assumption has been made that the environmental report prepared for this Project will combine all required environmental reviews of the

Figure 1 Proposed Site of Ethanol Refinery

Pending finalized contractual relationships for purchase of the site, the information contained in Figure 1 is proprietary. Please contact Ultrasonics for further details.

Figure 2 Proposed Routing of Railroad Spur Line

Pending finalized contractual relationships for purchase of the site, the information contained in Figure 2 is proprietary. Please contact Ultrasonics for further details.

Project into one assessment and thereby avoid unnecessary duplication and costly time delays preventing expeditious construction and operation of the ethanol refinery.

The impacts associated with the utilization of geothermal energy and the production of fermentation ethanol from agricultural feedstocks, are fairly well known. An extensive permit process has been instituted at all levels of government to control and mitigate the environmental impacts known to occur from the proposed Project. The issuance of permits crucial to the construction and operation of the ethanol refinery is contingent upon incorporation of suitable pollution control equipment and public/employee safety and health provisions. The permit and approval procedures required by local, state and federal governmental agencies are identified in the Permits and Approvals section of this Feasibility Study.

2.0 CURRENT ENVIRONMENTAL PROBLEMS

Based on an extensive review of environmental baseline data for the regional area and for Imperial County in its entirety, there are no apparent environmental problems unique to the site of the proposed ethanol refinery. Housing throughout the Imperial Valley and particularly in the Holtville/Brawley areas has been identified as a problem area, particularly with respect to limited apartment rentals. Long-term environmental impacts that are expected to eventually occur as a result of development of Imperial County's geothermal resources have been identified and discussed in the "Imperial Valley Action Plan". This report assesses the impacts associated with several development levels (500, 1000 and 2000 megawatts) of geothermal generating capacity. The impacts identified include: 1) Removal of agricultural land for the siting of powerplants, switchyards, production/injection wells, transmission facilities and pipelines, roads, 2) Consumption of water, 3) Land subsidence from geothermal extraction, 4) Induced seismicity caused by geothermal extraction, reinjection, and withdrawal of ground water, and 5) Air pollution from powerplants and satellite industries utilizing geothermal energy (which would include the proposed ethanol refinery).

Of the above identified impacts associated with geothermal energy, construction and operation of the proposed ethanol refinery could be related to removal of agricultural land, water consumption, and air pollution. Land subsidence and induced seismicity are direct results of geothermal extraction and reinjection and are therefore to be addressed as part of the application for a Geothermal Drilling Permit.

The ethanol refinery is proposed to be located in a KGRA on non-agricultural land and will not therefore cause an impact to existing agricultural production in Imperial County. The Imperial County General Plan categorizes the general area involved in the "Agricultural" land use category because of its potential to produce crops IF irrigation water became plentifully available. In the absence of irrigation water, the area will remain a desert sagebrush area.

Water supply to the project site is available through two present sources: ground water (requiring a well) and the Canal (requiring transmission from the canal to the project site). There is presently a large volume of water in underground storage, but the lining of the main canals will diminish seepage of canal water to the underground basin in future years. The Imperial Valley Action Plan suggests that irrigation drain water would ultimately have to be used for supplying the area with industrial process and cooling water. In this event, some form of collection system would have to be devised and constructed since the area is near the head of the Valley's irrigation system where agricultural drain waters have not had a chance to accumulate. The proposed ethanol refinery would obtain its process and cooling water from the East Highline Canal during the initial years of operation, but could be required at some time in the future to utilize drain waters.

The attainment and maintenance of air quality is an on-going concern throughout Imperial County and indeed throughout the state. Few emissions are associated with an ethanol refinery and are limited basically to carbon dioxide (if not recovered for commercial sale), trace amounts of ethanol and light ends (esters and aldehydes - organic vapors). The major source of air pollutant is the non-condensable hydrogen sulfides from the geothermal steam plant; this impact is to be addressed in the application for a Geothermal Drilling Permit. Based on recent ambient air monitoring data obtained for the project area where a substantial number of geothermal wells are in operation, it was determined that less than one percent of the daily maximum values exceed the state's air quality standard of 30 ppb hydrogen sulfide emission in a 1-hour period. The proposed geothermal production well is not expected to violate any state or federal standards, but further consideration of this impact will be given during the process of obtaining a permit from USGS for the production well.

The railroad spur line route shown in Figure 2 would impact a number of different properties containing a variety of land uses, several public roads, and numerous irrigation facilities (drains, laterals and canals). Baseline data for each affected property has not been assembled since installation of the spur line is not anticipated for a number of years and may never be required if truck transport of the feedstock remains economically viable. Certain impacts that are characteristic of any rail line are identified in the following subsections.

3.0 POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES TO BE INCORPORATED IN PROJECT

The anticipated environmental consequences of the ethanol refinery and railroad spur line have been identified and are listed in Table 1; the estimate of the degree of impact is noted along with specific mitigation measures planned to be incorporated into the project to reduce or eliminate the impact.

Considerable baseline data describing the project site has been collected and was used to estimate the degree of impact caused by the construction and operation of the ethanol refinery. This information will be made available to the Department of Energy as needed during their preparation of the Environmental Assessment.

The specific impacts of a railroad spur line are addressed separately from those of the ethanol refinery. Due to the vast array of properties along the route and the uncertainty that the railroad spur would ever be constructed, baseline data for affected properties has not been accumulated at this time. Nevertheless, potential impacts that are likely to result from installation and operation of a spur line are listed in Section B of Table 1.

The mitigation measures proposed to be included as part of this project consist primarily of the required pollution control equipment devices that are specifically required by the Air Pollution Control District and the Regional Water Quality Control Board. Public health and safety and employee safety measures are regulated by various agencies that specify certain safety equipment, training procedures, operating manuals, etc., for the particular area of risk. No unusual or unidentified safety hazards are associated with the proposed project.

Table 1

Potential Environmental Impacts and Incorporated Mitigation Measures

Section A - Ethanol Refinery

ENVIRONMENTAL PARAMETER	DEGREE OF IMPACT	DESCRIPTION OF IMPACT	INCORPORATED MITIGATION MEASURE
Air Quality: Emissions	Minor	Controlled emissions from process are: Carbon Dioxide . 12,722 lb/hr Ethanol 30 lb/hr Light Ends 2 lb/hr	None Proposed CO ₂ Scrubber Condenser
Odor	No Impact	There will be a 'bakery-like' odor from the fermentation process; due to isolation of the site from urban developments, this impact is considered negligible.	None Proposed
Water Quality: Process and Cooling Water	No Impact	Process and cooling wastewater of 271 gpm to be injected into geothermal basin. Treated wastewater contains: Ethanol Trace BOD ₅ <30 ppm Total Suspended Solids. ≤1 ppm Dewatered sludge remaining after treatment of the process/cooling wastewater (29 gpm) contains: Ethanol Trace BOD ₅ 104 ppm Total Suspended Solids. . 50,000 ppm	Two-stage aeration/clarifier treatment system with filters Sludge to be sold as fertilizer; drying beds (approximately 5 acres) to be on-site for storing sludge as needed
Domestic Sewage	No Impact	Domestic sewage amounts to 1250 gpd (based on a factor of 25 gpd per employee)	Sewage to be treated by on-site septic tank/leach field system
Accidental Spill	No Impact	Accidental spills of ethanol could contaminate groundwater if not contained.	Storage areas will be surrounded by earth dikes to contain any spilled material

Continued on next page . . .

Table 1
Potential Environmental Impacts and Incorporated Mitigation Measures

Section A - Ethanol Refinery

ENVIRONMENTAL PARAMETER	DEGREE OF IMPACT	DESCRIPTION OF IMPACT	INCORPORATED MITIGATION MEASURE
Water Resources: Process and Cooling Water	Minor	585 gpm make-up water to be obtained from East Highline Canal. In future years, the area may be required to use irrigation drain water for this purpose.	That portion of the process and cooling water that is not re-cycled will be injected into the geothermal field.
Potable Water	No Impact	Bottled water to be used.	None Proposed
Noise	No Impact	There are no major noise sources associated with the ethanol refinery operation. Construction noise which is short-term in duration, will not impact others due to isolation of project site.	None Proposed
Solid Waste Disposal	No Impact	Dewatered sludge to be sold as fertilizer; excess sludge to be stored as needed in drying beds on-site for later use as fertilizer.	Disposal as a fertilizer rather than disposal in sanitary landfill.
	No Impact	Distilled Dried Grains and Solubles to be sold as commercial animal feed.	Commercial sale rather than disposal in sanitary landfill.
	No Impact	Construction waste to be hauled to approved Class III landfill.	None Proposed
Vegetation and Wildlife	No Impact	Removal of 25 acres of desert vegetation and habitat. No endangered or threatened species are anticipated to be affected.	Landscape materials to consist of natural desert vegetation
Cultural Re- sources	No Impact	No known archaeological/paleontological/historical resources are known to exist at the project site.	Walk-over survey to be performed by qualified personnel prior to grading.

Continued on next page . . .

Table 1
Potential Environmental Impacts and Incorporated Mitigation Measures

Section A - Ethanol Refinery

ENVIRONMENTAL PARAMETER	DEGREE OF IMPACT	DESCRIPTION OF IMPACT	INCORPORATED MITIGATION MEASURE
Land Use	No Impact	Project site will not involve agriculturally-productive land. Required grading is minimal and is limited to that required to achieve proper surface drainage, dikes for spill containment and pads for structures.	None Proposed
Visual Impact	Minor	Remote location of site is such that proposed structures are not visible from urban areas. However, proposed structures will be a visual intrusion on the desert landscape. Tallest structure is the Beer Still and Milling Bldg. at 120 feet height.	All structures to be painted in earth tones to blend with desert surroundings. Landscaping will be designed to obscure certain obtrusive structures.
Socioeconomics	Minor	Project population of 160 (max.) persons will not overload government facilities and services or public schools. Housing availability in the rental apartment market is currently scarce but is expected to improve in next few years. Lodging accommodations for temporary construction workers (max. of 195 at peak construction period) are considered sufficient.	None Proposed
Use of Non-Renewable Resources	No Impact	Geothermal heat would be dissipated over time without benefit if not used now.	Reinjection of fluids could maintain longevity of the geothermal field if injection wells are properly located to avoid premature cooling of the field.

Table 1
Potential Environmental Impacts and Incorporated Mitigation Measures

Section B - Railroad Spur Line

ENVIRONMENTAL PARAMETER	DEGREE OF IMPACT	DESCRIPTION OF IMPACT	INCORPORATED MITIGATION MEASURE
Air Quality	Minor	Diesel Exhaust Emissions	Unknown at this time
Water Quality	No Impact	-----	-----
Noise	Minor	Passing trains will disturb the peace and quiet of adjoining farmhouses along route.	Route selected to minimize number of homes along route.
Land Use	Minor	Spur line will remove a small amount of agricultural land for the 30-foot right-of-way.	Route selected to avoid division of agricultural land.
	Moderate	Spur line route across desert land could disturb habitat and forage land of native wildlife.	Unknown at this time
Growth Inducement	Moderate	Railroad spur will facilitate and encourage industrial developments along route.	None Proposed
Public Safety	Moderate	Railroad crossing of public road and highways will increase potential for accidents at these crossings.	Installation of required crossing control devices as specified by the State Public Utilities Commission and County Public Works Department.

4.0 SOCIOECONOMIC CONSEQUENCES OF THE PROJECT

The socioeconomic consequences of the proposed project are discussed in terms of the impact of constructing and operating an ethanol refinery in the Imperial Valley. There are no significant socioeconomic impacts associated with installation and operation of the railroad spur line.

Baseline data for evaluating the socioeconomic consequences of the proposed ethanol refinery was obtained from the following sources:

- Projections of Employment by Industry and Occupation, 1980-1985, Imperial County, prepared by State of California Employment Development Department, Employment Data and Research Division, Sept. 1978.
- Annual Planning Information, Imperial County, 1980-1981, prepared by State of California Health and Welfare Agency, Employment Data and Research Division, May 1980.
- Housing Element of the General Plan, Imperial County, 1980, prepared by Imperial County Planning Department, 1980.

Imperial County, the 9th largest county in California, encompasses 4,284 square miles. The county is considered predominantly rural in that none of its twelve urban centers contain more than 50,000 population and the central valley is one of California's most productive agricultural areas. Total county population has increased from 74,500 in 1970 to 93,600 by mid-1979, with yearly growth over the past decade averaging about 2%-3%. Approximately half of this growth is attributable to net in-migration and the remaining half to the natural increase of births over deaths. The majority of the population is Hispanic (about 60%) and the number of persons per household is the highest in the state, 3.3 compared to the state-wide average of 2.7. The county seat is located in El Centro, the largest of the county's seven incorporated cities. The 1978 county-wide population distribution is shown in Table 2 below.

Table 2 Population Distribution

	1978 Population	Percent of Total County
El Centro	23,404	26.3%
Brawley	14,013	15.8%
Calexico	13,341	15.0%
Holtville	4,463	5.0%
Imperial	3,244	3.6%
Calipatria	2,360	2.7%
Westmorland	1,175	1.4%
Unincorporated Area	26,880	30.2%
Total County Population	88,880	100.0%

The total county civilian labor force in 1979 was 43,200; of this total, 14,800 (or 34%) were employed as farm workers. The construction trades (which is important to this project) employed 1,471 persons, or 3.4% of the total civilian labor force. Although the county's civilian labor force annual unemployment rate has averaged between 20% and 25% for the past several years, most of this is due to the seasonal migrant farm workers. In the low harvest seasons in July, August and September, it is not uncommon for the labor force to decrease by 5,000 persons as migrant farm workers move to other areas.

Statistics on housing units in the county's seven incorporated cities as well as in the unincorporated area where 30% of the total county population resides, are presented in Imperial County's Housing Element. Unfortunately, information in this document is based primarily on 1970 and 1975 census data, since 1980 census information is not available until the Spring of 1981. The Element does address the subject of future housing needs which, based on recent conversations with local realtors and government employees, appears to be representative of the current housing concerns throughout the county, and particularly in the central valley area where the proposed project would be located. These concerns are:

- High housing construction costs, partly due to the isolated nature of the county away from larger urban supply centers
- High housing costs, both sales and rentals
- Low vacancy rates, particularly in apartment rentals

As an outgrowth of this housing situation, residents of Imperial County are increasingly resorting to mobile home housing units. For instance, in the unincorporated area of the county, 25% of the total housing units are mobile homes. The number of permits issued to install mobile homes have been far greater in the past decade than the permits issued to construct conventional homes. The fact that mobile homes are considerably less expensive than conventional housing makes them attractive to those who cannot otherwise afford a conventional structure.

The average monthly rental and purchase housing costs for 1979 are listed in the Housing Element; these figures are also supported by the Imperial Valley Board of Realtors multiple listing reports covering the past 6 months of housing activity in Imperial County. Ranges of housing costs are as follows:

One and two bedroom apartments and duplexes (rentals)	\$150 to \$300/month
Two and three bedroom homes (rentals)	\$250 to \$500/month
Existing Homes (resales)	\$40,000 to \$150,000
New Homes (sales)	\$60,000 to \$175,000
Mobile Homes (resales)	\$35,000/unit

There are presently a number of government-funded or rental assistance projects in various stages of implementation; the primary aim of all these projects is to assist lower income families in meeting their housing needs.

The proposed project will involve both a temporary and permanent influx of personnel. A temporary workforce of up to 150-200 construction workers would probably be required over a 5-month peak construction period. The distribution of construction manpower is estimated in Figure 3. A considerable portion of the workers required for this project are in the skilled crafts category — pipefitters, ironworkers, electricians, boilermakers (certified welders), etc. It is probable that the demand for these craftsmen will exceed their availability in the local resident labor force, which means that workers from outside the county would be hired. It is to be expected that outside employees would need temporary living quarters. For those who have their own recreational vehicles or mobile homes, rental spaces will be needed; these are generally more available during the off-season summer months. A substantial number of modern motels are available for temporary living quarters; these are located primarily in the Brawley area.

Personnel required for operating the ethanol plant are of the order of 55 persons. Even in the unlikely event that all of these permanent personnel are hired from outside the county, the accompanying population increase of 160 persons (based on 3.2 persons per household) represents only .18% of the county's total population. These families would most likely seek housing in the Brawley-Holtville-Westmorland-El Centro communities. The only expected impact is the delay that these employees may experience in finding suitable housing, particularly in the apartment category.

The project site is ultimately contemplated to occupy 50 acres of non-agricultural land. Furthermore, the Geothermal Element for Imperial

Figure 3. Estimated Ethanol Refinery Construction Manpower for a 15 to 20 MM Gallon per Year Plant

County mentions that the impact of geothermal energy development (such as the proposed project) on agricultural production appears to be insignificant since predicted geothermal development would ultimately require 16,000 acres of land which is equivalent to only 3.3% of the total agricultural acreage in the county. This is considered insignificant in terms of impacting both the agricultural labor force or agricultural crop production.

In summary, it is believed that the socioeconomic impacts of this project are inconsequential as the potential population increase is minor, and what little added population would occur would be dispersed through several communities. Because of this dispersement, no single community would experience a noticeable impact on public schools, medical facilities, governmental services, etc. On the other hand, the project population itself may be adversely affected for a short-term interval by the lack of rental apartments and the present low vacancy rate/high monthly rental rates and sales prices for housing in Imperial County.

5.0 SIGNIFICANT OCCUPATIONAL AND PUBLIC SAFETY ISSUES

5.1 Ethanol Refinery

Occupational hazards associated with an ethanol refinery are fairly well known and have been identified in the recently-published document entitled "A Guide to Commercial-Scale Ethanol Production and Financing", prepared by the Solar Energy Research Institute for the Department of Energy. Tables 3 and 4 have been reprinted from this document. The chemicals considered hazardous which are consumed and/or generated in the ethanol process are described in Table 3. The codes and standards which are applicable to the production of fuel-grade ethanol are listed in Table 4. The primary areas of concern are the fire and explosion hazards associated with handling large quantities of ethanol, and the potential for grain dust explosions. The degree of accident prevention is highly dependent on adequate supervision, good maintenance practices, and process equipment safeguards. Typical precautionary measures that are vital to the safe operation of an ethanol refinery are listed in Table 5.

Public safety issues consist of potential air and water pollution; however, with pollution control equipment that is a standard requirement for obtaining operating permits from the Air Pollution Control District, Environmental Protection Agency, and the Regional Water Quality Control Board, air emissions and discharge water are sufficiently treated to minimize any pollution potential. There are no toxic or hazardous waste materials associated with the production of ethanol, or geothermal heat, that would generate a public safety issue.

5.2 Railroad Spur Line

Both the California Public Utilities Commission and the Department of Public Works of Imperial County have permit-issuing authority over the construction of a railroad line crossing public roads. Both governmental agencies require installation of appropriate crossing devices to assure public safety. In addition to the road crossings, it will be necessary to construct the railroad across several laterals and drains and the major

Canal. These water transport facilities belong to the Imperial Irrigation District and Encroachment Permits are required for each crossing. In obtaining approval of the Encroachment Permit, the District has authority to specify the type of crossing required to assure safe and stable crossing devices.

Table 3 Hazardous Liquids and Gases
Associated with Production of Ethanol

HAZARDOUS MATERIAL	DESCRIPTION	FIRE AND EXPLOSION HAZARD	LIFE HAZARD	PERSONAL PROTECTION	EMERGENCY PROCEDURES	HANDLING TECHNIQUES
Sulfuric Acid (H_2SO_4)	Colorless (pure) to dark brown, oily dense liquid.	Not flammable but highly reactive. Reacts violently with water and organic materials with evolution of heat. Attacks many metals releasing hydrogen.	Causes severe, deep burns to tissue when contacting liquid. Vapors are extremely irritating to eyes and mucous membranes (nose and throat). AVOID CONTACT!	Wear rubber gloves, rubber apron, and indirectly ventilated, liquid-tight chemical goggles when transferring acid to storage tank or manually adding acid to any vessels.	In case of contact, immediately flush skin or eyes (affected area) with large quantities of water for at least 15 minutes. FOR EYES GET MEDICAL ATTENTION!	Transfer acid by pump or gravity flow. <u>Never use a compressed gas or air to pressurize an acid container.</u> Always add acid to water, never water to acid, a violent reaction will occur causing acid to be ejected from container. Make addition slowly to minimize heating. Use proper carboy truck and titer if acid is received in carboys. Small glass containers of acid shall be handled in impact-resistant chemical carriers.
Calcium Oxide (CaO)	Colorless crystal also known as unslaked, quick, or burnt lime.	Noncombustible but reactive. When wetted, it swells, gets hot, and becomes calcium hydroxide, $Ca(OH)_2$ (slaked lime, caustic lime).	Causes skin burns. Less corrosive than caustic soda (NaOH or sodium hydroxide) or caustic potash (KOH or potassium hydroxide). Dust is highly irritative to the eyes and mucous membranes and prolonged contact with skin can cause dermatitis. Avoid contact.	Wear rubber gloves, chemical goggles, and long-sleeved shirt or jacket.	In case of contact, immediately flush skin or eyes (affected area) with large quantities of water for at least 15 minutes. For eyes, get medical attention.	Transfer crystals from container to rubber pail. Pour required quantity into empty addition vessel. Close vessel cover and add required quantity of water to dissolve crystals.
Ethyl Alcohol (EtOH)	Clear, colorless, fragrant liquid, burning taste. Also known as ethanol or grain alcohol.	Flammable liquid. Vapors form flammable mixtures with air. BURNS WITH INVISIBLE FLAME.*	Exposure to concentrations above 1000 ppm may cause headache and irritation of the eyes, nose, and throat. If continued for prolonged time, will cause drowsiness and stupor. Contact with liquid can cause defatting of skin. No known cumulative effect as is common with methyl alcohol.	Wear standard safety glasses. When breaking lines for maintenance, wear neoprene gloves and liquid-tight chemical goggles.	In case of body splash, flush with large quantities of water. Dilute liquid spills with large volumes of water. Attack small spill fires with ABC dry chemical extinguishers.	Product will normally be handled in a closed system. When transferring to transport vehicle, proper bonding and grounding procedures will be used.
Carbon Dioxide (CO_2)	A colorless, odorless, tasteless gas.	None, is a fire extinguishing agent.	Is a simple asphyxiant. Symptoms include dizziness, headache, shortness of breath, muscular weakness, drowsiness, and ringing in ears. OSHA standards require oxygen concentration of 19.5% or greater before entry is made into tanks or vessels. All vessel entry is to be made under the Safe Work Permit system. Skin contact with CO_2 snow will cause frost burns.		Remove victim from oxygen-deficient atmosphere. <u>Rescuers must wear self-contained breathing apparatus if vessel entry is necessary.</u> If breathing has ceased, start mouth-to-mouth resuscitation. Call for medical assistance.	

*NOTE: Flammability Characteristics of Ethanol - Flash point, 55°F. Flammable limits, 3.3-19%. Ignition temperature, 685°F. Vapor density (air = 1), 0.8 (water soluble). Specific gravity (water = 1), 0.8 (water soluble). Boiling point, 173°F. Odor detectable at 5-10 ppm. Flash point of 5% alcohol/water solution, 144°F. Flash point of 10% alcohol/water solution, 120°F. Flash point of 15% alcohol/water solution, 110°F. Flash point of 20% alcohol/water solution, 97°F.

Table 4 Codes and Standards for the
Production of Ethanol

Title	Code
Prevention of Dust Explosion in Industrial Plants	NFPA 63
Basic Classification of Flammable and Combustible	NFPA 321
Liquids Static Electricity	NFPA 77
Flammable and Combustible Liquids Code	NFPA 30
Occupational Noise Exposure	OSHA 191094
Machinery and Machine Guarding	OSHA Subpart O
Power Piping	ANSI B31.1
Standard for Steel Aboveground Tanks for Flammable and Combustible Liquids	UL 142
Boiler and Pressure Vessel Code	ASME Code, Sect. IV & VII, Div.I
All electrical instrumentation	NFPA 70-1978
National Electric Code	Class II Div. I°

Abbreviations: NFPA - National Fire Protection Association
 OSHA - Occupational Safety and Health Administration
 UL - Underwriters Laboratory
 ASME - American Society of Mechanical Engineers
 ANSI - American National Standards Institute

Table 5 Occupational Hazards and Precautionary Measures

Hazard	Precautionary Measures
Overpressurization; explosion	<ul style="list-style-type: none"> ◦ Regularly maintained safety valves set to relieve pressure ◦ Strict adherence to proper operating procedure ◦ Continuous operator attendance during boiler operation
Scalding from steam gasket leaks	◦ Use welded joints in steam lines
Contact burns from steam lines	◦ Insulate all steam lines
Ignition of ethanol leaks/fumes or grain dust	<ul style="list-style-type: none"> ◦ Enclosed explosion-proof motors ◦ Fully ground all equipment to prevent static electricity build-up ◦ Prohibit smoking and incendiary devices around ethanol tanks, distillation columns, dehydration section, and condenser ◦ Prohibit use of metal grinders, cutting torches, welders, etc., around ethanol systems. Flush and vent all vessels prior to performing these operations
Handling acids/bases	<ul style="list-style-type: none"> ◦ Prohibit storage of concentrated acids in carbon steel containers ◦ Do not breathe fumes of concentrated acids or bases ◦ Mix or dilute acids and bases slowly to allow heat of mixing to dissipate ◦ Immediately flush skin exposed to acid or base with copious quantities of water ◦ Wear goggles when handling acids/bases ◦ Do not store acids/bases in overhead areas above work areas or equipment ◦ Do not carry acids/bases in open containers ◦ Select proper materials of construction for all acid/base containers, valves, etc.
Suffocation	◦ Never enter the fermenters, beer well, or stillage tank unless they are properly vented
Accidental Spills of Ethanol	◦ Surround ethanol storage tanks with an earthen dike of sufficient height to capture stored fluid

6.0 LAND USE IMPLICATIONS

6.1 Ethanol Refinery

The proposed site for the ethanol refinery is comprised of 25 acres in a KGRA in Imperial Valley. The major portion of the particular KGRA is owned by the federal Bureau of Land Management. The Lead Agency for geothermal production and utilization projects on federal land is the United States Department of the Interior, Geological Survey. Permit-issuing authority has been granted to USGS although the Bureau of Land Management (BLM) does have veto rights over surface use of the leased land. In addition, BLM reviews all environmental documents covering the impacts of geothermal projects (including those of the proposed ethanol refinery) and in cooperation with USGS, specific mitigation measures and conditions of approval for the Geothermal Permits are prepared.

County authority on federal land is basically limited to a review of the environmental documents and permit applications that are submitted to USGS. The County may also recommend conditions of approval that can be applied by USGS to the Geothermal Permits. Imperial County is one of the few counties in the United States that has an adopted Geothermal Element with established regulatory procedures governing geothermal exploration and production permits. As a result, the County has been granted the authority to issue Geothermal Exploration and Production Permits on privately-owned land. For geothermal projects on federal or state land, USGS retains permit-issuing authority. The proposed ethanol refinery will be required to obtain a Geothermal Utilization Permit from USGS since it is to be located on federal land.

The present policies of Imperial County with respect to 'land use' regulation encourages cooperation with federal agencies to bring about compliance by these agencies with the County's General Plan and Zoning regulations. Concomitant with these policies, the appropriate General Plan designation, zoning classification, and required Conditional Use Permit (for the ethanol refinery) will be sought.

6.1.1 Status of Land Use Classification on Project Site

The project site is identified on the County's General Plan Land Use map as "Agriculture". It is presently zoned Open Space (S) and does not have a Geothermal (G) overlay zone. (Note: The Geothermal overlay zone has been instituted by Imperial County specifically to identify geothermal resource areas. It is specifically not applied to federally-owned lands, however.)

6.1.2 Land Use Process

Imperial County has an adopted General Plan which places all land outside of incorporated city limits into broad use categories. In addition, the county has a comprehensive zoning ordinance that is designed to implement the General Plan. This ordinance contains development standards for 21 classes of land use. These two land use regulatory processes — the General Plan and the zoning ordinance — are described below.

The General Plan for Imperial County may be amended no more than three times a year; amendments are regularly scheduled for February, June and October of each year. Approximately two to three months is required to complete the amendment process assuming that an environmental document is acceptable for concurrent processing with the request for an amendment. An amendment from a land use category of 'Agriculture' to 'Heavy Industry' would be required under the present General Plan before the proposed ethanol refinery could be found consistent with the General Plan. However, the county is presently evaluating revisions to the General Plan that would, if adopted, allow industrial plants in the Agricultural land use category subject to a Conditional Use Permit. The qualifying factor would be a requirement that the industrial plant use geothermal energy for process heat. In this situation, a General Plan amendment from Agriculture to Heavy Industry, would not be required.

The present zone classification of the project site is Open Space (S). This particular zone does not permit industrial uses and therefore a zone change to M-2 (Heavy Manufacturing) would be required. Manufacturing of alcohol and alcoholic beverages are permitted uses in the M-2 zone (subject to a Conditional Use Permit). As mentioned previously, the County does not apply the Geothermal overlay zone to federal lands.

Both the General Plan amendment request, the Zone Change to M-2, and the Conditional Use Permit for the ethanol plant, may be processed simultaneously. Undoubtedly these items would be accompanied by an environmental document and it is assumed that the document prepared by the Department of Energy for the Loan Guarantee will serve as the County's document for the land use process. Approximately 2-3 months is required to process the General Plan amendment which becomes effective upon approval by the Board of Supervisors. The Zone Change and CUP cannot be acted upon by the Planning Commission until the General Plan amendment has been approved by the Board. However, both the Zone Change and the CUP can be processed concurrently with the amendment request and held at the Commission until the Board has approved the amendment request. The estimated land use processing schedule is shown in Figure 4 on the following page.

6.2 Railroad Spur Line

The proposed railroad spur line connecting the Southern Pacific main line near Holtville with the project site, is shown in Figure 2. Various Encroachment Permits would be required where the line crosses public roads (from the County Road Commissioner and/or Cal Trans if State highways or roads are crossed) and irrigation drains, laterals and canals (from the Imperial Irrigation District). The California Public Utilities Commission also has jurisdiction over all railroad lines which cross public roads and an "Authority to Cross" must be obtained from them in addition to the Encroachment Permits noted above.

A Conditional Use Permit would be required from Imperial County for constructing and operating the railroad spur line on non-federal properties. This Permit would involve an evaluation by the County Planning Department of the following facets:

- Consistency of the railroad line with the General Plan
- Conflict with existing and/or proposed land uses along the selected route
- Environmental impacts associated with the railroad - noise, public safety, conversion of agricultural land for railroad right-of-way

It should be noted that construction and operation of a railroad spur line for purposes of connecting the project site with an existing main line, could be considered a growth-inducing action in that it would tend to encourage development of other industries that could be served by the spur line. Whether or not this type of growth is consistent with the County's General Plan can not be easily determined and would ultimately involve a finding by the Board of Supervisors.

Figure 4

Schedule of Land Use Processing

LEGEND:

- ▲ Application Accepted
- Planning Commission Approval
- Board of Supervisors Approval
- * Effective Date of Action

The proposed railroad spur line would cross federal Bureau of Land Management (BLM) property after crossing the East Highline Canal. The BLM has authority to grant or deny access for a railroad; however, the process of obtaining permission or denial is considered to be a long and tedious ordeal, particularly since the adopted California Desert Plan does not identify a transportation corridor to the project site. (Note: The California Desert Plan includes a Public Transportation and Transmission Element which identifies specific corridors across the desert.) In order to obtain permission from BLM, an amendment to the California Desert Plan would be required. This would entail public hearings and an amendment would probably be difficult to obtain unless an over-riding benefit of the railroad spur to the general public could be shown.

7.0 SYNOPSIS OF EXISTING ENVIRONMENTAL STUDIES

The Imperial County Planning Department files were researched to identify documents and studies that contain information or are relevant to the proposed project. The following list identifies those reports that are available for review at the county planning department offices.

- 7.1 "East Mesa Proposed Geothermal Leasing Environmental Assessment Record Draft," U.S. Department of the Interior, Bureau of Land Management, Riverside District, April 1980.

SYNOPSIS: This document is in response to applications received by the BLM for non-competitive lease of Federal lands. The purpose for this action is to lease lands for the development of geothermal resources and ultimate electrical power generation. Study area was for 45 non-competitive geothermal lease applications located on the East Mesa of Imperial Valley in Imperial County, California.

- 7.2 "Multi-Purpose Utilization of Hydrothermal Resources Within the City of El Centro," Westec Services, Inc., prepared for U. S. Department of Energy, April 1979.

SYNOPSIS: This study determines the engineering and economic feasibility of the utilization of low and moderate temperature geothermal heat from the Heber KGRA for the City of El Centro including space heating and cooling for government buildings, business complexes and residences, industrial process heat, and agribusiness.

- 7.3 "Use of Geothermal Heat for Sugar Refining in Imperial County, Final Environmental Report," Imperial County Planning Department and TRW Energy Systems Group, October 1979.

SYNOPSIS: This is an environmental evaluation of replacing significant quantities of fossil fuel presently used by The Holly Sugar Corporation as a power source for processing sugar beets, with geothermal energy. A 3-phase project is evaluated. Phase I - A detailed design of 1 geothermally-powered boiler and one beet pulp dryer with associated piping, valves, etc. and a survey of the Holly property to estimate extent of geothermal reservoir. Phase II - Includes drill site preparation and drilling of two deep wells. Phase III - Involves additional boilers and beet pulp dryers.

- 7.4 "Final Master Environmental Impact Report, Heber Geothermal Project," VTN Consolidated, Inc., prepared for Imperial County Planning Department, Report #213-79, September 1979.

SYNOPSIS: Project is to develop 500 MW of generating capacity from the Heber Geothermal Overlay Zone. Includes a series of seven geothermal power plants and production/injection wells. Includes construction and operation of a 45 MW dual flash cycle power plant and either a 45 MW binary cycle or 49 MW dual flash cycle power plant.

- 7.5 "Identification of Environmental Control Technologies for Geothermal Development in the Imperial Valley of California," D.F. Snoeberger and J. H. Hill, Lawrence Livermore Laboratory, prepared for U. S. Department of Energy, October 5, 1978.
- SYNOPSIS: Discusses control technologies to manage environmental impacts from geothermal developments in the Imperial Valley from development to 1985. Includes land subsidence by fluid injection, managing of liquid wastes, controlling H₂S, and minimizing noise impact from power plants.
- 7.6 "A Description of Imperial Valley, California for the Assessment of Impacts of Geothermal Energy Development," David Layton and Donald Ermak, Lawrence Livermore Laboratory, prepared for U. S. Energy and Research Development Administration, August 26, 1976.
- SYNOPSIS: Includes a description of Imperial Valley's physical and human environments and geothermal laws.
- 7.7 "An Assessment of Geothermal Development in the Imperial Valley of California. Volume 1 - Environment, Health and Socioeconomics. Volume 2 - Environmental Control Technology, Lawrence Livermore Laboratory, prepared for U. S. Department of Energy, DOE/EV-0092, July 1980.
- SYNOPSIS: The Imperial Valley Environmental Project (IVEP) is a regional case study representing a program of surveys, field measurements, and analysis aimed at characterizing existing environmental conditions in the valley and assessing the potential impacts that geothermal developments could have on these conditions.
- 7.8 "State-of-the-Art of Liquid Waste Disposal for Geothermal Energy Systems: 1979," U. S. Department of Energy, DOE/EV-0083, June 1980.
- SYNOPSIS: This document evaluates existing technologies of geothermal liquid waste disposal and evaluates surface and subsurface disposal methods with respect to technical, economic, legal and environmental factors. Concluded that there are seven liquid disposal methods (four surface and three subsurface) that are viable.
- 7.9 "State-of-the-Art Hydrogen Sulfide Control for Geothermal Energy Systems: 1979," U. S. Department of Energy, DOE/EV-0068, March 1980.
- SYNOPSIS: Reviews present technologies for removal of H₂S in geothermal energy systems. Concluded that upstream control technologies are preferred over downstream control methods.
- 7.10 "Salton Sea Ten Megawatt Geothermal Demonstration Facility EIR Draft," Imperial County Planning Department, 1980.
- SYNOPSIS: Project is a 10 MW geothermal power plant utilizing high-temperature brines from the Salton Sea KGRA.

- 7.11 "Final EIR for Geothermal Exploration Project East Brawley," EIR #223-79, Imperial County Planning Department, October 29, 1979.
SYNOPSIS: Identifies and evaluates the environmental impacts encountered with the drilling and testing of 13 exploratory geothermal wells 2000 to 6000 feet in depth in the East Brawley KGRA.
- 7.12 "Extended Initial Study of the East Brawley Geothermal Exploration Project, Phillips Petroleum Company," Imperial County Planning Department, January 1980.
SYNOPSIS: Discusses impacts of drilling and testing 1 to 6 deep wells in the East Brawley KGRA.
- 7.13 "Imperial Valley Environmental Project: Quarterly Data Report," Robert A. Nyholm and Lynn R. Anspaugh, Lawrence Livermore Laboratory, UCID-17444-1, prepared for U.S. Energy Research and Development Administration, April 13, 1977.
- 7.14 "Imperial Valley Environmental Project: Baseline Air Quality and Meteorological Data," P. H. Gudiksen et al, Lawrence Livermore Laboratory, prepared for U. S. Department of Energy, UCID-1812, September 26, 1979.
- 7.15 "Development Schedule, Subtask B, Imperial Valley Action Plan," Imperial County Planning Department, August 20, 1979.
SYNOPSIS: Discusses impacts of development of 500 MW of geothermal power at each of the four major geothermal anomalies in the Imperial Valley. Identifies cooling water supply as the primary environmental issue. Secondary issues are: land subsidence, induced seismicity, air quality and land use.
- 7.16 "Environmental Assessment of Republic East Mesa Project, Imperial County, California, Geothermal Loan Guarantee Program," U. S. Department of Energy, DOE/EA-0089, July 1979.
SYNOPSIS: Discusses environmental aspects related to completion of a 64 MW well field and a 48 MW power plant in the East Mesa KGRA.
- 7.17 "North Brawley Ten Megawatt Geothermal Demonstration Facility," Final EIS, Imperial County Planning Department, April 1979.
SYNOPSIS: Addresses the environmental issues related to construction and operation of a 10 MW power plant and associated steam production and fluid reinjection facilities, located in the Brawley KGRA in Imperial Valley, California.
- 7.18 "Monitoring Natural Subsidence and Seismicity in the Imperial Valley as a Basis for Evaluating Potential Impacts of Geothermal Production," Crow, N.B. and Kasameyer, P.W., Geotherm. Resourc. Coun. Trans. 2, 1978.

- 7.19 "The Potential Air Quality Impact of Geothermal Power Production in the Imperial Valley," Gudiksen, P.H. et al, Lawrence Livermore Laboratory, UCRL-52797, 1979.
- 7.20 "Water for Long Term Geothermal Energy Production in the Imperial Valley," Layton, D.W., Lawrence Livermore Laboratory, UCRL-52576, 1978.
- 7.21 "Water Supply Dilemmas of Geothermal Developing in the Imperial Valley of California," Layton, W.D., Water Res. Bull. 14, 1978.
- 7.22 "Measuring Ground Movement in Geothermal Areas of the Imperial Valley, California," Proceedings of the Conference on Research for the Development of Geothermal Energy Resources, Jet Propulsion Laboratory, Pasadena, California, NSF-RA-N-74-159, Sept. 23-25, 1974.
- 7.23 "Measuring Crustal Deformation in the Imperial Valley, California," U.S. Geological Survey, Sacramento, California, B. E. Lofgren, Open File Report 78-910, 1978.
- 7.24 "A Multisector Analysis of the Impact of Geothermal Development on the Economy of Imperial County, California," E.M. Lofting, Dry-Lands Research Institute, University of California at Riverside, 1977.
- 7.25 "Draft Environmental Impact Report Proposed 10 MW Geothermal Power Plant, East Mesa KGRA Imperial County (Republic Geothermal, Inc.)," Atlantis Scientific, Beverly Hills, California.
- 7.26 "Archaeological Impact Statement on East Mesa, Areas 1 and 2, Imperial Valley, California," Ellis, R.R., and Crabtree, R.H., unpublished open-file report, Bureau of Reclamation, Boulder City, Nevada, 1974.
- 7.27 "Inventory of Rare and Endangered Vascular Plants of California," Special Publication No. 1, California Native Plant Society, Berkeley, California, Powell, W.R., 1974.
- 7.28 "Botanical Survey of Republic Geothermal, Inc.'s Proposed 48-MW Geothermal Generating Plant and Associated Field Development Operations," open-file report, prepared for the U.S. Geological Survey, Menlo Park, California, Pritchett, L., 1978.
- 7.29 "Baseline Studies in the Desert Ecosystem at East Mesa Geothermal Test Site, Imperial Valley, California," Romney, E.M., et al, University of California, Laboratory of Nuclear Medicine and Radiation Biology UCLA-12-1143, 1977.
- 7.30 "Environmental Analysis, EA 12 (CA-1903 and CA-966)," U.S. Department of the Interior, Geological Survey, Menlo Park, California, 1975.

- 7.31 "Environmental Analysis, EA 29 (CA-966)," U.S. Department of the Interior, Geological Survey, Menlo Park, California, 1975.
- 7.32 "Environmental Analysis, EA 78 (CA-964)," U.S. Department of the Interior, Geological Survey, Menlo Park, California, 1977.
- 7.33 "Supplement to Environmental Analysis #67," U.S. Department of the Interior, Geological Survey, Menlo Park, California, 1977.
- 7.34 "Environmental Analysis, No. 99-100, Final EA 99-100 (CA-966)," U.S. Department of the Interior, Geological Survey, Menlo Park, California, 1978.
- 7.35 "Environmental Analysis, No. 107-9, An Addendum to Environmental Analysis 99-100, Draft EA 107-9 (CA-966)," U.S. Department of the Interior, Geological Survey, Menlo Park, California, 1979.
- 7.36 "Environmental Assessment, An Addendum to U.S. Geological Survey-Area Geothermal Supervisor's Environmental Analysis 99-100 (CA-966)," U.S. Department of the Interior, Menlo Park, California, 1979.
- 7.37 "Archaeological Examinations of Certain Geothermal Test Well Sites on East Mesa, Imperial County," von Werlhof, J. and von Werlhof, S., unpublished, open-file report for Republic Geothermal, Inc., Imperial Valley College Museum, El Centro, California, 1975.
- 7.38 "Archaeological Examinations of Certain Geothermal Test Wells and Access Roads at East Mesa, Imperial County," von Werlhof, J. and von Werlhof, S., unpublished, open-file report prepared for Republic Geothermal, Inc., Imperial Valley College Museum, El Centro, California, 1977.
- 7.39 "Addendum II; Archaeological Examinations of Certain Test Bore Sites and Access Roads, East Mesa, Imperial County," von Werlhof, J. and S., unpublished, open-file report prepared for Republic Geothermal, Inc., Imperial Valley College Museum, El Centro, California, 1977.
- 7.40 "Archaeological Examinations of the Republic Geothermal Field, East Mesa; Final Report," von Werlhof, J. and S., unpublished, open-file report prepared for Republic Geothermal, Inc., Imperial Valley College Museum, El Centro, California, 1978.
- 7.41 "Fault Investigation East Mesa Geothermal Power Plant Site Imperial Valley, California," Woodward-Clyde Consultants, San Diego, California, 1978.
- 7.42 "East Mesa Wildlife Inventory, Imperial County, California", open-file report prepared for the U.S. Geological Survey, Menlo Park, California, 1980.

- 7.43 Botanical Survey of Republic Geothermal, Inc.'s proposed 48-MW geothermal generating plant and associated field development operations, Open-file report prepared for the U.S. Geological Survey, Menlo Park, California, 1978.
- 7.44 "Environmental Analysis No. 112-8," unpublished open-file report, U.S. Geological Survey, Office of the Area Geothermal Supervisor.
- 7.45 Archaeological examinations of T16S, R17E, Section 7, East Mesa, Imperial County. Unpublished manuscript on file at Imperial Valley College Museum, El Centro, California.

8.0 ENVIRONMENTAL AGENCIES CONCERNED WITH THE PROJECT

8.1 Ethanol Refinery

The issuance of a federal guarantee for a loan for a Geothermal Energy Utilization Project is subject to the provisions of the National Environmental Policy Act (NEPA). Additionally, since the project is to be located in the State of California in an unincorporated area of Imperial County, both the California Environmental Quality Act (CEQA) and the county environmental regulations are applicable. Technically the county environmental regulations are not applicable to this project because it is located on federally-owned land; however, as stated previously, it is the intent of the applicant and DOE/USGS to prepare an Environmental Assessment that meets the county's requirements. It is also intended that all local and state regulations and procedures will be complied with as if the property were on privately-owned land insofar as these do not conflict with mandated federal regulations and/or permits.

Table 6 on the following page lists by governmental jurisdiction, the environmental agencies which are known to have a vital interest in the construction and operation of the proposed ethanol refinery. The applicant has made contact with each of the agencies listed.

8.2 Railroad Spur Line

Construction of the railroad spur line will involve acquisition of easements (or right-of-ways) across privately-owned and federally-owned land, as well as crossing a number of public roads and irrigation drains and laterals (including Canal). The environmental concerns associated with the railroad spur line are discussed in Section III and will involve coordination with several local, state and federal agencies as listed in Table 7.

Table 6
Local, State and Federal Environmental Agencies
Ethanol Refinery

Agency	Area of Concern	Address	Phone No.	Contact Person
A. LOCAL JURISDICTION:				
• Imperial County Planning Department	Environmental Documents	1097 Airport Road Imperial 92251	714 352-8184	Dick Mitchell Alex Hines
• Imperial County Health Dept., Office of Environmental Quality Control	Domestic Wastewater Disposal System	935 Broadway El Centro 92243	714 352-3610	Wm. H. Ellison
• Imperial County Air Pollution Control District	Air Pollution	939 Main El Centro 92243	714 352-310	Harry Dillon, Engineer
• Imperial County Department of Public Works, Geothermal Coordinator	Solid Waste Disposal	939 Main El Centro 92243	714 352-2851	F.A. Scholz, Geothermal Coordinator
• Southern California Association of Governments	A-95 Clearinghouse	600 S. Commonwealth Suite 1000 Los Angeles 90005	213 385-1000	Loretta Anaya
• Imperial Irrigation District	Water Supply and Power Supply	333 E. Main Imperial 92251	714 355-1112	Robt. Wilson- Mgr. Water Department, Ext. 261 Rufus Ogilvie- Mgr. Power Department, Ext. 231

Continued on next page . . .

Table 6

Local, State and Federal Environmental AgenciesEthanol Refinery
Continued

Agency	Area of Concern	Address	Phone No.	Contact Person
B. STATE JURISDICTION:				
<ul style="list-style-type: none"> • Dept. of Conservation, Division of Oil and Gas 	Geothermal Source Test and Production Wells	5199 E. Pacific Coast Highway Long Beach 90703	213 590-5311	Don Lande
<ul style="list-style-type: none"> • State Air Resources Board, Southeast Desert Air Basin 	Air Pollution	9528 Telstar Ave. El Monte 91731	213 575-6962	Kevin Doody
<ul style="list-style-type: none"> • Regional Water Quality Control Board, Colorado River Basin, Reg. 7 	Water Pollution (Wastewater Disposal Systems)	73-271 Highway 111 Suite 21 Palm Desert 92260	714 346-7491	W. C. Ponder, Staff Engineer
C. FEDERAL JURISDICTION:				
<ul style="list-style-type: none"> • Dept. of Energy, Environmental Safety and Program Support Division 	Environmental Documents	1333 Broadway Oakland 92251	415 273-7963	Ray Brechbill
<ul style="list-style-type: none"> • U.S. Geological Survey, Conservation Division, Geothermal Office 	Environmental Documents Geothermal Utilization Permit	345 Middlefield Rd. Menlo Park, Cal. 94025	415 323-8111	Don Ross Bill Isherwood
<ul style="list-style-type: none"> • Dept. of Agriculture, Soil Conservation Service 	Soil Erosion/Crop Selection	1285 Broadway St. El Centro 92243	714 352-7886	Robert Cabalsi

Table 7

Local, State and Federal Environmental AgenciesRailroad Spur Line

Agency	Area of Concern	Address	Phone No.	Contact Person
A. LOCAL JURISDICTION:				
	● Imperial County Planning Department	Environmental Documents	1097 Airport Road Imperial 92251	714 352-8184 Dick Mitchell
	● Imperial County Department of Public Works, Road Commissioner's Office	Public Safety - Road Crossings	939 Main El Centro 92243	714 352-2851 Harry Orfanos
	● Imperial Irrigation District	Public Safety - Canal, Drain and Lateral Crossings	333 E. Main Imperial 92251	714 355-1112 George Wheeler
	● Southern California Association of Governments	A-95 Clearinghouse	600 S. Commonwealth Suite 1000 Los Angeles 90005	213 385-1000 Loretta Anaya
B. STATE JURISDICTION:				
	● California Public Utilities Commission	Public Safety - Road Crossings	107 S. Broadway Los Angeles	213 620-2634 Ed Stewart
C. FEDERAL JURISDICTION:				
	● Bureau of Land Management	Conflicts of Proposed Railroad Spur Line with California Desert Plan	333 S. Waterman Ave. El Centro 92243	714 352-5842 Joe Edney

PERMITS AND APPROVALS

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 ETHANOL REFINERY REGULATORY PROCESS	1
2.0 LOCAL GOVERNMENT PERMITS AND APPROVALS	1
2.1 General Plant Amendment, Zone Change, Conditional Use Permit	2
2.2 Air Pollution 'Authority to Construct' and 'Permit to Operate'	2
2.3 Domestic Sewage System Construction Permits	5
2.4 Building Permits	5
2.5 Encroachment Permit	6
2.6 Solid Waste Permit	6
3.0 STATE GOVERNMENT PERMITS AND APPROVALS	6
3.1 Waste Discharge Permit	6
3.2 Encroachment Permit	7
3.3 Weighmasters License	7
3.4 Commercial Feed License	8
3.5 Motor Vehicle Fuel Distributors License	8
3.6 Sellers Permit	8
3.7 Industrial Alcohol Dealers License	9
3.8 Still License	9
3.9 Permit to Operate a Pressure Vessel	9
4.0 FEDERAL GOVERNMENT PERMITS AND APPROVALS	10
4.1 Alcohol Fuel Producers Permit	10
4.2 Geothermal Utilization Permit	11
4.3 Federal Excise Tax Exemption	14

TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
5.0	PERMITS AND APPROVALS FROM OTHER AGENCIES	14
	5.1 Industrial Water	14
	5.2 Commercial Power	15
6.0	RAILROAD SPUR LINE REGULATORY PROCESS	22
	6.1 Local Government Permits and Approvals	22
	6.2 State Government Permits and Approvals	23
	6.3 Federal Government Permits and Approvals	23
	6.4 Permits and Approvals from Other Agencies	24
7.0	TIMETABLE FOR PERMIT APPLICATION/APPROVAL PROCESS	26

LIST OF TABLES

<u>Number</u>		<u>Page</u>
1	Applicable Local Government Permits	16-17
2	Applicable State Government Permits	19-20
3	Applicable Federal Government Permits	20
4	Other Required Permits/Approvals	21
5	Permits/Approvals Required for Railroad Spur Line . .	25
6	Timetable for Permit/Approvals Process	28

LIST OF APPENDICES

<u>Number</u>	
1	Permit Application Forms

1.0

ETHANOL REFINERY REGULATORY PROCESS

This Report covers the feasibility of the design and construction of an ethanol refinery using a geothermal production well(s) for generating process steam. For projects located on federal land, in this case Bureau of Land Management (BLM) property, the Lead Agency is the Department of the Interior, Geological Survey (USGS). Additionally, since the Loan Guarantee is to be through the Department of Energy (DOE), both USGS and DOE act as co-Lead Agencies.

While certain local County regulations such as General Plan and Zoning considerations are not mandatory for projects located on federal or state land, it is the intent of the applicant to comply with Imperial County's land use regulations. In addition, because this project would be constructed and operated by a private firm, it is also subject to the County's building permit, plan check and inspection procedures.

The Environmental Assessment that would be prepared by DOE as part of the Loan Guarantee process, would be written to serve as the County's environmental document for the above-mentioned land use regulations (including the Conditional Use Permit that is required by the M-2 zone for the proposed ethanol refinery).

The following subsections discuss the various local, state and federal permits required for constructing and operating the ethanol refinery on federal BLM land. The procedure for drilling a production geothermal well is not included in this discussion inasmuch as it would be separately handled by the particular leasee. The timetable for the permit application/approval process is presented at the end of this section.

Sample copies of the various permit application forms are included as Appendix 1 to this section of the Feasibility Study.

2.0

LOCAL GOVERNMENT PERMITS AND APPROVALS

The following subsections detail the information essential for each permit required for construction and operation of the proposed ethanol refinery on federal Bureau of Land Management land using an already-permitted geothermal production well(s). Table 1 contains a listing of the local permits.

2.1 General Plan Amendment, Zone Change, Conditional Use Permit

Regulatory procedures and permits concerning land use are described in detail in Subsection VI of the Environmental Section of this Loan Guarantee application. Although the General Plan amendment, zone change, and conditional use permit procedures in Imperial County are not mandatory for projects located on federal property, the applicant intends to apply for the appropriate land use classifications.

The General Plan amendment, Zone Change and Conditional Use Permit applications must be accompanied by an environmental document. In this case an Environmental Assessment will have been prepared by the Department of Energy (DOE) as part of the Loan Guarantee process; this document will address the construction and operational impacts of the proposed ethanol refinery. It is intended that this environmental document be prepared so as to meet the County's requirements and thereby avoid preparation of a second environmental document to be processed by the County separately from DOE's environmental document.

In addition to submitting an Environmental Assessment, the following information is required for the General Plan amendment, Zone Change to M-2, and the Conditional Use Permit allowing installation and operation of the ethanol refinery:

- 1) Legal description of the property
- 2) Statement of intended use
- 3) Plot Plan showing existing and proposed structures, adjacent land uses and zoning

2.2 Air Pollution 'Authority to Construct' and 'Permit to Operate'

The Environmental Protection Agency (EPA) enforces the Prevention of Significant Deterioration (PSD) regulations. The PSD regulations apply to twenty-six (26) different types of major stationary sources which include fossil fuel-fired boilers and any other source which will emit any one pollutant in excess of 250 tons per year (assuming continuous year-round operation of the geothermal steam plant) and is simultaneously located in an attainment (or unclassified) area. The geothermal steam plant is not classified as a Major Stationary Source nor does it emit in excess of 250 tons per year of any pollutant; hence it is not subject to PSD regulations.

The project is, however, subject to the State-mandated New Source Review (NSR) rules and regulations that are implemented and enforced by the local District. Although the NSR includes provisions for applying Best Available Control Technology (BACT) or Lowest Achievable Emission Rate (LAER) requirements, it is unlikely that either will apply to the proposed project since the District's regulations provide exemptions from both BACT and LAER under certain conditions. BACT applies to pollutants from all new stationary sources which result in a net increase in emissions of 250 or more pounds during any day of any air pollutant for which there is a National Ambient Air Quality Standard (NAAQS), excluding carbon monoxide, or any precursor of such contaminant. LAER applies only to new stationary sources which result in either a) a net increase in emissions of 250 or more pounds during any day of any air pollutant which the County is designated a nonattainment area of any NAAQS (excluding carbon monoxide) or any precursor of such a contaminant, or b) a net increase in carbon monoxide emissions which the Control Officer determines would exceed any NAAQS for carbon monoxide at the point of maximum ground level impact. The proposed facility is anticipated to emit less than these prescribed amounts and thereby qualify for exemptions from both BACT and LAER. This is not to say, however, that the best available control technology and equipment will not be utilized in this project.

New Source Review (NSR) is a two-permit process which provides for extensive preconstruction analysis culminating in issuance of the 'Authority to Construct' permit, followed by the 'Permit to Operate' which is issued only when the Control Officer has determined that all conditions specified in the construction permit have been or will be met by the dates specified. This could involve actual operation of the facility to verify satisfactory operation and compliance with the specified conditions. The Rules and Regulations of the District details the procedures for processing and issuance of these permits. Specific information which is required to be submitted with an application for a construction permit, is contained in the District's 'List and Criteria'. This information includes, but is not limited, to the following:

- 1) Location of facility
- 2) Plot Plan showing: Existing and proposed buildings including heights
Storage areas for fuel, materials and products
Basic, control and air monitoring equipment
Piping and ducts for carrying fuels, products and possible sources of pollutants
Identify points of emission
- 3) Estimated construction dates and completion dates
- 4) Process description including:
Flow diagram of each process line, including material balance
Method of transfer of materials, products and possible sources of air pollutants between process lines, buildings and storage areas
Basic and control equipment descriptions (make, size, inlet and outlet temperatures, energy consumption, etc.)
Operating schedule of facility
Production rates and raw material usage rates
Locations and amounts of emissions
Description of fugitive emissions
- 5) Description of fuel burning equipment and fuel, if any
- 6) Description of storage facilities and materials/products being stored. Include a description of control procedures and equipment to be utilized on the storage facilities.
- 7) Provide information required for an air quality impact analysis:
Identify any monitoring stations to be installed
Provide meteorological data
Provide topographical data
Provide air quality data
Provide computer modeling data
- 8) Identify all facilities within the air basin that are owned or operated by the applicant and the compliance status of each.
- 9) List the total amount of electrical power to be consumed by the facility and the percentage of electrical power to be provided by off-site generating facilities.
- 10) If off-setting trade-offs from other existing sources are involved, provide sufficient information to determine whether adequate emission reductions will be achieved to off-set the air quality impacts.
- 11) List proposed mitigating measures including the air pollution control equipment proposed, process changes or operations utilized to reduce emissions, and any other measures proposed.

2.3 Domestic Sewage System Construction Permits

The Office of Environmental Quality, a division of the county's Department of Health, issues construction permits for domestic wastewater treatment systems, either of the subsurface or surface category. A septic tank/leach field system would be utilized for handling the estimated 1250 gallons per day of domestic sewage generated by the ethanol facility and its employees. A Subsurface Septic System permit is issued following submittal and approval of the following: (Note: There are no application forms for this permit)

- 1) Construction plans showing details of the septic tank/leach field system
- 2) Percolation test results
- 3) Soils Analysis
- 4) Groundwater depth

2.4 Building Permits

The Building Inspection Division of Imperial County issues separate permits for: Building (structural), Electrical, Plumbing, Mechanical, Grading and Demolition. In addition the Division obtains verification sign-offs from other county departments including the Planning Department (for zoning verification), Health Department (for domestic sewage treatment system), and the Fire Department (for fire and life safety provisions incorporated into the design of the ethanol plant).

Completed design drawings will be accepted for processing incrementally to avoid unnecessary delays in construction. Two sets of plans are required with each submittal. The initial permit application requires the following information:

- 1) Legal description of project site including the assessor's parcel number.
- 2) Name, address, phone and State license number of the Architect, Engineer and Contractor.
- 3) Lender's name, address and phone number.
- 4) Description of proposed work including the intended use, size of project, square footage, etc..
- 5) Valuation of the entire project.

2.5 Encroachment Permit

The Imperial County Road Commissioner has jurisdiction over County property and, as such, Encroachment Permits must be obtained authorizing construction within any County right-of-way. In the event that construction entails, for instance, tying into a County road, or utilities are to be installed within a County right-of-way, the following information must be submitted with the Encroachment Permit application:

- 1) Construction drawings showing work proposed within the County right-of-way
- 2) Bond for value of improvements with the County right-of-way

2.6 Solid Waste Permit

Disposal of solid waste generated during construction and operation of the ethanol plant requires a permit allowing use of any of the County's 10 public disposal sites. A "per load" fee is charged which varies with the type of material being disposed and with the size of the disposal truck being used. Vehicles or contractors that are already covered by an agreement with the County are exempt from these fees. (There is no application form for this permit.)

3.0 STATE GOVERNMENT PERMITS AND APPROVALS

State government is involved in a permit-issuing capacity primarily by virtue of authority delegated by the federal government. The following permits are required for construction and operation of the ethanol plant on federally owned land using an already permitted geothermal well(s) for supplying process steam. A summary of these permits is listed in Table 3.

3.1 Waste Discharge Permit

The State of California has assumed administrative responsibility for the National Pollutant Discharge Elimination System (NPDES) under regulations meeting the requirements of the Clean Water Act. Permit applications in Imperial County are reviewed and acted on by the Colorado River Basin Regional Water Quality Control Board. Process wastewater is to be treated by an on-site treatment plant and surface oxidation pond. Domestic sewage is to be handled using a septic tank or leach field system. Both the domestic and process wastewater systems require a Waste Discharge Permit

(instead of the NPDES permit); this permit allows land disposal of treated wastewater versus disposal to surface waters which requires an NPDES permit. Information to be supplied to the Regional Water Quality Control Board for the domestic and process Waste Discharge permits includes:

- 1) Location of disposal areas
- 2) Description of waste treatment and disposal facilities
- 3) Type of waste discharge
- 4) Quantity of waste discharge
- 5) Source of water supply

3.2 Encroachment Permit

The Department of Transportation issues Encroachment Permits for federal construction projects located within State highway or utility corridor rights-of-way. In order to obtain an Encroachment Permit, the following information is required:

- 1) Project location with reference to State highway
- 2) Description of work within State right-of-way including construction drawings, specifications, calculations, etc.
- 3) Estimated number of days required to do work within State right-of-way

3.3 Weighmasters License

Whenever the price of merchandise sold commercially is based on a weight, measurement, or count, a Weighmasters License must be obtained by the entity selling the merchandise. This license enables certification that the merchandise -- in this case distillers dried grains and solubles and ethanol -- was weighed, measure or counted by a Weighmaster whose signature is a recognized authority of accuracy. The Weighmasters License is obtained from the Department of Food and Agriculture upon submittal of an application containing the following information:

- 1) Measurement device location
- 2) Type and description of measurement device
- 3) List of employees authorized to conduct measurement operations on merchandise to be sold commercially

3.4 Commercial Feed License

A major by-product of the ethanol fermentation/distillation process using grain feedstock is distillers dried grains and solubles. This material has commercial value as a high-protein livestock or poultry feed. In order to provide assurance to the consumer-buyer of this feed that it is properly identified and of the quality and quantity represented, a Commercial Feed license is required. The Feed, Fertilizer and Livestock Drug Unit of the Department of Food and Agriculture sets standards for commercial feed ingredients and retains free access for inspection/sampling purposes. In order to obtain a Commercial Feed license, the following information is to be provided on the license application:

- 1) Type of feed manufactured
- 2) Workmen's Compensation Insurance Carrier

3.5 Motor Vehicle Fuel Distributors License

The State of California Board of Equalization requires a distributor of motor vehicle fuel to be licensed, to file monthly tax motor vehicle fuel tax returns, and to pay a \$.07/gallon tax on the amount of ethanol sold for use as a motor vehicle fuel. In the proposed project, tax-paid fuel (gasoline) will be acquired and commingled (for denaturant purposes) with ethanol (not previously taxed) and the resultant blended product distributed as a motor vehicle fuel. Upon distribution of the denatured ethanol, that fraction of the total gallonage previously purchased tax-paid can be deducted on the tax returns from the total distributed tax-collected gallonage. A Motor Vehicle Fuel Distributor's License is issued when an application containing the following information has been filed and security of not less than \$1000 nor more than \$500,000 has been posted.

- 1) Corporation officers
- 2) Location of ethanol refinery
- 3) Description of blending process
- 4) Date of commencement of distribution operations

3.6 Sellers Permit

Ethanol sold for fuel is subject to the State's 6 percent sales tax. The required Seller's Permit is obtained from the Board of Equalization

upon completion of Registration, Credit and Corporate Information forms. This information must include:

- 1) Name and location of bank
- 2) Location of ethanol plant
- 3) Estimated monthly expenses and sales
- 4) Corporate Information including:
 - Full name and address
 - Date of first stock issue
 - Corporate Officers
 - Names of Major Stockholders
 - Parent Corporation (if any)

3.7 Industrial Alcohol Dealers License

An Industrial Alcohol Dealers License must be obtained to allow the production and sale of ethanol as a motor vehicle fuel. Application for this license should be made at the Alcoholic Beverage Control District Office for Imperial County. The license is issued upon receipt and verification of specific information, including:

- 1) Name and location of ethanol plant
- 2) Types of transactions involved - i.e., premise-to-premise transfer, exchange, person-to-person transfer.

3.8 Still License

It is a felony in the State of California to possess or operate an unlicensed still. The California Alcoholic Beverage Control has established special procedures for licensing stills for producing industrial alcohol for fuel (non-beverage) use. Certain forms are filed in person with the Alcoholic Beverage Control District Office for Imperial County; these forms require the following information:

- 1) Personal Affidavit of responsible persons
- 2) Financial Affidavits in support of application
- 3) Diagram of the licensed premises showing where ethanol is to be sold, served, consumed, possessed or stored

3.9 Permit to Operate a Pressure Vessel

The State Department of Industrial Relations requires a permit to operate a pressure vessel. The permit process enables verification by the Division of Occupational Safety and Health, that the pressure vessel was fabricated

in accordance with ASME (American Society of Mechanical Engineers) strict specifications. After the pressure vessel is constructed, the Division will issue a Permit to Operate subject to a satisfactory inspection report on the constructed vessel. A formal application form for this permit is not available.

4.0 FEDERAL GOVERNMENT PERMITS AND APPROVALS

In concert with the federal government's delegation of authority to the states, very few permits for ethanol plants are handled by federal agencies. For an ethanol plant producing alcohol for use as a fuel and using a geothermal energy source, the major federal permits are the Alcohol Fuel Producers Permit and the Geothermal Utilization Permit. This and other actions involving federal approvals are tabulated in Table 5 and described below.

4.1 Alcohol Fuel Producers Permit

The Department of the Treasury, Bureau of Alcohol, Tobacco and Firearms regulates the operation of distilled spirits (ethanol) plants intended solely for producing, processing and storing, and using or distributing distilled spirits exclusively for fuel use. For a large plant (producing in excess of 500,000 proof gallons per year), a \$200,000 bond for providing security to the government against possible loss of distilled spirits tax revenue must be submitted along with the following information:

- 1) Plot Plan of ethanol plant including location and land owner
- 2) Description of Still - including the manufacturer, serial number, kind, capacity (maximum number of proof gallons that can be distilled in a 24-hour period)
- 3) Basic feedstock material(s)
- 4) Description of security measures to be used to protect premises, buildings and equipment where spirits are produced, processed and stored.
- 5) A statement as to the environmental impact of the proposed operation
- 6) Statement of the amount of funds invested in the business and the source of those funds
- 7) Information identifying the principal persons involved in business and a statement as to whether any principal person has been convicted of a felony or misdemeanor under Federal or State law
- 8) Statement of the type of business organization and the persons with an interest in the business

- 9) Corporate charter or certificate of corporate existence
- 10) List of directors and officers, including names, addresses, social security numbers, dates and places of birth
- 11) Certified extracts or digests of minutes of meetings of Board of Directors authorizing certain individuals to sign for the corporation
- 12) Statement showing the number of shares of each class of stock or other evidence of ownership and the voting rights of the respective owners or holders
- 13) Names and addresses of the 10 persons having the largest ownership or other interest in each of the classes of stock in the corporation.

4.2 Geothermal Utilization Permit

A Geothermal Utilization Permit (GUP) is required for constructing and operating a facility that involves direct use of a geothermal resource. This permit is obtained from the U. S. Department of Interior, Geological Survey, and involves a multi-faceted application process.

The first step of the GUP process* involves preparation and submittal of a "Plan of Utilization (POU)". This must be submitted prior to construction along with the application for a GUP. The POU should present a general overview of the proposed ethanol plant and its operation. Detailed engineering design plans and specifications for actual construction may be submitted later as they become available. Ideally, the POU should include the following information:

1) Title Page showing:

- Lease number(s)
- Location (Section, Township, Range, Base and Meridian, County, State, KGRA)
- Name, Address, Phone Number for lessee or operator, contractor, and field representatives
- Brief description of proposed operations and objectives
- Estimated starting and completion dates for each activity

2) Topographic Map showing:

- Facilities and production and injection wells
- Power transmission lines
- Federal and private lease boundaries and serial numbers
- Existing and planned access roads
- Source of road building materials

*There are no formal application forms for the Geothermal Utilization Permit or the Plan of Utilization.

- 3) Description, purpose and operation procedures for each facility or important components of the facility
- 4) Schematic flow diagram of the important components of each facility
- 5) Plan of proposed architectural landscaping
- 6) Time schedule for installation and start-up of the facility, including designing of the plant, acquiring materials, construction, and prestart-up testing
- 7) Number of personnel necessary to operate the facilities
- 8) Schedule for testing and maintaining safety devices
- 9) Large-scale map showing layout of the operations site (equipment, facilities, dumps, etc.)
- 10) Detailed engineering plan and profile drawings for any site, road, or other construction or modification located on rugged terrain, potentially unstable ground, or environmentally-sensitive area.
- 11) Facility-Site Suitability Studies conducted and planned, including reports, logs, laboratory reports, and raw data obtained from geological, geotechnical and soil bearing surveys.
- 12) Water Supplies: Source, quality, consumption rate, and planned use
- 13) Disposal Methods for wastewater, solid wastes, and non-condensable gases, other than those covered in a Plan of Injection (provided by Union)
- 14) Narrative Statement containing: Measures to prevent or control fires, pollution of surface and ground water, air and noise pollution, hazards to public health and safety, and damage to fish, wildlife, natural resources, and areas of cultural, historical, or archaeological value.
- 15) Certified Statement of the presence of or absence of any cultural, historical, or Native American religious site which may be disturbed by operations. The statement must be made by a person acceptable to the Bureau of Land Management, and a copy must be submitted to BLM and Deputy Conservation Manager of the U.S. Geological Survey. A certified statement of the presence of any rare, threatened or endangered animal or plant species may also be required.
- 16) Emergency Contingency Plans including: Accident and Injury Contingency Plan containing:
 - Description of adverse effects the emergency would have on operations, personnel, public health and the environment
 - Measures to control these effects, including shutdown procedures
 - Responsibilities of each employee in an emergency situation
 - Information about personnel with special training or experience with emergency procedures
 - Where to obtain emergency control services and medical aid
 - Emergency notification list (names, addresses and telephone numbers of pertinent Federal, State and local regulatory, law enforcement, and emergency service offices)

- 17) Program for monitoring operations to assure compliance with noise, air, hazardous wastes, and water quality standards and regulations.
- 18) Abandonment and Reclamation Procedures

The GUP requires a two-step approval. The initial approval authorizes construction and prestart-up testing of the ethanol plant. The second approval allows operation of the facility and is obtained after evaluation of the prestart-up testing results (which generally takes about 2 weeks). Various phases of facility construction may be authorized by the issuance of "Geothermal Sundry Notices" when complete construction plans are not submitted with the GUP application. However, approval of the Sundry Notices must follow the 'conceptual' first approval of the GUP.

The GUP application and Plan of Utilization are submitted concurrently. After construction and prestart-up testing, the signed GUP must be submitted with the prestart-up test results in order to obtain the second step approval. Over and above the information submitted in the POU (the 18 items listed previously), the following additional information must be submitted as part of the GUP application:

- 1) An official surveyor's plat showing elevation at ground level and location of the facility and all related sites by distances from the nearest section or tract lines or corners.
- 2) Detailed engineering design plans and specifications for all construction of principal and related facilities, power transmission lines, and facility sites, including road construction and improvement.
- 3) A list of all state, county and other local agencies and private organizations, including professional consultants, who have conducted or will conduct independent reviews of criteria, analyses and designs for verification of sound design practice and compliance with applicable codes and standards.
- 4) Operating Plan containing procedures and standards to operate and maintain the facility.
- 5) Planned metering to determine facility input and output.
- 6) Proposed sampling and chemical analyses program to monitor fluid flow stream through facility, including byproducts.
- 7) Schedule and Procedures for installation and prestart-up testing of all equipment and commencement of operations for commercial utilization of resources.

Based on information provided by the U. S. Geological Survey, approximately three (3) months are required to obtain conceptual 'first approval' of the GUP. It is important to note that construction of the ethanol facility cannot

proceed until conceptual first approval has been obtained. Thereafter, Geothermal Sundry Notices can be issued to allow construction to begin and take place in phases as construction drawings and specifications become available.

4.3 Federal Excise Tax Exemption

Effective from January 1, 1979 to October 1, 1984, sales of fuel blended from gasoline and alcohol which is at least 10 percent ethanol made from agricultural or forestry products, are exempt from the 4-cent Federal Excise Tax. This exemption also applies to gasoline or other motor fuel purchased for the purpose of blending with alcohol, including gasoline used as a denaturant.

So as not to be taxed on the gasoline purchased for denaturing the ethanol, a valid Federal Excise Tax Exemption number must be obtained by submitting the following information on Form 637:

- 1) Corporation Name and address
- 2) Employer's Identification Number
- 3) Description of material to be purchased, and its intended use

5.0 PERMITS AND APPROVALS FROM OTHER AGENCIES

The Imperial Irrigation District (IID) was formed in 1911 as a publicly-owned subdivision of the State of California, and presently has jurisdiction over much of Imperial County with respect to irrigation water and commercial electrical power. Both industrial (non-potable) water and electrical power for the ethanol refinery would be acquired through the District. Table 6 lists the permit/approval process, and the following paragraphs describe the required steps in greater detail.

5.1 Industrial Water

The Imperial Irrigation District has jurisdiction over a major portion of Imperial County with respect to providing non-potable water for irrigation and limited industrial use. Over the years an extensive system of gravity-flow canals and drains have been constructed to provide controlled water for crop irrigation. The District will also supply water from this system to those industries that are judged to be agriculturally-related, as is the ethanol refinery. In the case of the proposed ethanol refinery, the nearest water supply is the East Highline Canal.

The project site is presently outside the water service area of the District and must therefore undergo annexation before water from the District's resources could be provided to the site. The annexation process is estimated to require approximately 4-6 months and is initiated by submitting a written request in letter form to the District's Board of Directors. If the Board looks upon the annexation request favorably, it is then submitted to the Water and Power Resources Agency (formerly the Bureau of Reclamation). This Agency has final authority over the annexation request and considers the amount of water required by the project, as well as long-term availability of water from the Colorado River. If annexation is approved by the Agency, an Authorization Card (signed by a responsible person representing the ethanol refinery) is then submitted to IID. The District will then provide water from the East Highline Canal; expenditures for transmitting or diverting the water from the canal to the project site are borne by the user, however, and not by the District.

5.2 Commercial Power

In 1936, the Imperial Irrigation District entered the power business by constructing hydroelectric plants on the All-American Canal. The District has continued to expand its power service to its present capacity of 370 MWe. (The annual growth rate is approximately 18 MWe/year.) The power needs of the ethanol refinery are of the order of 4-5 MWe. The District is presently conducting a detailed study covering various options for providing the project site with the required power. The results of this study are not yet available. In any event, commercial power must be obtained through the IID; formal application is made on a standard form requiring the following information:

- 1) Name, address of business
- 2) Electric Loads required by ethanol refinery
- 3) Names of Officers of company

Table 1

APPLICABLE LOCAL GOVERNMENT PERMITS

Permit Title	Issuing Agency	Purpose of Permit	Process Time	Fees	Time of Submittal
Application Environmental Information Form ¹	Imperial County Planning Dept.	To provide information to the County's Environmental Evaluation Committee to determine extent of environmental documentation required.	15 days	\$ 50	As soon as project can be defined and ethanol process parameters are known.
Environmental Documentation ¹	Imperial County Planning Dept.	To evaluate environmental impacts and to identify mitigation measures.	3-6 months	\$100	As early in the process as possible.
General Plan Amendment ²	Approved by Imperial County Board of Supervisors, processed by Imperial County Planning Dept.	To amend County's General Plan Land Use designation from Agriculture to Heavy Industry	60-90 days	\$200	Submit as soon as environmental document has been accepted. Submit with Zone Change application.
Zone Change ²	Approved by Imperial County Board of Supervisors, processed by Imperial County Planning Dept.	To zone project site Heavy Manufacturing (M-2)	90-120 days	\$200	Submit concurrently with General Plan Amendment request.
Geothermal Production Permit ³	Imperial County Planning Dept.	Authorizes operation of the ethanol plant using geothermal energy source.	45 days	\$100	Submit concurrently with Zone Change request for Geothermal (G) zone.
Authority to Construct	Imperial County Air Pollution Control District	To permit construction of the ethanol plant.	30 days to accept application 180 days to issue permit	\$25 + \$500 deposit for New Source Review	Submit as soon as air pollutants and pollution equipment can be identified.

Table 1

APPLICABLE LOCAL GOVERNMENT PERMITS

(Continued)

Permit Title	Issuing Agency	Purpose of Permit	Process Time	Fees	Time of Submittal
Subsurface Septic System and/or Surface Oxidation Pond Disposal Permits	Imperial County Health Dept., Office of Environmental Quality	To permit construction of disposal systems for handling domestic wastewater.	30 days	\$ 30	Submit when wastewater treatment system is designed.
Building Permits	Imperial County Building Dept., Inspection Division	To approve structural, electrical, plumbing, mechanical, grading, demolition, and fire and life safety plans.	3-4 weeks	\$207,000 (Based on \$50M turnkey construction.)	Submit design plans as they are available
Solid Waste Permit ⁴	Imperial County Public Works Dept.	To permit disposal of solid waste at County disposal sites.	7 days	\$18 to \$25 per load.	Apply for prior to construction/site preparation activities.
Encroachment Permit	Imperial County Public Works Dept., Road Commissioner	To allow construction within county right-of-way	14-21 days	Bond for amount of improvements	Apply for as construction plans are finalized.
Permit to Operate	Imperial County Air Pollution Control	To permit operation of the ethanol plant.	60 days	\$400	Submit after Authority to Construct Permit has been granted and prior to operation of the ethanol plant.

NOTES:

1. Environmental Assessment will be prepared by DOE as part of the Loan Guarantee process. The Assessment will be written to serve as the county's environmental document also.
2. Optional if project is on Federal land. (Applicant intends to process all land use permits including a General Plan Amendment and appropriate Zoning.)
3. Required only if on private or State land.
4. Required only if an already-licensed disposal hauler is not used.

Table 2
APPLICABLE STATE GOVERNMENT PERMITS

Permit Title	Issuing Agency	Purpose of Permit	Process Time	Fees	Time of Submittal
Waste Discharge Permit	California Resources Agency; Colorado River Basin Regional Water Quality Control Board	To permit land disposal of domestic and process wastewater.	30 days	\$100 ea = \$200	Apply for as soon as wastewater treatment systems have been designed.
Encroachment Permit	Business and Transportation Agency, Dept. of Transportation	To permit construction within State right-of-way	14-21 days	Bond for amount of improvement	Apply for when construction plans are finalized.
Weighmasters License	Dept. of Food and Agriculture, Div. of Measurement Standards	To certify accuracy of merchandise weight or measurement when price is based on a weight or measurement	30 days	\$ 50	Apply for when weighing and measuring devices are on-hand.
Permit to Operate a Pressure Vessel	Dept. of Industrial Relations, Div. of Occupational Safety and Health	To permit operation of a pressure vessel fabricated by an ASME-certified fabricator/manufacturer.	30 days	\$ 60	Apply for when pressure vessel fabrication is nearing completion.
Commercial Feed License	Dept. of Food and Agriculture; Feed, Fertilizer and Livestock Drug Unit	To permit manufacture and commercial distribution of animal feed	30 days	\$ 25	Apply for towards end of construction.

Table 2

APPLICABLE STATE GOVERNMENT PERMITS

(Continued)

Permit Title	Issuing Agency	Purpose of Permit	Process Time	Fees	Time of Submittal
Motor Vehicle Fuel Distributor License	Board of Equalization, Excise Tax Branch	To permit the sale of ethanol (subject to a 7¢/gallon tax) for use as a motor vehicle fuel.	15 days	Surety Bond between \$1000 and \$500,000.	Apply for near completion of construction phase.
Sellers Permit	Board of Equalization, Sales Tax Branch	To permit the sale of ethanol subject to a 6% sales tax.	7 days	No Fee	Apply for near completion of construction phase.
Industrial Alcohol Dealers License	Alcoholic Beverage Control Board	To permit the production and sale of ethanol as a motor vehicle fuel.	30 days	\$61.60	Apply for after the Federal Alcohol Producers Permit has been granted.
Still License	Alcoholic Beverage Control Board	To license the still	30 days	\$ 6.20	Combine this application with the Industrial Alcohol Dealers License

Table 3

APPLICABLE FEDERAL GOVERNMENT PERMITS

Permit Title	Issuing Agency	Purpose of Permit	Process Time	Fees	Time of Submittal
Environmental Documentation ¹	Department of the Interior, Geological Survey	To evaluate environmental impacts and to identify mitigation measures	6 months	No Fees	As early in the process as possible.
Geothermal Utilization Permit ²	Department of the Interior, Geological Survey	To: 1) Authorize construction and prestart-up testing of the ethanol plant, and 2) Authorize operation of the ethanol plant.	9 months	No Fee	Apply for soon as design plans are completed.
			2 weeks	No Fee	Apply for after prestart-up test results have been approved by USGS.
Alcohol Fuel Producers Permit	Department of the Treasury, Bureau of Alcohol, Tobacco and Firearms	To permit production, processing, storage and distribution of ethanol for fuel use.	60 days	\$200,000 Bond	Apply for soon as design is known; however, plant must be operational within 2 years from issuance of permit.
Federal Excise Tax Exemption ³	Internal Revenue Service, Excise Tax Office	To obtain exemption from paying 4-cent per gallon tax on gasoline purchased to blend with ethanol.	Effective Immediately	No Fee	Apply for near completion of construction.

NOTES:

- 1 An Environmental Assessment will be prepared by DOE as part of the Loan Guarantee process. This document will be written to meet the environmental documentation requirements of the USGS and Imperial County (with respect to land use requests).
- 2 Required only if project is on Federal land. On private or State land, the Imperial County Geothermal Production Permit suffices for the ethanol plant.
- 3 This exemption is currently effective from Jan. 1, 1979 to Oct. 1, 1984.

Table 4

OTHER REQUIRED PERMITS/APPROVALS

Permit/Approval	Issuing Agency	Purpose of Permit/Approval	Process Time	Fee	Time of Submittal
Annexation to IID	Water and Power Resources Agency and Imperial Irrigation District	To annex to water service area of IID and thereby obtain industrial water from East Highline Canal.	6 months	No Fee	Apply at start of project
Authorization Card (Water)	Imperial Irrigation District	To obtain water delivery from East Highline Canal.	1 month	No Fee	As soon as annexation to IID has been obtained
Authorization Card (Power)	Imperial Irrigation District	To obtain commercial power	12-14 months	No Fee	Apply at start of project

6.0 RAILROAD SPUR LINE REGULATORY PROCESS

As an adjunct to the proposed ethanol refinery, a railroad spur line may ultimately be constructed along the Pampas Lateral eastward across the East Highline Canal and thence southeast to the project site. Various privately-owned land, public roads and highways and irrigation facilities would be affected in the segment between the existing Southern Pacific main line near Holtville (at the Pampas Lateral location) and a location just east of the East Highline Canal. From this latter location to the project site, the railroad spur would cross federal Bureau of Land Management property. The following subsections describe the various permits and/or approvals that are required for construction and operation of this spur line; Table 7 lists these items in tabular form.

6.1 Local Government Permits and Approvals

6.1.1 Conditional Use Permit

Imperial County requires approval of a Conditional Use Permit for installation and operation of the railroad spur across privately-owned land and public roads and highways. As part of the CUP process, Imperial County would have to make a finding that the proposed railroad spur would be consistent with the adopted General Plan. This would involve careful consideration of the long-term impact of the railroad spur line on future development of the regional area (since the spur line could likely induce industrial growth in the particular area that is presently designated "Agriculture" on the adopted General Plan) and the environmental impacts including noise, public safety, and potential use of agricultural land along the required 30 feet of right-of-way. Information to be included in the application for a CUP is as follows:

- 1) Legal description of the property included in the right-of-way
- 2) Statement of intended use
- 3) Plot Plan showing existing and proposed structures, adjacent land uses, zoning, along the proposed route.

6.1.2 Encroachment Permits

The Public Works Department (Road Commissioner's Office) issues Encroachment Permits for each crossing of a county road. In order to obtain an Encroachment Permit, detailed drawings showing the appropriate safety control devices are to be submitted for their review and approval. Although

the standard fee for an Encroachment Permit is approximately \$15, the additional inspection involved with the spur line could increase this fee to \$2,000-\$3,000. Information required on the application includes:

- 1) Construction drawings showing work proposed within the County right-of-way, including details of all proposed safety crossing control devices.
- 2) Bond for value of improvements within the County right-of-way.

6.2 State Government Permits and Approvals

6.2.1 Authority to Cross Public Road

The California Public Utilities Commission has the responsibility of assuring public safety with respect to railroad crossings of all public roads. Applications for the "Authority to Cross Public Road" are not accepted by the PUC from private parties, but must be submitted by either the City, the County, or the railroad -- in this case, the Southern Pacific Transportation Company. A standard application form is not available for obtaining the "Authority to Cross," but is handled on a case-by-case basis by submitting a letter describing the intended use and submitting details with respect to safety crossing control devices.

6.3 Federal Government Permits and Approvals

6.3.1 Approval from Bureau of Land Management for Railroad Installation

The Bureau of Land Management has jurisdiction over surface land uses on property owned by them, whether or not the property is leased to others. Thus, BLM's approval of the railroad right-of-way and routing would have to be obtained prior to construction of the spur line. The BLM's approval is governed, to a large extent, by the adopted California Desert Plan and the Public Transportation and Transmission corridors specifically identified in the plan. The proposed routing to the project site is not contained within an already identified transportation corridor and would therefore involve a lengthy process for consideration of an amendment to the California Desert Plan to accommodate the proposed routing.

6.4 Permits and Approvals from Other Agencies

6.4.1 Encroachment Permits from Imperial Irrigation District

The proposed routing between the federal BLM land and the existing main SPRR line near Holtville would involve crossing of numerous irrigation laterals, drains and canals that are owned and maintained by the Imperial Irrigation District. For each crossing of their facilities, an Encroachment Permit would be required; this permit is issued after satisfactory review of the proposed crossing devices. The District would additionally evaluate which of the crossings could be accommodated by merely installing underground pipe and thereby avoiding overhead crossings of the laterals and drains. The major crossing would be at the East Highline Canal, and the District would expect this crossing to be constructed by a qualified contractor at the expense of the applicant.

6.4.2 Approval from Southern Pacific Transportation Company

Once the railroad spur line would be operational, Southern Pacific Transportation Company would operate the train equipment. Thus, Southern Pacific must play a key role in assuring that design and construction of the spur line meets with their specific requirements. In order to obtain approval from Southern Pacific for installation of the spur line, all engineering drawings are required to be reviewed and approved by the Southern Pacific Chief Engineer.

Table 5

PERMITS/APPROVALS REQUIRED FOR RAILROAD SPUR LINE

Permit/Approval Title	Issuing Agency	Purpose of Permit	Process Time	Fees	Time of Submittal
Conditional Use Permit	Imperial County Planning Dept.	To regulate land use on non-federal land required for railroad right-of-way	2-3 months	\$100	As soon as railroad routing is determined.
Encroachment Permits	Imperial County Public Works Dept. - Road Commissioner's Office	To permit construction of railroad line across county roads and to assure proper safety control devices are installed.	1 month	Unknown	As soon as detailed drawings of crossings are available.
Authority to Cross Public Road	California Public Utilities Commission	To assure installation of required safety control devices where railroad crosses public roads	2-3 months	Unknown	As soon as detailed drawings of crossings are available.
Approval to construct railroad on BLM land	Bureau of Land Management	To regulate land use on federal land	6 months	Unknown	Contact should be made with BLM as soon as possible to discuss possible routings across their land to the project site.
Encroachment Permits	Imperial Irrigation District	To permit crossing of IID laterals, drains and canals.	1 month	Unknown	As soon as routing has been identified a meeting should be held with IID to ascertain required methods for crossing IID facilities.
Approval of Track Design/Construction	Southern Pacific Transportation Company	To obtain approval of spur line design and equipment for operation by SPRR.	1-2 months	Unknown	As soon as detail drawings are available

7.0 TIMETABLE FOR PERMIT APPLICATION/APPROVAL PROCESS

The permit/approval process estimated schedule is presented in Table 8. The controlling action on construction start-up will be issuance of the Air Pollution Control District's 'Authority to Construct' permit which requires an estimated 6-7 month processing period. In order to begin construction by the eighth month, it is essential that a complete permit application be submitted to the Imperial County APCD at the beginning of Month 1 (which is the start of Phase II of this project).

The operational date for the ethanol plant will be controlled by the availability of commercial power since long lead times are involved for procurement and installation of power equipment. The schedule shown in Table 8 is based on a 13-month timeframe for purchasing and installing a power transformer. If more extensive power generating equipment is required, the start-up date could be extended 2-3 years.

Most of the permits are highly dependent on the availability of design drawings which must be included along with the applications for each permit. This applies particularly to building permits (including plumbing, electrical, mechanical, etc.) and to the Geothermal Utilization Permit. However, both Imperial County and USGS allow construction to proceed in phases by reviewing design drawings as they become available and issuing permits covering the approved tasks.

Land use regulations (including the General Plan amendment, zone change and Conditional Use Permit) are processed through Imperial County's Planning Department. As mentioned previously, the Environmental Assessment prepared as part of the Loan Guarantee process by the DOE is intended to serve also as the county's environmental document.

Wastewater discharge and domestic sewage system permits can be applied for as soon as design drawings and technical specifications covering these systems are available. Those permits that are needed for operation of the ethanol plant can be applied for during the latter stages of construction. These include the Weighmasters License, Industrial Alcohol Dealers License, Motor Vehicle Fuel Distributor License, and the Permit to Operate (issued by the Imperial County APCD), among others. The federal Alcohol Fuel Producers Permit can be applied for mid-way through construction inasmuch as it takes only about 60 days to process; however, it should be recognized that the plant

must be operational within 2 years of issuance of this permit. The Geothermal Utilization Permit is the final authorization permitting operation of the ethanol refinery. Issuance of this permit is contingent upon USGS's satisfactory review and approval of the prestart-up test results.

The timetable for obtaining the required permits and approvals for construction of the railroad spur line is also presented in Table 6 . This involves first of all, the establishment of a routing that is satisfactory to BLM, Imperial County and Southern Pacific Transportation Company. This process must start with BLM which has jurisdiction over that portion of the route crossing their property (generally that area east of the East Highline Canal). Following approval by BLM, a Conditional Use Permit must be obtained from Imperial County's Planning Department (with final approval by the Board of Supervisors). Once these approvals are obtained, Encroachment Permits are required from a number of agencies including the Public Works Department of Imperial County, the California Public Utilities Commission, and the Imperial Irrigation District. Finally, since the Southern Pacific Transportation Company will operate the train on the spur line once it is constructed, all design drawings must be submitted to Southern Pacific for review and approval prior to actual construction.

REVISION:

Form 11-22-00-0773-00

IMPERIAL VALLEY ETHANOL REFINERY

U.S. ALCOHOL FUELS

PROJECT NUMBER 1013

APPENDIX 1

PERMIT APPLICATION FORMS

APPLICATION FOR CHANGE OF ZONE
AS PROVIDED BY PART 25 OF ORDINANCE 249
OF THE COUNTY OF IMPERIAL

DATE: _____

TO THE COUNTY PLANNING COMMISSION

COUNTY OF IMPERIAL, CALIFORNIA

The undersigned applicant is the (leasee) (owner) of the following
described property (give complete legal description).

The property is situated (give street address of exterior boundary
by streets, alleys, canals, drains, etc.)

Statement of intended use: _____

Adjacent Land Uses: _____

Adjacent Zoning: _____

Application for Change of Zone
Page Two

A plot plan of the property involved, showing all existing and proposed structures shall be included as a part of this application. Additional plans may be required if the Planning Commission finds them necessary.

Present Zoning _____ Zoning Requested _____

We, the undersigned property (leasee) (owner) request that Ordinance No. 249, Map No. _____ be amended to reclassify this property from Zone _____ to Zone _____.

Print or type name

Address

Signature

City

Print or type name

Address

Signature

City

Application taken by: _____

Zone: _____

Date: _____

APPLICATION FOR CONDITIONAL USE PERMIT
AS PROVIDED BY PART 26 OF ORDINANCE 249
OF THE COUNTY OF IMPERIAL

DATE _____

TO THE COUNTY PLANNING COMMISSION

COUNTY OF IMPERIAL, CALIFORNIA

The undersigned applicants is the (leasee) (owner) of the following described property. (Give complete legal description.)

The property is situated (give street address, or exterior boundary by streets, alleys, canals, drains, etc.).

Present Zoning _____

Adjacent Land Uses _____

We, the undersigned property (leasee) (owner) request a Conditional Use Permit to use the above described property for the following purpose:

Application for Conditional Use Permit
Page 2

A plot plan of the property involved, showing the location of all existing and proposed structures shall be included as part of this application. Additional plans may be required if the Planning Commission finds them necessary.

The undersigned applicant must commence work within six (6) months from the date of issuance and pursue diligently until completion of work or the permit shall expire by limitation and become null and void.

Print or type name _____ Address _____

Signature _____ City _____

Print or type name _____ Address _____

Signature _____ City _____

Application taken by: _____

Zone: _____ Date: _____

Form #311

Application for 'Authority to Construct' and 'Permit to Operate'

IMPERIAL COUNTY AIR POLLUTION CONTROL DISTRICT
County Services Building
El Centro, California 92243
352-3610 Ext. 240

APPLICATION FOR: ☐ Authority to Construct

\$25.00
~~XXX.XX~~ Filing Fee

☐ Permit to Operate

Permit Number _____

☐ Formal Inspection

Date: _____

☐ NEW

☐ RELOCATION

☐ TRANSFER OF OWNERSHIP

☐ EQUIPMENT MODIFICATION OR ADDITION

☐ RENEWAL

1. Name of Business _____

2. Responsible Person _____

3. Mailing Address _____

4. Title _____

5. City, State and Zip Code _____

6. Telephone Number _____

7. Type of Organization (Check Appropriate Box)

☐ Corporation ☐ Partnership ☐ Individual Owner ☐ Government ☐ Other

8. Brief Description of Business/Operation _____

9. Location of Plant/Operation _____

10. Person in Charge at Location _____

11. Title _____

12. Telephone Number _____

13. Construction Completion Date _____

14. Start-Up Date _____

15. ATTACHMENTS (Please Check Appropriate Boxes)

a. ☐ Equipment Summary c. ☐ Rules Compliance Summary e. ☐ Drawings and Specifications g. ☐ Plot Plan

b. ☐ Flow Chart(s) d. ☐ Calculations f. ☐ Filing Fee h. ☐ _____

16. ☐ All attachments previously submitted with the Authority to Construct application are valid and no changes have been made.

☐ The information supplied for the previous Permit to Operate is still valid and no changes have been made.

☐ Any equipment/process variations from the previous application are attached.

"I am familiar with the Rules and Regulations of the Imperial County Air Pollution Control District and I certify that the operation of the plant and/or equipment which is the subject of the application will comply with said Rules and Regulations."

Signature of Responsible Person _____

Title _____

Name (Printed) _____

Date _____

17. ACTION TAKEN BY APCD (Official Use Only)

PERMIT

APPLICATION

TYPE OF PERMIT

☐ BUILDING
☐ ELECTRICAL
☐ PLUMBING
☐ MECHANICAL
☐ DEMOLITION

CLASS OF WORK

☐ NEW RESIDENCIAL
☐ NEW COMMERCIAL
☐ NEW INDUSTRIAL
☐ NEW POOL
☐ MOBILE HOME UTILITIES
☐ REMODEL RESIDENCIAL
☐ REMODEL COMMERCIAL
☐ REMODEL INDUSTRIAL
☐ GRADING

(APPLICANT TO COMPLETE NUMBERED SPACES ONLY)

1. OWNER		MAIL ADDRESS		ZIP	PHONE
2. JOB ADDRESS					
3. LEGAL DESCRIPTION	LOT	BLOCK	TRACT	ASSESSORS PARCEL NO.	
ARCHITECT OR ENGINEER	MAIL ADDRESS		LICENSE NO.	PHONE NO.	
4. CONTRACTOR	MAIL ADDRESS		LICENSE NO.	PHONE NO.	
5. LENDER	MAIL ADDRESS		PHONE NO.		
6. DESCRIBE PROPOSED WORK					
7. STATE INTENDED USE OF BUILDING OR PROPOSED WORK					
8. TWO SETS OF PLANS INCLUDED		SIZE OF PROJECT		SQUARE FOOTAGE	VALUATION
☐ YES ☐ NO					
NOTICE					
THIS PERMIT BECOMES NULL AND VOID IF WORK OR CONSTRUCTION AUTHORIZED IS NOT COMMENCED WITHIN 120 DAYS, OR IF CONSTRUCTION OR WORK IS SUSPENDED OR ABANDONED FOR A PERIOD OF 120 DAYS AT ANY TIME AFTER WORK IS COMMENCED. I HEREBY CERTIFY THAT I HAVE READ AND EXAMINED THIS APPLICATION AND KNOW THE SAME TO BE TRUE AND CORRECT. ALL PROVISIONS OF LAWS AND ORDINANCES GOVERNING THIS TYPE OF WORK WILL BE COMPLIED WITH WHETHER SPECIFIED HEREIN OR NOT. THE GRANTING OF A PERMIT DOES NOT PRESUME TO GIVE AUTHORITY TO VIOLATE OR CANCEL THE PROVISIONS OF ANY OTHER STATE OR LOCAL LAW REGULATING CONSTRUCTION OR THE PERFORMANCE OF CONSTRUCTION.					
SIGNATURE OF CONTRACTOR OR AGENT				DATE	
10. SIGNATURE OF OWNER-BUILDER				DATE	
11.					
A. ZONING B. SANITATION C. FIRE DEPT. D. FLOODING EASEMENT E. ENERGY CERT. F. OTHER Grading Demolition					
FEE COMPUTATION					
QTY.		ITEM		FEE	
ELECTRICAL PERMIT					
		Main service under 200 Amp.			
		Main service over 200 Amp.			
		Each breaker box			
		Each motor (see other side)			
		Each stationary unit			
		Other			
				ELECTRICAL FEE \$	
PLUMBING PERMIT					
		Each plumbing fixture or trap			
		Each sewer connection			
		Each water heater			
		Gas piping (1 to 5 outlets)			
		Water piping (1 to 4 outlets)			
		Other			
				PLUMBING FEE \$	
MECHANICAL PERMIT					
		A/C with ducts (BTU)			
		Ventilation fan			
		Range hood			
		Furnace			
		Other			
				MECHANICAL FEE \$	
S.M.I.					
BUILDING PERMIT		\$			
PLAN CHECK FEE		\$			
ELECTRICAL		\$			
PLUMBING		\$			
MECHANICAL		\$			
DEMOLITION		\$			
OTHER		\$			
RECEIPT NO: PERMIT NO: DATE:					
APPLICATION ACCEPTED BY		DATE	APPROVED BY		DATE
TOTAL FEE \$					

"I CERTIFY THAT IN THE PERFORMANCE OF THE WORK FOR WHICH THIS PERMIT IS ISSUED I SHALL NOT EMPLOY ANY PERSON IN ANY MANNER SO AS TO BECOME SUBJECT TO THE WORKMEN'S COMPENSATION LAWS OF CALIFORNIA."

NAME _____

SIGNATURE _____

If, after making this certificate, I become subject to the workmen's compensation provisions of the California Labor Code, I will forthwith comply with Section 3700 of the Labor Code.

I understand that if I fail to comply with the workmen's compensation laws, this permit shall be deemed revoked.

"CERTIFICO QUE EN ESTA OBRA POR CUAL SE ME DA ESTE PERMISO PARA CONSTRUIR, QUE NO VOY A EMPLEAR A NINGUNA PERSONA EN CUALQUIER MANERA DE QUE ME SUJETA A LOS REQUISITOS DE LAS LEYES DE CALIFORNIA CUBRIENDO SEGUROS DE TRABAJADORES (WORKMEN'S COMPENSATION).

NOMBRE _____

FIRMA _____

Si despues de haber hecho este certificado, llego a hacer sujeto a los requisitos de compensacion para trabajadores de el codigo de trabajo de California, yo cumplire inmediatamente con seccion 3700 de el codigo de trabajo.

Comprendo que si no cumplo con los leyes de compensacion para trabajadores, este permiso sera visto como revocado.

<u>MOTOR SCHEDULE</u>			
QTY	SIZE	PER EA	FEE
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
TOTAL M.P. _____		TOTAL FEE _____	

Application for Encroachment Permit from County
Public Works Department

No. _____

APPLICATION FOR ENCROACHMENT PERMIT
Ordinance No. 218

Date _____

To The Imperial County Road Commissioner
Imperial County, California

Gentlemen:

The undersigned hereby applies for permission to excavate,
construct and/or otherwise encroach on County right of way by
performing the following work:

Space for sketch, submit detailed plans if available.

At the following location _____

And agrees to do the work in accordance with your rules and
regulations and subject to your inspection and approval.

Date work to be completed: _____

Amount of Bond: (Cashier's Check, Certified Check or Surety Bond)

Recommended by Road Commissioner

\$ _____

Applicant will print or type name

Signature of Applicant

Address

Application for Waste Discharge Permit

STATE OF CALIFORNIA THE RESOURCES AGENCY OF CALIFORNIA CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

REPORT OF WASTE DISCHARGE Pursuant to Division 7 of the State Water Code

FOR USE OF REGIONAL BOARD

(A) REPORT FROM:

Discharger: _____
(Owner of Facility, Municipality, County, District, Firm or Individual)
Mailing Address: _____
Zip Code: _____
Telephone No.: _____
Name of Facility: _____

WRCB Form 200 Rec'd: _____

Duty Fee: _____

Letter to _____

Discharger: _____

Report Rec'd: _____

Effective Date: _____

(B) DESCRIPTION:

I. WASTE DISCHARGE: (check)

1. New discharge _____ ()
2. Existing discharge _____ ()
3. Increase in quantity of discharge _____ ()
4. Change in character of waste _____ ()
5. Change in place or method of disposal _____ ()

II. LOCATION OF POINT OF DISPOSAL OR OPERATION (describe and attach map, sketch or locate on USGS Quadrangle map, 7.5 minute series.) List distances or bearing and distance from section corner or quarter corner, Section, Township, Range and Base and Meridian.)

III. WASTE TREATMENT OR DISPOSAL FACILITIES: (check)

1. Construction of entirely new facilities _____ ()
2. Enlargement of existing facilities _____ ()
3. Other (explain) _____

(C) TYPE OF WASTE DISCHARGE: (check)

1. Sewage only _____ ()
2. Industrial wastes only _____ ()
3. Mixed sewage and industrial wastes _____ ()
4. Solid wastes _____ ()
5. Cattle wastes _____ ()
6. Soil, silt, clay, etc. _____ ()
7. Other wastes _____ ()

(D) QUANTITY OF WASTES:

1. Present or proposed flow (in mgd) _____
2. Design flow (in mgd) _____
3. Present population _____
4. Design population _____
5. Solid waste disposal site (in cubic yards) _____
6. Area in which soil will be disturbed (in acres) _____

(E) SOURCE OF WATER SUPPLY:

1. Municipal or utility service ()
2. Individual wells ()
3. Surface supply: (a) Name of Stream _____
(b) Type of Water Rights: Riparian () Appropriation ()
(c) Water Rights Permit or License Number _____

(F) ENVIRONMENTAL IMPACT REPORT (EIR):

1. Has an EIR been prepared for this project?
Yes () No ()
2. If yes, please enclose a copy
3. If no, will an EIR be prepared? Yes () No ()
4. If yes, who will prepare the EIR? _____

ALL OF THE STATEMENTS CONTAINED HEREIN ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND ARE SUBMITTED UNDER PENALTY OF PERJURY.

SIGNATURE OF AUTHORIZED PERSON _____

Title _____

(Manager, Clerk, Engineer, Consultant, etc.)

Date _____

You will be notified of the correctness of filing fee and submittal of any additional information deemed necessary to complete your Report of Waste Discharge pursuant to Division 7, Section 13260 of the State Water Code.

Application for Encroachment Permit from State
Department of Transportation

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

ENCROACHMENT PERMIT APPLICATION

FORM DM-M-P-1 (REV. 6/78)

TYPE OR PRINT LEGIBLY. COMPLETE ALL ITEMS. MARK N/A WHEN NOT APPLICABLE.

PART I - PROJECT INFORMATION

1. Applicant's Name:		Phone No.
2. Address:		
3. Location of Encroachment	County/City:	State Route No.
4. Project Location: Attach location map or describe location in reference to State highway.
5. Brief description of work within State right of way and attach plan(s), specifications, calculations, drainage shed maps, etc.
6. Number of days needed to do work within State right of way:
7. Are you the property owner or lessee? Yes ☐ No ☐
8. Is property: Residential ☐ Commercial ☐ Other ☐
9. Is any work being done on applicant's property? Yes ☐ No ☐
If "Yes", briefly describe and attach site and grading plans:
10. Is zoning revision involved? Yes ☐ No ☐
If "Yes", from _____ to _____. Approved by Local Agency _____ (Date)
11. Are Federal Funds involved with project: Yes ☐ No ☐
If "Yes", please describe:
12. Is City/County/other Agency requiring permits? Yes ☐ No ☐
If "Yes", please describe:
13. Is City/County/other Agency requiring environmental documents?
Yes ☐ No ☐ If "Yes", please check: Exempt ☐ ND ☐ EIR ☐
and attach.
14. If answers to Lines 12 and 13 are both "No", complete Part II.

STATE OF CALIFORNIA

DIVISION OF MEASUREMENT STANDARDS (916) 366-5119

WEIGHMASTER LICENSE APPLICATION

12-005 (REV. 6-79)

NOTE INSTRUCTIONS ON BACK OF FORM

Application for Weighmaster's License

MAIL REMITTANCE TO: CASHIER
DEPARTMENT OF FOOD AND AGRICULTURE
1220 N STREET
SACRAMENTO, CALIFORNIA 95814

1. CLASSIFICATION PUBLIC ☐ PRIVATE ☐ PUBLIC AT LARGE ☐ 2. YEAR ENDING JUNE 30, 19 _____ 3. BOND: PUBLIC WEIGHMASTERS ONLY MUST SUBMIT A \$2,000 SURETY BOND. 4. WEIGHT CERTIFICATES MUST BE SUITABLE FOR OPERATION 5. WORKMAN'S COMPENSATION INSURANCE COMPANY _____	6. INDICATE CLASSIFICATION AND AMOUNT PRINCIPAL P.W.M. AT LARGE @ \$200.00 \$ _____ PRINCIPAL PUBLIC OR PRIVATE @ \$ 50.00 \$ _____ _____ BRANCHES @ \$20.00 PUBLIC \$ _____ _____ BRANCHES @ \$20.00 PRIVATE \$ _____ _____ DEPUTIES @ \$10.00 \$ _____ TOTAL REMITTANCE \$ _____
--	--

DO NOT SEND COIN OR CURRENCY - MAIL REMITTANCE CHECK OR MONEY ORDER

7. PRINCIPAL NAME AND LOCATION FIRM, CORPORATION, PARTNERS, OWNER, (USE D.B.A. IF ANY) _____ MAILING ADDRESS _____ CITY _____ STATE _____ ZIP _____ TELEPHONE () _____ 8. SCALE LOCATION COUNTY OF _____ TELEPHONE () _____ 9. TYPE AND DESCRIPTION OF DEVICE USED _____ 10. INDICATE TYPE OF BUSINESS(S): ☐ CONCRETE READY MIX ☐ SAND, GRAVEL, ASPHALT ☐ FRUIT AND VEGETABLE PROCESSORS AND RECEIVERS ☐ GRAIN WEIGHING ☐ SCRAP METAL AND SALVAGE ☐ MOVING AND STORAGE ☐ LIVESTOCK SALES YARDS ☐ PUBLIC SCALES ☐ OTHER _____ WEIGH FOR HIRE: ☐ YES ☐ NO FORMER OWNER (IF KNOWN) _____ FORMER BUSINESS NAME _____ SIGNATURE AND TITLE OF OWNER, PARTNER, OR CORPORATE OFFICER _____ HOME ADDRESS _____ DATE _____	12. BRANCH LOCATION LICENSE(S) 1. WEIGHING LOCATION _____ COUNTY _____ TELEPHONE () _____ TYPE AND DESCRIPTION OF DEVICE USED _____ 2. WEIGHING LOCATION _____ COUNTY _____ TELEPHONE () _____ TYPE AND DESCRIPTION OF DEVICE USED _____ 3. WEIGHING LOCATION _____ COUNTY _____ TELEPHONE () _____ TYPE AND DESCRIPTION OF DEVICE USED _____ 4. WEIGHING LOCATION _____ COUNTY _____ TELEPHONE () _____ TYPE AND DESCRIPTION OF DEVICE USED _____ USE ADDITIONAL SHEETS IF NECESSARY	11. DEPUTY LICENSE(S) 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 9. _____ 10. _____ 11. _____ 12. _____ 13. _____ 14. _____ 15. _____ 16. _____ 17. _____ 18. _____ 19. _____ 20. _____ 21. _____
---	--	--

HAVE YOU COMPLETED THIS FORM IN ACCORDANCE WITH INSTRUCTIONS ON THE BACK? (41)

INSTRUCTIONS

1. Print the type of weighmaster license desired. Determine which classification is applicable to your business operation.
2. Indicate in this space the end of current fiscal year licensing period. (A fiscal year is July 1st of one year through June 30th of the following year.)
3. A license cannot be issued until a correct, properly executed, original surety bond is submitted to the department. Principal name is the official corporate name, individual name if sole ownership, all individuals' names in a partnership with DBA if a fictitious name is used. Principal or DBA name on license, surety bond, and weight certificate must be the same. Example: Tom Jones and William Smith DBA J & S Company.
4. Weight certificate must be suitable for the operation of the weighmaster and must be printed as required by Division 5, Chapter 7, Section 12715; or, Division 5, Chapter 7.3, Section 12752; or, Division 5, Chapter 7.7, Section 12785 of the Business and Professions Code.
5. Print insurance carrier's name in this space. If not covered, print "None".
6. Fill in the amount remitted in the appropriate space(s) by the Type of License, Branches, and Deputies. Indicate number of Branches and Deputies in the blank space(s) in the left column. Show total remittance.
7. Principal name is the official corporate name, individual name if sole ownership, all individuals' names in a partnership with DBA if a fictitious name is used. Principal or DBA name on the license, surety bond, and weight certificate must be the same. Example: Tom Jones and William Smith, DBA J & S Company.
8. Indicate exact place where weighing or measuring device is located by city and street address or name of ranch or number of miles from an established reference point.
9. Give type and description of the device (scale, meter, etc.) that will be used. Example: "X" Brand, Dial or Beam, 70 ft., 50 ton vehicle scale.
10. Indicate type of business. Check appropriate boxes for your type of business. Underline main type of business.
11. The signature and title and home address of the applicant or authorized representative.
12. Enter the location, county, and phone number of each branch to be licensed and a description of the device used. (See #8 and #9 above)
13. List in alphabetical order the names of all persons who will be determining weight, measure, or count and signing a certificate. A deputy license is NOT required for an owner or partner whose name appears as principal on the bond. ALL individuals of a corporation who perform the acts described above must be licensed as deputies.

Name of deputy should be submitted in the same manner as his customary signature.

STATE OF CALIFORNIA
DEPARTMENT OF FOOD AND AGRICULTUREDepartment
No.
Bonding
Company
No.**Weighmaster's Bond**

Know All Men by These Presents:

That
NAME
POST OFFICE ADDRESS as Principaland
a corporation organized under the laws of the State of and authorized to transact
a general surety business in the State of California, as Surety, are held and firmly bound unto the State of California in the
penal sum of Two Thousand Dollars for the payment of which well and truly to be made, we bind ourselves, our heirs, executors,
administrators, successors and assigns, jointly and severally, firmly by these presents.WHEREAS, The above named principal is about to engage in, conduct and carry on business as a Public
Weighmaster within the State of California;NOW, THEREFORE, if the said principal shall well, truly and faithfully perform all duties now required by law to be
performed by such Weighmasters within said State, and also all such additional duties as may be imposed upon such Weigh-
masters by any law of the State of California to be hereafter passed or enacted, then this obligation shall be void; otherwise
the same shall remain in full force and effect.The State of California, by and through the Director of Food and Agriculture, reserves the right, at any time, to terminate
this bond (except as to any liability thereunder already incurred or accrued) by a written notice of such termination to the
surety, and thereupon this bond shall terminate and be of no more force or effect except as to any liability already incurred
or accrued as to which it shall remain in full force and effect.This bond is continuous in form and the term thereof shall be from the date hereof, and shall remain in full force and
effect so long as the Principal shall be authorized by law to engage in, conduct, transact and carry on business as a Weigh-
master within the State of California unless sooner terminated as hereinafter provided.IT IS FURTHER PROVIDED, That the surety herein reserves the right to withdraw as surety from this bond except as
to any liability already incurred or accrued, and may do so upon giving the Division of Measurement Standards of the Department
of Food and Agriculture thirty (30) days written notice to that effect and thirty (30) days after the receipt of such notice by the
Division of Measurement Standards of the Department of Food and Agriculture, its liability under this bond, except as to any
liabilities or indebtedness already incurred or accrued, shall cease, and said bond shall thereupon terminate and be of no more
force or effect, except as to any liabilities or indebtedness already incurred or accrued thereunder.IN WITNESS WHEREOF, The said principal and surety have hereunto set their hands and seals this day
of 19 Liability hereunder to commence 19
(CORPORATION OFFICER SIGN BELOW) (INDIVIDUAL OR PARTNERSHIP SIGN BELOW)

SIGNATURE

SIGNATURE

Signature of Surety must be acknowledged by a notary

SURETY

Cancellation effective 19

SIGNATURE OF SURETY

Canceled this day of 19

ADDRESS OF SURETY

Received and approved: 19
DATEDEPARTMENT OF FOOD AND AGRICULTURE
DIVISION OF MEASUREMENT STANDARDS

Division of Measurement Standards, Dept. of Food and Agriculture

License Clerk, Division of Measurement Standards,

Mail bond direct to Division of Measurement Standards, Department of Food and Agriculture, 8500 Fruitridge Road, Sacra-
mento, California 95826.

Application for Commercial Feed License

DEPARTMENT OF FOOD & AGRICULTURE
FEED, FERTILIZER AND LIVESTOCK DRUG
1220 N STREET
SACRAMENTO 95814

COMMERCIAL FEED LICENSE APPLICATION

818-002 (REV. 9-77)

FOR FISCAL YEAR ENDING JUNE 30, 19 _____

DOING BUSINESS AS (FIRM NAME) (PHONE NO.)

FULL NAME OF APPLICANT (OWNER OR OWNERS)

MAILING ADDRESS (STREET NUMBER) (CITY OR TOWN) (STATE) (ZIP CODE)

LOCATION OF PLANT
DO NOT USE P.O. BOX (STREET NUMBER) (CITY OR TOWN) (COUNTY) (STATE)

CHECK ONE

☐ CORPORATION ☐ PARTNERSHIP ☐ INDIVIDUAL ☐ COPARTNERSHIP

CHECK THE FOLLOWING

☐ BROKER ☐ DEALER ☐ SELL UNDER OWN LABEL ☐ OPERATE COMMERCIAL FEED LOT ☐ FEED MANUFACTURE

TYPE OF FEED YOU MANUFACTURE

☐ ANIMAL PRODUCTS ☐ ALFALFA PRODUCTS ☐ POULTRY FEED ☐ FISH MEAL
☐ MIXED CONCENTRATE ☐ ROLLED GRAINS ☐ DAIRY FEED ☐ PREMIXES
☐ VEGETABLE OIL MEALS ☐ BEEF CATTLE FEED ☐ OTHER _____

WORKMAN'S COMPENSATION INSURANCE CARRIER

(SECTION 3700 OF THE LABOR CODE REQUIRES EVERY EMPLOYER TO BE INSURED AGAINST LIABILITY FOR WORKMEN'S COMPENSATION)

I CERTIFY THAT THE INFORMATION CONTAINED IN THIS APPLICATION IS TRUE AND CORRECT.

Signed _____

(APPLICATION MUST BE SIGNED BY PERSON IN AUTHORITY SHOWING TITLE)

LICENSE FEE OF \$25 FOR EACH PLANT LOCATION.

PENALTY OF \$10 FOR FAILURE TO RENEW LICENSE WITHIN ONE CALENDAR MONTH AFTER THE BEGINNING OF THE FISCAL YEAR.

SUBMIT WITH FEE TO CASHIER, CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE, 1220 N STREET, SACRAMENTO, CA 95814. DO NOT SEND COIN OR CURRENCY.

GENERAL CORRESPONDENCE MAY BE ADDRESSED TO FEED, FERTILIZER AND LIVESTOCK DRUG AT THE SAME ADDRESS.

DATE

DEPT. USE ONLY

RC. NO.

FEE

PENALTY

APPLICATION OK

LICENSE NO.

ISSUED

Application for Motor Vehicle Fuel Distributors License

3T-400-D REV. 1 (9-78)

APPLICATION FOR A LICENSE AS A DISTRIBUTOR OF MOTOR VEHICLE FUEL

STATE OF CALIFORNIA
BOARD OF EQUALIZATION
DEPARTMENT OF BUSINESS TAXES

Required by Section 7451
of the Revenue and Taxation Code

FOR BOARD USE			
1. Date Issued	2. Account Number		
	Tax	Office	Number
	MD		

3. Owner(s)				
4. Firm Name				
5. Location of Business:	Street & Number	City or Town	State	Zip Code
6. Mailing Address (If different from above):	P.O. Box or Street & Number	City or Town	State	Zip Code
7. Type of Organization: Describe				
Individual ☐ Partnership ☐ Corporation ☐ Other ☐				
8. Corporation Officers:				
President	Vice-President	Secretary	Treasurer	
9. Do you intend to refine motor vehicle fuel?				
10. Where will refinery be located?				
11. Do you intend to blend motor vehicle fuel?				
12. Where will blending be done?				
13. Do you intend to import motor vehicle fuel?				
14. Date you intend to commence operations as a distributor				

CERTIFICATE: THE ABOVE STATEMENTS ARE HEREBY CERTIFIED TO BE CORRECT TO THE BEST KNOWLEDGE AND BELIEF OF THE UNDERSIGNED WHO IS DULY AUTHORIZED TO SIGN THIS APPLICATION.

Signature _____ Title _____
 Residence Address _____ Date _____
 Residence Phone _____ Business Phone _____ Social Security Number _____

NOTE:
 Before the license will be issued, a surety bond must be deposited with the Board in an amount determined by the Board, but not less than \$1,000 nor more than \$500,000. In lieu of the surety bond, money or securities as described by Section 7456 of the Revenue and Taxation Code may be deposited with the State Treasurer.

REGISTRATION AND CREDIT INFORMATION

Application for Sellers Permit Page 1 of 3STATE BOARD OF EQUALIZATION
DEPARTMENT OF BUSINESS TAXES

ACCOUNT NUMBER		
Tax	Office	Number

1. OWNER _____ Social Security Number _____

2. NAME OF BANK _____
AND LOCATION _____

Commercial

Personal and Savings

Savings and Loan

Credit Union - Other

3. REAL ESTATE (Describe briefly and give location) _____

Present Value \$ _____ Balance Owning \$ _____ Payments made to _____

4. FIXTURES AND EQUIPMENT PURCHASED FROM _____ Total Cost \$ _____

5. ESTIMATED MONTHLY EXPENSES

ESTIMATED MONTHLY SALES

Rent \$ _____

Total Sales \$ _____

Payroll \$ _____

Non-taxable Sales \$ _____

Payments on Equipment etc. \$ _____

Taxable Sales \$ _____

Total \$ _____

Monthly Tax \$ _____

6. PRINCIPAL SUPPLIERS (Name & Address) _____

7. RECORDS KEPT BY _____ Located at _____

8. NAME OF SPOUSE _____ Employed by _____

9. PERSONAL REFERENCES

Name and Address

Telephone No.

Relationship

10. CERTIFICATE: The above statements are certified to be correct to the best knowledge and belief of the undersigned.

SIGNED _____ Title _____ Date _____

11. OTHER DATA - Prior Permits, Previous Occupation, Equipment Leases, etc. _____

12. REPORTING BASIS _____ Security \$ _____ Date _____ Approved _____

REGISTRATION AND CREDIT INFORMATION FOR
USE FUEL TAX PERMIT

Application for Sellers Permit

Page 2 of 3

STATE BOARD OF EQUALIZATION
DEPARTMENT OF BUSINESS TAXES

1. NAME	ACCOUNT NUMBER		
	Tax	Office	Number
	F		

2. MOTOR VEHICLES FOR WHICH PERMIT IS REQUIRED - ATTACH SCHEDULE IF NECESSARY

(Indicate Type of Fuel in Column 4: D for Diesel; L for L.P.G.; N for Natural Gas)

1 Make & Year of Vehicle	2 Engine No., Serial, Id., or Frame Number	3 License Number	4 Indicate Type of Fuel	5 Name of Registered Owner on Date of Application	6 Name and Address of Legal Owner

3. ENTER INFORMATION CONCERNING ANY LEASE, CONTRACT OR RENTAL AGREEMENT

ATTACH COPY OF AGREEMENT

4. CREDIT REFERENCES:	
A. BANK	
B. ADDRESS OF REAL ESTATE OWNED	APPROXIMATE VALUE \$
5. ESTIMATED MONTHLY INCOME FROM THIS OPERATION	
6. ESTIMATED MONTHLY USAGE OF DIESEL FUEL, NATURAL GAS OR L.P.G. FUEL USE IN CALIFORNIA (Gallons or cubic feet)	
7. ADDITIONAL INFORMATION	

8. DATE	BY
	47

FULL NAME OF CORPORATION
(As it appears on the Charter) _____

DATE OF FIRST STOCK ISSUE _____

PRESIDENT _____
NAME _____ RESIDENCE ADDRESS _____
() _____
TELEPHONE _____ SOCIAL SECURITY NUMBER _____ DRIVERS LICENSE NUMBER _____

VICE PRESIDENT _____
NAME _____ RESIDENCE ADDRESS _____
() _____
TELEPHONE _____ SOCIAL SECURITY NUMBER _____ DRIVERS LICENSE NUMBER _____

SECRETARY _____
NAME _____ RESIDENCE ADDRESS _____
() _____
TELEPHONE _____ SOCIAL SECURITY NUMBER _____ DRIVERS LICENSE NUMBER _____

TREASURER _____
NAME _____ RESIDENCE ADDRESS _____
() _____
TELEPHONE _____ SOCIAL SECURITY NUMBER _____ DRIVERS LICENSE NUMBER _____

CORPORATE BANK _____ BRANCH _____
ADDRESS _____ ACCOUNT NUMBER _____
CITY _____

TELEPHONE NUMBER TO CONTACT LOCALLY FOR INFORMATION () _____

NAME OF PERSON TO CONTACT FOR INFORMATION _____

PARENT CORPORATION (IF ANY) _____

Address _____

NAMES OF MAJOR STOCKHOLDERS

CERTIFICATE: The above statements are certified to be correct to the best knowledge and belief
of the undersigned.

SIGNATURE _____ TITLE _____ DATE _____

Application for Industrial Alcohol Dealers License

Do not detach—Return all copies

Do Not Write Above This Line—For Headquarters Office Only

APPLICATION FOR ALCOHOLIC BEVERAGE LICENSE(S)		1. TYPE(S) OF LICENSE(S)	FILE NO.
To: Department of Alcoholic Beverage Control 1215 O Street Sacramento, Calif. 95814 <small>(DISTRICT SERVING LOCATION)</small>			FEE NO.
The undersigned hereby applies for licenses described as follows:			GEOGRAPHICAL CODE
2. NAME(S) OF APPLICANT(S)			Date Issued
		Applied under Sec. 24044 ☐	Temp. Permit
		Effective Date:	Effective Date:
		3. TYPE(S) OF TRANSACTION(S)	FEE
			\$
4. Name of Business			LIC. TYPE
5. Location of Business—Number and Street			
City and Zip Code	County	RECEIPT NO.	TOTAL \$
6. If Premises Licensed, Show Type of License		7. Are Premises Inside City Limits?	
8. Mailing Address (if different from 5)—Number and Street		(Temp) (Perm)	
9. Have you ever been convicted of a felony?		10. Have you ever violated any of the provisions of the Alcoholic Beverage Control Act or regulations of the Department per- taining to the Act?	
11. Explain a "YES" answer to items 9 or 10 on an attachment which shall be deemed part of this application.			
12. Applicant agrees (a) that any manager employed in on-sale licensed premises will have all the qualifications of a licensee, and (b) that he will not violate or cause or permit to be violated any of the provisions of the Alcoholic Beverage Control Act.			
13. STATE OF CALIFORNIA		County of	Date
Under penalty of perjury, each person whose signature appears below, certifies and says: (1) He is the applicant, or one of the applicants, or an executive officer of the applicant corporation, named in the foregoing application, duly authorized to make this application on its behalf; (2) that he has read the fore- going application and knows the contents thereof and that each and all of the statements therein made are true; (3) that no person other than the applicant or applicants has any direct or indirect interest in the applicant's or applicants' business to be conducted under the license(s) for which this application is made; (4) that the transfer application or proposed transfer is not made to satisfy the payment of a loan or to fulfill an agreement entered into more than ninety (90) days preceding the day on which the transfer application is filed with the Department or to gain or establish a preference to or for any creditor of transferor or to defraud or injure any creditor of transferor; (5) that the transfer application may be withdrawn by either the applicant or the licensee with no resulting liability to the Department.			
14. APPLICANT SIGN HERE			

APPLICATION BY TRANSFEROR

15. STATE OF CALIFORNIA		County of	Date
Under penalty of perjury, each person whose signature appears below, certifies and says: (1) He is the licensee, or an executive officer of the corporate licensee, named in the foregoing transfer application, duly authorized to make this transfer application on its behalf; (2) that he hereby makes application to surrender all interest in the attached license(s) described below and to transfer same to the applicant and/or location indicated on the upper portion of this application form. If such transfer is approved by the Director; (3) that the transfer application or proposed transfer is not made to satisfy the payment of a loan or to fulfill an agreement entered into more than ninety days preceding the day on which the transfer application is filed with the Department or to gain or establish a preference to or for any creditor of transferor or to defraud or injure any creditor of transferor; (4) that the transfer application may be withdrawn by either the applicant or the licensee with no resulting liability to the Department.			
16. Name(s) of Licensee(s)		17. Signature(s) of Licensee(s)	18. License Number(s)
19. Location		Number and Street	City and Zip Code
			County

Do Not Write Below This Line; For Department Use Only

Attached: ☐ Recorded notice,
☐ Fiduciary papers,
☐

(OTHER)

COPIES MAILED
49

STATE OF CALIFORNIA
DEPARTMENT OF
ALCOHOLIC BEVERAGE CONTROL

PERSONAL AFFIDAVIT IN SUPPORT OF APPLICATION

1. FULL NAME		2. PREVIOUS NAME(S) (Maiden, Prior Married Name, etc.)		3. SOC. SEC. NO.	
4. PREMISES ADDRESS		(WHERE LICENSE TO BE ISSUED)		(ZIP)	PHONE
5. HOME ADDRESS		(STREET)		(CITY)	(ZIP) PHONE
6. AGE:	SEX:	HT:	WT:	HAIR:	EYES:
					PRESENT BUSINESS PHONE

7. I AM OR WILL BE ☐ SOLE OWNER ☐ PARTNER ☐ OFFICER ☐ DIRECTOR ☐ STOCKHOLDER ☐ MGR. ☐ RESTAURANT LESSEE
OF PERSONS OR COMPANY

8. DRIVERS LICENSE NO.	PLACE OF BIRTH	DATE OF BIRTH
------------------------	----------------	---------------

9. DO YOU NOW HAVE ANY DIRECT OR INDIRECT INTEREST IN ANY OTHER ALCOHOLIC BEVERAGE BUSINESS, OR HAVE YOU EVER BEEN AN ALCOHOLIC BEVERAGE LICENSEE OR AN OFFICER OR DIRECTOR OF A CORPORATE LICENSEE? ☐ NO ☐ YES (If Yes, Explain Fully)

10. HAVE YOU AS AN INDIVIDUAL, A PARTNER, OR WHILE AN OFFICER, DIRECTOR OR STOCKHOLDER OF A CORPORATE APPLICANT OR LICENSEE EVER HAD AN ALCOHOLIC BEVERAGE LICENSE DENIED, SUSPENDED, REVOKED, OR AN OFFER IN COMPROMISE ACCEPTED OR REJECTED? ☐ NO ☐ YES (If Yes, Explain Fully)

11. CURRENT AND PAST EMPLOYMENT (FOR AT LEAST FIVE YEARS) (Use additional sheets if necessary)

FROM MO./YR.	TO MO./YR.	TYPE OF WORK	FIRM NAME	CITY

12. WILL YOUR SPOUSE WORK ON PREMISES? ☐ NO ☐ YES	SPOUSE'S NAME	PLACE AND DATE OF MARRIAGE
---	---------------	----------------------------

13. Have you ever, anywhere or at any time, (1) forfeited bail, (2) been convicted, (3) fined, or (4) placed on probation for any violation of the law? (If any of these events has occurred, this question must be answered "Yes" regardless of subsequent court action resulting in expungement, unless an order sealing records under Section 1203.45 of the Penal Code, relating to persons under age 18 years, has been issued. If no order has been issued, the answer must be "Yes".)
☐ No ☐ Yes (If yes, explain each event fully.)

DATE OF ARREST	PLACE ARRESTED	OFFENSE	RESULTS

I have read all of the above and declare under penalty of perjury that each and every statement made is true, correct and complete.

PLACE	SIGNED
-------	--------

TEST (BY EMPLOYEE OR NOTARY PUBLIC)	DATE
-------------------------------------	------

INDIVIDUAL FINANCIAL AFFIDAVIT

This affidavit is made in connection with the following application for an alcoholic beverage license:

APPLICANT'S ADDRESS

AFFIDAVIT OF

DHA

PREMISES ADDRESS (STREET)

(CITY)

I am or will be a ☐ Partner ☐ Stockholder ☐ Corporate Officer ☐ Director ☐ Financier
in the above-described licensed business.

PLEASE READ INSTRUCTIONS BELOW BEFORE COMPLETING THE FOLLOWING.

My total personal contribution will be \$_____. Of this amount, \$_____ will be in cash and the cash will be or has been derived from the following sources (describe in detail):

INSTRUCTIONS: Explain the source of cash fully. If cash is from savings, indicate the source from which it was saved, where the money was or is kept, and the period of time necessary to save it. If the source was from the sale of property, indicate what was sold, the address if real estate, when it was sold, the name and address of the buyer, and the net proceeds from the sale. If a loan is involved, show the date, amount, terms, security, name, address and occupation of the lender. Fully describe any other sources such as inheritances or gifts. List any and all bank accounts in the following spaces by identifying the bank, type of account, number of account, and authorized signatures:

BANK ACCOUNT(S). (BANK, LOCATION, TYPE OF ACCOUNT, ACCOUNT NUMBER.)

Authorized Signature

Authorized Signature

APPLICANT(S) UNDERSTAND THAT FALSIFICATION OF THE INFORMATION ON THIS FORM MAY CONSTITUTE GROUNDS FOR DENIAL OR REVOCATION OF THE LICENSE(S).

For a period of 90 days from this date, I/we hereby authorize the Department of Alcoholic Beverage Control, or any of its officers, to examine and secure copies of financial records consisting of signature cards, checking and savings accounts, notes and loan documents, deposit and withdrawal records, and encrow documents of my/our financial institution(s) or any financial records established in connection with this business. This authorization to examine records at any financial institution may be revoked at any time.

I/We also authorize the Department of Alcoholic Beverage Control, or any of its officers, to examine and secure copies of any business records or documents established in connection with this business including, but not limited to, those on file with my/our bookkeeper or with the above-named encrow holder.

I/We have also read all of the above and declare under penalty of perjury that each and every statement is true and correct.

Applicant's Signatures

Witness

DEPARTMENT OF ALCOHOLIC BEVERAGE CONTROL
FINANCIAL AFFIDAVIT IN SUPPORT OF APPLICATION

1. APPLICANT(S)

2. PREMISES ADDRESS (STREET) (CITY) TELEPHONE

3. LESSOR OR OWNER ADDRESS (STREET) (CITY) (STATE)

4. LESSEE OR RENTER ADDRESS (STREET) (CITY) (STATE)

5. MONTHLY RENTAL \$ EXPIRATION DATE OF LEASE 6. DOES LEASE OR RENTAL AGREEMENT INCLUDE FURNITURE AND FIXTURES?
☐ ALL ☐ SOME ☐ NONE

PURCHASE AND INVESTMENT INFORMATION

7. Item	Purchased from	Cost
a. LICENSE		\$
b. GOODWILL		\$
c. REALTY OR INTEREST THEREIN		\$
d. FURNITURE/FIXTURES		\$
e. INVENTORY		\$
f. NON-COMPETE COVENANT		\$
8. FEES FOR OTHER LICENSES, PERMITS, AND DEPOSITS (APPROXIMATE)		\$
9. WORKING CAPITAL (APPROXIMATE)		\$
10. OTHER (SPECIFY)		\$
TOTAL INVESTMENT (Items 7 through 10)		\$

11. ESCROW HOLDER ADDRESS (STREET) (CITY) ESCROW NUMBER

12. Indicate what part of the Total Investment will be in cash and from what source(s) it will be or has been derived. \$ (EXPLAIN - USE REVERSE IF NECESSARY)

13. Indicate the amount remaining and how it will be paid. \$ (EXPLAIN - USE REVERSE IF NECESSARY)

14. IF FRANCHISED, NAME FRANCHISOR

15. BOOKKEEPER OR ACCOUNTANT ADDRESS (STREET) (CITY) TELEPHONE

16. BUSINESS BANK ACCOUNT (BANK(S) AND ACCOUNT NO(S).)

AUTHORIZED SIGNATURE(S)

17. OTHER BANK ACCOUNT(S) (BANK(S) AND ACCOUNT NO(S).)

AUTHORIZED SIGNATURE(S)

APPLICANT(S) UNDERSTAND THAT FALSIFICATION OF THE INFORMATION ON THIS FORM MAY CONSTITUTE GROUNDS FOR DENIAL OR REVOCATION OF THE LICENSE(S).

For a period of 90 days from this date, I/we hereby authorize the Department of Alcoholic Beverage Control, or any of its officers, to examine and secure copies of financial records consisting of signature cards, checking and savings accounts, notes and loan documents, deposit and withdrawal records, and escrow documents of my/our financial institution(s) or any financial records established in connection with this business. This authorization to examine records at any financial institution may be revoked at any time.

I/we also authorize the Department of Alcoholic Beverage Control, or any of its officers, to examine and secure copies of any business records or documents established in connection with this business including, but not limited to, those on file with my/our bookkeeper or with the above-named escrow holder.

I/we have also read all of the above and declare under penalty of perjury that each and every statement is true and correct.

Applicant(s) Signature(s)

Title(s)

DIAGRAM OF LICENSED PREMISES

APPLICANT(S)

PREMISES ADDRESS (Street)

(City)

TYPE OF LICENSE

The diagram below is a true and correct description of the entrances and boundaries of the premises to be licensed, and is the only area where alcoholic beverages will be sold, served, consumed, possessed or stored. (If only a portion of the floor plan is to be licensed, please outline in red the area where alcoholic beverages will be sold, served, consumed, possessed or stored.)

DIAGRAM:

SAMPLE

It is hereby declared that the above-described boundaries and entrances will not be changed without first notifying and securing prior approval of the Department of Alcoholic Beverage Control. I declare under penalty of perjury that the foregoing is true and correct.

Date: _____

SIGNATURE

Place: _____

SIGNATURE

Special Instructions for Applicants for Public Premises Type Licenses

Your signature above acknowledges that you are aware that in premises operated as a Public Premises no persons under 21 years of age are to be allowed. A sign at least 7" x 11" stating "No Person Under 21 Allowed" must be posted near each entrance and at a prominent place in the interior of the premises.

DEPARTMENT use only.

DECLARATION OF PREMISES USAGE IN SUPPORT OF APPLICATION FOR ON-SALE LICENSE

My planned operation of the premises can best be described as:

1. ☐ Cocktail Lounge	5. ☐ Hotel/Motel	9. ☐ Private Club
2. ☐ Bar: beer or beer & wine	6. ☐ Cafe/Coffee Shop	10. ☐ Other (Describe) _____
3. ☐ Complete Restaurant	7. ☐ Bowling Alley	_____
4. ☐ Speciality Restaurant	8. ☐ Discotheque	_____

Do you intend to employ a manager? ☐ Yes ☐ No

Hours of Operation:

to

Fixed Bar?

☐ Yes ☐ No

Patron Capacity:

Do premises have off-street parking? ☐ Yes ☐ No

Number of cars:

EXPLAIN FOOD SERVICE☐ No Food ☐ Minimal Food (sandwiches, snacks, etc.)☐ Restaurant:☐ Full course meals☐ Specialty Restaurant

Describe (pizza, fish & chips, etc.) _____

Hours of
Meal
Service

Breakfast: _____

Lunch: _____

Dinner: _____

ENTERTAINMENT☐ Juke box or recorded music☐ Pool tables/coin operated
game machines☐ Card room☐ Movies☐ Band/combo/singer(s), etc.☐ Patron dancing☐ Bikini/topless dancers☐ Floor Show☐ Other (Explain) _____Estimate what percentage of your total
sales will be alcoholic beverages: _____ %Are the premises currently operating? ☐ Yes ☐ NoWill your planned operation be substantially the same as recent or present operation of the
premises? ☐ Yes ☐ No

Date _____

Applicant Signature _____

DEPARTMENT OF THE TREASURY BUREAU OF ALCOHOL, TOBACCO AND FIREARMS APPLICATION AND PERMIT FOR ALCOHOL FUEL PRODUCER <i>(Prepare in Duplicate, See Instructions)</i>		ATF USE ONLY	
1. ORIGINAL APPLICATION (Check applicable box)		DATE RECEIVED	DATE RETURNED AFTER CORRECTIONS
☐ SMALL 10,000 Proof Gallons or less* ☐ MEDIUM -- More than 10,000 Proof Gallons but not more than 500,000* ☐ LARGE -- More than 500,000 Proof Gallons* *Proof Gallons to be produced and received during one calendar year (See Instruction 4.)		PERMIT NUMBER	EFFECTIVE DATE
3. NAME OF OWNER (If partnership, include name of each partner)		2. AMENDED PERMIT (Check applicable box(es))	
5. LOCATION (If no street address show rural route)		4. DAYTIME TELEPHONE NUMBER (Include Area Code)	
6. MAILING ADDRESS (If different from plant location) (RFD or Street No., City, State, ZIP Code)		7. PREMISES FOR ALCOHOL FUEL PLANT ARE (Check applicable box)	
☐ OWNED BY THE APPLICANT (Skip Item 8.) ☐ NOT OWNED BY THE APPLICANT (Complete Item 8.)		8. OFFICERS OF THE BUREAU OF ALCOHOL TOBACCO AND FIREARMS ARE GRANTED ACCESS TO THE PREMISES DESCRIBED BY THIS APPLICATION FOR A ALCOHOL FUEL PRODUCERS PERMIT.	
9. STILLS FOR FUEL PRODUCTION ON THE PLANT PREMISES		NAME OF PROPERTY OWNER	
STILL MANUFACTURER (If owner is the manufacturer, write "Owner")		SIGNATURE OF/FOR PROPERTY OWNER	
SERIAL NUMBER OF STILL		DATE	
KIND OF STILL (State whether Kettle, Pot, Charge Chamber, Continuous Still, or Other (Specify))		CAPACITY (Proof Gallons) (See Instruction 7.)	
10. BASIC MATERIALS (Other than yeasts or enzymes) TO BE USED IN PRODUCTION OF SPIRITS (Check applicable box(es))		11. DESCRIBE SECURITY MEASURES (Such as use of locks, fences, building alarms, etc.) TO PROTECT PREMISES, CONTAINERS, STILL(S) AND BUILDINGS WHERE SPIRITS ARE STORED	
☐ GRAIN (Corn, Wheat, Sorghum, Barley, etc.) AND OTHER STARCH PRODUCTS (Potatoes, Sweet Potatoes, etc.) ☐ SUGAR BASED CROPS (Cane Sugar, Sugar Beets, Molasses, Sweet Sorghum, Beet Fodder, etc.) AND PRODUCTS ☐ OTHER (Specify)		☐ FRUITS OR FRUIT PRODUCTS (Grapes, Peaches, Apples, etc.) ☐ FORAGE CROPS (Alfalfa, Sudan Grass, Forage Sorghum, etc.) ☐ CROP RESIDUE (Garbage or other refuse)	

Application for Alcohol Fuel Producers Permit

Page 2 of 2

12. **DIAGRAM OF PLANT PREMISES** (In the space provided or by attached map or diagram, show the area to be included for the alcohol fuel plant. Identify roads, streams, lakes, railroads, buildings, and other structures or topographical features on the diagram. Show location(s) where alcohol fuel plant operations will occur. The diagram should be in sufficient detail to locate your operations and premises.) (See directions for sample diagram.)

13. I WILL COMPLY WITH THE CLEAN WATER ACT (33 U.S.C. 1341(a)). (Will not discharge into navigable waters of the U.S.)

☐ YES

☐ NO

14. IF THIS APPLICATION IS APPROVED AND THE PERMIT IS ISSUED, I CONSENT TO THE DISCLOSURE OF THE NAME AND ADDRESS SHOWN ON THE APPLICATION IN AN ATF PUBLICATION, "ALCOHOL FUEL PRODUCERS", WHICH MAY BE DISTRIBUTED ON REQUEST TO THE GENERAL PUBLIC (including media, business, civic, government agencies, and others). UNDER 26 U.S.C. 5103 YOU HAVE A LEGAL RIGHT NOT TO GIVE THIS RELEASE.

☐ YES

☐ NO (A no response will have no effect on the consideration given this application)

APPLICANTS FOR MEDIUM AND LARGE ALCOHOL FUEL PLANTS MUST ATTACH THE ADDITIONAL INFORMATION REQUIRED IN INSTRUCTIONS

Under the penalties of perjury, I declare that I have examined this application, including the documents submitted in support thereof or incorporated therein by reference, and, to the best of my knowledge and belief, it is true, correct, and complete.

15. SIGNATURE OF/FOR APPLICANT

16. TITLE (Owner, Partner, Corporate Officer)

STOP

MAKE NO FURTHER ENTRIES ON THIS FORM

ALCOHOL FUEL PRODUCERS PERMIT UNDER 26 U.S.C. 5181

1. EFFECTIVE DATE

2. PERMIT NUMBER

AFP -

Pursuant to the above application and subject to applicable law and regulations and to the conditions set forth below you are hereby authorized and permitted at the premises described in your application to produce, process and store, and use or distribute distilled spirits (Not including distilled spirits produced from petroleum, natural gas or coal) exclusively for fuel use. The quantity to be produced and received from other plants during the calendar year is limited to the quantity stated in this application.

This permit is continuing, and will remain in force until suspended, revoked, voluntarily surrendered, or automatically terminated. This permit does not allow you to operate in violation of State or local laws.

THIS PERMIT IS NOT TRANSFERABLE. In the event of any lease, sale, or other transfer of the operations authorized, or of any other change in the ownership or control of such operations, this permit shall automatically terminate. (See 27 CFR 19.145 AND 19.949)

3. SIGNATURE OF REGIONAL REGULATORY ADMINISTRATOR, BUREAU OF ALCOHOL, TOBACCO AND FIREARMS

CONDITIONS

1. That the permittee in good faith complies with the provisions of Chapter 51 of Title 26 of the United States Code and regulations issued thereunder.
2. That the permittee has made no false statement as to any material fact in his application for this permit
3. That the permittee discloses all the material information required by law and regulation
4. That the permittee shall not violate or conspire to violate any law of the United States relating to intoxicating liquor and shall not be convicted of

any offense under the United States Code punishable as a felony or of any conspiracy to commit such an offense.

5. That all persons employed by the permittee in good faith observe and conform to all of the terms and conditions of this permit.

6. That the permittee engages in the operations authorized by this permit within a 2 year period.

7. This permit is conditioned on compliance by you with the Clean Water Act (33 U.S.C. 1341(a))

Form **637**

(Rev. April 1979)

Department of the Treasury
Internal Revenue Service**Registration for Tax-Free Transactions
Under Chapter 32 of the Internal Revenue Code****This Application Should Also Be Used by Producers and Importers
of Gasoline and Manufacturers of Lubricating Oil**

For District Director's Use Only

No.

Please type or print	Name of individual, corporation, partnership, association, etc.	Social Security or Employer Identification Number
	Name under which business is operated	Will you be required to file Form 720? . . . ☐ Yes ☐ No
	Business address (Number and street)	File this application in duplicate with your District Director of Internal Revenue. See the instructions on pages 2 and 4.
	City, State, and ZIP code	

Application is hereby made for a Certificate of Registry in the name(s) indicated above. The applicant is a:

☐ Manufacturer ☐ Producer ☐ Importer ☐ Wholesaler ☐ Jobber ☐ Selling or ☐ Purchasing (specify type of product) ☐ Retailer ☐ Other (specify) ▶

The applicant affirms that use of articles purchased or sold tax-free is to be for the exempt purposes specified in the applicable provisions of the law and regulations and understands that misuse of this certificate will lead to its revocation and/or the penalties provided by law.

See item 2 on page 2 and check applicable letter(s). I qualify as a:

☐ a, ☐ b, ☐ c, ☐ d, ☐ e, ☐ f, ☐ g, ☐ h, ☐ i, ☐ j, ☐ k, ☐ l, ☐ m, and/or ☐ other—(specify) ▶

Under the penalties of perjury, I declare that I have examined this application and to the best of my knowledge and belief it is true, correct, and complete.

Signature ▶

Title ▶

Date ▶

District Director's Validation

A certificate of registry for the above applicant is approved and issued under the number shown.

District Director of Internal Revenue

By

Date

283-453-1

Authorization Card for Non-Potable
Water from Imperial Irrigation Dist.

IMPERIAL IRRIGATION DISTRICT
CERTIFICATE OF OWNERSHIP AND AUTHORIZATION OF AGENT OR TENANT

Account No. _____

VOID - IF ALTERED

I hereby certify that I am the owner of part(s) of Section(s) or Tract(s)
T _____ S R _____ E 36M containing _____ acres as shown by detailed legal
description on reverse side, and am entitled to water from Imperial Irrigation District.

I hereby authorize _____
(Name) (Write in above - Tenant or Agent)

Address _____
to order water in my name for delivery to the land described, and hereby confirm all orders by
him, and guarantee the payment of all charges, under the rules and regulations of the District.
This authorization shall be revocable at any time upon fifteen (15) days notice in writing to
the District.

This authorization will be effective on condition that the tenant named herein deposit with
the District \$ _____, to be applied in payment of unpaid charges for water delivered
to said tenant. (If no deposit required, write in "None.")

Effective date _____, 19 _____

Name and Signature of Landowner _____
(Write in above - Partner or Corporation Title)

Address _____

Application for Commerical Electric Serv.

IID-755 (RS 6-77)				Print Name (Mr. Mrs. Miss) of Applicant				D.B.A. (Full Legal Name)			
APPLICATION FOR COMMERCIAL ELECTRIC SERVICE											
Meter Address				C. O. No.		Date		Acct. No.		Received in Division	
Mailing Address				D. O. No.		Date		Meter No.			
☐ Own ☐ Rent		Telephone	C. I. I. ☐ Yes ☐ No	G. D. No.	Amount	ELECTRIC LOAD	Heat Pump Tons	Air Conditioner Tons	Motors HP	Other Load	
Previous Address				How Long		Type of Business					
Principal Place of Business (Address)						Is Business a Sole Proprietorship? (If so, Name of Proprietor) SIC					
Is Business a Partnership? (If so, Names of Partners) (1)						Spouse's Name and Address					
(2)						(3)					
Is Business a Corporation? (If no, Place of Incorporation)										Federal Tax No.	
Names of Officers	President					Vice-President					
	Secretary					Treasurer					

IMPERIAL IRRIGATION DISTRICT REGULATIONS GOVERNING SALE AND USE OF ELECTRIC ENERGY

Excerpts from Regulation No. 6

The customer shall, at his own risk and expense, furnish, install and keep in good and safe condition all electric wires, lines, machinery and apparatus of any sort which may be required for receiving electric energy from the District, and for applying and utilizing such energy, including all necessary protective appliances and suitable housing therefor. The District shall not be responsible for any loss or damage occasioned or caused by the negligence or want of proper care or wrongful act of the customer or any of his agents, employees or licensees on the part of the customer in installing, maintaining, using, operating or interfering with any such wires, lines, machinery or apparatus.

Excerpts from Regulation No. 11

The District shall, at its option, have the right to:
Disconnect its service until the customer has complied with all the terms of the service agreement and of the District's regulation.

Excerpts from Regulation No. 15

The District will construct, own, operate and maintain lines only along public streets, roads and highways which the District has the legal right to occupy and on public lands and private property across which rights-of-way satisfactory to the District may be obtained without cost or condemnation by the District.

All Imperial Irrigation District Regulations Governing Sale and Use of Electric Energy are available for viewing at all IID Division Offices and Imperial Operating Headquarters.

The undersigned applicant hereby certifies that he has read and understands the regulations governing the sale and use of electric energy printed above and requests that Imperial Irrigation District supply electric service required at the address shown until such time as written or accepted telephone notice of discontinuance is given, and in consideration thereof does hereby agree to abide by the rules and regulations adopted by the Board of Directors of Imperial Irrigation District, and to pay all bills for service rendered pursuant thereto under the rates adopted by said Board of Directors.

By (Authorized Signature)			Title		Date Signed
Identification (Select One)	S. S. No.	D. L. No.	State	Other	Taken By (Initials)

APPLICATION FOR CONDITIONAL USE PERMIT
AS PROVIDED BY PART 26 OF ORDINANCE 249
OF THE COUNTY OF IMPERIAL

DATE _____

TO THE COUNTY PLANNING COMMISSION

COUNTY OF IMPERIAL, CALIFORNIA

The undersigned applicants is the (leasee) (owner) of the following described property. (Give complete legal description.)

The property is situated (give street address, or exterior boundary by streets, alleys, canals, drains, etc.).

Present Zoning _____

Adjacent Land Uses _____

We, the undersigned property (leasee) (owner) request a Conditional Use Permit to use the above described property for the following purpose:

Application for Conditional Use Permit
Page 2

A plot plan of the property involved, showing the location of all existing and proposed structures shall be included as part of this application. Additional plans may be required if the Planning Commission finds them necessary.

The undersigned applicant must commence work within six (6) months from the date of issuance and pursue diligently until completion of work or the permit shall expire by limitation and become null and void.

Print or type name

Address

Signature

City

Print or type name

Address

Signature

City

Application taken by:

Zone:

Date:

Form 3311

Application for Encroachment Permit from
County Public Works Department

No. _____

APPLICATION FOR ENCROACHMENT PERMIT
Ordinance No. 218

Date _____

To The Imperial County Road Commissioner
Imperial County, California

Gentlemen:

The undersigned hereby applies for permission to excavate,
construct and/or otherwise encroach on County right of way by
performing the following work:

Space for sketch, submit detailed plans if available.

At the following location _____

And agrees to do the work in accordance with your rules and
regulations and subject to your inspection and approval.

Date work to be completed: _____

Amount of Bond: (Cashier's Check, Certified Check or Surety Bond)

Recommended by Road Commissioner

\$ _____

Applicant will print or type name

Signature of Applicant

Address

ENCROACHMENT PERMIT

To _____

Permit No. _____ to encroach upon _____

THIS ENCROACHMENT PERMIT, granted by IMPERIAL IRRIGATION DISTRICT, an irrigation district, hereinafter referred to as "District," to _____, hereinafter referred to as "Permittee."

WITNESSETH: The District for good and valuable consideration grants Permittee permission to

In the County of Imperial, State of California, at the location more particularly shown on sketch attached and made a part hereof.

THIS AGREEMENT is made upon the following terms and conditions:

1. All work done under the terms of this agreement shall be done at expense of Permittee unless otherwise specified.
2. All work done shall conform to the rules and regulations or orders as issued by any Commission or other lawful authority of said State which may pertain to the type of installation for which this permit is granted.
3. District shall not be responsible for any deaths, injuries or property damages caused by Permittee or its agents or contractors either during the construction period or any time thereafter.
4. Permittee shall notify the District at least ten (10) days in advance of start of any work or portion thereof which is to be done under terms of this agreement.
5. All installations or repairs are to be made in such a manner or at a time which will not interfere with the ordinary operations of the system of the District.
6. In the event the District finds it necessary to relocate or rebuild any of its canals, drains, power lines or structures affected by this permit, the Permittee shall upon thirty (30) days' notice from the District and at its own expense make any changes that the District shall designate.
7. The Permittee, by acceptance of this permit, assumes responsibility for any and all damages which may arise out of work herein permitted or which may arise out of failure of the facilities installed under this permit.

8. The Permittee agrees to exercise reasonable care in maintaining any encroachment placed by it under this permit and to exercise reasonable care in inspecting for and immediately repairing and making good any damage to District facilities which occurs as a result of the installation and maintenance of the encroachment or as a result of the work done under this permit, including any and all damages which would not have occurred had such work not been done or such encroachment not been placed on District facilities.

9. In case of the failure of the Permittee to perform any or all covenants or agreements on its part herein contained, all rights and privileges hereby granted shall cease at the option of the District, and the District shall have the right to remove any or all structures or appurtenances thereto from said premises which have been placed thereon or thereover by the Permittee.

10. This agreement shall inure to and bind the heirs, successors or assigns of the parties hereto.

IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed
this _____ day of _____, 19____.

IMPERIAL IRRIGATION DISTRICT

By _____
President of the Board of Directors

By _____
Secretary of the Board of Directors