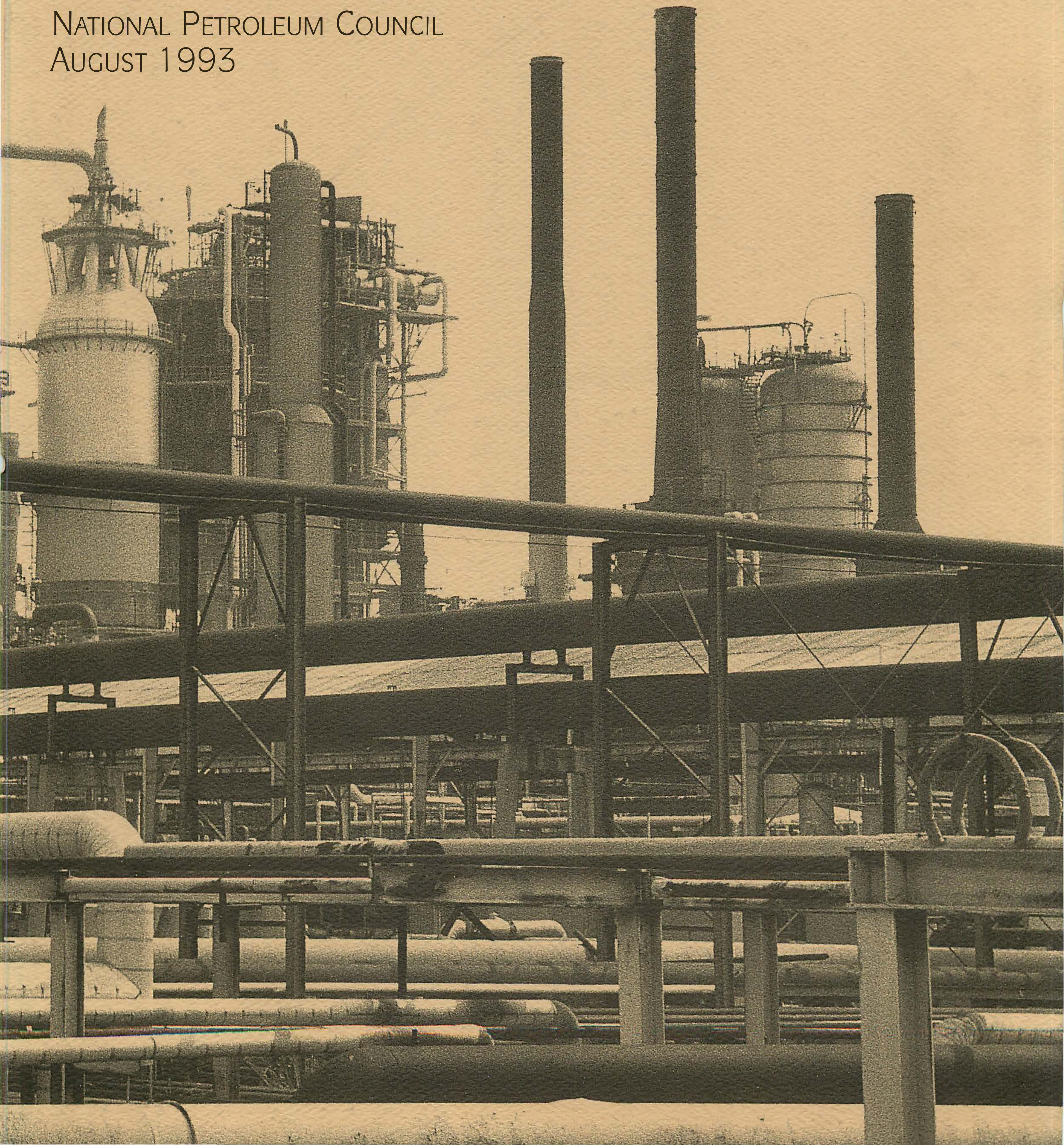
U.S. PETROLEUM REFINING

MEETING REQUIREMENTS FOR CLEANER FUELS AND REFINERIES

VOLUME VI—SURVEY APPENDIX

NATIONAL PETROLEUM COUNCIL
AUGUST 1993



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U.S. Petroleum Refining

Meeting Requirements for Cleaner Fuels and Refineries

Volume VI–Survey Appendix

National Petroleum Council
Committee on Refining,
Kenneth T. Derr, Chairman
August 1993

NATIONAL PETROLEUM COUNCIL

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The sole purpose of the National Petroleum Council is to advise, inform, and make recommendations to the Secretary of Energy on any matter requested by the Secretary relating to oil and natural gas or to the oil and gas industries.

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Table of Contents

Appendix N

Appendix To Chapter Five — NPC Survey

Part I

Survey Questionnaire
Blank Survey Forms

NATIONAL PETROLEUM COUNCIL
1991 SURVEY OF U.S. PETROLEUM REFINING INDUSTRY

SECTION I. PERCEPTIONS OF REGULATORY IMPACTS ON INDIVIDUAL REFINERIES

Complete this questionnaire for the refinery specified below. In the case of jointly owned refineries, the operating company should complete the questionnaire.

If you have questions or need more copies of the questionnaire, contact:

Benjamin Oliver, Jr., NPC, (202) 393-6100
FAX: (202) 331-8539
OR
Susan Russell, SRI International, (415) 859-2640
FAX: (415) 859-2861

Use the enclosed envelope to return this completed questionnaire no later than January 31, 1992, to:

Survey Research Program
SRI International
P.O. Box 2246
Menlo Park, CA 94026-2246

Whom should we contact if we have questions about your responses to this section?

Name: ______________________

Telephone: ______________________

FAX: ______________________

INTRODUCTION

In response to a request by the Secretary of Energy, the National Petroleum Council (NPC) is conducting a study of the U.S. refining industry's capability and flexibility to meet future product demand. Task groups consisting of representatives from NPC member companies have been responsible for identifying the data needs and specifying the content of the questionnaires.

The survey includes both existing and planned U.S. refineries, as follows:

- **All refineries with operable capacity as of January 1, 1991, regardless of whether they were actually in operation on that date.**

- **All refineries that are planned to be operable by January 1, 1996.**

Data Tabulations and Confidentiality

The NPC has retained SRI International to format the survey questionnaires and to collect and tabulate the survey data and provide aggregated data to the U.S. petroleum refining study participants, NPC staff, and contractors who will use the data in mathematical models. **The final report will be sent to all survey respondents.** SRI International--formerly Stanford Research Institute--is a broad-based, nonprofit research and consulting organization serving clients in industry, government, and service organizations worldwide.

Individual company data from the survey will be held **strictly confidential** by SRI and will not be released to government, study participants, NPC staff, or other contractors. The only SRI staff who will have access to the data are Survey Research Program staff and Ms. Susan Leiby, an SRI process engineer, who will assist Survey Research Program staff in reviewing the questionnaires and will be available in the event of any difficulties in questionnaire interpretation. Confidential Information Agreements prepared by the NPC have been executed by SRI management, individual Survey Research Program staff, and Ms. Leiby committing themselves to these data handling procedures.

SRI International will release the aggregated data to NPC study participants only when sufficient data are available to permit aggregation in a manner that would not disclose individual operations. Once the data have been aggregated, accepted by the NPC, and reported, all individual responses will be destroyed.

Overview of the Information Requested

The overall survey is divided into 10 sections, as outlined below. This is Section I.

I. Perceptions of the impacts of regulatory requirements on the refinery's operations in 1995 and 2000.

II. Refinery facilities' capabilities and utilization, feedstocks, and product yields--actual 1990 data and as anticipated for 1995.

III. Refinery emission sources and controls.

IV. Economic impacts of environmental regulations on refineries--both historical and anticipated costs.

V. Distribution and transport modes of products from refineries among national regions--1990 and 1995.

VI. Expectations regarding the 1995 supply and distribution of oxygenates, corporate-wide.

VII. Various issues concerning terminals, including supply of product, capacity, and environmentally related costs.

VIII. Various issues concerning pipelines, including capacity, product segregations, and costs.

IX. Tanker, barge, rail, and truck transport costs.

X. Foreign refinery and supply issues, including likely product specifications in other nations in 1995 and 2000.

A separate questionnaire on the supply and distribution of oxygenates is being sent to companies that blend oxygenates with petroleum products but do <u>not</u> produce petroleum products.

Purposes for the Information Requested

The NPC needs your company's responses to this questionnaire to help build an accurate picture of the current and anticipated future capability and flexibility of the nation's refining industry to supply its customers' needs. This information, aggregated across all respondents, will comprise a major component of the NPC's response to the Secretary of Energy. The aggregated survey results also will be used to validate industry models.

For use in the mathematical models, the survey results will be supplemented with aggregate 1990 operating data from the Department of Energy's Energy Information Administration reports and the judgments of the industry experts on the NPC study groups. Use of these three sources of information will help to ensure that the models provide valid representations of the industry and do not under- or over-state industry capability or flexibility.

INSTRUCTIONS AND DEFINITIONS

Conventional gasoline = Finished gasoline other than gasoline that meets government regulations for CO and ozone non-attainment areas.

Oxygenated gasoline (OG) = Finished gasoline that meets the minimum oxygen content requirement for gasoline sold in CO non-attainment areas in winter months but does not meet RFG specifications (see below) for ozone non-attainment areas.

Reformulated gasoline (RFG) = Finished gasoline that meets all requirements for reformulated gasoline in ozone non-attainment areas and, if necessary, for CO non-attainment areas.

Non-attainment areas:

CO non-attainment areas = Approximately 40 cities (listed below) that are not in compliance with federal carbon monoxide (CO) standards:

Albuquerque, NM
Anchorage, AK
Baltimore, MD
Boston, MA (CMSA)
Chico, CA
Cleveland, OH (CMSA)
Colorado Springs, CO
Denver, Boulder, CO (CMSA)
Duluth, MN, WI
El Paso, TX
Fairbanks, AK (non-MSA)
Fort Collins, CO
Fresno, CA
Greensboro, Winston-Salem, H. Point, NC
Hartford, CT (CMSA)
Josephine County (Grants Pass), OR (non-MSA)
Klamath County, OR (non-MSA)
Las Vegas, NV
Los Angeles, CA (CMSA)
Medford, OR
Memphis, TN
Minneapolis/St. Paul, MN
Missoula County, MT (non-MSA)
Modesto, CA
*New York, NY, NJ, CT (CMSA)
Philadelphia, PA, NJ, DE (CMSA)
Phoenix, AZ
Portland, OR, Vancouver, WA (CMSA)
Provo, Orem, UT
Raleigh, Durham, NC
Reno, NV
Sacramento, CA
San Diego, CA
San Francisco, Oakland, San Jose, CA (CMSA)
Seattle, Tacoma, WA (CMSA)
*Spokane, WA
*Steubenville, Weirton, OH, WV (nonmobile)
Stockton, CA
Syracuse, NY
Washington, DC, MD, VA
*Winnebago County (Oshkosh), WI (nonmobile)

---

*Rated as a "serious" CO non-attainment area.
MSA = Metropolitan statistical area.
CMSA = Consolidated metropolitan statistical area.

Ozone non-attainment areas = Nine cities (listed below) with extreme or severe ozone pollution problems that must use reformulated gasoline (RFG) by January 1, 1995.

Baltimore, MD	*Los Angeles, CA (CMSA)
Chicago, IL, IN, WI (CMSA)	Milwaukee, Racine, WI (CMSA)
Hartford, CT	New York, NY, NJ, CT (CMSA)
Houston, Galveston, Brazoria, TX (CMSA)	Philadelphia, PA, NJ, DE (CMSA)
	San Diego, CA

Opt-ins = Approximately 100 cities (other than the 9 ozone non-attainment areas listed above) with marginal, moderate, or serious ozone pollution problems that may choose to participate in ("opt-in" to) the RFG program.

Survey Acronyms and Abbreviations

NOTE: The abbreviations below refer to the way in which they are used in this section of the questionnaire.

CO	Carbon monoxide
EPA	Environmental Protection Agency
OSHA	Occupational Safety and Health Administration
RCRA	Resource Conservation and Recovery Act
RVP	Reid vapor pressure, pounds per square inch
VOCs	Volatile organic compounds

---

*Rated as an "extreme" ozone non-attainment area.
CMSA = Consolidated metropolitan statistical area.

SECTION I. PERCEPTIONS OF REGULATORY IMPACTS ON INDIVIDUAL REFINERIES

1. **Between now and the end of 1995**, what level of financial impact (investment and operating costs) do you expect each of the following types of regulatory requirements/constraints to have on this refinery?

   Base your response on your current perception of future conditions (for example, opt-ins, regulations, etc.).

   (CIRCLE ONE NUMBER FOR EACH ITEM)

	LEVEL OF FINANCIAL IMPACT:				
Requirements for 1995	None	Some	Quite a Bit	A Great Deal	Have No Idea
Motor gasoline:					
a. Reduction in Reid vapor pressure (RVP)	0	1	2	3	9
b. Reduction in benzene content	0	1	2	3	9
c. Reduction in volatile organic compounds (VOCs)	0	1	2	3	9
d. Air toxics requirements	0	1	2	3	9
e. Addition of oxygenates	0	1	2	3	9
f. Reduction in sulfur content	0	1	2	3	9
g. Additional state/local requirements	0	1	2	3	9
Diesel fuel:					
h. Reduction in diesel fuel sulfur	0	1	2	3	9
i. Additional state/local requirements	0	1	2	3	9
Facilities:					
j. Air emissions (criteria pollutants) requirements	0	1	2	3	9
k. Air emissions (toxics) requirements	0	1	2	3	9
l. Waste-water quality requirements	0	1	2	3	9
m. RCRA requirements	0	1	2	3	9
n. Process safety management/process hazards analysis/OSHA requirements	0	1	2	3	9
o. Remediation (soil and groundwater cleanup) requirements	0	1	2	3	9
p. Additional state/local requirements	0	1	2	3	9

Other especially difficult 1995 requirements (specify):

____

____

2. **Between now and the end of 1995**, what level of impact on meeting customers' requirements for product supply do you expect the following types of regulatory requirements/constraints to have on this refinery?

Base your response on your current perception of future conditions (for example, opt-ins, regulations, etc.).

(CIRCLE ONE NUMBER FOR EACH ITEM)

	IMPACT ON MEETING CUSTOMERS' PRODUCT SUPPLY REQUIREMENTS:				
Requirements for 1995	None	Some	Quite a Bit	A Great Deal	Have No Idea
a. Obtaining construction and operating permits	0	1	2	3	9
b. Meeting product quality specifications	0	1	2	3	9
c. Enforcement practices regarding product quality regulations	0	1	2	3	9
d. Meeting facilities emissions regulations	0	1	2	3	9
e. Enforcement practices regarding facility emissions and waste	0	1	2	3	9
f. Meeting facilities safety regulations	0	1	2	3	9
g. Enforcement practices regarding process safety/OSHA requirements	0	1	2	3	9

Other especially difficult 1995 requirements (specify):

____

____

3. **Between the beginning of 1996 and the end of 2000**, what level of financial impact (investment and operating costs) do you expect each of the following types of regulatory requirements/constraints to have on this refinery?

Base your response on your current perception of future conditions (for example, opt-ins, regulations, etc.).

(CIRCLE ONE NUMBER FOR EACH ITEM)

Requirements Between the Beginning of 1996 and the End of 2000	LEVEL OF FINANCIAL IMPACT: None	Some	Quite a Bit	A Great Deal	Have No Idea
Motor gasoline:					
a. Further reduction of RVP	0	1	2	3	9
b. Further reductions in VOCs	0	1	2	3	9
c. Further air toxics reduction	0	1	2	3	9
d. Further addition of oxygenates	0	1	2	3	9
e. Reduction in sulfur content	0	1	2	3	9
f. Additional state/local requirements	0	1	2	3	9
Diesel fuel and #2 fuel oil:					
g. Reduction in sulfur	0	1	2	3	9
h. Reduction of diesel fuel aromatics or equivalent	0	1	2	3	9
i. Additional state/local requirements	0	1	2	3	9
Facilities:					
j. Air emissions (criteria pollutants) requirements	0	1	2	3	9
k. Air emissions (toxics) requirements	0	1	2	3	9
l. Waste-water quality requirements	0	1	2	3	9
m. RCRA requirements	0	1	2	3	9
n. Process safety management/process hazards analysis/OSHA requirements	0	1	2	3	9
o. Remediation (soil and groundwater cleanup) requirements	0	1	2	3	9
p. Additional state/local requirements	0	1	2	3	9

Other especially difficult requirements between the beginning of 1996 and the end of 2000 (specify):

____

____

4. **Between the beginning of 1996 and the end of 2000**, what level of impact on meeting customers' requirements for product supply do you expect the following types of regulatory requirements/constraints to have on this refinery?

Base your response on your current perception of future conditions (for example, opt-ins, regulations, etc.).

(CIRCLE ONE NUMBER FOR EACH ITEM)

	IMPACT ON MEETING CUSTOMERS' PRODUCT SUPPLY REQUIREMENTS:				
Requirements Between the Beginning of 1996 and the End of 2000	None	Some	Quite a Bit	A Great Deal	Have No Idea
a. Obtaining construction and operating permits	0	1	2	3	9
b. Meeting product quality specifications	0	1	2	3	9
c. Enforcement practices regarding product quality regulations	0	1	2	3	9
d. Meeting facilities emissions regulations	0	1	2	3	9
e. Enforcement practices regarding facility emissions and waste	0	1	2	3	9
f. Meeting facilities safety regulations	0	1	2	3	9
g. Enforcement practices regarding process safety/OSHA requirements	0	1	2	3	9

Other especially difficult requirements between the beginning of 1996 and the end of 2000 (specify):

____

____

5. To meet <u>1995</u> reformulated gasoline specifications, a variety of strategies and actions are available to refineries. Indicate the extent to which you think this refinery will use each of the strategies/actions listed below.

Base your response on <u>your</u> current perception of future conditions (for example, opt-ins, regulations, etc.).
(CIRCLE ONE NUMBER FOR EACH STRATEGY/ACTION)

	ANTICIPATED USE OF EACH STRATEGY:				
Strategies/Actions for 1995	Not at All	Some	Quite a Bit	A Great Deal	Have No Idea
a. Exceed required product specifications (that is, increase quality giveaway)	0	1	2	3	9
b. Rework off-spec product	0	1	2	3	9
c. Increase tankage	0	1	2	3	9
d. Statistical quality control	0	1	2	3	9
e. Reduce throughputs on certain process units to keep blend-stocks in balance	0	1	2	3	9
f. Blocked production of RFG	0	1	2	3	9
g. Adopt certain RFG specifications for conventional gasolines	0	1	2	3	9
h. Purchase, sell, or exchange blendstocks	0	1	2	3	9
i. Purchase, sell, or exchange conventional and reformulated gasoline	0	1	2	3	9
j. Use credit trading/averaging	0	1	2	3	9
k. Shift heavy gasoline boiling range components to distillates	0	1	2	3	9
l. Withdraw from selected market area	0	1	2	3	9

(continued)

5. (concluded)

Strategies/Actions for 1995	ANTICIPATED USE OF EACH STRATEGY: Not at All	Some	Quite a Bit	A Great Deal	Have No Idea
m. Eliminate production of mid-grade gasoline at the refinery	0	1	2	3	9
n. Produce subgrades of gasoline	0	1	2	3	9
o. Produce only one grade of RFG	0	1	2	3	9
p. Manufacture oxygenates in this refinery to meet blending requirements	0	1	2	3	9
q. Depend on other sources to provide oxygenates to meet blending requirements	0	1	2	3	9
r. Shut down marginal operations/units	0	1	2	3	9
s. Invest in new facilities	0	1	2	3	9
t. Modify existing units	0	1	2	3	9
u. Realign terminal distribution systems	0	1	2	3	9

Other strategies or actions to meet 1995 reformulated gasoline specifications (specify):

____

____

NATIONAL PETROLEUM COUNCIL
1991 SURVEY OF U.S. PETROLEUM REFINING INDUSTRY

SECTION II. REFINERY FACILITIES--
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

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III. Refinery emission sources and controls.

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V. Distribution and transport modes of products from refineries among national regions--1990 and 1995.

VI. Expectations regarding the 1995 supply and distribution of oxygenates, corporate-wide.

VII. Various issues concerning terminals, including supply of product, capacity, and environmentally related costs.

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INSTRUCTIONS AND DEFINITIONS

- **REPORT DATA ONLY ON THOSE LINES THAT ARE APPLICABLE TO YOUR OPERATION. IF THERE ARE NO DATA FOR A SPECIFIC LINE, LEAVE THE LINE BLANK.**

- **DO NOT ENTER ZERO UNLESS YOUR RESPONSE INDICATES THAT THE QUANTITY IS "ZERO."**

- **BASE 1995 ESTIMATES ON YOUR CURRENT PLANS OR VIEW.**

Average feed rate or product rate in barrels per calendar day (B/CD) = Annual volume of feed or product divided by 365.

Capacity utilization: Feed and product rates should reflect the annual average barrels per calendar day (B/CD) of input (or output) for the indicated period.

Conventional motor gasoline = Finished motor gasoline other than gasoline that meets government regulations for CO and ozone non-attainment areas.

Maximum desulfurization = Maximum percent reduction in sulfur content possible at specified feed rate, at what you believe is a reasonable run length.

Motor gasoline subgrades = Mostly finished gasoline that requires oxygenate addition at terminals to meet the specifications for conventional, reformulated, or oxygenated gasolines. (Also referred to by EPA as refined blendstocks for oxygenate blending, or RBOB.)

Operable capacity = The sum of that capacity in operation at the beginning of a given period, that capacity not in operation nor under repair but which can be placed in operation within 30 days, and that capacity not in operation but under active repair that can be completed within 90 days.

Operable capacity in barrels per stream day (B/SD) = The maximum number of barrels of input that can be processed, or primary product that can be yielded, during a 24-hour period, after making allowances for the following limitations:

- The types and grades of inputs to be processed.
- The types and grades of products expected to be manufactured.
- Constraints due to environmental regulations.

Oxygenated gasoline (OG) = Finished gasoline that meets the minimum oxygen content requirement for gasoline sold in CO non-attainment areas in winter months but does not meet RFG specifications (see below) for ozone non-attainment areas.

Reformulated gasoline (RFG) = Finished gasoline that meets all requirements for reformulated gasoline in ozone non-attainment areas and, if necessary, for CO non-attainment areas.

Conversion factors:

The following are factors for converting liquid barrels or gas volumes from thousand-standard-cubic-feet (MSCF) to fuel-oil-equivalent (FOE) barrels for associated fuels:

- One barrel fuel-oil-equivalent (FOE) = 6,300,000 BTU gross
- Crude Oil: Average for one barrel = 5,800,000 BTU = 0.92 barrel of FOE
- Natural Gas: 1 MMSCF = 162 barrels of FOE
- Fuel Gas: 1 FOE barrel = 6.3 MSCF
- Hydrogen (100%): 1 FOE barrel = 19.7 MSCF

Factors for converting marketable and catalytic coke and wax to barrels (DOE basis):

- Coke: 1 short ton (ST) = 5 barrels (400 lb./B)

- Wax: 1 short ton (ST) = 6.5 barrels (310 lb./B)

Survey Acronyms and Abbreviations

NOTE: The abbreviations below refer to the way in which they are used in this survey.

%	Percent
#	Number
$	U.S. dollars
°API	API gravity in degrees at 60°F
°F	Degree Fahrenheit
API	American Petroleum Institute
ASTM	American Society for Testing and Materials
B	Barrels at 60°F
B/CD	Barrels per calendar day
B/SD	Barrels per stream day
BTU	British Thermal Units
BTX	Benzene, Toluene, Xylene
CD	Calendar day
CO	Carbon Monoxide
D	Day
EIA	Energy Information Agency
ETBE	Ethyl tertiary butyl ether
FCC	Fluid catalytic cracker
FOE	Fuel oil equivalent
H_2	Hydrogen
IPA	Isopropyl alcohol
lb.	Pound
LPG	Liquefied petroleum gas
LT	Long ton (2,240 pounds)
Max.	Maximum
Min.	Minimum
M	Thousand
MB	Thousand barrels
MeOH	Methanol
MM	Million
MMB	Million barrels
MMSCF	Million standard cubic feet
MONC	Motor octane number clear (no lead or other metal)
MTBE	Methyl tertiary butyl ether
OG	Oxygenated gasoline (see page iv)
PPM	Parts per million
PSIG	Pounds per square inch gauge
Regs.	Regulations
RFG	Reformulated gasoline (see page iv)
RONC	Research octane number clear (no lead or other metal)
(R+M)/2	Road octane number
RVP	Reid vapor pressure, pounds per square inch
S	Sulfur
SCF	Standard cubic feet
Spec.	Specification
ST	Short ton (2,000 pounds)
TAME	Tertiary amyl methyl ether
TBA	Tertiary butyl alcohol
VGO	Vacuum gas oil
vol.	Volume
wt.	Weight

SECTION II. REFINERY FACILITIES

IMPORTANT:

Operable capacity: The sum of that capacity in operation at the beginning of a given period, that capacity not in operation nor under repair but which can be placed in operation within 30 days, and that capacity not in operation but under active repair that can be completed within 90 days.

Express feed and product rates in barrels per calendar day (B/CD)

Express unit capacities in barrels per stream day (B/SD)

If a unit has multiple capabilities or uses, include it only under the section that relates to its major operating function.

NOTE: YOUR RESPONSES REGARDING 1990 AND 1991 SHOULD REFLECT ACTUAL NUMBERS; FOR 1995 AND 1996, THEY SHOULD REFLECT YOUR BEST ESTIMATES. INCLUDE RESPONSES FOR THE SAME UNITS REPORTED IN EIA REPORTS 810 AND 820.

A. CAPABILITIES AND UTILIZATION

1. ATMOSPHERIC CRUDE OIL DISTILLATION

	1/1/90	1/1/91	1/1/96
a. Number of operable units	______	______	______
b. Total operable capacity (B/SD)	______B/SD	______B/SD	______B/SD

	Actual 1990	Estimated 1995
c. Average gross feed rate (B/CD)	______B/CD	______B/CD

2. VACUUM CRUDE OIL DISTILLATION

	1/1/90	1/1/91	1/1/96
a. Number of operable units	______	______	______
b. Total operable capacity (B/SD)	______B/SD	______B/SD	______B/SD

	Actual 1990	Estimated 1995
c. Average feed rate (B/CD)	______B/CD	______B/CD

3. **SOLVENT DEASPHALTING**

	1/1/90	1/1/91	1/1/96
a. Number of operable units	________	________	________
b. Total operable capacity (B/SD)	________B/SD	________B/SD	________B/SD

	Actual 1990	Estimated 1995
c. Average feed rate (B/CD)	________B/CD	________B/CD
d. Average yield of deasphalted oil (B/CD)	________B/CD	________B/CD

4. **HYDROTREATING (INCLUDING NAPHTHA, KEROSENE/MIDDLE DISTILLATE, GAS OILS, AND RESIDUA)**

	1/1/90	1/1/91	1/1/96
a. Total number of operable units	________	________	________

Naphtha and Reformer Feed Hydrotreating

	1/1/90	1/1/91	1/1/96
b. Total operable capacity for naphtha and reformer feed hydrotreating (B/SD)	________B/SD	________B/SD	________B/SD

	Actual 1990	Estimated 1995
c. Average feed rate for naphtha and reformer feed (B/CD)	________B/CD	________B/CD
d. Percentage cracker or thermal naphtha (olefinic) of total naphtha and reformer feed	________%	________%

Distillate Hydrotreating

	1/1/90	1/1/91	1/1/96
e. Total operable capacity for distillate hydrotreating (B/SD)	________B/SD	________B/SD	________B/SD

f. Actual 1990 operation	Average Feed Rate (B/CD)	Sulfur Content (Wt. %) Feed	Sulfur Content (Wt. %) Product	Maximum Desulfurization* (% Sulfur Reduction)
(1) Kerosene/kerosene-type jet fuel	________B/CD	____%	____%	____%
(2) Middle distillates**	________B/CD	____%	____%	____%
(3) Percent cracker or thermal feedstock (olefinic) of kerosene/kerosene-type jet fuel and middle distillate in total feed	________%			
g. Estimated 1995 operation				
(1) Kerosene/kerosene-type jet fuel	________B/CD	____%	____%	____%
(2) Middle distillates**	________B/CD	____%	____%	____%
(3) Percent cracker or thermal feedstock (olefinic) of kerosene/kerosene-type jet fuel and middle distillate in total feed	________%			

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*Maximum desulfurization: maximum reduction in sulfur content possible at specified feed rate, at what you believe is a reasonable run length.

**Middle distillates for production of #2 diesel fuel, #2 fuel oil, and similar products or intermediates.

Gas Oil/Catalytic Cracker Feed Hydrotreating (Minimal or no residua in feed)

	1/1/90	1/1/91	1/1/96
h. Total operable capacity for gas oil/catalytic cracker feed hydrotreating (B/SD)	________B/SD	________B/SD	________B/SD

	Actual 1990	Estimated 1995
i. Average feed rate (B/CD)	________B/CD	________B/CD
j. Sulfur content of feed (wt. %)	________%	________%
k. Percent cracker or thermal feedstock in total feed	________%	________%
l. Hydrogen consumption (SCF/B)	________SCF/B	________SCF/B

	Average Rate (B/CD)	Sulfur Content of Product (Wt. %)	Maximum Desulfurization* (% Sulfur Reduction)
m. Actual 1990 product rates and sulfur content			
(1) Hydrotreated cat-cracker feed (620+°F)	________B/CD	____%	____%
(2) Other hydrotreated gas oil (620+°F)	________B/CD	____%	____%
(3) Hydrotreated distillate (350°-620°F)	________B/CD	____%	
(4) Hydrotreated naphtha (C_5-350°F)	________B/CD	____%	
n. Estimated 1995 product rates and sulfur content			
(1) Hydrotreated cat-cracker feed (620+°F)	________B/CD	____%	____%
(2) Other hydrotreated gas oil (620+°F)	________B/CD	____%	____%
(3) Hydrotreated distillate (350°-620°F)	________B/CD	____%	
(4) Hydrotreated naphtha (C_5-350°F)	________B/CD	____%	

*Maximum desulfurization: maximum reduction in sulfur content possible at specified feed rate, at what you believe is a reasonable run length.

Residua Hydrotreating

	1/1/90	1/1/91	1/1/96
o. Total operable capacity for residua hydrotreating (B/SD)	______B/SD	______B/SD	______B/SD

	Actual 1990	Estimated 1995
p. Atmospheric residua feed rate (B/CD)	______B/CD	______B/CD
q. Atmospheric residua sulfur content (wt. %)	______%	______%
r. Vacuum residua feed rate (B/CD)	______B/CD	______B/CD
s. Vacuum residua sulfur content (wt. %)	______%	______%
t. Hydrogen consumption (SCF/B)	______SCF/B	______SCF/B

	Average Rate (B/CD)	Sulfur Content of Product (Wt. %)	Maximum Desulfurization* (% Sulfur Reduction)
u. Actual 1990 product rates and sulfur content			
(1) Hydrotreated atmospheric residua (620+°F)	______B/CD	____%	____%
(2) Hydrotreated vacuum residua (1050+°F)	______B/CD	____%	____%
(3) Hydrotreated VGO (620°-1050°F)	______B/CD	____%	____%
(4) Hydrotreated distillate (350°-620°F)	______B/CD	____%	
(5) Hydrotreated naphtha (C_5-350°F)	______B/CD	____%	
v. Estimated 1995 product rates and sulfur content			
(1) Hydrotreated atmospheric residua (620+°F)	______B/CD	____%	____%
(2) Hydrotreated vacuum residua (1050+°F)	______B/CD	____%	____%
(3) Hydrotreated VGO (620°-1050°F)	______B/CD	____%	____%
(4) Hydrotreated distillate (350°-620°F)	______B/CD	____%	
(5) Hydrotreated naphtha (C_5-350°F)	______B/CD	____%	

*Maximum desulfurization: maximum reduction in sulfur content possible at specified feed rate, at what you believe is a reasonable run length.

5. AROMATICS SATURATION

	1/1/90	1/1/91	1/1/96
a. Number of operable units	______	______	______
b. Operable capacity (B/SD of feed) for:			
(1) Light naphtha/ gasoline blendstocks	______B/SD	______B/SD	______B/SD
(2) Kerosene/kerosene-type jet fuel blendstocks	______B/SD	______B/SD	______B/SD
(3) Middle distillate* blendstocks	______B/SD	______B/SD	______B/SD

c. Average product rates	Actual 1990	Estimated 1995
(1) Light naphtha/gasoline blendstocks	______B/CD	______B/CD
(2) Kerosene/kerosene-type jet fuel blendstocks	______B/CD	______B/CD
(3) Middle distillate* blendstocks	______B/CD	______B/CD

*Middle distillates for production of #2 diesel fuel, #2 fuel oil, and similar products or intermediates.

6. **DELAYED COKING**

	1/1/90	1/1/91	1/1/96
a. Number of operable units	______	______	______
b. Total operable capacity (B/SD)	______B/SD	______B/SD	______B/SD

	Actual 1990	Estimated 1995
c. Average fresh feed rate (B/CD)	______B/CD	______B/CD
d. Average feed properties		
(1) Conradson carbon (wt. %)	______%	______%
(2) Sulfur (wt. %)	______%	______%
e. Average product rates (B/CD)		
(1) Fuel gas (including hydrogen) FOE	______B/CD	______B/CD
(2) Total C_3/C_4 (as recovered)	______B/CD	______B/CD
Within total C_3/C_4, amount of:		
(a) Propylene	______B/CD	______B/CD
(b) Isobutane	______B/CD	______B/CD
(c) Isobutylene	______B/CD	______B/CD
(d) Other butylenes	______B/CD	______B/CD
(3) Thermal naphtha (C_5-350°F)	______B/CD	______B/CD
(4) Thermal distillate (350°-620°F)	______B/CD	______B/CD
(5) Thermal gas oil (620+°F)	______B/CD	______B/CD
(6) Marketable coke (dry 400 lb./B)	______B/CD	______B/CD

7. FLUID COKING AND FLEXICOKING

	1/1/90	1/1/91	1/1/96
a. Number of operable units	______	______	______
b. Total operable capacity (B/SD)	______B/SD	______B/SD	______B/SD

	Actual 1990	Estimated 1995
c. Average fresh feed rate (B/CD)	______B/CD	______B/CD
d. Average feed properties		
(1) Conradson carbon (wt. %)	______%	______%
(2) Sulfur (wt. %)	______%	______%
e. Average product rates (B/CD)		
(1) Fuel gas (including hydrogen and flexicoker gas) FOE	______B/CD	______B/CD
(2) Total C_3/C_4 (as recovered)	______B/CD	______B/CD
Within total C_3/C_4, amount of:		
(a) Propylene	______B/CD	______B/CD
(b) Isobutane	______B/CD	______B/CD
(c) Isobutylene	______B/CD	______B/CD
(d) Other butylenes	______B/CD	______B/CD
(3) Thermal naphtha (C_5-350°F)	______B/CD	______B/CD
(4) Thermal distillate (350°-620°F)	______B/CD	______B/CD
(5) Thermal gas oil (620+°F)	______B/CD	______B/CD
(6) Marketable coke (dry 400 lb./B)	______B/CD	______B/CD

8. **VISBREAKING/THERMAL CRACKING/OTHER THERMAL**

	1/1/90	1/1/91	1/1/96
a. Number of operable units	________	________	________
b. Total operable capacity (B/SD)	________B/SD	________B/SD	________B/SD

	Actual 1990	Estimated 1995
c. Average fresh feed rate (B/CD)	________B/CD	________B/CD
d. Average feed properties		
(1) Gravity (°API)	________°API	________°API
(2) Conradson carbon (wt. %)	________%	________%
(3) Sulfur (wt. %)	________%	________%
e. Average product rates (B/CD)		
(1) Fuel gas (including hydrogen) FOE	________B/CD	________B/CD
(2) Ethylene (as recovered)	________B/CD	________B/CD
(3) Total C_3/C_4 (as recovered)	________B/CD	________B/CD
Within total C_3/C_4, amount of:		
(a) Propylene	________B/CD	________B/CD
(b) Isobutane	________B/CD	________B/CD
(c) Isobutylene	________B/CD	________B/CD
(d) Other butylenes	________B/CD	________B/CD
(4) Thermal naphtha (C_5-350°F)	________B/CD	________B/CD
(5) Thermal distillate (350°-620°F)	________B/CD	________B/CD
(6) Thermal gas oil (620°F-1050°F)	________B/CD	________B/CD
(7) Thermal residua (1050+°F)	________B/CD	________B/CD

9. CATALYTIC CRACKING (ALL KINDS)

	1/1/90	1/1/91	1/1/96
a. Number of operable units	______	______	______
b. Total operable capacity of all units (B/SD of fresh feed):	______B/SD	______B/SD	______B/SD

	Actual 1990		Estimated 1995	
	Total Fresh Feed Rate (B/CD)	% of Feed That Is Hydrotreated	Total Fresh Feed Rate (B/CD)	% of Feed That Is Hydrotreated
c. Average fresh feed rate				
(1) Straight-run gas oil*	______	______%	______	______%
(2) Coker/thermal gas oil	______	______%	______	______%
(3) Deasphalted oil	______	______%	______	______%
(4) Atmospheric residua	______	______%	______	______%
(5) Vacuum residua	______	______%	______	______%
(6) Hydrocracked gas oil	______	______%	______	______%
(7) Hydrotreated cat-cracked cycle oils**	______	100 %	______	100 %
(8) Other ______ *(specify)*	______	______%	______	______%

	Actual 1990	Estimated 1995
d. Average feedstock quality to catalytic cracking unit:		
(1) Gravity (°API)	______°API	______°API
(2) Sulfur content (wt. %)	______%	______%
(3) Conradson carbon (wt. %)	______%	______%
e. Average product yields (B/CD)		
(1) Fuel gas (including hydrogen) FOE	______B/CD	______B/CD
(2) Total C_3/C_4 (as recovered)	______B/CD	______B/CD
Within total C_3/C_4, amount of:		
(a) Propylene	______B/CD	______B/CD
(b) Isobutane	______B/CD	______B/CD
(c) Isobutylene	______B/CD	______B/CD
(d) Other butylenes	______B/CD	______B/CD
(3) Cat cracked naphtha (C_5-430°F)	______B/CD	______B/CD
(4) Light cycle oil (430°-630°F)	______B/CD	______B/CD
(5) Heavy cycle/slurry/decant oil (630+°F)	______B/CD	______B/CD
(6) Coke, wt. percent of feed	______%	______%

*Including atmospheric gas oil.
**For the purposes of this survey, consider hydrotreated cat-cracked cycle oils to be fresh feed. Untreated, cat-cracked oils are not fresh feed.

10. HYDROCRACKING

	1/1/90	1/1/91	1/1/96
a. Number of operable units	______	______	______

UNIT 1:

	1/1/90	1/1/91	1/1/96
b. Operable capacity (B/SD)	______B/SD	______B/SD	______B/SD

	Actual 1990	Estimated 1995
c. Average fresh feed rate (B/CD)		
(1) Straight run gas oil (including atmospheric gas oil)	______B/CD	______B/CD
(2) Coker/thermal gas oil	______B/CD	______B/CD
(3) Deasphalted oil	______B/CD	______B/CD
(4) FCC products	______B/CD	______B/CD
(5) Hydrotreater/hydrocracker products	______B/CD	______B/CD
(6) Atmospheric residua	______B/CD	______B/CD
(7) Vacuum residua	______B/CD	______B/CD
(8) Other ______ *(specify)*	______B/CD	______B/CD
d. Average chemical hydrogen consumption (SCF/B of feed)	______SCF/B	______SCF/B
e. Average product yields (B/CD)		
(1) Fuel gas (including hydrogen) FOE	______B/CD	______B/CD
(2) Propane (as recovered)	______B/CD	______B/CD
(3) Isobutane	______B/CD	______B/CD
(4) Normal butane	______B/CD	______B/CD
(5) Hydrocracked light gasoline (C_5-180°F)	______B/CD	______B/CD
(6) Hydrocracked gasoline (180°-300°F)	______B/CD	______B/CD
(7) Hydrocracked heavy gasoline (300°-350°F)	______B/CD	______B/CD
(8) Hydrocracked kerosene (350°-500°F)	______B/CD	______B/CD
(9) Hydrocracked distillate (500°-620°F)	______B/CD	______B/CD
(10) Hydrocracked heavy gas oil (620°-1050°F)	______B/CD	______B/CD
(11) Hydrocracked residua (1050+°F)	______B/CD	______B/CD
f. Maximum yield capability at operable capacity (percent of fresh feed)		
(1) Maximum gasoline mode		
(a) Gasoline (C_5-350°F)	______%	______%
(b) Kerosene (350°-500°F)	______%	______%
(2) Maximum kerosene mode		
(a) Gasoline (C_5-350°F)	______%	______%
(b) Kerosene (350°-500°F)	______%	______%

10. **HYDROCRACKING (continued)**

UNIT 2:

	1/1/90	1/1/91	1/1/96
b. Operable capacity (B/SD)	______B/SD	______B/SD	______B/SD

	Actual 1990	Estimated 1995
c. Average fresh feed rate (B/CD)		
(1) Straight run gas oil (including atmospheric gas oil)	______B/CD	______B/CD
(2) Coker/thermal gas oil	______B/CD	______B/CD
(3) Deasphalted oil	______B/CD	______B/CD
(4) FCC products	______B/CD	______B/CD
(5) Hydrotreater/hydrocracker products	______B/CD	______B/CD
(6) Atmospheric residua	______B/CD	______B/CD
(7) Vacuum residua	______B/CD	______B/CD
(8) Other ______________ *(specify)*	______B/CD	______B/CD
d. Average chemical hydrogen consumption (SCF/B of feed)	______SCF/B	______SCF/B
e. Average product yields (B/CD)		
(1) Fuel gas (including hydrogen) FOE	______B/CD	______B/CD
(2) Propane (as recovered)	______B/CD	______B/CD
(3) Isobutane	______B/CD	______B/CD
(4) Normal butane	______B/CD	______B/CD
(5) Hydrocracked light gasoline (C_5-180°F)	______B/CD	______B/CD
(6) Hydrocracked gasoline (180°-300°F)	______B/CD	______B/CD
(7) Hydrocracked heavy gasoline (300°-350°F)	______B/CD	______B/CD
(8) Hydrocracked kerosene (350°-500°F)	______B/CD	______B/CD
(9) Hydrocracked distillate (500°-620°F)	______B/CD	______B/CD
(10) Hydrocracked heavy gas oil (620°-1050°F)	______B/CD	______B/CD
(11) Hydrocracked residua (1050+°F)	______B/CD	______B/CD
f. Maximum yield capability at operable capacity (percent of fresh feed)		
(1) Maximum gasoline mode		
(a) Gasoline (C_5-350°F)	______%	______%
(b) Kerosene (350°-500°F)	______%	______%
(2) Maximum kerosene mode		
(a) Gasoline (C_5-350°F)	______%	______%
(b) Kerosene (350°-500°F)	______%	______%

10. **HYDROCRACKING** (concluded)

UNIT 3:

	1/1/90	1/1/91	1/1/96
b. Operable capacity (B/SD)	________B/SD	________B/SD	________B/SD

	Actual 1990	Estimated 1995
c. Average fresh feed rate (B/CD)		
(1) Straight run gas oil (including atmospheric gas oil)	________B/CD	________B/CD
(2) Coker/thermal gas oil	________B/CD	________B/CD
(3) Deasphalted oil	________B/CD	________B/CD
(4) FCC products	________B/CD	________B/CD
(5) Hydrotreater/hydrocracker products	________B/CD	________B/CD
(6) Atmospheric residua	________B/CD	________B/CD
(7) Vacuum residua	________B/CD	________B/CD
(8) Other ____________ *(specify)*	________B/CD	________B/CD
d. Average chemical hydrogen consumption (SCF/B of feed)	________SCF/B	________SCF/B
e. Average product yields (B/CD)		
(1) Fuel gas (including hydrogen) FOE	________B/CD	________B/CD
(2) Propane (as recovered)	________B/CD	________B/CD
(3) Isobutane	________B/CD	________B/CD
(4) Normal butane	________B/CD	________B/CD
(5) Hydrocracked light gasoline (C_5-180°F)	________B/CD	________B/CD
(6) Hydrocracked gasoline (180°-300°F)	________B/CD	________B/CD
(7) Hydrocracked heavy gasoline (300°-350°F)	________B/CD	________B/CD
(8) Hydrocracked kerosene (350°-500°F)	________B/CD	________B/CD
(9) Hydrocracked distillate (500°-620°F)	________B/CD	________B/CD
(10) Hydrocracked heavy gas oil (620°-1050°F)	________B/CD	________B/CD
(11) Hydrocracked residua (1050+°F)	________B/CD	________B/CD
f. Maximum yield capability at operable capacity (percent of fresh feed)		
(1) Maximum gasoline mode		
(a) Gasoline (C_5-350°F)	________%	________%
(b) Kerosene (350°-500°F)	________%	________%
(2) Maximum kerosene mode		
(a) Gasoline (C_5-350°F)	________%	________%
(b) Kerosene (350°-500°F)	________%	________%

11. **CATALYTIC REFORMING--HIGH PRESSURE SEMI-REGENERATIVE OR CYCLIC UNITS (UNITS FOR WHICH AVERAGE OPERATING PRESSURE AT THE SEPARATOR OUTLET EXCEEDS 225 PSIG)**

	1/1/90	1/1/91	1/1/96
a. Number of operable units	________	________	________
b. Total operable capacity (B/SD)	________B/SD	________B/SD	________B/SD
c. Maximum reformate octane (RONC) at operable capacity	________RONC	________RONC	________RONC

	Actual 1990		Estimated
	Annual Average	Summer*	1995 Annual Average
d. Average feed rate (B/CD)	________B/CD	________B/CD	________B/CD
e. Average feed, 10% distilled (°F)	________°F	________°F	________°F
f. Average feed, 90% distilled (°F)	________°F	________°F	________°F
g. Average C_5+ reformate production rate, before any aromatics extraction (B/CD)	________B/CD	________B/CD	________B/CD
h. Average C_5+ reformate octane (RONC)	________RONC	________RONC	________RONC

*April 1 through September 30.

12. CATALYTIC REFORMING--LOW PRESSURE SEMI-REGENERATIVE OR CYCLIC UNITS (UNITS FOR WHICH AVERAGE OPERATING PRESSURE AT THE SEPARATOR OUTLET IS LESS THAN 225 PSIG)

	1/1/90	1/1/91	1/1/96
a. Number of operable units	______	______	______
b. Total operable capacity (B/SD)	______B/SD	______B/SD	______B/SD
c. Maximum reformate octane (RONC) at operable capacity	______RONC	______RONC	______RONC

	Actual 1990		Estimated 1995 Annual Average
	Annual Average	Summer*	
d. Average feed rate (B/CD)	______B/CD	______B/CD	______B/CD
e. Average feed, 10% distilled (°F)	______°F	______°F	______°F
f. Average feed, 90% distilled (°F)	______°F	______°F	______°F
g. Average C_5+ reformate production rate, before any aromatics extraction (B/CD)	______B/CD	______B/CD	______B/CD
h. Average C_5+ reformate octane (RONC)	______RONC	______RONC	______RONC

*April 1 through September 30.

13. CATALYTIC REFORMING--CONTINUOUS CATALYST REGENERATION UNITS

	1/1/90	1/1/91	1/1/96
a. Number of operable units	____	____	____
b. Total operable capacity (B/SD)	____B/SD	____B/SD	____B/SD
c. Maximum reformate octane (RONC) at operable capacity	____RONC	____RONC	____RONC

	Actual 1990		Estimated 1995 Annual Average
	Annual Average	Summer*	
d. Average feed rate (B/CD)	____B/CD	____B/CD	____B/CD
e. Average feed, 10% distilled (°F)	____°F	____°F	____°F
f. Average feed, 90% distilled (°F)	____°F	____°F	____°F
g. Average C_5+ reformate production rate, before any aromatics extraction (B/CD)	____B/CD	____B/CD	____B/CD
h. Average C_5+ reformate octane (RONC)	____RONC	____RONC	____RONC

*April 1 through September 30.

14. ISOMERIZATION

	1/1/90	1/1/91	1/1/96
a. Number of operable units	______	______	______
b. Total operable capacity (B/SD of isomerized product)			
(1) Isobutane (net)	______B/SD	______B/SD	______B/SD
(2) Pentane/hexane (once through)	______B/SD	______B/SD	______B/SD
(3) Pentane/hexane (recycle, net)	______B/SD	______B/SD	______B/SD

	Actual 1990		
	Annual Average	Summer*	Estimated 1995 Annual Average
c. Isomerized product rate (B/CD of isomerized product)			
(1) Isobutane (net)	______B/CD	______B/CD	______B/CD
(2) Pentane/hexane (once through)	______B/CD	______B/CD	______B/CD
(3) Pentane/hexane (recycle, net)	______B/CD	______B/CD	______B/CD

15. ALKYLATION

	1/1/90	1/1/91	1/1/96
a. Number of operable units	______	______	______
b. Total operable capacity (B/SD of debutanized alkylate)	______B/SD	______B/SD	______B/SD
c. Capacity of hydrofluoric acid type units (% of total)	______%	______%	______%

	Actual 1990		
	Annual Average	Summer*	Estimated 1995 Annual Average
d. Average feed rates of:			
(1) Propylenes	______B/CD	______B/CD	______B/CD
(2) Butylenes	______B/CD	______B/CD	______B/CD
(3) Amylenes	______B/CD	______B/CD	______B/CD
e. Total debutanized alkylate production rate (B/CD)	______B/CD	______B/CD	______B/CD

*April 1 through September 30.

16. POLYMERIZATION/DIMERSOL

a. Type of unit: *(CIRCLE ONE NUMBER)*

Polymerization	Dimersol
1	2

	1/1/90	1/1/91	1/1/96
b. Total operable capacity (B/SD of polymerized product)	________B/SD	________B/SD	________B/SD

	Actual 1990		Estimated
c. Average feed rates of:	Annual Average	Summer*	1995 Annual Average
(1) Propylenes	________B/CD	________B/CD	________B/CD
(2) Butylenes	________B/CD	________B/CD	________B/CD
d. Total debutanized product rate	________B/CD	________B/CD	________B/CD
e. Percent of debutanized product to gasoline blending	________%	________%	________%

*April 1 through September 30.

17. OXYGENATE PRODUCTION AT REFINERY SITE

	1/1/90	1/1/91	1/1/96
a. Operable capacity (B/SD)			
(1) MTBE	________B/SD	________B/SD	________B/SD
(2) ETBE	________B/SD	________B/SD	________B/SD
(3) TAME	________B/SD	________B/SD	________B/SD
(4) Other	________B/SD	________B/SD	________B/SD

b. Operable capacity for in-refinery isobutane dehydrogenation for oxygenate production (B/SD) . . . . ________B/SD

	Actual 1990	Estimated 1995
c. Average production rate (B/CD) (report oxygenate production only)		
(1) MTBE	________B/CD	________B/CD
(2) ETBE	________B/CD	________B/CD
(3) TAME	________B/CD	________B/CD
(4) Other	________B/CD	________B/CD

18. AROMATICS EXTRACTION

	1/1/90	1/1/91	1/1/96
a. Operable capacity of aromatics extraction feed (B/SD)	________B/SD	________B/SD	________B/SD
b. Operable capacity of total aromatics products (B/SD)	________B/SD	________B/SD	________B/SD

	Actual 1990	Estimated 1995
c. Average aromatics extraction feed (B/CD)	________B/CD	________B/CD
d. Average aromatics production rate (B/CD)	________B/CD	________B/CD

19. TOLUENE DEALKYLATION

	1/1/90	1/1/91	1/1/96
a. Operable capacity of benzene product (B/SD)	________B/SD	________B/SD	________B/SD

	Actual 1990	Estimated 1995
b. Average benzene production rate (B/CD)	________B/CD	________B/CD

20. HYDROGEN MANUFACTURING UNITS*

	1/1/90	1/1/91	1/1/96
a. Number of operable units	________	________	________
b. Total operable capacity (MMSCF/SD OF 100% H_2)			
(1) Total from all feeds	________MMSCF/SD	________MMSCF/SD	________MMSCF/SD
(2) Maximum percent from pentane or heavier feeds	________%	________%	________%

	Actual 1990	Estimated 1995
c. Average 100% H_2 production rates (MMSCF/CD)		
(1) Total from all feeds	________MMSCF/CD	________MMSCF/CD
(2) Percent from natural gas, fuel gas, or propane/butane feeds	________%	________%
(3) Percent from pentane or heavier feeds	________%	________%

*Do not include hydrogen produced in the catalytic reforming units included in Questions 11, 12, and 13.

21. HYDROGEN PURIFICATION UNITS

	1/1/90	1/1/91	1/1/96
a. Total operable capacity (MMSCF/SD of recovered 100% H_2)	________MMSCF/SD	MMSCF/SD	________MMSCF/SD

	Actual 1990	Estimated 1995
b. Average purified H_2 recovered (MMSCF/CD)	________MMSCF/CD	________MMSCF/CD

22. SECONDARY GASOLINE FRACTIONATION*

	1/1/90	1/1/91	1/1/96
a. Number of columns	________	________	________
b. Total feed capacity (B/SD)	________B/SD	________B/SD	________B/SD

23. SULFUR RECOVERY
(include H_2S conversion by others for this refinery)

	1/1/90	1/1/91	1/1/96
a. Total operable capacity** (LT/SD of sulfur)	________LT/SD	________LT/SD	________LT/SD

	Actual 1990	Estimated 1995
b. Average sulfur production rate** (LT/CD)	________LT/CD	________LT/CD

*Include columns that receive only gasoline (and lighter) boiling range material as a feed.
**If plant makes sulfuric acid, state net production rate as sulfur equivalent.

B. REFINERY FEEDSTOCKS

1. **Crude Oil Inputs**: List actual 1990 and estimated 1995 crude oil inputs to this refinery. *(See definitions at bottom of page for each type of oil.)*

	B/CD	°API	Sulfur Weight %	Residua (1050+°F)* Volume %
a. **1990 Actual (annual average)**				
Sweet crude oil				
(1) Light				
(2) Heavy				
Medium sulfur crude oil				
(3) Light				
(4) Heavy				
High sulfur crude oil				
(5) Light				
(6) Heavy				
(7) TOTAL				
b. **1995 Estimated (annual average)**				
Sweet crude oil				
(1) Light				
(2) Heavy				
Medium sulfur crude oil				
(3) Light				
(4) Heavy				
High sulfur crude oil				
(5) Light				
(6) Heavy				
(7) TOTAL				

Definitions:

Sweet crude: Under 0.5 wt % sulfur
Light: 15% or less 1050+°F residuum assay
Heavy: Greater than 15% 1050+°F residuum assay

Medium sulfur crude oil: Between 0.5 and 1.0 wt % sulfur
(ANS crude is defined to be medium sulfur, heavy)
Light: 15% or less 1050+°F residuum assay
Heavy: Greater than 15% 1050+°F residuum assay

High sulfur crude oil: Over 1.0 wt % sulfur
Light: 15% or less 1050+°F residuum assay
Heavy: Greater than 15% 1050+°F residuum assay

*Express as volume % of residuum in crude oil boiling above 1050°F.

2. As of January 1, 1991, did you run any sweet crude oil (<0.5% S) in this refinery?

(CIRCLE ONE NUMBER)

Yes 1

No . . . . . 2 --> SKIP TO QUESTION 4, BELOW

3. With the facilities that this refinery had in place as of January 1, 1991, if sweet crude oil (<0.5% S) becomes less available, how much sweet crude oil could be replaced with a light, high sulfur crude oil (of about 33 gravity and 1.5% sulfur) and still maintain about the same light product rates and specifications? *Base your response on your judgment.*

   a. Amount of sweet crude oil possible to reduce: __________ B/CD

   b. Amount of light, high sulfur crude oil replacing sweet crude oil: __________ B/CD

4. **In 1995**, to what extent, if at all, do you anticipate that each of the following environmental or other constraints will restrict this refinery's ability to process high sulfur (>1% S) crude oils?

(CIRCLE ONE NUMBER FOR EACH ITEM)

	ANTICIPATED LEVEL OF CONSTRAINT ON ABILITY TO PROCESS HIGH SULFUR CRUDE OILS IN 1995:				
	None	Some	Quite a Bit	A Great Deal	Have No Idea
a. Required sulfur content of products	0	1	2	3	9
b. Sulfur content of refinery fuels	0	1	2	3	9
c. Stationary-source air emissions requirements	0	1	2	3	9
d. Effluent water quality requirements	0	1	2	3	9
e. Metallurgy	0	1	2	3	9
f. H_2S recovery and/or sulfur plant capacity	0	1	2	3	9
g. Residua processing capacity	0	1	2	3	9

Other important constraints (specify:)

____

____

5. **Other Raw Material Inputs**: List actual 1990 and estimated 1995 rates of unfinished oils and other raw materials received from sources outside this refinery and fed to processing or blended at the refinery.

	Actual 1990 (Annual Average B/CD)	Estimated 1995 (Annual Average B/CD)
a. Propane	______B/CD	______B/CD
b. C_3/C_4 olefins (100% olefins)	______	______
c. Isobutane	______	______
d. Normal butane	______	______
e. Natural/light straight run gasoline	______	______
f. Heavy naphtha	______	______
g. Oxygenates:		
(1) MTBE	______	______
(2) ETBE	______	______
(3) TAME	______	______
(4) Ethanol	______	______
(5) Methanol	______	______
(6) Other (specify: ______)	______	______
h. Other gasoline blendstocks (except oxygenates)	______	______
i. Middle distillates*/cutter stock	______	______
j. Heavy gas oil/cracker feeds/ lubestocks	______	______
k. Residua	______	______
(1) Percent 1050+°F — 1990 ___% 1995 ___%		
l. Natural gas		
(1) For refinery fuel FOE	______	______
(2) For H_2 plant feed FOE	______	______
m. Hydrogen (100% H_2) FOE	______	______
n. Other (specify):		
(1) ______	______	______
(2) ______	______	______
(3) ______	______	______
(4) ______	______	______
TOTAL	______	______

*Middle distillates for production of #2 diesel fuel, #2 fuel oil, and similar products or intermediates.

C. PRODUCT RATES

1. List the actual <u>1990</u> and estimated <u>1995</u> production rates of this refinery's products, including refinery fuels that are produced and consumed internally.

Product	Actual 1990 (Annual Average B/CD)	Estimated 1995 (Annual Average B/CD)
a. Fuel gas FOE	______ B/CD	______ B/CD
b. C_2s (including ethylene) sold	______	______
c. C_3s (including propylene) sold	______	______
d. C_4s (including butylenes) sold	______	______
e. Oxygenates, not blended	______	______
f. Total motor gasolines*	______	______
g. Aviation gasoline	______	______
h. Special naphthas (solvents)	______	______
i. Naphtha-type jet fuel	______	______
j. Kerosene-type jet fuel	______	______
k. Kerosene/#1 fuel oil	______	______
l. #2 Diesel fuel/#2 fuel oil**	______	______
m. Other finished diesel/distillate fuel oils***	______	______
n. Residual fuel oil:		
(1) <0.30 wt. % S	______	______
(2) 0.30 - 1.00 wt. % S	______	______
(3) >1.00 wt. % S	______	______

(continued)

*Production should equal total production rates given in item g at the bottom of page II-27 (1990), and in item f at the bottom of page II-28 (1995).

**See page II-29, question 4, for breakdown of product grades included in this category.

***Do not meet specs for either #2 diesel fuel or #2 fuel oil.

1. (continued)

Product	Actual 1990 (Annual Average B/CD)	Estimated 1995 (Annual Average B/CD)
o. Asphalt and road oils	______B/CD	______B/CD
p. Lubes/waxes (310 lb./B)	______	______
q. Benzene	______	______
r. Toluene	______	______
s. Xylenes	______	______
t. Petrochemical naphthas (<400°F)	______	______
u. Petrochemical feedstocks (400°F+)	______	______
v. Unfinished oils:		
(1) Light straight run gasoline	______	______
(2) Heavy naphtha	______	______
(3) Other gasoline blendstocks (except oxygenates)	______	______
(4) Middle distillates*/cutter stock	______	______
(5) Heavy gas oil/cracker feeds/ lubestocks	______	______
(6) Residua	______	______
w. Marketable coke (dry 400 lb./B)	______	______
x. Catalytic coke (400 lb./B)	______	______
y. Miscellaneous products (specify):		
(1) ______	______	______
(2) ______	______	______
z. Total products	______	______
aa. Refinery loss (gain)	______	______
bb. Total crude oil and raw materials**	______	______
cc. Sulfur (LT/CD)***	______LT/CD	______LT/CD

*Middle distillates for production of #2 diesel fuel, #2 fuel oil, and similar products or intermediates.

**Sum of crude oil inputs on page II-22 and raw material inputs on page II-24.

***If plant makes sulfuric acid, state net production rate as sulfur equivalent. Include H_2S conversion by others for this refinery.

2. **<u>1990 Motor Gasoline Grades</u>**: For each of the types of motor gasoline listed below that this refinery produced <u>in 1990</u>, provide the annual averages for: octane rating ([R+M]/2), oxygen (<u>not</u> oxygen<u>ate</u>) content, lead content, and production rate (B/CD) of each grade.

	Annual Averages of:			
Type of Motor Gasoline	Octane Rating (R+M)/2	Oxygen Content (Wt. %)	Lead Content (Grams/ Gallon)	1990 Annual Production (B/CD)
a. Leaded				
(1) Regular	______		______	______
(2) ______	______		______	______
(3) ______	______		______	______
b. Conventional unleaded*				
(1) Regular	______	______		______
(2) Mid-grade	______	______		______
(3) Premium	______	______		______
(4) ______	______	______		______
(5) ______	______	______		______
(6) ______	______	______		______
c. Oxygenated**				
(1) Unleaded regular	______	______		______
(2) Unleaded mid-grade	______	______		______
(3) Unleaded premium	______	______		______
(4) Leaded	______	______	______	______
(5) ______	______	______	______	______
(6) ______	______	______	______	______
d. Total finished gasoline				______
e. Subgrade and other gasoline (specify):				
(1) ______	______	______	______	______
(2) ______	______	______	______	______
(3) ______	______	______	______	______
(4) ______	______	______	______	______
f. Total subgrades				______
g. Total subgrades and finished				______

*Including <u>voluntary</u> oxygenate additions.
**Finished gasoline that meets the minimum oxygen content requirement for gasoline sold in regulated areas.

3. **1995 Motor Gasoline Grades**: For each of the types of motor gasoline listed below that this refinery expects to produce in 1995, provide the estimated annual averages for: octane rating ([R+M]/2), oxygen (not oxygenate) content, lead content, and production rate (B/CD) of each grade.

Type of Motor Gasoline	Octane Rating (R+M)/2	Oxygen Content (Wt. %)	Lead Content (Grams/ Gallon)	1995 Annual Production (B/CD)
a. Leaded				
(1) Regular	______		______	______
(2) ______	______		______	______
(3) ______	______		______	______
b. Conventional unleaded*				
(1) Regular	______	______		______
(2) Mid-grade	______	______		______
(3) Premium	______	______		______
(4) ______	______	______		______
(5) ______	______	______		______
c. Reformulated (RFG)**				
(1) Regular	______	______		______
(2) Mid-grade	______	______		______
(3) Premium	______	______		______
(4) ______	______	______		______
(5) ______	______	______		______
d. Oxygenated (OG)**				
(1) Unleaded regular	______	______		______
(2) Unleaded mid-grade	______	______		______
(3) Unleaded premium	______	______		______
(4) Leaded	______	______	______	______
(5) ______	______	______	______	______
(6) ______	______	______	______	______
e. Subgrade and other gasoline (specify):				
(1) ______	______	______	______	______
(2) ______	______	______	______	______
(3) ______	______	______	______	______
f. Total				______

*Including voluntary oxygenate additions.
**See page iv for definition.

4. **1990 and 1995 Production of #2 Diesel Fuel and #2 Fuel Oil Grades**: For each of the types of #2 diesel fuel and #2 fuel oil in the sulfur content ranges listed below, provide the quantity that this refinery produced and delivered in 1990 and the quantity that it expects to produce and deliver in 1995.

Types of #2 Diesel Fuel and #2 Fuel Oil	Production Rate (B/CD) Actual 1990	Production Rate (B/CD) Estimated 1995
a. Sulfur content <0.05 wt. %		
(1) Common #2 diesel fuel/#2 fuel oil*		
(2) #2 diesel fuel**		
(3) #2 fuel oil***		
(4) California diesel****		
b. Sulfur content 0.05 - 0.20 wt. %		
(1) Common #2 diesel fuel/#2 fuel oil*		
(2) #2 diesel fuel**		
(3) #2 fuel oil***		
c. Sulfur content >0.20 wt. %		
(1) Common #2 diesel fuel/#2 fuel oil*		
(2) #2 diesel fuel**		
(3) #2 fuel oil***		
d. Total (should equal production rates reported on page II-25, line 1)		

*Meets ASTM specifications for both #2 diesel fuel and #2 fuel oil.

**Does not meet #2 fuel oil specifications.

***Does not meet #2 diesel fuel specifications.

****Meets California vehicular diesel specifications.

5. **1990 Gasoline Components**: Provide the requested information for annual average operations for gasoline components blended at this refinery in 1990. Report results for similar components from multiple units as composite volumetric averages. Use best available component property data (including 1991 data adjusted for changes since 1990 if the result is more accurate than available 1990 data).

	Reformate			Straight-Run Naphtha	Natural Gasoline/ Condensate
	Full Range	Light	Heavy		
a. Production rate (B/CD)					
b. Gravity (°API)					
c. RONC					
d. MONC					
e. RVP (PSI)					
f. Benzene (vol. %)					
g. Aromatics (vol. %)					
h. Olefins (vol. %)					
i. Sulfur (PPM wt.)					
j. ASTM distillation (°F):					
(1) 10% point					
(2) 50% point					
(3) 90% point					

5. **Gasoline Components (1990)** (continued)

	FCC Naphtha			Pentane/Hexane Isomerate	
	Full Range	Light	Heavy	Once-Through	Recycle
a. Production rate (B/CD)					
b. Gravity (°API)					
c. RONC					
d. MONC					
e. RVP (PSI)					
f. Benzene (vol. %)					
g. Aromatics (vol. %)					
h. Olefins (vol. %)					
i. Sulfur (PPM wt.)					
j. ASTM distillation (°F):					
(1) 10% point					
(2) 50% point					
(3) 90% point					

5. **Gasoline Components (1990)** (continued)

	Coker Gasoline	Hydro-cracker Gasoline	Alkylate
a. Production rate (B/CD)			
b. Gravity (°API)			
c. RONC			
d. MONC			
e. RVP (PSI)			
f. Benzene (vol. %)			
g. Aromatics (vol. %)			
h. Olefins (vol. %)			
i. Sulfur (PPM wt.)			
j. ASTM distillation (°F):			
(1) 10% point			
(2) 50% point			
(3) 90% point			

6. With the operable capacity of facilities that your company had in place on January 1, 1991, what is your **maximum short-term (1-month) production capability** for each of the following products. Also, given the maximum production of the first-listed product, what is the amount of each of the other products that you would produce? For example, if you maximize motor gasoline production, how much kerosene-type jet fuel, #2 diesel fuel/#2 fuel oil, and residual fuel oil would you produce at the same time?

   Base your response on your: (1) 1990 product specifications, raw material rates, and incremental crude; and (2) experience and judgment.

   a. **Maximum summer* production of motor gasoline:** __________ B/CD

      Given the above figure:

      (1) Production of kerosene-type jet fuel: __________ B/CD

      (2) Production of #2 diesel fuel/#2 fuel oil: __________ B/CD

      (3) Production of residual fuel oil __________ B/CD

   b. **Maximum winter** production of kerosene-type jet fuel:** __________ B/CD

      Given the above figure:

      (1) Production of motor gasoline: __________ B/CD

      (2) Production of #2 diesel fuel/#2 fuel oil: __________ B/CD

      (3) Production of residual fuel oil __________ B/CD

   c. **Maximum winter** production of #2 diesel fuel/#2 fuel oil:** __________ B/CD

      Given the above figure:

      (1) Production of motor gasoline: __________ B/CD

      (2) Production of kerosene-type jet fuel: __________ B/CD

      (3) Production of residual fuel oil __________ B/CD

---

*April 1 through September 30.

**January 1 through March 31 and October 1 through December 31.

7. If your refinery had run <u>5% less crude in 1990</u> than it actually did, what would have been the likely changes in refinery stock balance, process unit utilization, and total operating costs?

a. **Change in refinery stock balance**

Feedstock	Increased Input <Decreased Input>
(1) Amount of change in crude run	<_________> B/CD
<u>Character of the 5% crude that was backed out</u>	
(a) Gravity (°API) _____ °	
(b) Sulfur (wt. %) _____%	
(c) 1050+°F residua (vol. %) _____%	
(2) Other feeds purchased (include butane and lighter on a FOE basis)	__________ B/CD

Products	Increased Production <Decreased Production>
(3) Motor gasolines	__________ B/CD
(4) Kerosene-type jet fuel	__________ B/CD
(5) #2 Diesel fuel/#2 fuel oil	__________ B/CD
(6) Residual fuel oil	__________ B/CD
(7) Other products sold (include butane and lighter on a FOE basis)	__________ B/CD

b. **Change in process unit utilization**	Increased Utilization <Decreased Utilization>
(1) Catalytic reforming	__________ B/CD
(2) Alkylation	__________ B/CD
(3) Polymerization/dimersol	__________ B/CD
(4) Catalytic cracking	__________ B/CD
(5) Hydrocracking	__________ B/CD
(6) Coking	__________ B/CD
(7) Middle distillate* hydrotreating	__________ B/CD
(8) Gas oil/catalytic cracker feed hydrotreating	__________ B/CD

c. **Change in total operating costs**	Increased Costs <Decreased Costs>
	__________ $/CD

---

*Middle distillates for production of #2 diesel fuel, #2 fuel oil, and similar products or intermediates.

8. If your refinery had run 5% more crude in 1990 than it actually did, what would have been the likely changes in refinery stock balance, process unit utilization, and total operating costs?

NOTE: If a 5% increase would result in more than your maximum crude run, report delta to your maximum crude run.

a. Change in refinery stock balance

Feedstock	Increased Input <Decreased Input>
(1) Amount of change in crude run	___________ B/CD
Character of incremental crude	
(a) Gravity (°API) _____ °	
(b) Sulfur (wt. %) _____%	
(c) 1050+°F residua (vol. %) _____%	
(2) Other feeds purchased (include butane and lighter on a FOE basis)	___________ B/CD

Products	Increased Production <Decreased Production>
(3) Motor gasolines	___________ B/CD
(4) Kerosene-type jet fuel	___________ B/CD
(5) #2 Diesel fuel/#2 fuel oil	___________ B/CD
(6) Residual fuel oil	___________ B/CD
(7) Other products sold (include butane and lighter on a FOE basis)	___________ B/CD

b. Change in process unit utilization	Increased Utilization <Decreased Utilization>
(1) Catalytic reforming	___________ B/CD
(2) Alkylation	___________ B/CD
(3) Polymerization/dimersol	___________ B/CD
(4) Catalytic cracking	___________ B/CD
(5) Hydrocracking	___________ B/CD
(6) Coking	___________ B/CD
(7) Middle distillate* hydrotreating	___________ B/CD
(8) Gas oils/catalytic cracker feed hydrotreating	___________ B/CD

c. Change in total operating costs	Increased Costs <Decreased Costs>
	___________ $/CD

*Middle distillates for production of #2 diesel fuel, #2 fuel oil, and similar products or intermediates.

NATIONAL PETROLEUM COUNCIL
1991 SURVEY OF U.S. PETROLEUM REFINING INDUSTRY

SECTION III. REFINERY EMISSION SOURCES AND CONTROLS

Complete this questionnaire for the refinery specified below. In the case of jointly owned refineries, the operating company should complete the questionnaire.

If you have questions or need more copies of the questionnaire, contact:

Benjamin Oliver, Jr., NPC, (202) 393-6100
FAX: (202) 331-8539
OR
Susan Russell, SRI International, (415) 859-2640
FAX: (415) 859-2861

Use the enclosed envelope to return this completed questionnaire **no later than January 31, 1992**, to:

Survey Research Program
SRI International
P.O. Box 2246
Menlo Park, CA 94026-2246

Whom should we contact if we have questions about your responses to this section?

Name: ______________________________

Telephone: ______________________________

FAX: ______________________________

INTRODUCTION

In response to a request from the Secretary of Energy, the National Petroleum Council (NPC) is conducting a study of the U.S. refining industry's capability and flexibility to meet future product demand. Task groups consisting of representatives from NPC member companies have been responsible for identifying the data needs and specifying the content of the questionnaires.

The survey includes both existing and planned U.S. refineries, as follows:

- **All refineries with operable capacity as of January 1, 1991, regardless of whether they were actually in operation on that date.**

- **All refineries that are planned to be operable by January 1, 1996.**

Data Tabulations and Confidentiality

The NPC has retained SRI International to format the survey questionnaires and to collect and tabulate the survey data and provide aggregated data to the U.S. petroleum refining study participants, NPC staff, and contractors who will use the data in mathematical models. **The final report will be sent to all survey respondents.** SRI International--formerly Stanford Research Institute--is a broad-based, nonprofit research and consulting organization serving clients in industry, government, and service organizations worldwide.

Individual company data from the survey will be held **strictly confidential** by SRI and will not be released to government, study participants, NPC staff, or other contractors. The only SRI staff who will have access to the data are Survey Research Program staff and Ms. Susan Leiby, an SRI process engineer, who will assist Survey Research Program staff in reviewing the questionnaires and will be available in the event of any difficulties in questionnaire interpretation. Confidential Information Agreements prepared by the NPC have been executed by SRI management, individual Survey Research Program staff, and Ms. Leiby committing themselves to these data handling procedures.

SRI International will release the aggregated data to NPC study participants only when sufficient data are available to permit aggregation in a manner that would not disclose individual operations. Once the data have been aggregated, accepted by the NPC, and reported, all individual responses will be destroyed.

Overview of the Information Requested

The 1991 Survey of U.S. Petroleum Refiners consists of 10 sections, as outlined below. This is Section III.

I. Perceptions of the impacts of regulatory requirements on the refinery's operations in 1995 and 2000.

II. Refinery facilities' capabilities and utilization, feedstocks, and product yields--actual 1990 data and as anticipated for 1995.

III. Refinery emission sources and controls.

IV. Economic impacts of environmental regulations on refineries--both historical and anticipated costs.

V. Distribution and transport modes of products from refineries among national regions--1990 and 1995.

VI. Expectations regarding the 1995 supply and distribution of oxygenates, corporate-wide.

VII. Various issues concerning terminals, including supply of product, capacity, and environmentally related costs.

VIII. Various issues concerning pipelines, including capacity, product segregations, and costs.

IX. Tanker, barge, rail, and truck transport costs.

X. Foreign refinery and supply issues, including likely product specifications in other nations in 1995 and 2000.

A separate questionnaire on the supply and distribution of oxygenates is being sent to companies that blend oxygenates with petroleum products but do not produce petroleum products.

Purposes for the Information Requested

The NPC needs your company's responses to this questionnaire to help build an accurate picture of the current and anticipated future capability and flexibility of the nation's refineries. This information, aggregated across all respondents, will comprise a major component of the NPC's response to the Secretary of Energy. The aggregated survey results also will be used to validate industry models.

For use in the mathematical models, the survey results will be supplemented with aggregate 1990 operating data from the Department of Energy's Energy Information Administration reports and the judgments of the industry experts on the NPC study groups. Use of these three sources of information will help to ensure that the models provide valid representations of the industry and do not under- or over-state industry capability or flexibility.

This section asks for information about refinery facilities and environmental controls currently in place or planned for a specified date in the future. The information will be used to model the impact of future environmental regulation.

Survey Acronyms and Abbreviations

NOTE: The abbreviations below refer to the way in which they are used in this section of the questionnaire.

%	Percent
#	Number
B	Barrels
CAA	Clean Air Act
FCCU	Fluid catalytic cracker unit
FPCD	Final particulate control devices
LT/D	Long tons per day
MM	Million
MMB	Million barrels
MTR	Minimum Technology Requirement
PRV	Pressure relief valve
RCRA	Resource Conservation and Recovery Act
SWMU	Solid waste management unit

SECTION III. REFINERY EMISSION SOURCES AND CONTROLS

NOTE: INCLUDE ONLY THE OIL PORTION OF A REFINERY IF THIS FACILITY HAS BOTH OIL AND CHEMICAL OPERATIONS.

1. Indicate whether this refinery is currently in an attainment or non-attainment area with regard to each of the following emissions: *(CIRCLE ONE NUMBER FOR EACH KIND OF EMISSION)*

	Attainment Area	Non-Attainment Area
a. Ozone	1	2
b. Carbon monoxide	1	2
c. Particulates	1	2
d. Sulfur dioxide	1	2
e. Nitrogen oxides	1	2

2. Redundancy for unplanned shutdowns of sulfur plants, sulfur tail gas plants, or FCCU final particulate control devices (FPCD): **By the end of 1995**, how much capacity would you have to add to allow continued normal operation of this refinery in the event of an unplanned shutdown of this refinery's largest sulfur plant, largest sulfur tail gas plant, or largest FCCU FPCD?

Answer "0" if you will have total redundancy by 1995 for the refinery's largest plant or FPCD; answer "DNA" (does not apply) if refinery does not have a sulfur plant, sulfur tail gas plant, or FCCU.

	Capacity Needed to Be **Added** to Provide Total Redundancy
a. Largest sulfur plant	___________LT/D
b. Largest sulfur tail gas plant	___________LT/D
c. Largest FCCU FPCD	___________% of total capacity operated

d. Type of FCCU FPCD:

(CIRCLE ONE NUMBER)

Wet scrubber 1

Electrostatic precipitator . . 2

Baghouse 3

Cyclones 4

Other 5

3. **By the end of 1995**, how many hydrocarbon pressure relief valves (PRVs) in this refinery will be designed to release to the atmosphere?

(CIRCLE ONE NUMBER)

10 or fewer. 1

11 to 100. 2

101 to 200 3

More than 200. 4

4. **By the end of 1995**, how many large crude columns and other fractionators in this refinery will have PRVs that are designed to release to the atmosphere? *(Note: These PRVs also are included in Question 3.)*

   a. Number of crude columns that release to the atmosphere: _______

   b. Number of other fractionators that release to the atmosphere: _______

5. At this refinery, what was the <u>average</u> daily volume of treated water effluent that was discharged **during 1990?**

   a. ________ million gallons of process water per day **during 1990**

   b. ________ million gallons of stormwater per day **during 1990**

6. **By the end of 1995**, what will be the highest level of waste water treatment at this refinery?

   (CIRCLE ONE NUMBER)

   Primary (oil/water separation) 1

   Secondary (biological treatment) 2

   Tertiary (for example, filtration, activated carbon) . . . 3

7. Given the current regulatory environment in your area, how likely is it that receiving body (for example, lake, bay) sediments will be an issue at this refinery **before the end of 1995?**

   (CIRCLE ONE NUMBER)

Highly Unlikely	Unlikely	Possible	Likely	Highly Likely
1	2	3	4	5

8. **By the end of 1995**, what will be this refinery's stormwater surge (that is, storage) capacity?

   __________ million gallons

9. What stormwater surge (that is, storage) capacity would be required for a 10-year, 24-hour storm at this refinery location? *(Note: Assume that storm runoff that meets federal standards is discharged [after first flush].)*

   __________ million gallons

10. **By the end of 1995,** what percentage of this refinery's process waste water will be segregated from stormwater?

(CIRCLE ONE NUMBER)

25% or less 1
26% to 50% 2
51% to 75% 3
More than 75% 4

11. **By the end of 1995,** what percentage of this refinery's process waste water system piping will be above ground?

(CIRCLE ONE NUMBER)

25% or less 1
26% to 50% 2
51% to 75% 3
More than 75% 4

12. **By the end of 1995,** approximately how many linear feet of below-ground sewer system piping (segregated process waste water and process waste water combined with stormwater and/or sanitary waste water) will there be at this refinery location?

(CIRCLE ONE NUMBER)

10,000 or fewer linear feet 1
10,001 to 50,000 linear feet 2
50,001 to 100,000 linear feet 3
100,001 to 500,000 linear feet 4
More than 500,000 linear feet 5

13. **By the end of 1995,** approximately how many linear feet of refinery process piping in liquid hydrocarbon service will be underground (including off-sites)?

(CIRCLE ONE NUMBER)

10,000 or fewer linear feet 1
10,001 to 100,000 linear feet 2
100,001 to 500,000 linear feet 3
500,001 to 2,000,000 linear feet 4
More than 2,000,000 linear feet 5

14. Assuming all non-Minimum Technology Requirement (MTR)* surface impoundments, as defined under RCRA, must be modified or closed...

   a. What is the total acreage of surface impoundments that will be upgraded to MTR **after the end of 1995?**

      Total acreage: __________ acres

   b. What is the total volume of the surface impoundments that will be replaced with above-ground storage tanks **after the end of 1995?**

      Total volume of tanks: __________ million gallons

   c. What is the total acreage of surface impoundments that will be closed and not replaced **after the end of 1995?**

      Total acreage: __________ acres

15. If this refinery filed RCRA Part B application(s), provide the following information with regard to the inactive solid waste management units (SWMUs) (that is, surface impoundments, landfills, waste piles, and land treatment units) that are anticipated to be at this refinery location **by the end of 1995:**

   0 Circle this "0" and skip to Question 17 if this refinery did not file RCRA Part B applications.

   a. Approximate total quantity of nonhazardous waste (as defined under RCRA) in these inactive SWMUs **by the end of 1995:** _______ cubic yards

   b. Approximate total quantity of hazardous waste (as defined under RCRA) in these inactive SWMUs **by the end of 1995:** _______ cubic yards

   c. Approximate percentage of the hazardous waste that is anticipated to be cleaned up **by the end of 1995:** _______%

16. **By the end of 1995**, do you anticipate having any active SWMUs at this refinery location (excluding surface impoundments associated with waste water treatment)?

   Yes 1

   No . . . . 2 ---> IF NO, SKIP TO QUESTION 18

---

*MTR for surface impoundments under RCRA includes secondary containment and leak detection.

17. Provide the following information for <u>active</u> SWMUs anticipated to be at this refinery location **by the end of 1995** (<u>excluding surface impoundments associated with waste water treatment</u>):

a. Hazardous waste (as defined under RCRA)

(1) Total waste volumes anticipated for these units **by the end of 1995:** _______ cubic yards

(2) Estimated <u>total</u> capacity for these units **at the end of 1995:** _______ cubic yards

(3) Estimated <u>remaining</u> capacity for these units **at the end of 1995:** _______ cubic yards

b. Nonhazardous waste (as defined under RCRA)

(1) Total waste volumes anticipated for these units **by the end of 1995:** _______ cubic yards

(2) Estimated <u>total</u> capacity for these units **at the end of 1995:** _______ cubic yards

(3) Estimated <u>remaining</u> capacity for these units **at the end of 1995:** _______ cubic yards

18. <u>In addition</u> to the volumes of material identified in Questions 15 and 17, what is the estimated volume of hydrocarbon contaminated soil, including Areas of Concern (AOCs), that will <u>require remediation</u> at this refinery **after the end of 1995?**
(Calculate volume by using <u>known</u> areas at an estimated average depth.)

___________ cubic yards

19. Indicate the ground water monitoring system(s) anticipated at this refinery location **by the end of 1995.**

(CIRCLE ALL THAT APPLY)

None 1
Perimeter 2
Groups of SWMUs . . 3
Individual SWMUs . . 4

20. **By the end of 1995**, what kind of hydrocarbon and ground water recovery and treatment system(s) is this refinery location anticipated to have?

(CIRCLE ALL THAT APPLY)

None 1

Perimeter 2

Barrier(s) 3

Groups of SWMUs . . 4

Individual SWMUs . . 5

21. Provide your best estimates with regard to the following information about tanks that are anticipated to be available for light (greater than 0.75 psi vapor pressure) and heavy hydrocarbon service at this refinery location **at the end of 1995**:

	Number of Tanks	Total Capacity (Millions of Barrels)	Percent Equipped with Leak Containment and Detection (for Example, Double-Bottoms)	Percent Equipped with Double Seals or Equivalent
a. Tanks for light (> 0.75 psi vapor pressure) hydrocarbons	______	________ MMB	______%	______%
b. Tanks for heavy hydrocarbons	______	________ MMB	______%	

22. **By the end of 1995**, about how many of the tanks identified in Question 21 will be less than 40 years old, about how many will be 40 or more years old, and what will be the approximate total capacity of these tanks?

Tank Age by End of 1995	Number of Tanks	Total Capacity (Millions of Barrels)
a. Less than 40 years	________	__________ MMB
b. 40 or more years	________	__________ MMB

NATIONAL PETROLEUM COUNCIL
1991 SURVEY OF U.S. PETROLEUM REFINING INDUSTRY

SECTION IV. ECONOMIC IMPACTS OF ENVIRONMENTAL REGULATIONS ON REFINERIES

Complete this questionnaire for the refinery specified below. In the case of jointly owned refineries, the operating company should complete the questionnaire.

If you have questions or need more copies of the questionnaire, contact:

Benjamin Oliver, Jr., NPC, (202) 393-6100
FAX: (202) 331-8539
OR
Susan Russell, SRI International, (415) 859-2640
FAX: (415) 859-2861

Use the enclosed envelope to return this completed questionnaire **no later than January 31, 1992**, to:

Survey Research Program
SRI International
P.O. Box 2246
Menlo Park, CA 94026-2246

Whom should we contact if we have questions about your responses to this section?

Name: ______________________________

Telephone: ______________________________

FAX: ______________________________

INTRODUCTION

In response to a request from the Secretary of Energy, the National Petroleum Council (NPC) is conducting a study of the U.S. refining industry's capability and flexibility to meet future product demand. Task groups consisting of representatives from NPC member companies have been responsible for identifying the data needs and specifying the content of the questionnaires.

The survey includes both existing and planned U.S. refineries, as follows:

- **All refineries with operable capacity as of January 1, 1991, regardless of whether they were actually in operation on that date.**

- **All refineries that are planned to be operable by January 1, 1996.**

Data Tabulations and Confidentiality

The NPC has retained SRI International to format the survey questionnaires and to collect and tabulate the survey data and provide aggregated data to the U.S. petroleum refining study participants, NPC staff, and contractors who will use the data in mathematical models. **The final report will be sent to all survey respondents.** SRI International--formerly Stanford Research Institute--is a broad-based, nonprofit research and consulting organization serving clients in industry, government, and service organizations worldwide.

Individual company data from the survey will be held strictly confidential by SRI and will not be released to government, study participants, NPC staff, or other contractors. The only SRI staff who will have access to the data are Survey Research Program staff and Ms. Susan Leiby, an SRI process engineer, who will assist Survey Research Program staff in reviewing the questionnaires and will be available in the event of any difficulties in questionnaire interpretation. Confidential Information Agreements prepared by the NPC have been executed by SRI management, individual Survey Research Program staff, and Ms. Leiby committing themselves to these data handling procedures.

SRI International will release the aggregated data to NPC study participants only when sufficient data are available to permit aggregation in a manner that would not disclose individual operations. Once the data have been aggregated, accepted by the NPC, and reported, all individual responses will be destroyed.

Overview of the Information Requested

The overall survey is divided into 10 sections, as outlined below. This is Section IV.

I. Perceptions of the impacts of regulatory requirements on the refinery's operations in 1995 and 2000.

II. Refinery facilities' capabilities and utilization, feedstocks, and product yields--actual 1990 data and as anticipated for 1995.

III. Refinery emission sources and controls.

IV. Economic impacts of environmental regulations on refineries--both historical and anticipated costs.

V. Distribution and transport modes of products from refineries among national regions--1990 and 1995.

VI. Expectations regarding the 1995 supply and distribution of oxygenates, corporate-wide.

VII. Various issues concerning terminals, including supply of product, capacity, and environmentally related costs.

VIII. Various issues concerning pipelines, including capacity, product segregations, and costs.

IX. Tanker, barge, rail, and truck transport costs.

X. Foreign refinery and supply issues, including likely product specifications in other nations in 1995 and 2000.

A separate questionnaire on the supply and distribution of oxygenates is being sent to companies that blend oxygenates with petroleum products but do not produce petroleum products.

Purposes for the Information Requested

The NPC needs your company's responses to this questionnaire to help build an accurate picture of the current and anticipated future capability and flexibility of the nation's refining industry to supply its customers' needs. This information, aggregated across all respondents, will comprise a major component of the NPC's response to the Secretary of Energy. The aggregated survey results also will be used to validate industry models.

For use in the mathematical models, the survey results will be supplemented with aggregate 1990 operating data from the Department of Energy's Energy Information Administration reports and the judgments of the industry experts on the NPC study groups. Use of these three sources of information will help to ensure that the models provide valid representations of the industry and do not under- or over-state industry capability or flexibility.

This section asks for historical and projected information on the capital costs, operations and maintenance expenses, remediation expenditures, and permits to construct new or revamped facilities as a result of environmental regulations and approved legislation as of December 31, 1990.

INSTRUCTIONS AND DEFINITIONS

Conventional gasoline = Finished gasoline other than gasoline that meets government regulations for CO and ozone non-attainment areas.

Motor gasoline subgrades = Mostly finished gasoline that requires oxygenate addition at terminals to meet the specifications for conventional, reformulated, or oxygenated gasolines. (Also referred to by EPA as refined blendstocks for oxygenate blending, or RBOB.)

Oxygenated gasoline (OG) = Finished gasoline that meets the minimum oxygen content requirement for gasoline sold in CO non-attainment areas in winter months but does not meet RFG specifications (see below) for ozone non-attainment areas.

Reformulated gasoline (RFG) = Finished gasoline that meets all requirements for reformulated gasoline in ozone non-attainment areas and, if necessary, for CO non-attainment areas.

Survey Acronyms and Abbreviations

NOTE: The abbreviations below refer to the way in which they are used in this section of the questionnaire.

$	U.S. dollars
%	Percent
API	American Petroleum Institute
BOD	Biochemical oxygen demand
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	Carbon monoxide
COD	Chemical oxygen demand
CWA	Clean Water Act
EIA	Energy Information Administration
FCC	Fluid catalytic cracker
MM	Million
NESHAP	National Emission Standard for Hazardous Air Pollutants
NPDES	National Pollutant Discharge Elimination System
OG	Oxygenated gasoline (see at left for definition)
OPA	Oil Pollution Act of 1990
PHA	Process hazards analysis
RCRA	Resource Conservation and Recovery Act
Regs	Regulations
RFG	Reformulated gasoline (see at left for definition)
RVP	Reid vapor pressure
SO_2	Sulfur dioxide

SECTION IV. ECONOMIC IMPACTS OF ENVIRONMENTAL REGULATIONS ON REFINERIES

NOTE: INCLUDE <u>ONLY THE OIL PORTION</u> OF A REFINERY IF THIS FACILITY HAS BOTH OIL AND CHEMICAL OPERATIONS.

1. <u>Historical expenditures</u>: Fill in the table on the facing page to indicate this refinery facility's capital and annual expenditures from <u>January 1, 1986, through December 31, 1990</u>, for each of the listed kinds of environmental issues. If this facility has both oil and chemical operations, include only the oil portion of this refinery's expenditures.

   <u>Directions</u>: Most of this information can be obtained from previous reports prepared for the 1986 through 1990 annual filings of Form MA-200 with the U.S. Department of Commerce. (For your information, a copy of this form, including definitions and instructions, is attached to this questionnaire.) Fill in information <u>only</u> for the years in which the MA-200 forms were prepared.

   <u>Operations and Maintenance Expenses</u>: Amounts entered in these columns for each type of environmental pollutant should be the <u>sum of Items 3 and 4</u> on Form MA-200, <u>except</u>:

   - *Do <u>not</u> include depreciation costs.*
   - *<u>Add</u> refinery remediation costs, such as corrective action.*

(continued)

<u>Capital Expenditures</u>:

- *Amounts for air-related issues should be the amounts entered for Item 6, line c, on Form MA-200 for the years 1986 through 1990.*
- *Amounts for water-related issues should be the amounts entered for Item 7, line c, on Form MA-200 for the years 1986 through 1990.*
- *Amounts for hazardous and nonhazardous solid waste issues should be the amounts entered for Item 8, line a, on Form MA-200 for the years 1986 through 1990.*

Express amounts in <u>then-current</u> dollars (that is, the dollar amounts recorded when expended).

1. <u>Historical Expenditures</u> (concluded)

Type of Environmental Expenditure	HISTORICAL COST INFORMATION: 1986 Oper. & Maint. Expenses ($ MM)	1986 Capital Expend. ($ MM)	1987 Oper. & Maint. Expenses ($ MM)	1987 Capital Expend. ($ MM)	1988 Oper. & Maint. Expenses ($ MM)	1988 Capital Expend. ($ MM)	1989 Oper. & Maint. Expenses ($ MM)	1989 Capital Expend. ($ MM)	1990 Oper. & Maint. Expenses ($ MM)	1990 Capital Expend. ($ MM)
a. Air-related costs	$_____	$_____	$_____	$_____	$_____	$_____	$_____	$_____	$_____	$_____
b. Water-related costs	$_____	$_____	$_____	$_____	$_____	$_____	$_____	$_____	$_____	$_____
c. Hazardous and nonhazardous solid-waste-related costs (including remediation, spills, etc.)	$_____	$_____	$_____	$_____	$_____	$_____	$_____	$_____	$_____	$_____
d. Was a percentage of operating unit (for example, FCC) costs included in annual environmental operations and maintenance expenses? *(CIRCLE ONE NUMBER FOR EACH YEAR)*										
Yes	1		1		1		1		1	
No	2		2		2		2		2	

2. <u>Projected environmental expenditures</u>: What are this refinery facility's projected operations and maintenance expenses for <u>1995</u>, and what are its total one-time expenses and total capital expenditures during the 5-year period <u>from January 1, 1991, through December 31, 1995</u>, as a result of regulations and approved legislation as of December 31, 1990? Include expenditures resulting from the Clean Air Act Amendments of 1990 and expected regulations from those amendments.

For definitions of cost categories, use same definitions as on page IV-1. In addition, follow the directions below.

- *Provide costs related to process safety management that are expended in response to API RP 750 or other State and Federal process safety requirements.*
- *Note that <u>only</u> 1995 operation and maintenance expenses are being requested.*
- *Express amounts in 1991 (that is, constant) dollars.*

Type of Environmental Expenditure	Operations and Maintenance Expenses 1995 ($ Millions)	Total One-Time Expenses[1] 1991 - 1995 ($ Millions)	Total Capital Expenditures 1991 - 1995 ($ Millions)
a. Air-related costs[2]	$______	$______	$______
b. Water-related costs	$______	$______	$______
c. Hazardous and nonhazardous solid-waste-related costs (including remediation, spills, etc.)	$______	$______	$______
d. Reformulated-fuels-related costs (for example, RFG, OG, highway diesel fuel, California vehicular diesel fuel, and associated new tankage)	$______	$______	$______
e. Process safety-related costs	$______	$______	$______

---

[1]One-time expenses include expenses associated with capital projects and one-time remediation activities.

[2]Include all costs associated with benzene waste NESHAP.

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3. About what percentage of the various costs that you listed in Question 2 are expected to be due to each of the following major regulatory requirements?

Source of Expenses	TYPE OF EXPENSE: Operations and Maintenance Expenses 1995	One-Time Expenses 1991 - 1995	Capital Expenditures 1991 - 1995
a. Approximate percentage of air-related costs (Question 2.a.) attributable to:			
(1) CAA Amendments of 1990 (excluding reformulated-fuel-related issues)	____%	____%	____%
(2) Benzene waste NESHAP[1]	____%	____%	____%
(3) Local air district requirements	____%	____%	____%
b. Approximate percentage of water-related costs (Question 2.b.) attributable to:			
(1) CWA water quality standards/NPDES	____%	____%	____%
c. Approximate percentage of solid-waste-related costs (Question 2.c.) attributable to:			
(1) Waste treatment, recycle, and disposal (including K wastes, toxicity-characteristic waste, primary sludges, and land disposal restrictions)	____%	____%	____%
(2) RCRA facility closures	____%	____%	____%
(3) Corrective actions (RCRA and others) and groundwater/soil remediation	____%	____%	____%

(continued)

3. (Concluded)

Source of Expenses	TYPE OF EXPENSE: Operations and Maintenance Expenses 1995	One-Time Expenses 1991 - 1995	Capital Expenditures 1991 - 1995
d. Approximate percentage of reformulated-fuels-related costs[2] (Question 2.d.) attributable to:			
(1) Low-sulfur diesel fuel	____%	____%	____%
(2) Oxygenated gasoline (OG)	____%	____%	____%
(3) Reformulated gasoline (RFG)	____%	____%	____%
(4) State and local regulations (for example, California vehicular diesel fuel regulations)	____%	____%	____%

---

[1] Include total costs for benzene waste NESHAP, including water- and waste-related issues.

[2] Include costs of new tankage.

4. Provide the information requested below for each type of unit that this refinery plans to build or revamp **primarily** to meet current or anticipated environmental regulations.

Include only:

- **Units that you expect to be in operation by January 1, 1996.**
- **Units to be built or revamped in response to Federal and State reformulated gasoline and diesel fuel requirements, or in response to other environmental requirements.**

For each unit to be built or revamped, enter:

- The estimated capital expenditures for each unit, including necessary off-site facilities, using constant 1991 dollars.
- The expected start-up date.
- The estimated number of months from submission for a permit to construct until approval of the permit.

Type of Unit to Be Built or Revamped Primarily to Meet Environmental Regulations	Estimated Capital Expenditures for Facility ($ Millions)	Expected Permit Application Date (Month/Yr)	Expected Start-up Date (Month/Yr)	Estimated Number of Months to Obtain Permit to Construct
a. Atmospheric crude oil distillation	$______	___/19___	___/19___	____ months
b. Vacuum crude oil distillation	$______	___/19___	___/19___	____ months
c. Solvent deasphalting	$______	___/19___	___/19___	____ months
d. Hydrotreating (including naphtha, kerosene/middle distillate, gas oils, and residua)	$______	___/19___	___/19___	____ months
e. Aromatics saturation	$______	___/19___	___/19___	____ months
f. Delayed coking	$______	___/19___	___/19___	____ months
g. Fluid coking and flexicoking	$______	___/19___	___/19___	____ months
h. Visbreaking/thermal cracking/ other thermal	$______	___/19___	___/19___	____ months

(continued)

4. (Concluded)

Type of Unit to Be Built or Revamped Primarily to Meet Environmental Regulations	Estimated Capital Expenditures for Facility ($ Millions)	Expected Permit Application Date (Month/Yr)	Expected Start-up Date (Month/Yr)	Estimated Number of Months to Obtain Permit to Construct
i. Catalytic cracking (any kind)	$________	___/19___	___/19___	______ months
j. Hydrocracking	$________	___/19___	___/19___	______ months
k. Catalytic reforming	$________	___/19___	___/19___	______ months
l. Isomerization	$________	___/19___	___/19___	______ months
m. Alkylation	$________	___/19___	___/19___	______ months
n. Polymerization/dimersol	$________	___/19___	___/19___	______ months
o. Oxygenate production at refinery site	$________	___/19___	___/19___	______ months
p. Aromatics extraction	$________	___/19___	___/19___	______ months
q. Toluene dealkylation	$________	___/19___	___/19___	______ months
r. Hydrogen manufacturing units	$________	___/19___	___/19___	______ months
s. Hydrogen purification units	$________	___/19___	___/19___	______ months
t. Secondary gasoline fractionation	$________	___/19___	___/19___	______ months
u. Sulfur recovery	$________	___/19___	___/19___	______ months
v. Waste water treatment	$________	___/19___	___/19___	______ months
w. Off-site facilities (tanks, blending, pipelines, utilities)--if not included above	$________	___/19___	___/19___	______ months

5. Provide the information requested below about process hazards analyses (PHAs) already completed for units at the refinery and about PHA corrective action costs for those units. PHAs are conducted in response to API RP 750 or other State and Federal process safety requirements.

Type of Unit for Which PHA Was Completed	Number of Units for Which PHAs Are Complete	Percentage of Total Corrective Action Completed or Resolved	Total Expenditures for Corrective Actions Completed or Resolved ($ Millions)	Total Budget for Remaining Corrective Actions ($ Millions)
a. Atmospheric crude oil distillation	______	______%	$______	$______
b. Vacuum crude oil distillation	______	______%	$______	$______
c. Solvent deasphalting	______	______%	$______	$______
d. Hydrotreating (including naphtha, kerosene/middle distillate, gas oils, and residua)	______	______%	$______	$______
e. Aromatics saturation	______	______%	$______	$______
f. Delayed coking	______	______%	$______	$______
g. Fluid coking and flexicoking	______	______%	$______	$______
h. Visbreaking/thermal cracking/ other thermal	______	______%	$______	$______
i. Catalytic cracking (any kind)	______	______%	$______	$______
j. Hydrocracking	______	______%	$______	$______
k. Catalytic reforming	______	______%	$______	$______
l. Isomerization	______	______%	$______	$______

(continued)

5. (Concluded)

Type of Unit for Which PHA Was Completed	Number of Units for Which PHAs Are Complete	Percentage of Total Corrective Action Completed or Resolved	Total Expenditures for Corrective Actions Completed or Resolved ($ Millions)	Total Budget for Remaining Corrective Actions ($ Millions)
m. Alkylation	______	______%	$______	$______
n. Polymerization/dimersol	______	______%	$______	$______
o. Oxygenate production at refinery site	______	______%	$______	$______
p. Aromatics extraction	______	______%	$______	$______
q. Toluene dealkylation	______	______%	$______	$______
r. Hydrogen manufacturing units	______	______%	$______	$______
s. Hydrogen purification units	______	______%	$______	$______
t. Secondary gasoline fractionation	______	______%	$______	$______
u. Sulfur recovery	______	______%	$______	$______
v. Waste water treatment	______	______%	$______	$______
w. Off-site facilities (tanks, blending, pipelines, utilities)--if not included above	______	______%	$______	$______

SAMPLE OF MA-200 FORM

DUE DATE: WITHIN 90 DAYS AFTER RECEIPT

OMB No. 0607-0176: Approval Expires 10/31/92

NOTICE – Response to this inquiry is **voluntary. By law (title 13, U.S. Code),** section 9, your report to the Census Bureau is **confidential**. It may be seen only by sworn Census employees and may be used only for statistical purposes. The law also provides that copies retained in your files are **immune from legal process**.

FORM **MA-200(V)**
(11-1-90)

U.S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

SURVEY OF POLLUTION ABATEMENT COSTS AND EXPENDITURES

In correspondence pertaining to this report refer to this **CENSUS FILE NUMBER (11 digits)**

RECODE	ADDRESS	EXTRA COPY	FOLLOWUP
TAB NUMBER		INDUSTRY	
WEIGHT	TE	EI	
AREA		PPN	

CENSUS USE ONLY

(Please correct any errors in name, address, and ZIP Code)

RETURN COMPLETED FORM TO

Bureau of the Census
1201 East 10th Street
Jeffersonville, IN 47132-0001

Name of person who prepared or certified the prior year's report

This report is only for the establishment specified in the address block of the report form. **DO NOT COMBINE** with other establishments in your company even though operations may jointly use the same pollution abatement facilities. When this occurs, apportion the expenditures and cost according to the rate of pollution abatement equipment utilization or the relative amounts of pollutants produced.

Item 1A – OPERATIONAL STATUS

Mark (X) ONE box which best describes this establishment at the end of

111 ☐ In operation
112 ☐ Temporarily idle . . . .
113 ☐ Sold or leased to another company – *Report new owner or operator in item 1B* . . . .
114 ☐ Permanently ceased operations . . . .

Give date — Mo. | Yr.

Item 1B – NEW OWNER OR OPERATOR

121 Name

122 Number and street

123 City | 124 State | 125 ZIP Code

126 Employer Identification Number →

IMPORTANT — ***PLEASE READ INSTRUCTIONS AND DEFINITIONS BEFORE COMPLETING FORM***

Item 2 – IF THIS ESTABLISHMENT HAD NO OPERATING COSTS, PAYMENTS TO GOVERNMENT OR CAPITAL EXPENDITURES

Mark (X) in box for appropriate reason, ***complete Item 9 and return form.*** Please review items 3 and 4; under normal operations those expenses, such as sewage and trash removal in excess of $500, should be reported on this form.

211 ☐ No pollutants generated
212 ☐ Cost included in rent, taxes, lease agreement, or removal without charge or payment (such as scavenger services)
213 ☐ All costs less than $500
214 ☐ Other – *Specify*

Item 3 – ANNUAL OPERATING COSTS FOR POLLUTION ABATEMENT

Report the annual operating costs and expenses for pollution abatement activities.

Note: This item should include the operating costs for all pollution abatement equipment and processes in operation regardless of the year the equipment was installed or process initiated. **DO NOT REDUCE** your estimate by **COSTS RECOVERED** (item 5).

Item (1)	TYPE OF POLLUTANT: Air (2) Mil.	Thou.	Dol.	Water (3) Mil.	Thou.	Dol.	Solid waste: Hazardous (4) Mil.	Thou.	Dol.	Solid waste: Nonhazardous (5) Mil.	Thou.	Dol.
a. Depreciation	301			311			321			331		
b. Labor	302			312			322			332		
c. Materials, supplies, fuel, and electricity	303			313			323			333		
d. Services, equipment leasing, and other costs	304			314			324			334		
e. **TOTAL** ***(Sum of lines a through d)*** →	305			315			325			335		

Item 4 – PAYMENTS TO GOVERNMENT FOR POLLUTION REMOVAL

Total payments to governmental (Federal, State, county, local) units for –	Mil.	Thou.	Dol.
a. Public sewage services	401		
b. Municipal solid waste collection/disposal	402		

Item 5 – COSTS RECOVERED THROUGH ABATEMENT ACTIVITIES

Report the best estimate of the value of materials or energy reclaimed (costs recovered) through pollution abatement activities and either reused in production or sold by form of pollution abated.

	Mil.	Thou.	Dol.
a. Air	501		
b. Water	502		
c. Solid waste	503		
d. **TOTAL** ***(Sum of lines 5a through 5c)*** →	505		

Item 6 — CAPITAL EXPENDITURES FOR ABATEMENT OF AIR POLLUTANTS		Mil.	Thou.	Dol.
	a. Report total expenditures for new plant and equipment designed to abate air pollutants **through end-of-line techniques.**	601		
	b. Report total expenditures for **changes-in-production process** to abate air pollutants.	602		
	c. **TOTAL AIR CAPITAL** *(Sum of lines 6a and 6b)* →	605		

d. Distribute total expenditures (on line 6c) in terms of percent by TYPE OF POLLUTANTS *(Please give best estimates.)*

EXAMPLE

(1) Particulates	40%
(2) Sulfur oxides	10%
(3) Nitrogen oxides, etc	35%
(4) Hydrocarbons-voc	4%
(5) Lead	3%
(6) Hazardous air pollutants	1%
(7) Other	7%
(8) TOTAL	100%

	Percentage
(1) Particulates	611 %
(2) Sulfur oxides	612 %
(3) Nitrogen oxides and carbon monoxide	613 %
(4) Hydrocarbons-volatile organic compounds	614 %
(5) Lead	615 %
(6) Hazardous air pollutants	616 %
(7) Other	617 %
(8) **TOTAL** *(Sum of lines (1) through (7))*	**100%**

Item 7 — CAPITAL EXPENDITURES FOR ABATEMENT OF WATER POLLUTANTS		Mil.	Thou.	Dol.
	a. Report total expenditures for new plant and equipment designed to abate water pollutants **through end-of-line techniques.**	701		
	b. Report total expenditures for **changes-in-production process** to abate water pollutants.	702		
	c. **TOTAL WATER CAPITAL** *(Sum of lines 7a and 7b)* →	705		

Item 8 — CAPITAL EXPENDITURES FOR SOLID WASTE MANAGEMENT		Mil.	Thou.	Dol.
	a. Report total expenditures for new plant and equipment designed for management of solid waste. *(See specific instructions.)*	805		

b. Distribute total expenditures (on line 8a) in terms of percent by TYPE OF POLLUTANTS *(Please give best estimates.)*

EXAMPLE

(1) Hazardous	[illegible]
(2) Nonhazardous	[illegible]
(3) TOTAL	100%

	Percentage
(1) Hazardous	811 %
(2) Nonhazardous	812 %
(3) **TOTAL** *(Sum of lines (1) and (2))*	**100%**

REMARKS
130

Item 9 — CERTIFICATION — This report is substantially accurate and has been prepared in accordance with instructions.

Key	Name of person to contact regarding this report *(Print or type)*	Mo.	Day	Year
131				

	Telephone — Area code and number	Extension	Signature of authorized person
132			

FORM MA-200(V) (11-1-90)

INSTRUCTIONS AND DEFINITIONS
1990 SURVEY OF POLLUTION ABATEMENT COSTS AND EXPENDITURES

GENERAL INSTRUCTIONS

The purpose of the questionnaire is to collect total expenditures made by industry to abate pollutant emissions. The survey covers current operating costs and capital expenditures made to reduce pollution in its air, water, or solid forms.

ANSWER ALL QUESTIONS. If you cannot answer a question from your company records, please estimate the answer carefully. In particular cases, identification of abatement expenditures may require the joint efforts of your establishment's financial and engineering staff. If your establishment did not operate for a full year, please indicate the disposition by marking the appropriate box(es) in item 1A, Operating Status.

Report all value figures in thousands of dollars.

Example: 1,125,628 dollars	Mil	Thou.	Dol.
The **preferred** entry is	1	126	
You **may** report as follows	1	125	628

Report data on a calendar year basis for 1990. However, if your establishment uses a fiscal year that ends between 10/31/90 and 2/28/91, fiscal year data will be acceptable.

For information concerning the possible use of reporting formats other than the form provided, such as computer tape or printouts, contact Ms. Patricia Garner (301) 763-1755.

DEFINITIONS

1. **Pollution abatement** means the reduction or elimination of pollutants emitted from your property or activities. Pollution abatement includes prevention, treatment, and recycling. Treatment refers to the wide variety of techniques used to cool, detoxify, decompose, and separate-to-store or ameliorate.

   Efforts to improve environmental aesthetics or employee comfort, such as landscaping or air conditioning, should **not** be included in the answers to this survey. Do **not** include expenditures for health and safety. Do **not** include purchases of motor vehicles with pollution abatement devices. The cost of such devices will be estimated by other means.

   Some establishments manufacture equipment and materials, such as electrostatic precipitators or desulfurized fuels, to be sold to others for pollution abatement purposes. Current operating costs and capital expenditures for the production of such equipment and materials should **not** be reported.

   A. **Air pollutants** are airborne substances, including particulates (dust, fly ash, smoke), sulfur oxides, nitrogen oxides, carbon monoxide, hydrocarbons, volatile organic compounds, lead, hazardous air pollutants (arsenic, asbestos, benzene, beryllium, mercury, radioactive material, and vinyl chloride or those designated by the Clean Air Act and EPA) and other air pollutants.

   B. **Water pollutants** are harmful or objectionable water-borne substances causing alterations in water quality. They include:

   - Conventional pollutants (total suspended solids, oil and grease, BOD5)
   - Nonconventional pollutants (aluminum, ammonia, iron, barium, boron, chlorine, cobalt, fluoride, manganese, phosphorous, sulfur-hydrogen sulfide, titanium, COD)
   - Toxic metals/toxic inorganic compounds (antimony, arsenic, asbestos, beryllium, cadmium, chromium, copper, cyanide, lead, mercury, nickel, silver, thallium, zinc)
   - Toxic organic (benzene, chloroethane, chloromethane, toluene, zylene or those designated by the Clean Water Act and EPA)

2. **Solid waste management** is the collection and disposal of solid waste, materials and energy recovery, and changes-in-production processes to reduce the generation of solid waste. Collection and disposal refer to the collection, storage, transport, processing, and disposal of solid waste by incineration, sanitary or other landfill methods, and dumping in authorized areas. **Materials and energy recovery** refer to taking materials that cannot be converted into profitmaking output and recycling them for further use. Included are capital expenditures to recycle scrap metal, scrap paper, scrap wood, etc.; excluded are capital expenditures for secondary products (e.g., animal hides). Contained liquids are considered solid waste.

   A. **Nonhazardous wastes** includes garbage, trash, sewage sludge, dredged spoils, incinerator residue, wrecked or discarded equipment. Include solid waste produced as a result of air and water pollution abatement.

   B. **Hazardous solid waste** is waste having one of the following four characteristics: ignitability, corrosivity, reactivity, or toxicity. Ignitable waste poses a fire hazard during routine management. Corrosive waste has an extreme PH (strongly acidic or basic) or corrodes steel used in containment. Reactive waste is explosive, readily undergoes violent changes without detonating, or reacts violently or generates toxic gases when mixed with water or moderately strong acids or bases. Toxic waste contains more than allowable concentrations of contaminants such as arsenic, lead, endrin, and toxaphene. For further details see 40 CFR 261, 21-.24 or the Resource Conservation and Recovery Act 1976, Public Law 94-580.42 USCS 6921.

SPECIFIC INSTRUCTIONS

Report the status of operations at this plant at the end of 1990.

Item 1A — OPERATIONAL STATUS

Idle Plants — If this plant was temporarily idle during the entire period covered by this survey, this report should still be completed in its entirety.

Sold or Leased Plant — If this plant was sold or leased to another company to operate, indicate the month and year this action took place, and report the new owner or operator in item 1B. If your company owned the plant for more than 6 months, complete the survey form for all items applicable for that period of time, and return the form.

Item 2 — WHO SHOULD REPORT?

No Pollution Abatement Activities — Every concern receiving a report form which had no pollution abatement operating costs, payments to government, or capital expenditures related to the manufacturing process during 1990, should complete only items 2 and 9, and return form for processing.

Pollution Abatement Activities — Every concern receiving a report form which had some pollution abatement operating costs, payment to government, or capital expenditures during 1990, is requested to submit data for items 3 through 8 as applicable.

Items 3 through 5 — ANNUAL COST FOR POLLUTION ABATEMENT — 1990

Item 3 — Report the **annual operating costs and expenses** for pollution abatement incurred in 1990. Include all costs and expenses to operate and maintain plant and equipment that abate air or water pollutants and for solid waste management. **Include** services provided by private contractor for solid waste collection/disposal in item 3d. If the solid waste includes office and cafeteria trash with the industrial, report the entire amount if unable to separate.

The item should include the operating costs for all pollution abatement equipment and processes in operation during 1990 regardless of the year the equipment was installed or the process initiated.

SPECIFIC INSTRUCTIONS — Continued

Items 3 through 5 — ANNUAL COST FOR POLLUTION ABATEMENT — 1990 — Continued

INCLUDE THESE COSTS

- Operation and maintenance of plant and equipment
- Depreciation (or amortization) due to usage of plant and equipment
- Materials, leasing of equipment, parts, and direct labor
- Fuel and power as well as any increased costs due to increased consumption
- Services provided by private contractor

DO NOT INCLUDE THESE COSTS

- Expenditures for research and development
- Expenditures for health and safety
- Interest for financing pollution abatement capital expenditures
- Payment to governmental units (item 4)

Item 4a — Report all **payments to governmental units** for sewage service. Include payments for industrial sewage and payments to government for overstrength effluent charges, sewer district taxed assessment, etc. Include sewage service charges which are included in your local tax bill; estimate if necessary. If the sewage payment includes cafeteria and restroom sewage with the industrial, report the entire amount if unable to separate.

Item 4b — Report all **payments to governmental units** for municipal solid waste collection and disposal services. Included are collection cost to municipal agency (hauler) and disposal cost such as dump or burial fees at a landfill or incinerator.

Item 5 — The estimate of **costs recovered through abatement activities** may have two parts: (1) the value of materials or energy reclaimed through abatement activities that were reused in production, and (2) revenue that was obtained from the sale of materials or energy reclaimed through abatement activities. Heat is an example of reclaimed energy. Value and revenue are net of any additional cost incurred for additional processing of materials or energy to make them reusable or salable.

For air, water, and solid waste, exclude the value of items if they would have been recovered, sold, or reused in production in the absence of pollution control regulations. In the case where a pollution abatement device is installed solely for the purpose of making a manufacturing process profitable; the recovery cost obtained by the usage of this device should **not** be reported in this item.

Do **not** reduce annual costs of abatement (item 3) by the estimate reported here.

Items 6 through 8 — CAPITAL EXPENDITURES FOR NEW PLANT AND EQUIPMENT FOR POLLUTION ABATEMENT — 1990

Capital expenditures for new plant and equipment include new plant and equipment acquisitions (both replacement and expansion) and expenditures for construction in progress. Capital expenditures are those chargeable to your establishment's accounts for plant and equipment that are subject to depreciation or to amortization. Total capital expenditures for abatement include expenditures for both end-of-line techniques and changes-in-production processes. Exclude expenditures for research and development.

CAPITAL EXPENDITURES FOR ABATEMENT OF AIR POLLUTANTS — 1990

Item 6a — **End-of-line techniques** treat air pollutants after their generation in your production processes by use of separately identifiable abatement (retrofit) facilities such as dust collectors, scrubbers, precipitators, or other treatment processes. These facilities are installed exclusively for the purpose of abating pollutant emissions from your plant or property.

Item 6b — **Changes-in-production processes** reduce or eliminate the generation of pollutants by employing material substitution, improved catalysts, reuse of waste or water, and equipment alteration. These changes may involve converting equipment to handle the use of substitute fuels that generate less pollutants.

Report only the pollution abatement portion of expenditures for changes-in-production processes. Estimate this portion as the difference between actual expenditures on new plant and equipment and what your establishment would have spent for comparable plant and equipment without air pollution abatement features.

Item 6d — To estimate the impact of emission standards upon capital investment for pollution abatement in industry, it is necessary to match investment expenditures to major types of pollutants abated. **Note:** When a single device has the ability to abate more than one pollutant, the classification of the device is to be guided by the primary purpose for which the device was installed.

CAPITAL EXPENDITURES FOR ABATEMENT OF WATER POLLUTANTS — 1990

Item 7a — Same as item 6a, except that it refers to waste water treatment techniques such as trickling filters, settling ponds, clarifiers, oil spill dikes, and other separately identifiable treatment techniques.

Item 7b — Same as item 6b, except that it refers to abatement of water pollutants. The purpose of pollution abatement may be achieved by converting processes and equipment to enable recycling (closed or partially closed loop systems) or to enable additional uses of water prior to discharge. Do **not** include capital expenditures undertaken exclusively for the purpose of insuring adequate water supply for production.

CAPITAL EXPENDITURES FOR SOLID WASTE MANAGEMENT — 1990

Item 8a — Report all capital expenditures made for solid waste management. Include all capital expenditures made for the collection and disposal of solid waste, materials and energy recovery, and changes-in-production processes to reduce the generation of solid waste.

Materials and energy recovery refer to taking materials that cannot be converted into profitmaking output and recycling them for further use. Included are capital expenditures to recycle scrap metal, scrap paper, scrap wood, etc.; excluded are capital expenditures for secondary products (e.g., animal hides).

Item 8b — To estimate the impact of standards upon capital investment for pollution abatement in industry, it is necessary to match investment expenditures to the types of pollutants abated.

NATIONAL PETROLEUM COUNCIL
1991 SURVEY OF U.S. PETROLEUM REFINING INDUSTRY

SECTION V. DISTRIBUTION AND TRANSPORT MODE OF PRODUCTS FROM REFINERIES

Complete this questionnaire for the refinery specified below. In the case of jointly owned refineries, the operating company should complete the questionnaire.

If you have questions or need more copies of the questionnaire, contact:

Benjamin Oliver, Jr., NPC, (202) 393-6100
FAX: (202) 331-8539
OR
Susan Russell, SRI International, (415) 859-2640
FAX: (415) 859-2861

Use the enclosed envelope to return this completed questionnaire **no later than January 31, 1992**, to:

Survey Research Program
SRI International
P.O. Box 2246
Menlo Park, CA 94026-2246

Whom should we contact if we have questions about your responses to this section?

Name: ______________________________

Telephone: ______________________________

FAX: ______________________________

INTRODUCTION

In response to a request from the Secretary of Energy, the National Petroleum Council (NPC) is conducting a study of the U.S. refining industry's capability and flexibility to meet future product demand. Task groups consisting of representatives from NPC member companies have been responsible for identifying the data needs and specifying the content of the questionnaires.

The survey includes both existing and planned U.S. refineries, as follows:

- **All refineries with operable capacity as of January 1, 1991, regardless of whether they were actually in operation on that date.**

- **All refineries that are planned to be operable by January 1, 1996.**

Data Tabulations and Confidentiality

The NPC has retained SRI International to format the survey questionnaires and to collect and tabulate the survey data and provide aggregated data to the U.S. petroleum refining study participants, NPC staff, and contractors who will use the data in mathematical models. **The final report will be sent to all survey respondents.** SRI International--formerly Stanford Research Institute--is a broad-based, nonprofit research and consulting organization serving clients in industry, government, and service organizations worldwide.

Individual company data from the survey will be held strictly confidential by SRI and will not be released to government, study participants, NPC staff, or other contractors. The only SRI staff who will have access to the data are Survey Research Program staff and Ms. Susan Leiby, an SRI process engineer, who will assist Survey Research Program staff in reviewing the questionnaires and will be available in the event of any difficulties in questionnaire interpretation. Confidential Information Agreements prepared by the NPC have been executed by SRI management, individual Survey Research Program staff, and Ms. Leiby committing themselves to these data handling procedures.

SRI International will release the aggregated data to NPC study participants only when sufficient data are available to permit aggregation in a manner that would not disclose individual operations. Once the data have been aggregated, accepted by the NPC, and reported, all individual responses will be destroyed.

Overview of the Information Requested

The overall survey is divided into 10 sections, as outlined below. This is Section V.

I. Perceptions of the impacts of regulatory requirements on the refinery's operations in 1995 and 2000.

II. Refinery facilities' capabilities and utilization, feedstocks, and product yields--actual 1990 data and as anticipated for 1995.

III. Refinery emission sources and controls.

IV. Economic impacts of environmental regulations on refineries--both historical and anticipated costs.

V. Distribution and transport modes of products from refineries among national regions--1990 and 1995.

VI. Expectations regarding the 1995 supply and distribution of oxygenates, corporate-wide.

VII. Various issues concerning terminals, including supply of product, capacity, and environmentally related costs.

VIII. Various issues concerning pipelines, including capacity, product segregations, and costs.

IX. Tanker, barge, rail, and truck transport costs.

X. Foreign refinery and supply issues, including likely product specifications in other nations in 1995 and 2000.

A separate questionnaire on the supply and distribution of oxygenates is being sent to companies that blend oxygenates with petroleum products but do not produce petroleum products.

Purposes for the Information Requested

The NPC needs your company's responses to this questionnaire to help build an accurate picture of the current and anticipated future capability and flexibility of the nation's refining industry to supply its customers' needs. This information, aggregated across all respondents, will comprise a major component of the NPC's response to the Secretary of Energy. The aggregated survey results also will be used to validate industry models.

For use in the mathematical models, the survey results will be supplemented with aggregate 1990 operating data from the Department of Energy's Energy Information Administration reports and the judgments of the industry experts on the NPC study groups. Use of these three sources of information will help to ensure that the models provide valid representations of the industry and do not under- or over-state industry capability or flexibility.

The purpose of this section is to determine the quantity and transport mode of various products moved between regions in 1990 and anticipated to be moved in 1995. This information will help determine changes in distribution costs and any distribution bottlenecks.

INSTRUCTIONS AND DEFINITIONS

REPORT DATA ONLY ON THOSE LINES THAT ARE APPLICABLE TO YOUR OPERATION.
IF THERE ARE NO DATA FOR A SPECIFIC LINE, LEAVE THE LINE BLANK; DO NOT ENTER ZERO (0).

Attainment areas = Cities or regions that meet federal standards for carbon monoxide (CO) and ozone concentrations in the atmosphere.

Barrels per calendar day (B/CD) (for this section of the questionnaire) = The number of barrels of product transported or blended over the course of a year (1990 or 1995), divided by 365.

Conventional gasoline = Finished gasoline other than gasoline that meets government regulations for CO and ozone non-attainment areas.

Motor gasoline subgrades = Mostly finished gasoline that requires oxygenate addition at terminals to meet the specifications for conventional, reformulated, or oxygenated gasolines. (Also referred to by EPA as refined blendstocks for oxygenate blending, or RBOB.)

Oxygenated gasoline (OG) = Finished gasoline that meets the minimum oxygen content requirement for gasoline sold in CO non-attainment areas in winter months but does not meet RFG specifications (see below) for ozone non-attainment areas.

Reformulated gasoline (RFG) = Finished gasoline that meets all requirements for reformulated gasoline in ozone non-attainment areas and, if necessary, for CO non-attainment areas.

Non-attainment areas:

CO non-attainment areas = Approximately 40 cities (listed below) that are not in compliance with federal carbon monoxide (CO) standards:

Albuquerque, NM
Anchorage, AK
Baltimore, MD
Boston, MA (CMSA)
Chico, CA
Cleveland, OH (CMSA)
Colorado Springs, CO
Denver, Boulder, CO (CMSA)
Duluth, MN, WI
El Paso, TX
Fairbanks, AK (non-MSA)
Fort Collins, CO
Fresno, CA
Greensboro, Winston-Salem, H. Point, NC
Hartford, CT (CMSA)
Josephine County (Grants Pass), OR (non-MSA)
Klamath County, OR (non-MSA)
Las Vegas, NV
Los Angeles, CA (CMSA)
Medford, OR
Memphis, TN
Minneapolis/St. Paul, MN
Missoula County, MT (non-MSA)
Modesto, CA
*New York, NY, NJ, CT (CMSA)
Philadelphia, PA, NJ, DE (CMSA)
Phoenix, AZ
Portland, OR, Vancouver, WA (CMSA)
Provo, Orem, UT
Raleigh, Durham, NC
Reno, NV
Sacramento, CA
San Diego, CA
San Francisco, Oakland, San Jose, CA (CMSA)
Seattle, Tacoma, WA (CMSA)
*Spokane, WA
*Steubenville, Weirton, OH, WV (nonmobile)
Stockton, CA
Syracuse, NY
Washington, DC, MD, VA
*Winnebago County (Oshkosh), WI (nonmobile)

Ozone non-attainment areas = Nine cities (listed below) with extreme or severe ozone pollution problems that must use reformulated gasoline (RFG) by January 1, 1995.

Baltimore, MD
Chicago, IL, IN, WI (CMSA)
Hartford, CT
Houston, Galveston, Brazoria, TX (CMSA)
**Los Angeles, CA (CMSA)
Milwaukee, Racine, WI (CMSA)
New York, NY, NJ, CT (CMSA)
Philadelphia, PA, NJ, DE (CMSA)
San Diego, CA

Opt-ins = Approximately 100 cities (other than the 9 ozone non-attainment areas listed above) with marginal, moderate, or serious ozone pollution problems that may choose to participate in ("opt-in" to) the RFG program.

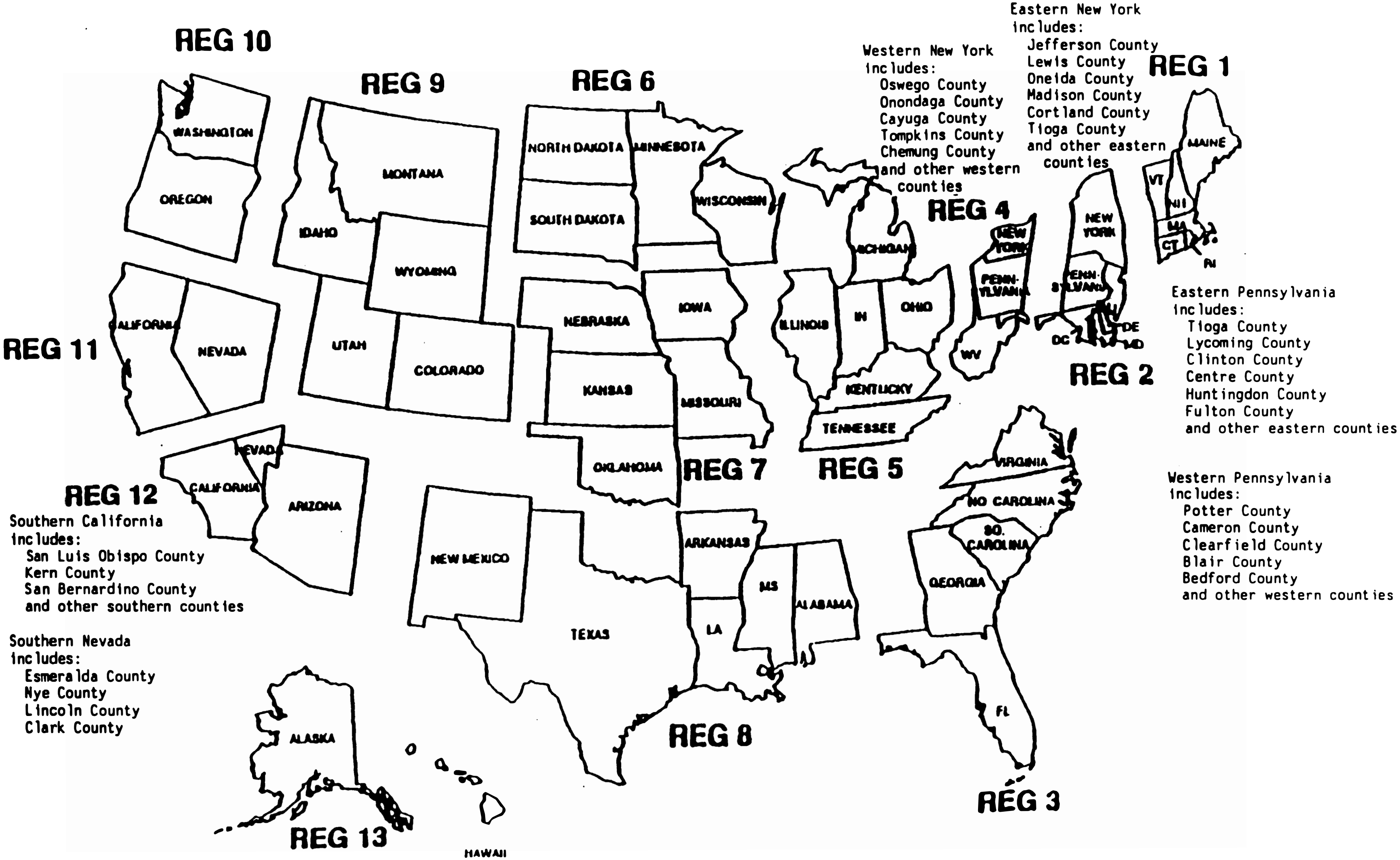
*Rated as a "serious" CO non-attainment area.
**Rated as an "extreme" ozone non-attainment area.
MSA = Metropolitan statistical area.
CMSA = Consolidated metropolitan statistical area.

Survey Acronyms and Abbreviations

NOTE: The abbreviations below refer to the way in which they are used in this section of the questionnaire.

#	Number
%	Percent
$MM	U.S. dollars in millions
B	Barrels
B/CD	Barrels per calendar day
CAAA	Clean Air Act Amendments
CD	Calendar day
CO	Carbon monoxide
D	Day
M	Thousand
MB	Thousand barrels
MB/CD	Thousand barrels per calendar day
MDWT	Thousand dead weight tons
MM	Million
MMB	Million barrels
NESHAP	National Emission Standard for Hazardous Air Pollutants
OG	Oxygenated gasoline (see page iii)
RFG	Reformulated gasoline (see page iii)

U.S. REGIONS
NATIONAL PETROLEUM COUNCIL REFINING STUDY



1. In 1990, what volume of each product (MB/CD) was moved from this refinery to each region (shown in map above) by each of the listed transportation modes? *Note: Report transportation only to the region where the company transfers title of the product. If any given shipment of product was moved by more than one mode of transportation, include only the mode by which the product was moved the greatest distance. Refinery gate sales should be shown as delivered to the region in which the refinery is located. Product sold at the refinery rack should be considered to be transported by truck.*

IMPORTANT: The total volumes for each product should sum to the total MB/CD of product delivered in 1990. The totals should be the same as the amounts reported for 1990 in Section II, except for inventory differences. In Section II, total finished motor gasoline volume is reported as item d on page II-27, motor gasoline subgrades are reported as item f on page II-27, #2 diesel fuel/#2 fuel oil is reported as item l on page II-25 (1990), and kerosene/kerosene-type jet fuel is reported as items j and k on page II-25 (1990).

Volume of Product (MB/CD) Delivered from This Refinery to Each Region in 1990 That Was Moved by Each Transport Mode

1990 Transport Mode	REGION: 1	2	3	4	5	6	7	8	9	10	11	12	13	Export
Total finished motor gasoline:														
Pipeline														
Tanker														
Barge														
Rail														
Truck														

(continued)

Volume of Product (MB/CD) Delivered from This Refinery to Each Region in 1990
That Was Moved by Each Transport Mode

1990 Transport Mode	REGION: 1	2	3	4	5	6	7	8	9	10	11	12	13	Export
Motor gasoline subgrades not produced as finished product:[1]														
Pipeline														
Tanker														
Barge														
Rail														
Truck														
#2 Diesel fuel/#2 fuel oil:														
Pipeline														
Tanker														
Barge														
Rail														
Truck														
Kerosene/kerosene-type jet fuel:														
Pipeline														
Tanker														
Barge														
Rail														
Truck														

[1] Unfinished motor gasolines that will meet the specifications for conventional, reformulated, or oxygenated gasolines after oxygenates are added. (Also referred to by EPA as refined blendstocks for oxygenate blending, or RBOB.)

ANTICIPATED SPILLOVER:

2. In 1995, about what percent of this refinery's gasoline products that meet specifications for ozone or carbon monoxide non-attainment areas do you anticipate will be distributed to the areas in each region that do not require oxygenated or reformulated gasoline?

	Percent of This Refinery's Product Supplied to Each Region in 1995 That Will Be Distributed to Non-Required Areas													
	REGION:													
Product	1	2	3	4	5	6	7	8	9	10	11	12	13	Export
Oxygenated gasoline (OG)	____%	____%	____%	____%	____%	____%	____%	____%	____%	____%	____%	____%	____%	____%
Reformulated gasoline (RFG)	____%	____%	____%	____%	____%	____%	____%	____%	____%	____%	____%	____%	____%	____%

3. In 1995, about what percent of this refinery's diesel production that meets federal or California diesel fuel specifications will be supplied to each region for uses not requiring these specifications?

	Percent of Diesel That Meets Federal or California Diesel Fuel Specifications That Will Be Supplied to Each Region for Non-Required Use													
	REGION:													
Product	1	2	3	4	5	6	7	8	9	10	11	12	13	Export
Diesel meeting federal or California diesel fuel specifications	____%	____%	____%	____%	____%	____%	____%	____%	____%	____%	____%	____%	____%	____%

NATIONAL PETROLEUM COUNCIL
1991 SURVEY OF U.S. PETROLEUM REFINING INDUSTRY

SECTION VI. CORPORATE SUPPLY AND DISTRIBUTION OF OXYGENATES

If you have questions or need more copies of the questionnaire, contact:

Benjamin Oliver, Jr., NPC, (202) 393-6100
FAX: (202) 331-8539
OR
Susan Russell, SRI International, (415) 859-2640
FAX: (415) 859-2861

Use the enclosed envelope to return this completed questionnaire **no later than January 31, 1992**, to:

Survey Research Program
SRI International
P.O. Box 2246
Menlo Park, CA 94026-2246

Whom should we contact if we have questions about your responses to this section?

Name: ______________________

Telephone: ______________________

FAX: ______________________

INTRODUCTION

In response to a request from the Secretary of Energy, the National Petroleum Council (NPC) is conducting a study of the U.S. refining industry's capability and flexibility to meet future product demand. Task groups consisting of representatives from NPC member companies have been responsible for identifying the data needs and specifying the content of the questionnaires.

The survey includes both existing and planned U.S. refineries, as follows:

- **All refineries with operable capacity as of January 1, 1991, regardless of whether they were actually in operation on that date.**
- **All refineries that are planned to be operable by January 1, 1996.**

Data Tabulations and Confidentiality

The NPC has retained SRI International to format the survey questionnaires and to collect and tabulate the survey data and provide aggregated data to the U.S. petroleum refining study participants, NPC staff, and contractors who will use the data in mathematical models. **The final report will be sent to all survey respondents.** SRI International--formerly Stanford Research Institute--is a broad-based, nonprofit research and consulting organization serving clients in industry, government, and service organizations worldwide.

Individual company data from the survey will be held strictly confidential by SRI and will not be released to government, study participants, NPC staff, or other contractors. The only SRI staff who will have access to the data are Survey Research Program staff and Ms. Susan Leiby, an SRI process engineer, who will assist Survey Research Program staff in reviewing the questionnaires and will be available in the event of any difficulties in questionnaire interpretation. Confidential Information Agreements prepared by the NPC have been executed by SRI management, individual Survey Research Program staff, and Ms. Leiby committing themselves to these data handling procedures.

SRI International will release the aggregated data to NPC study participants only when sufficient data are available to permit aggregation in a manner that would not disclose individual operations. Once the data have been aggregated, accepted by the NPC, and reported, all individual responses will be destroyed.

Overview of the Information Requested

The overall survey is divided into 10 sections, as outlined below. This is Section VI.

I. Perceptions of the impacts of regulatory requirements on the refinery's operations in 1995 and 2000.

II. Refinery facilities' capabilities and utilization, feedstocks, and product yields--actual 1990 data and as anticipated for 1995.

III. Refinery emission sources and controls.

IV. Economic impacts of environmental regulations on refineries--both historical and anticipated costs.

V. Distribution and transport modes of products from refineries among national regions--1990 and 1995.

VI. Expectations regarding the 1995 supply and distribution of oxygenates, corporate-wide.

VII. Various issues concerning terminals, including supply of product, capacity, and environmentally related costs.

VIII. Various issues concerning pipelines, including capacity, product segregations, and costs.

IX. Tanker, barge, rail, and truck transport costs.

X. Foreign refinery and supply issues, including likely product specifications in other nations in 1995 and 2000.

A separate questionnaire on the supply and distribution of oxygenates is being sent to companies that blend oxygenates with petroleum products but do <u>not</u> produce petroleum products.

Purposes for the Information Requested

The NPC needs your company's responses to this questionnaire to help build an accurate picture of the current and anticipated future capability and flexibility of the nation's refining industry to supply its customers' needs. This information, aggregated across all respondents, will comprise a major component of the NPC's response to the Secretary of Energy. The aggregated survey results also will be used to validate industry models.

For use in the mathematical models, the survey results will be supplemented with aggregate 1990 operating data from the Department of Energy's Energy Information Administration reports and the judgments of the industry experts on the NPC study groups. Use of these three sources of information will help to ensure that the models provide valid representations of the industry and do not under- or over-state industry capability or flexibility.

The purpose of this section is to determine the anticipated volumes, transport modes, and interregional flows of oxygenates in 1995. This information will help evaluate the logistical issues related to getting the oxygenates to the required areas. Oxygenate storage is being assessed as a measure of the anticipated seasonal oxygenate demand for CO non-attainment areas.

INSTRUCTIONS AND DEFINITIONS

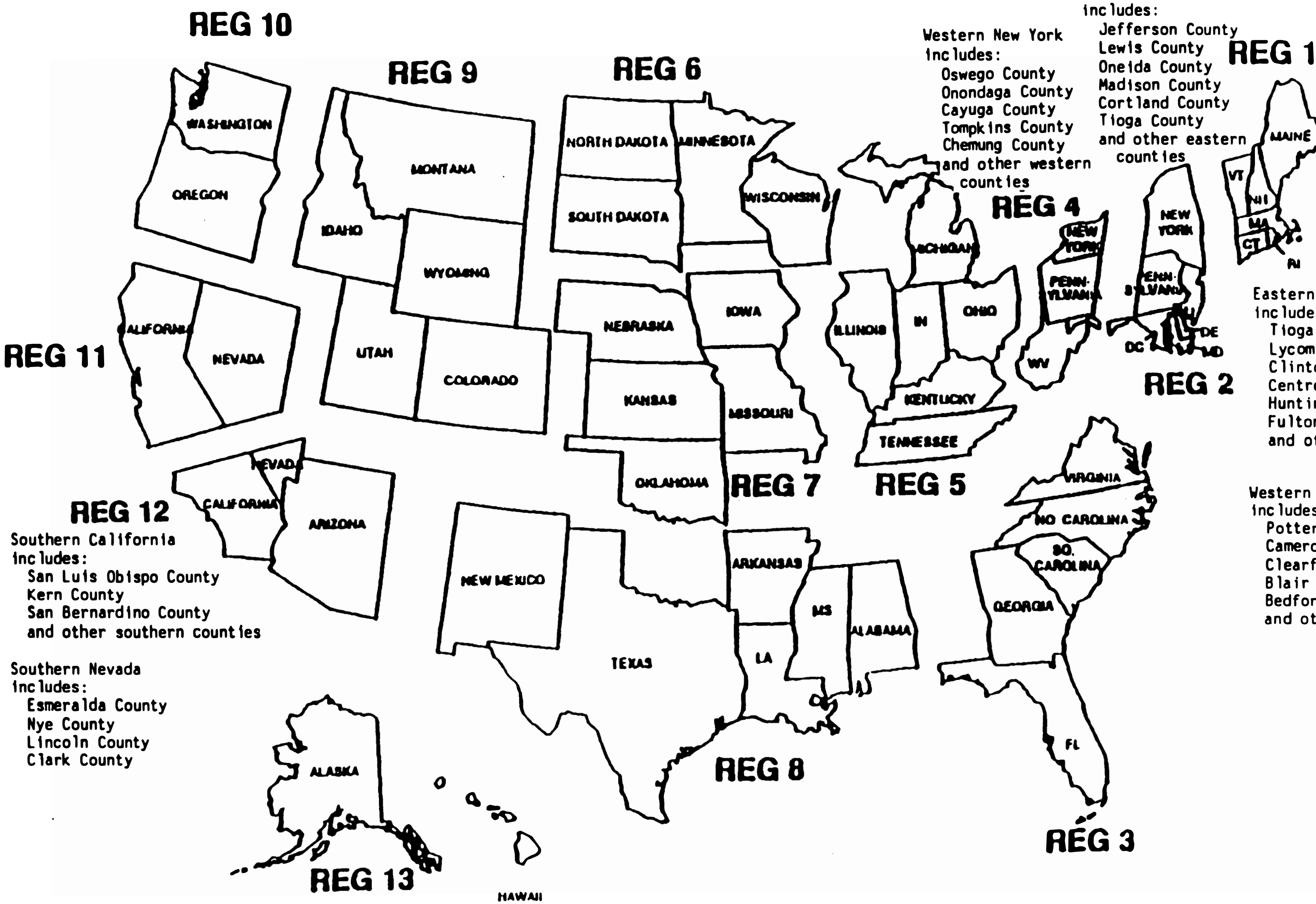
- REPORT DATA ONLY ON THOSE LINES THAT ARE APPLICABLE TO YOUR OPERATION.
- IF THERE ARE NO DATA FOR A SPECIFIC LINE, LEAVE THE LINE BLANK; DO NOT ENTER ZERO.

Survey Acronyms and Abbreviations

NOTE: The abbreviations below refer to the way in which they are used in this section of the questionnaire.

%	Percent
$	U.S. dollars
B	Barrels
B/CD	Barrels per calendar day
CD	Calendar day
M	Thousand
MB	Thousand barrels

U.S. REGIONS
NATIONAL PETROLEUM COUNCIL REFINING STUDY



Eastern New York includes:
- Jefferson County
- Lewis County
- Oneida County
- Madison County
- Cortland County
- Tioga County
- and other eastern counties

Western New York includes:
- Oswego County
- Onondaga County
- Cayuga County
- Tompkins County
- Chemung County
- and other western counties

Eastern Pennsylvania includes:
- Tioga County
- Lycoming County
- Clinton County
- Centre County
- Huntingdon County
- Fulton County
- and other eastern counties

Western Pennsylvania includes:
- Potter County
- Cameron County
- Clearfield County
- Blair County
- Bedford County
- and other western counties

Southern California includes:
- San Luis Obispo County
- Kern County
- San Bernardino County
- and other southern counties

Southern Nevada includes:
- Esmeralda County
- Nye County
- Lincoln County
- Clark County

OXYGENATES TO BE BLENDED IN YOUR REFINERIES

NOTE: Non-refinery-blended oxygenates are covered in Questions 4 through 6.

1. Location of refinery blending of oxygenates: **In 1995**, approximately what total volume of ethers and alcohols (that is, oxygenates) do you anticipate your company will blend at your refineries in each region (see map on facing page)? *Do not include oxygenates in the product that your company will receive on exchange. Answer in terms of barrels per calendar day (B/CD).*

Volume of Ethers and Alcohols to Be Blended at Your Refineries in Each Region in 1995 (B/CD)

	REGION:												
Oxygenate	1	2	3	4	5	6	7	8	9	10	11	12	13
Ethers													
Alcohols													

2. Sources of refinery-blended oxygenates: **In 1995**, approximately what volume of oxygenates for your company's refinery-blended gasolines do you anticipate will be supplied from each region of the U.S. or from foreign regions?

   Note: Include oxygenates produced by your company as well as those purchased. The total of the volume reported for each product in this question should equal the total reported for each product in Question 1. If you don't know where the oxygenates were produced, enter volume under "Unknown Sources." Answer in terms of barrels per calendar day (B/CD).

   Foreign Region Codes:

   14 = North Europe
   15 = Mediterranean
   16 = Middle East
   17 = Far East
   18 = Western Hemisphere other than U.S. or Canada
   19 = Western Canada
   20 = Eastern Canada

Volume of Refinery-Blended Ethers/Alcohols Supplied by Each Region or From Unknown Sources in 1995 (B/CD)

	U.S. REGIONS:													FOREIGN REGIONS:							
Oxygenate	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Unknown Sources
Ethers																					
Alcohols																					

3. <u>Transport mode of oxygenates to be blended in your refineries</u>: <u>In 1995</u>, about what volume of refinery-blended ethers and alcohols do you anticipate will be transported to your refineries in each region by each of the listed transport modes? *Note: If any given shipment of product will be moved by more than one mode of transportation, include <u>only</u> the mode by which the shipment will be moved the greatest distance. The total of the volume of each product reported in this question should equal the total of each product reported in Question 1. Answer in terms of barrels per calendar day (B/CD).*

Transport Mode of Oxygenates to Your Refineries	Volume of Refinery-Blended Ethers/Alcohols Transported to Your Refineries in Each Region in 1995 by Each Transport Mode (B/CD)												
	REGION:												
	1	2	3	4	5	6	7	8	9	10	11	12	13
<u>For ethers</u>:													
Pipeline													
Tanker													
Barge													
Rail													
Truck													
No transport*. . . .													
<u>For alcohols</u>:													
Pipeline													
Tanker													
Barge													
Rail													
Truck													
No transport*. . . .													

*That is, ether/alcohol is produced at the refinery.

<u>OXYGENATES TO BE BLENDED AT LOCATIONS OTHER THAN REFINERIES</u> (Include only volume to which your company has title)

4. <u>Location of oxygenates to be blended at locations other than refineries</u>: **<u>In 1995</u>**, approximately what volume of ethers and alcohols will be blended into gasoline at locations <u>other than refineries</u> in each region (for example, at remote terminals)? *Include only oxygenates that will be blended into gasoline to which your company holds title. Do <u>not</u> include oxygenates in the product that your company will receive on exchange. Answer in terms of barrels per calendar day (B/CD).*

Volume of Ethers/Alcohols Blended at Non-Refinery Locations in Each Region in 1995 (B/CD)

REGION:

Oxygenate	1	2	3	4	5	6	7	8	9	10	11	12	13
Ethers													
Alcohols													

5. <u>Sources of oxygenates to be blended at locations other than refineries</u>: **<u>In 1995</u>**, approximately what volume of oxygenates for your company's non-refinery-blended gasolines do you anticipate will be <u>supplied</u> from each region of the U.S. or from foreign regions?

   Note: Include oxygenates produced by your company as well as those purchased. The total of the volume reported for each product in this question should equal the total reported for each product in Question 4. If you don't know where the oxygenates were <u>produced</u>, enter volume under "Unknown Sources." Answer in terms of barrels per calendar day (B/CD).

<u>Foreign Region Codes</u>:

14 = North Europe
15 = Mediterranean
16 = Middle East
17 = Far East
18 = Western Hemisphere other than U.S. or Canada
19 = Western Canada
20 = Eastern Canada

Volume of Non-Refinery-Blended Ethers/Alcohols Supplied by Each Region or From Unknown Sources in 1995 (B/CD)

	U.S. REGIONS:													FOREIGN REGIONS:							
Oxygenate	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Unknown Sources
Ethers																					
Alcohols																					

6. <u>Transport mode of oxygenates reported in Question 4</u>: <u>In 1995</u>, about what volume of non-refinery-blended ethers and alcohols, reported in Question 4, do you anticipate will be transported to the blending facility in each region by each of the listed transport modes? *Note: If any given shipment of product will be moved by more than one mode of transportation, include <u>only</u> the mode by which the shipment will be moved the greatest distance. The total of the volume of each product reported in this question should equal the total of each product reported in Question 4. Answer in terms of barrels per calendar day (B/CD).*

1995 Transport Mode	Volume of Non-Refinery-Blended Ethers/Alcohols Transported to the Blending Facility in Each Region in 1995 by Each Transport Mode (B/CD)												
	REGION:												
	1	2	3	4	5	6	7	8	9	10	11	12	13
For ethers:													
Pipeline													
Tanker													
Barge													
Rail													
Truck													
For alcohols:													
Pipeline													
Tanker													
Barge													
Rail													
Truck													

ALL OXYGENATES TO BE BLENDED INTO GASOLINE

7. In 1995, what is the maximum storage capacity that your company will own in each region that you anticipate being available for the storage of your company's ethers and alcohols?
   Answer in thousand-barrels (MB).

Anticipated 1995 Maximum Available Alcohol/Ether Storage Capacity
Owned and Used by Your Company, by Region (MB)

	REGION:												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Ethers	___	___	___	___	___	___	___	___	___	___	___	___	___
Alcohols	___	___	___	___	___	___	___	___	___	___	___	___	___

8. What is the maximum alcohol/ether storage capacity in each region that you anticipate your company will own and be leasing to others in 1995, and what is the anticipated income from those leases? *(Note: The capacity reported here is in addition to the capacity reported in Question 7.)*

Maximum Storage Capacity Leased to Others for Alcohols and Ethers in 1995

	REGION:												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Maximum capacity to be leased to others (MB):	___	___	___	___	___	___	___	___	___	___	___	___	___
Estimated 1995 leasing income (thousands $ in 1991 $):	___	___	___	___	___	___	___	___	___	___	___	___	___

9. In each region, how much alcohol/ether storage capacity do you anticipate your company will build or convert from other uses between January 1, 1991, and December 31, 1995, and what are the anticipated costs for this additional alcohol/ether storage capacity? *(Note: The capacity reported here is part of the capacity reported in Questions 7 and 8.)*

	Alcohol/Ether Storage Capacity That Will Be Built or Converted from Other Uses												
	REGION:												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Capacity to be built or converted from other uses (MB):													
Total estimated costs (millions $) 1/1/91 - 12/31/95:													

10. What is the maximum alcohol/ether storage capacity in each region that your company will <u>lease from others</u> in 1995, and what are the anticipated <u>1995</u> costs for this leased alcohol/ether storage capacity? *(Note: The capacity reported here is <u>in addition</u> to the capacity reported in Question 7.)*

	Alcohol/Ether Storage Capacity That Will Be Leased from Others in 1995												
	REGION:												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Maximum capacity to be <u>leased from others</u> (MB):													
Estimated 1995 leasing costs (thousands $ in 1991 $):													

NATIONAL PETROLEUM COUNCIL
1991 SURVEY OF U.S. PETROLEUM REFINING INDUSTRY

SECTION VII. ISSUES CONCERNING TERMINALS FOR TERMINAL OPERATORS

Answer this questionnaire for terminals operated by the company identified below:

If you have questions or need more copies of the questionnaire, contact:

Benjamin Oliver, Jr., NPC, (202) 393-6100
FAX: (202) 331-8539
OR
Susan Russell, SRI International, (415) 859-2640
FAX: (415) 859-2861

Use the enclosed envelope to return this completed questionnaire **no later than January 31, 1992**, to:

Survey Research Program
SRI International
P.O. Box 2246
Menlo Park, CA 94026-2246

Whom should we contact if we have questions about your responses to this section?

Name: ______________________

Telephone: ______________________

FAX: ______________________

INTRODUCTION

In response to a request from the Secretary of Energy, the National Petroleum Council (NPC) is conducting a study of the U.S. refining industry's capability and flexibility to meet future product demand. Task groups consisting of representatives from NPC member companies have been responsible for identifying the data needs and specifying the content of the questionnaires.

The survey includes both existing and planned U.S. refineries, as follows:

- **All refineries with operable capacity as of January 1, 1991, regardless of whether they were actually in operation on that date.**
- **All refineries that are planned to be operable by January 1, 1996.**

Data Tabulations and Confidentiality

The NPC has retained SRI International to format the survey questionnaires and to collect and tabulate the survey data and provide aggregated data to the U.S. petroleum refining study participants, NPC staff, and contractors who will use the data in mathematical models. **The final report will be sent to all survey respondents.** SRI International--formerly Stanford Research Institute--is a broad-based, nonprofit research and consulting organization serving clients in industry, government, and service organizations worldwide.

Individual company data from the survey will be held strictly confidential by SRI and will not be released to government, study participants, NPC staff, or other contractors. The only SRI staff who will have access to the data are Survey Research Program staff and Ms. Susan Leiby, an SRI process engineer, who will assist Survey Research Program staff in reviewing the questionnaires and will be available in the event of any difficulties in questionnaire interpretation. Confidential Information Agreements prepared by the NPC have been executed by SRI management, individual Survey Research Program staff, and Ms. Leiby committing themselves to these data handling procedures.

SRI International will release the aggregated data to NPC study participants only when sufficient data are available to permit aggregation in a manner that would not disclose individual operations. Once the data have been aggregated, accepted by the NPC, and reported, all individual responses will be destroyed.

Overview of the Information Requested

The overall survey is divided into 10 sections, as outlined below. This is Section VII.

I. Perceptions of the impacts of regulatory requirements on the refinery's operations in 1995 and 2000.

II. Refinery facilities' capabilities and utilization, feedstocks, and product yields--actual 1990 data and as anticipated for 1995.

III. Refinery emission sources and controls.

IV. Economic impacts of environmental regulations on refineries--both historical and anticipated costs.

V. Distribution and transport modes of products from refineries among national regions--1990 and 1995.

VI. Expectations regarding the 1995 supply and distribution of oxygenates, corporate-wide.

VII. Various issues concerning terminals, including supply of product, capacity, and environmentally related costs.

VIII. Various issues concerning pipelines, including capacity, product segregations, and costs.

IX. Tanker, barge, rail, and truck transport costs.

X. Foreign refinery and supply issues, including likely product specifications in other nations in 1995 and 2000.

A separate questionnaire on the supply and distribution of oxygenates is being sent to companies that blend oxygenates with petroleum products but do not produce petroleum products.

Purposes for the Information Requested

The NPC needs your company's responses to this questionnaire to help build an accurate picture of the current and anticipated future capability and flexibility of the nation's refining industry to supply its customers' needs. This information, aggregated across all respondents, will comprise a major component of the NPC's response to the Secretary of Energy. The aggregated survey results also will be used to validate industry models.

For use in the mathematical models, the survey results will be supplemented with aggregate 1990 operating data from the Department of Energy's Energy Information Administration reports and the judgments of the industry experts on the NPC study groups. Use of these three sources of information will help to ensure that the models provide valid representations of the industry and do not under- or over-state industry capability or flexibility.

The purpose of this section is to determine the ability of terminals to handle possible increased numbers and amounts of products in the future and to assess the anticipated terminal-related costs due to environmental regulations.

INSTRUCTIONS AND DEFINITIONS

REPORT DATA ONLY ON THOSE LINES THAT ARE APPLICABLE TO YOUR OPERATION.
IF THERE ARE NO DATA FOR A SPECIFIC LINE, LEAVE THE LINE BLANK;
DO NOT ENTER ZERO.

Attainment areas = Cities or regions that meet federal standards for carbon monoxide (CO) and ozone concentrations in the atmosphere.

Oxygenated gasoline (OG) = Finished gasoline that meets the minimum oxygen content requirement for gasoline sold in CO non-attainment areas in winter months but does not meet RFG specifications (see below) for ozone non-attainment areas.

Reformulated gasoline (RFG) = Finished gasoline that meets all requirements for reformulated gasoline in ozone non-attainment areas and, if necessary, for CO non-attainment areas.

Segregation = Any product that cannot be co-mingled with another product.

Non-attainment areas:

CO non-attainment areas = Approximately 40 cities (listed below) that are not in compliance with federal carbon monoxide (CO) standards:

Albuquerque, NM
Anchorage, AK
Baltimore, MD
Boston, MA (CMSA)
Chico, CA
Cleveland, OH (CMSA)
Colorado Springs, CO
Denver, Boulder, CO (CMSA)
Duluth, MN, WI
El Paso, TX
Fairbanks, AK (non-MSA)
Fort Collins, CO
Fresno, CA
Greensboro, Winston-Salem, H. Point, NC
Hartford, CT (CMSA)
Josephine County (Grants Pass), OR (non-MSA)
Klamath County, OR (non-MSA)
Las Vegas, NV
Los Angeles, CA (CMSA)
Medford, OR
Memphis, TN
Minneapolis/St. Paul, MN
Missoula County, MT (non-MSA)
Modesto, CA
*New York, NY, NJ, CT (CMSA)
Philadelphia, PA, NJ, DE (CMSA)
Phoenix, AZ
Portland, OR, Vancouver, WA (CMSA)
Provo, Orem, UT
Raleigh, Durham, NC
Reno, NV
Sacramento, CA
San Diego, CA
San Francisco, Oakland, San Jose, CA (CMSA)
Seattle, Tacoma, WA (CMSA)
*Spokane, WA
*Steubenville, Weirton, OH, WV (nonmobile)
Stockton, CA
Syracuse, NY
Washington, DC, MD, VA
*Winnebago County (Oshkosh), WI (nonmobile)

Ozone non-attainment areas = Nine cities (listed below) with extreme or severe ozone pollution problems that must use reformulated gasoline (RFG) by January 1, 1995.

Baltimore, MD
Chicago, IL, IN, WI (CMSA)
Hartford, CT
Houston, Galveston, Brazoria, TX (CMSA)
**Los Angeles, CA (CMSA)
Milwaukee, Racine, WI (CMSA)
New York, NY, NJ, CT (CMSA)
Philadelphia, PA, NJ, DE (CMSA)
San Diego, CA

Opt-ins = Approximately 100 cities (other than the 9 ozone non-attainment areas listed above) with marginal, moderate, or serious ozone pollution problems that may choose to participate in ("opt-in" to) the RFG program.

---

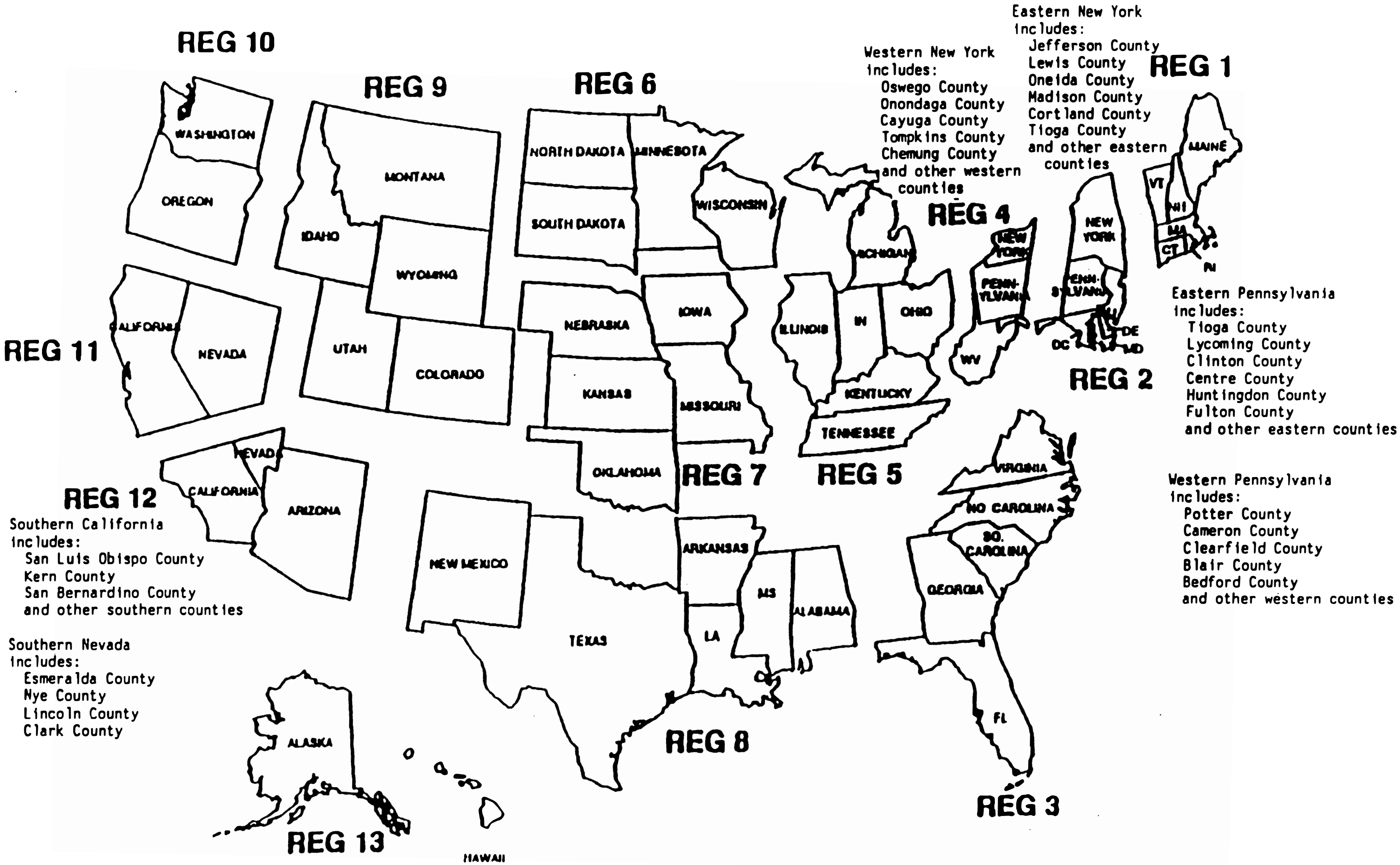
*Rated as a "serious" CO non-attainment area.
**Rated as an "extreme" ozone non-attainment area.
MSA = Metropolitan statistical area.
CMSA = Consolidated metropolitan statistical area.

Survey Acronyms and Abbreviations

NOTE: The abbreviations below refer to the way in which they are used in this section of the questionnaire.

$	U.S. dollars
%	Percent
B	Barrels
CO	Carbon monoxide
MB	Thousand barrels
MB/CD	Thousand barrels per calendar day
MM	Million
MMB	Million barrels

U.S. REGIONS
NATIONAL PETROLEUM COUNCIL REFINING STUDY



Hydrocarbon Fuel Throughput, Storage Capacity, and Product Segregations* of Terminals

1. Provide the following information for terminals operated by your company in each region *(See map on facing page for definitions of regions.)*
   - The actual total 1990 throughput for these terminals (including those at refineries). *(Include only physical volumes [wet barrels] moved through these terminals.)*
   - The greatest number of gasoline, distillate, and other product segregations* that your terminals actually stored at any one point in time in 1990. (If multiple terminals in a region, report the greatest number of segregations stored by any one terminal.)
   - The anticipated greatest number of product segregations that you will store at any one point in time in 1995. (If multiple terminals in a region, report the greatest number of segregations stored by any one terminal.)

	REGION:												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Total 1990 throughput (MB/CD):													
Greatest number of segregations* at any one point in time of:													
1990 motor gasoline products (including subgrades)													
1990 #2 diesel fuel/ #2 fuel oil													
1990 aviation gasoline, jet fuel, kerosene/#1 fuel oil													
Anticipated greatest number of segregations* at any one point in time of:													
1995 motor gasoline products (including subgrades)													
1995 #2 diesel fuel/ #2 fuel oil													
1995 aviation gasoline, jet fuel, kerosene/#1 fuel oil													

*By "segregation," we mean any product that cannot be co-mingled with another product.

2. Does your company have any deep-water terminals that are capable of receiving ocean-going tankers, <u>including terminals at refineries</u>?

Yes 1

No . . . . . 2 --> SKIP TO QUESTION 6

3. <u>In 1990</u>, what volume of each of the following did your company input and output by tanker <u>through its deep-water terminals</u> (including those at refineries)?
(If none, enter "0".)

	1990 Volume Input by Tanker	1990 Volume Output by Tanker
a. Crude oil	________B/CD	________B/CD
b. Clean fuel products and stocks*	________B/CD	________B/CD
c. Dirty products and stocks**	________B/CD	________B/CD

4. <u>In 1995</u>, what do you anticipate will be your company's capacities to **input** the following by tanker through its deep-water terminals (including those at refineries), <u>given the minimum volume of product that you expect you will output by tanker through these same terminals</u>?
(If none, enter "0". Assume current wharf, port, and pipeline constraints, plus <u>planned</u> expansions or reductions.)

	1995 Anticipated Capacity for INPUT by Tanker
a. Crude oil	________B/CD
b. Clean fuel products and stocks*	________B/CD
c. Dirty products and stocks**	________B/CD

---

*Distilled finished and unfinished fuel products such as gasolines, naphthas, jet fuel, diesel fuels, #2 fuel oil and other distillate fuels, and unfinished gasoline subgrades (including oxygenates).
**Finished and unfinished bottoms products such as residual fuel oil, asphalt, road oils, and heavy gas oil.

5. <u>In 1995</u>, what do you anticipate will be your company's capacities to **output** the following by tanker through its deep-water terminals (including those at refineries), <u>given the minimum volume of product that you expect you will input by tanker through these same terminals</u>?
(If none, enter "0". Assume current wharf, port, and pipeline constraints, plus <u>planned</u> expansions or reductions.)

	1995 Anticipated Capacity for OUTPUT by Tanker
a. Crude oil	________B/CD
b. Clean fuel products and stocks*	________B/CD
c. Dirty products and stocks**	________B/CD

<u>Estimated Environmental Expenses for Terminals</u> (Including Terminals at Refineries)

6. For <u>1990</u>, what were your company's environmental expenditures for its terminals?

<u>Environmental capital expenditures</u> include plant and equipment costs for reducing or eliminating air and water pollutants and hazardous and nonhazardous solid wastes. They also include costs for treatment, storage, disposal, or recycling of air and water pollutants and hazardous and nonhazardous solid wastes. Solid-waste-related costs include expenditures for remediation and spills.

Amounts entered for <u>environmental operations and maintenance expenses</u> should include all environmentally related costs for operations and maintenance of plant and equipment; equipment leases; reducing or eliminating pollutants or waste; treatment, storage, disposal, or recycling of pollutants/wastes; and remediation costs.

Do <u>not</u> include depreciation costs.

a. Total 1990 environmental capital expenditures: $__________ million

b. 1990 environmental operations and maintenance expenses: $__________ million

---

*Distilled finished and unfinished fuel products such as gasolines, naphthas, jet fuel, diesel fuels, #2 fuel oil and other distillate fuels, and unfinished gasoline subgrades (including oxygenates).
**Finished and unfinished bottoms products such as residual fuel oil, asphalt, road oils, and heavy gas oil.

7. In the 5-year period from January 1, 1991, through December 31, 1995, what do you anticipate the company's environmental and process safety expenses will be for its terminals, based on regulations and approved legislation as of December 31, 1990? Also, approximately what percentage of those expenses do you anticipate will be directly attributable to the 1990 Clean Air Act Amendements (CAAA)?

- *Use the same definitions as those provided in Question 6.*
- *Include expenses resulting from the Clean Air Act Amendments of 1990, expected regulations from those amendments, requirements for additional product segregations, etc.*
- *Answer in 1991 dollars.*
- *Provide costs related to process safety management that are expended in response to API RP 750 or other State and Federal process safety requirements.*

		% Attributable to 1990 CAAA
a. Total anticipated environmentally and process safety-related capital expenditures for 1/1/91 - 12/31/95:	$________ million	____%
b. Total anticipated environmentally and process safety-related one-time* expenses for 1/1/91 - 12/31/95:	$________ million	____%
c. Estimated 1995 environmentally and process safety-related operations and maintenance expenses:	$________ million	____%

8. In the 5-year period from January 1, 1991, through December 31, 1995, what costs (if any) do you expect to incur specifically in order to increase throughput or number of segregations? *Do not include costs reported in Question 7 above. (Enter "0" if you do not expect to increase throughput or number of segregations.)*

$________ million

*One-time expenses include expenses associated with capital projects and one-time remediation activities.

9. Provide your best estimates with regard to the following information for your company's terminals (including those at refineries), as of January 1, 1991.

   a. Total number of terminals: ________

   b. Percentage of terminals with marine loading and receiving capabilities: _____%

   c. Storage tanks in <u>hydrocarbon fuels</u> service:

      (1) Number: _______

      (2) Total capacity: ________MB

      (3) Percentage of tanks equipped with leak containment and detection (for example, double bottoms): _____%

      (4) Percentage of tanks equipped with double seals or equivalent: _____%

      (5) Number that are 0 to 40 years old: ________

      (6) Total capacity of tanks that are 0 to 40 years old: ________MB

      (7) Number that are more than 40 years old: ________

      (8) Total capacity of tanks that are 40+ years old: ________MB

10. How many of your company's terminals have each of the following:

	Number of Terminals
a. Groundwater monitoring program	________
b. Groundwater recovery treatment program	________
c. Known contaminated soil (that is, soil requiring monitoring or remediation under current regulations)	________

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NATIONAL PETROLEUM COUNCIL
1991 SURVEY OF U.S. PETROLEUM REFINING INDUSTRY

SECTION VIII. ISSUES CONCERNING CLEAN PRODUCT PIPELINES FOR PIPELINE OPERATORS

If you have questions, contact:

Benjamin Oliver, Jr., NPC, (202) 393-6100
FAX: (202) 331-8539
OR
Susan Russell, SRI International, (415) 859-2640
FAX: (415) 859-2861

Use the enclosed envelope to return this completed questionnaire **no later than January 31, 1992**, to:

Survey Research Program
SRI International
P.O. Box 2246
Menlo Park, CA 94026-2246

Whom should we contact if we have questions about your responses to this section?

Name: ____________________

Telephone: ____________________

FAX: ____________________

INTRODUCTION

In response to a request from the Secretary of Energy, the National Petroleum Council (NPC) is conducting a study of the U.S. refining industry's capability and flexibility to meet future product demand. Task groups consisting of representatives from NPC member companies have been responsible for identifying the data needs and specifying the content of the questionnaires.

The survey includes both existing and planned U.S. refineries, as follows:

- **All refineries with operable capacity as of January 1, 1991, regardless of whether they were actually in operation on that date.**

- **All refineries that are planned to be operable by January 1, 1996.**

Data Tabulations and Confidentiality

The NPC has retained SRI International to format the survey questionnaires and to collect and tabulate the survey data and provide aggregated data to the U.S. petroleum refining study participants, NPC staff, and contractors who will use the data in mathematical models. **The final report will be sent to all survey respondents.** SRI International--formerly Stanford Research Institute--is a broad-based, nonprofit research and consulting organization serving clients in industry, government, and service organizations worldwide.

Individual company data from the survey will be held **strictly confidential** by SRI and will not be released to government, study participants, NPC staff, or other contractors. The only SRI staff who will have access to the data are Survey Research Program staff and Ms. Susan Leiby, an SRI process engineer, who will assist Survey Research Program staff in reviewing the questionnaires and will be available in the event of any difficulties in questionnaire interpretation. Confidential Information Agreements prepared by the NPC have been executed by SRI management, individual Survey Research Program staff, and Ms. Leiby committing themselves to these data handling procedures.

SRI International will release the aggregated data to NPC study participants only when sufficient data are available to permit aggregation in a manner that would not disclose individual operations. Once the data have been aggregated, accepted by the NPC, and reported, all individual responses will be destroyed.

Overview of the Information Requested

The overall survey is divided into 10 sections, as outlined below. This is Section VIII.

I. Perceptions of the impacts of regulatory requirements on the refinery's operations in 1995 and 2000.

II. Refinery facilities' capabilities and utilization, feedstocks, and product yields--actual 1990 data and as anticipated for 1995.

III. Refinery emission sources and controls.

IV. Economic impacts of environmental regulations on refineries--both historical and anticipated costs.

V. Distribution and transport modes of products from refineries among national regions--1990 and 1995.

VI. Expectations regarding the 1995 supply and distribution of oxygenates, corporate-wide.

VII. Various issues concerning terminals, including supply of product, capacity, and environmentally related costs.

VIII. Various issues concerning pipelines, including capacity, product segregations, and costs.

IX. Tanker, barge, rail, and truck transport costs.

X. Foreign refinery and supply issues, including likely product specifications in other nations in 1995 and 2000.

A separate questionnaire on the supply and distribution of oxygenates is being sent to companies that blend oxygenates with petroleum products but do not produce petroleum products.

Purposes for the Information Requested

The NPC needs your company's responses to this questionnaire to help build an accurate picture of the current and anticipated future capability and flexibility of the nation's refining industry to supply its customers' needs. This information, aggregated across all respondents, will comprise a major component of the NPC's response to the Secretary of Energy. The aggregated survey results also will be used to validate industry models.

For use in the mathematical models, the survey results will be supplemented with aggregate 1990 operating data from the Department of Energy's Energy Information Administration reports and the judgments of the industry experts on the NPC study groups. Use of these three sources of information will help to ensure that the models provide valid representations of the industry and do not under- or over-state industry capability or flexibility.

The purpose of this section of the questionnaire is to determine the ability of pipelines to handle changes in supply patterns due to environmental regulations and to assess possible tariff changes between 1990 and 1995.

INSTRUCTIONS AND DEFINITIONS

REPORT DATA ONLY ON THOSE LINES THAT ARE APPLICABLE TO YOUR OPERATION. THERE ARE NO DATA FOR A SPECIFIC LINE, LEAVE THE LINE BLANK; DO NOT ENTER ZERO.

Oxygenated gasoline (OG) = Finished gasoline that meets the minimum oxygen content requirement for gasoline sold in CO non-attainment areas in winter months but does not meet RFG specifications (see below) for ozone non-attainment areas.

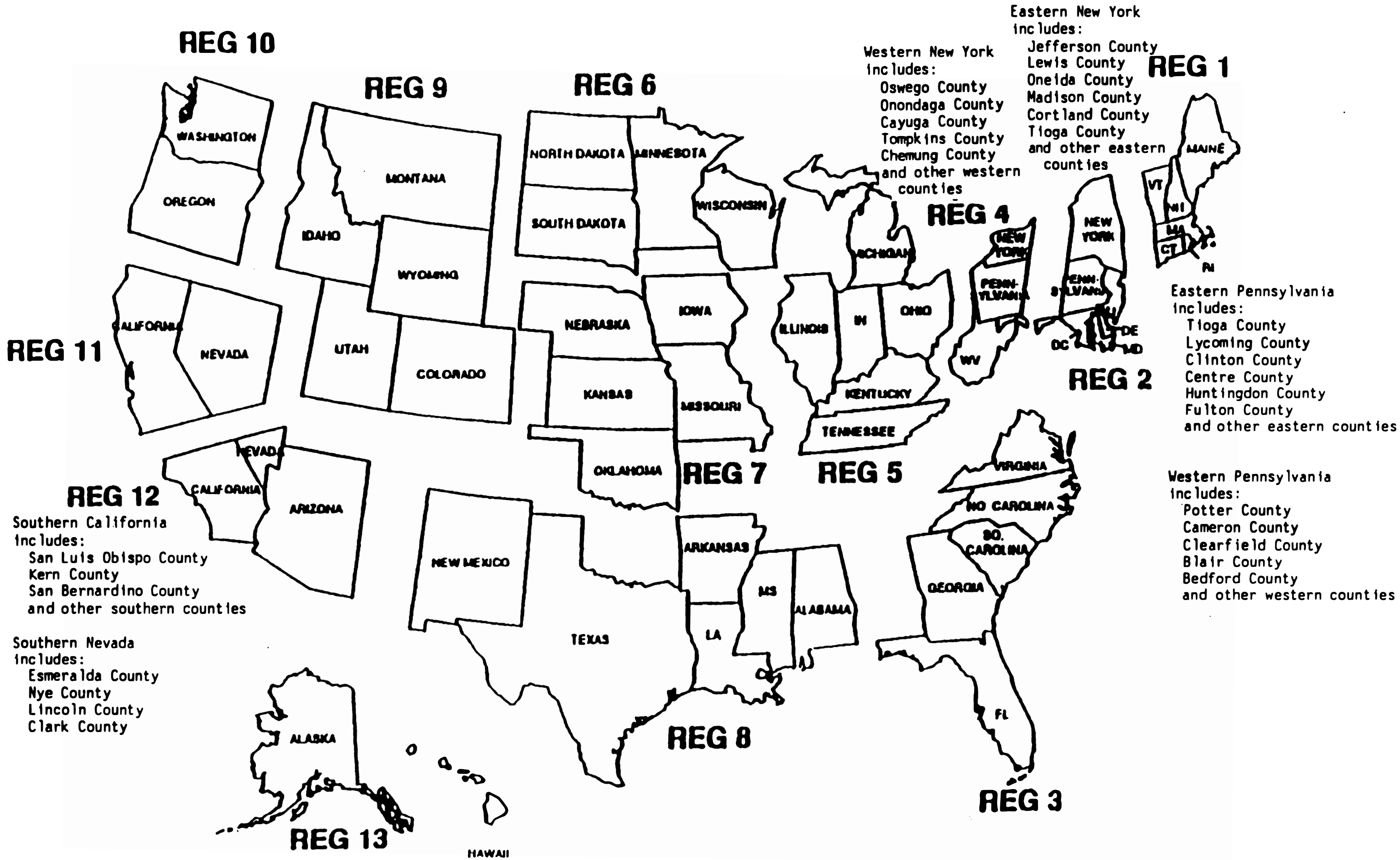
Reformulated gasoline (RFG) = Finished gasoline that meets all requirements for reformulated gasoline in ozone non-attainment areas and, if necessary, for CO non-attainment areas.

Survey Acronyms and Abbreviations

NOTE: The abbreviations below refer to the way in which they are used in this section of the questionnaire.

%	Percent
MB/D	Thousand barrels per day
NESHAP	National Emission Standard for Hazardous Air Pollutants
OG	Oxygenated gasoline
RFG	Reformulated gasoline

U.S. REGIONS
NATIONAL PETROLEUM COUNCIL REFINING STUDY



1. Complete the table below to indicate the following:
   (a) Your company's nominal <u>1990</u> pipeline capacities for gasoline (including subgrades), distillate, or jet fuel between each pair of regions listed below <u>in which your company operates a pipeline</u>.
   (Enter the total capacity of all your company's pipelines that originate in one region and move product to the other region. For example, if your pipelines deliver product from Region 3 through Region 2 to Region 4, enter the maximum MB/D from Region 3 to Region 2 and then the maximum MB/D from Region 2 to Region 4.)
   (b) Your company's average <u>1990</u> pipeline utilization for gasoline (including subgrades), distillate, or jet fuel between each pair of regions.
   (c) Your company's anticipated nominal <u>1995</u> pipeline capacities for gasoline (including subgrades), distillate, or jet fuel between each pair of regions. (Assume the same number of product segregations as you had in 1990.)
   (d) Percentage of each product (gasoline, distillate, or jet fuel) on which nominal pipeline capacities are based. For example, if capacity is based on pumping only distillate, enter 100% under "Distillate."

(Answer in terms of thousands of barrels per day (MB/D). Map on facing page has definitions of regions.)

Movement of Product		(a)	(b)	(c)	(d)		
					Percent of Each Product on Which Pipeline Capacities Are Based		
From Region:	To Region:	1990 Nominal Pipeline Capacities	1990 Average Pipeline Utilization	Anticipated 1995 Nominal Pipeline Capacities	Gasoline	Distillate	Jet Fuel
2	4	______	______	______	____%	____%	____%
3	2	______	______	______	____%	____%	____%
3	5	______	______	______	____%	____%	____%
4	2	______	______	______	____%	____%	____%
5	4	______	______	______	____%	____%	____%
5	6	______	______	______	____%	____%	____%
5	7	______	______	______	____%	____%	____%
5	8	______	______	______	____%	____%	____%
7	5	______	______	______	____%	____%	____%
7	6	______	______	______	____%	____%	____%
7	8	______	______	______	____%	____%	____%
7	9	______	______	______	____%	____%	____%
8	3	______	______	______	____%	____%	____%
8	5	______	______	______	____%	____%	____%
8	7	______	______	______	____%	____%	____%
8	9	______	______	______	____%	____%	____%
8	12	______	______	______	____%	____%	____%
9	6	______	______	______	____%	____%	____%
9	7	______	______	______	____%	____%	____%
9	10	______	______	______	____%	____%	____%
12	11	______	______	______	____%	____%	____%

2. <u>For each pair of regions in which you expect to have increased capacity</u>: Using January 1, 1991, as a base, about what percentage change will there be by January 1, 1996, in your company's pipeline per-barrel rates/tariffs <u>as a result of increased capacity</u>? *(Include effects on rates/tariffs of capital, one-time, and operating and maintenance costs due to increased capacity. Assume <u>current</u> regulations and 1991 dollars.)*
(CIRCLE ONE NUMBER FOR EACH PAIR OF REGIONS IN WHICH YOU EXPECT TO HAVE INCREASED CAPACITY)

From Region:	To Region:	1-10% Decrease	No Change	1-10% Increase	11-20% Increase	>20% Increase
		Percentage by Which This Company's Pipeline Per-Barrel Rates/Tariffs Will Change Due to Increased Capacity:				
2	4	1	2	3	4	5
3	2	1	2	3	4	5
3	5	1	2	3	4	5
4	2	1	2	3	4	5
5	4	1	2	3	4	5
5	6	1	2	3	4	5
5	7	1	2	3	4	5
5	8	1	2	3	4	5
7	5	1	2	3	4	5
7	6	1	2	3	4	5
7	8	1	2	3	4	5
7	9	1	2	3	4	5
8	3	1	2	3	4	5
8	5	1	2	3	4	5
8	7	1	2	3	4	5
8	9	1	2	3	4	5
8	12	1	2	3	4	5
9	6	1	2	3	4	5
9	7	1	2	3	4	5
9	10	1	2	3	4	5
12	11	1	2	3	4	5

3. Overall, by about what percentage (if any) do you expect the 1990 Clean Air Act Amendments and other environmental and process safety regulations to affect your pipeline's tariffs between 1990 and 1995? In developing your response, include costs for the following:

- Modifications to terminal facilities for product segregation required to accommodate additional "environmental products."
- Modifications for terminal blending (oxygenate blending and intermediate grade blending to reduce grades).
- Air and water quality compliance.
- New source performance standards (NSPS).
- Industrial toxins.
- NESHAP.
- Increased tank/pipeline inspection frequency (cost of inspection/more frequent repairs dictating increased downtime).
- Hazardous waste handling.

(CIRCLE ONE NUMBER)

None 0

Less than 10% . . . 1

10% to 20% 2

More than 20% . . . 3

4. IF, due to Clean Air Act Amendments (CAAA), the number of gasoline segregations* pumped through your pipelines were increased by six and the number of distillate segregations* were increased by one, by about how much would your pipelines' capacity be decreased, if at all? (For example, the gasoline products pumped through your pipelines might increase from conventional gasoline grades to conventional gasoline grades plus OG plus RFG, and the distillate products might increase from one grade of diesel to two.)

(CIRCLE ONE NUMBER)

Anticipated Change in Pipeline Capacity:

No Decrease	1% to 10% Decrease	11% to 15% Decrease	16% to 20% Decrease	21% to 25% Decrease	More than 25% Decrease
1	2	3	4	5	6

5. IF, due to Clean Air Act Amendments (CAAA), the number of gasoline segregations* pumped through your pipelines were increased by three and the number of distillate segregations* were increased by one, by about how much would your pipelines' capacity be decreased, if at all?

(CIRCLE ONE NUMBER)

Anticipated Change in Pipeline Capacity:

No Decrease	1% to 10% Decrease	11% to 15% Decrease	16% to 20% Decrease	21% to 25% Decrease	More than 25% Decrease
1	2	3	4	5	6

*By "segregation," we mean any product that cannot be co-mingled with another product.

6. IF, due to the Clean Air Act Amendments (CAAA), the number of gasoline segregations* pumped through your pipelines were increased by six and the number of distillate segregations* were increased by one, by about how much would your pipelines' rates/tariffs be increased, if at all, in order to maintain current capacity?

(CIRCLE ONE NUMBER)

Anticipated Change in Pipeline Rates/Tariffs:

No Increase	1% to 10% Increase	11% to 15% Increase	16% to 20% Increase	21% to 25% Increase	More than 25% Increase
1	2	3	4	5	6

7. IF, due to the Clean Air Act Amendments (CAAA), the number of gasoline segregations* pumped through your pipelines were increased by three and the number of distillate segregations* were increased by one, by about how much would your pipelines' rates/tariffs be increased, if at all, in order to maintain current capacity?

(CIRCLE ONE NUMBER)

Anticipated Change in Pipeline Rates/Tariffs:

No Increase	1% to 10% Increase	11% to 15% Increase	16% to 20% Increase	21% to 25% Increase	More than 25% Increase
1	2	3	4	5	6

---

*By "segregation," we mean any product that cannot be co-mingled with another product.

8. a. By January 1, 1996, does your company plan to construct or expand any interregional pipeline facilities that will handle motor gasolines (including subgrades), distillate, or jet fuel? *(By "pipeline facilities," we mean pipelines, pumping stations, and pipeline-owned terminals.)*

Yes 1

No . . . . . 2 --> SKIP TO QUESTION 9

b. (IF "YES") Between which pairs of regions (as shown on map facing page VIII-1) do you anticipate building or expanding pipeline facilities, and about how many months do you expect will be required to obtain the necessary permits and right-of-way easements?

Will Construct or Expand Pipeline Facilities Here by 1996: From Region:	To Region:	Number of Months Required to Obtain Permits and Right-of-Way Easements
______	______	______
______	______	______
______	______	______
______	______	______
______	______	______
______	______	______

9. In 1995, what is the probability that your company will ship each of the following products in any of your pipelines that are shipping other products?

(CIRCLE ONE NUMBER FOR EACH PRODUCT)

	Probability		
	Less Than 10%	10% to 50%	More Than 50%
a. Alcohol-blended gasoline	1	2	3
b. Neat methanol	1	2	3
c. Neat ethanol	1	2	3

NATIONAL PETROLEUM COUNCIL
1991 SURVEY OF U.S. PETROLEUM REFINING INDUSTRY

SECTION IX. TANKER, BARGE, RAIL, AND TRUCK TRANSPORT COSTS

If you have questions or need more copies of the questionnaire, contact:

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FAX: (202) 331-8539
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INTRODUCTION

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The survey includes both existing and planned U.S. refineries, as follows:

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Overview of the Information Requested

The overall survey is divided into 10 sections, as outlined below. This is Section IX.

I. Perceptions of the impacts of regulatory requirements on the refinery's operations in 1995 and 2000.

II. Refinery facilities' capabilities and utilization, feedstocks, and product yields--actual 1990 data and as anticipated for 1995.

III. Refinery emission sources and controls.

IV. Economic impacts of environmental regulations on refineries--both historical and anticipated costs.

V. Distribution and transport modes of products from refineries among national regions--1990 and 1995.

VI. Expectations regarding the 1995 supply and distribution of oxygenates, corporate-wide.

VII. Various issues concerning terminals, including supply of product, capacity, and environmentally related costs.

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X. Foreign refinery and supply issues, including likely product specifications in other nations in 1995 and 2000.

A separate questionnaire on the supply and distribution of oxygenates is being sent to companies that blend oxygenates with petroleum products but do <u>not</u> produce petroleum products.

Purposes for the Information Requested

The NPC needs your company's responses to this questionnaire to help build an accurate picture of the current and anticipated future capability and flexibility of the nation's refining industry to supply its customers' needs. This information, aggregated across all respondents, will comprise a major component of the NPC's response to the Secretary of Energy. The aggregated survey results also will be used to validate industry models.

For use in the mathematical models, the survey results will be supplemented with aggregate 1990 operating data from the Department of Energy's Energy Information Administration reports and the judgments of the industry experts on the NPC study groups. Use of these three sources of information will help to ensure that the models provide valid representations of the industry and do not under- or over-state industry capability or flexibility.

The purpose of this section is to determine 1990 marine, rail, and truck costs and projected increases, especially due to anticipated environmental regulations.

INSTRUCTIONS AND DEFINITIONS

REPORT DATA ONLY ON THOSE LINES THAT ARE APPLICABLE TO YOUR OPERATION. IF THERE ARE NO DATA FOR A SPECIFIC LINE, LEAVE THE LINE BLANK; DO NOT ENTER ZERO.

NOTE: The abbreviations below refer to the way in which they are used in this section of the questionnaire.

$	U.S. dollars
%	Percent
ATRS	American Tanker Rate Schedule
MDWT	Thousand dead weight tons
MTBE	Methyl tertiary butyl ether
OPA	Oil Pollution Act of 1990

1. Using January 1, 1991, clean tanker capacity as a base, what additional tanker capital, one-time, and operating and maintenance costs will your company incur by January 1, 1996, for tankers that you own and operate for each of the following sizes of tankers as a result of anticipated environmental and process safety regulations? **EXPRESS THE ADDITIONAL COSTS AS POINTS OF THE 1991 RATE SCHEDULE.** *In developing your response, include costs for all tankers that your company will be using in 1996 that are due to the following:*

- *1990 Oil Pollution Act (OPA 90) (double hulls, crew work-time limits, financial responsibility, spill contingency).*
- *1990 Clean Air Act Amendments (marine vapor recovery and stack emissions).*
- *State environmental laws overriding federal laws affecting vessels.*

Tanker Size	Additional Costs Expressed as Points of the 1991 Rate Schedule
ATRS (U.S. Flag):	
a. Less than 30 MDWT	________
b. 30 - 40.0 MDWT	________
c. Greater than 40.0 MDWT	________
World-Scale (Foreign Flag):	
d. Less than 25 MDWT	________
e. 25 - 30.0 MDWT	________
f. 30.1 - 40.0 MDWT	________
g. Greater than 40.0 MDWT	________

2. For each of the illustrative pairs of cities listed below between which your company uses clean barges, enter the barge rates that you paid in 1990 and the approximate percentage increase in rates between 1990 and 1995 that you expect will occur because of OPA 90 and other environmental issues. *(Assume constant dollars.)*

Barge Transport of Clean Petroleum Products	1990 Barge Rates ($ Per Barrel):	Expected Percent Rate Increase 1990 through 1995 Due to Environmental Issues:
a. From New York to Boston	$______	______%
b. From New York to Port Everglades	$______	______%
c. From Louisville to Pittsburgh	$______	______%
d. From Houston to Pittsburgh	$______	______%
e. From Houston/Port Arthur to Louisville	$______	______%
f. From Houston to the Twin Cities	$______	______%
g. From Houston to Kansas City	$______	______%
h. From New Orleans to Peoria/Pekin (IL)	$______	______%
Barge Transport of Oxygenates		
i. From Clinton (IA) to Louisville	$______	______%
j. From Peoria/Pekin (IL) to Kansas City	$______	______%
k. From Peoria/Pekin (IL) to Houston	$______	______%

3. In 1990, what were your company's net rail costs, including both rail car costs (that is, leasing costs) and transport costs, to transport each of the listed kinds of product over the rail route most frequently used by your company for each type of product? About how long is each of these rail routes?

Product Transported	1990 Net Rail Costs for Most Frequently Used Rail Route	Distance of Route
a. Motor gasoline/distillate	_____ cents per gallon	________ miles
b. Oxygenates	_____ cents per gallon	________ miles

4. In 1990, what were your company's trucking costs to transport each of the listed kinds of product over the trucking route most frequently used by your company for each type of product? About how long is each of these trucking routes?

Product Transported	1990 Net Trucking Costs for Most Frequently Used Trucking Route	Distance of Route
a. Motor gasoline/distillate	_____ cents per gallon	________ miles
b. Oxygenates	_____ cents per gallon	________ miles

5. By approximately what percentage do you anticipate these trucking costs to increase between 1990 and 1995 as a result of anticipated environmental regulations?
(Assume constant dollars.)

Expected percentage increase in U.S. trucking costs
between 1990 and 1995, due to environmental regulations: _______%

N-147

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NATIONAL PETROLEUM COUNCIL
1991 SURVEY OF U.S. PETROLEUM REFINING INDUSTRY

SECTION X. FOREIGN REFINERY AND SUPPLY ISSUES

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SRI International will release the aggregated data to NPC study participants only when sufficient data are available to permit aggregation in a manner that would not disclose individual operations. Once the data have been aggregated, accepted by the NPC, and reported, all individual responses will be destroyed.

Overview of the Information Requested

The 1991 Survey of U.S. Petroleum Refiners consists of 10 sections. Sections I through IX deal with operations in the United States. This is Section X.

I. Perceptions of the impacts of regulatory requirements on a refinery's operations in 1995 and 2000.

II. Refinery facilities' capabilities and utilization, feedstocks, and product yields--actual 1990 data and as anticipated for 1995.

III. Refinery emission sources and controls.

IV. Economic impacts of environmental regulations on refineries--both historical and anticipated costs.

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X. Foreign refinery and supply issues, including likely product specifications in other nations in 1995 and 2000.

A separate questionnaire on the supply and distribution of oxygenates is being sent to companies that blend oxygenates with petroleum products but do not produce petroleum products.

Sections I through IX are being sent to companies with only U.S. refining and/or logistics operations. Section X is being sent to all companies that maintain an office in the U.S. and have international refining, marketing, and/or cargo trading activities.

Purposes for the Information Requested

The NPC needs your company's responses to this questionnaire to help build an accurate picture of the industry's anticipated future capability and flexibility to supply the oil product requirements of the U.S. This information, aggregated across all respondents, will comprise a component of the NPC's response to the U.S. Secretary of Energy. Questions relating to future product quality are intended to assess the similarity of U.S. and other country fuel specifications. The more stringent levels of the ranges shown are typical of levels that could potentially apply in the U.S.

The survey results will be supplemented with data from the U.S. Department of Energy's Energy Information Administration reports and the judgments of the industry experts on the NPC study groups. Use of these three sources of information will help to ensure that there is a valid representation of the international industry without under- or over-stating industry capability or flexibility.

DEFINITIONS

Reformulated gasoline (RFG) = Finished gasoline formulated to meet requirements in ozone non-attainment areas in the U.S.A. Critical qualities are:

	April 1-September 30	October 1-March 31
RVP, psi max.		
Northeast U.S.A.*	8	11.5
Other U.S.A.	7	11.5

	Year Round
Benzene, vol. % max.	1.0
Oxygen, wt. % min.	2.0
Aromatics, vol. % max.	25.0
Heavy metals, max. grams/USG	0.05**
Sulfur, ppm typical	340
ASTM 90% distillation point, °F typical	330
Olefins, vol. % typical	10

Survey Acronyms and Abbreviations

NOTE: The abbreviations below refer to the way in which they are used in this section of the questionnaire.

%	Percent
#	Number
°API	API gravity in degrees at 60°F
°C	Degree Centigrade
°F	Degree Fahrenheit
ASTM	American Society for Testing Materials
Cat.	Catalytic
CO	Carbon monoxide
FCCU	Fluid catalytic cracker unit
MB/CD	Thousand barrels per calendar day
PPM	Parts per million
PSI	Pounds per square inch
(R+M)/2	Road octane number
RVP	Reid vapor pressure, psi
S	Sulfur
USG	U.S. gallon
Vol.	Volume
Wt.	Weight

*Product delivered to New York, Philadelphia, or Boston harbors.
**No heavy metals to be added to gasoline.

SECTION X. FOREIGN REFINERY AND SUPPLY ISSUES

IMPORTANT: Answer the following questions <u>only</u> for those countries for which your company has sufficient information as a result of refining or marketing operations or product cargo sales/purchases. For each question, provide your assessment for the country as a whole--<u>not</u> for just your affiliate.

1. What is the <u>most likely</u> motor gasoline situation in each country in <u>1995</u>?

   (RESPOND TO EACH OF THE FOUR QUESTIONS FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/PURCHASES)

	Anticipated Situation in 1995:						
	Maximum Lead Content in Leaded Gasoline (Grams Per Liter):			Approximate % of Domestic Motor Gasoline Pool That Will Be Unleaded	Average Pool Octane Level (R+M)/2	Will Manganese Be Allowed in Unleaded Motor Gasoline?	
	0.150 or Below	0.151 - 0.40	Above 0.40			Yes	No
a. North Europe							
(1) France	1	2	3	____%	______	1	2
(2) Germany	1	2	3	____%	______	1	2
(3) Netherlands	1	2	3	____%	______	1	2
(4) Norway	1	2	3	____%	______	1	2
(5) Sweden	1	2	3	____%	______	1	2
(6) U.K.	1	2	3	____%	______	1	2
b. Mediterranean							
(1) Greece	1	2	3	____%	______	1	2
(2) Italy	1	2	3	____%	______	1	2
(3) Spain	1	2	3	____%	______	1	2
c. Middle East							
(1) Bahrain	1	2	3	____%	______	1	2
(2) Saudi Arabia	1	2	3	____%	______	1	2
(3) U.A.E.	1	2	3	____%	______	1	2
d. Far East							
(1) Australia	1	2	3	____%	______	1	2
(2) China	1	2	3	____%	______	1	2
(3) India	1	2	3	____%	______	1	2
(4) Indonesia	1	2	3	____%	______	1	2
(5) Japan	1	2	3	____%	______	1	2
(6) Malaysia	1	2	3	____%	______	1	2
(7) Singapore	1	2	3	____%	______	1	2
(8) South Korea	1	2	3	____%	______	1	2
(9) Taiwan	1	2	3	____%	______	1	2
(10) Thailand	1	2	3	____%	______	1	2
e. Canada	1	2	3	____%	______	1	2
f. Other non-U.S. Western Hemisphere							
(1) Argentina	1	2	3	____%	______	1	2
(2) Brazil	1	2	3	____%	______	1	2
(3) Caribbean	1	2	3	____%	______	1	2
(4) Chile	1	2	3	____%	______	1	2
(5) Mexico	1	2	3	____%	______	1	2
(6) Venezuela	1	2	3	____%	______	1	2

2. What is the most likely motor gasoline situation in each country in 2000?

(RESPOND TO EACH OF THE FOUR QUESTIONS FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/PURCHASES)

	Anticipated Situation in 2000:						
	Maximum Lead Content in Leaded Gasoline (Grams Per Liter):			Approximate % of Domestic Motor Gasoline Pool That Will Be Unleaded	Average Pool Octane Level (R+M)/2	Will Manganese Be Allowed in Unleaded Motor Gasoline?	
	0.150 or Below	0.151 - 0.40	Above 0.40			Yes	No
a. North Europe							
(1) France	1	2	3	______%	______	1	2
(2) Germany	1	2	3	______%	______	1	2
(3) Netherlands	1	2	3	______%	______	1	2
(4) Norway	1	2	3	______%	______	1	2
(5) Sweden	1	2	3	______%	______	1	2
(6) U.K.	1	2	3	______%	______	1	2
b. Mediterranean							
(1) Greece	1	2	3	______%	______	1	2
(2) Italy	1	2	3	______%	______	1	2
(3) Spain	1	2	3	______%	______	1	2
c. Middle East							
(1) Bahrain	1	2	3	______%	______	1	2
(2) Saudi Arabia	1	2	3	______%	______	1	2
(3) U.A.E.	1	2	3	______%	______	1	2
d. Far East							
(1) Australia	1	2	3	______%	______	1	2
(2) China	1	2	3	______%	______	1	2
(3) India	1	2	3	______%	______	1	2
(4) Indonesia	1	2	3	______%	______	1	2
(5) Japan	1	2	3	______%	______	1	2
(6) Malaysia	1	2	3	______%	______	1	2
(7) Singapore	1	2	3	______%	______	1	2
(8) South Korea	1	2	3	______%	______	1	2
(9) Taiwan	1	2	3	______%	______	1	2
(10) Thailand	1	2	3	______%	______	1	2
e. Canada	1	2	3	______%	______	1	2
f. Other non-U.S. Western Hemisphere							
(1) Argentina	1	2	3	______%	______	1	2
(2) Brazil	1	2	3	______%	______	1	2
(3) Caribbean	1	2	3	______%	______	1	2
(4) Chile	1	2	3	______%	______	1	2
(5) Mexico	1	2	3	______%	______	1	2
(6) Venezuela	1	2	3	______%	______	1	2

3. What is the most likely maximum allowed volume percent benzene for the year-round pool average of motor gasoline in each country in 1995?

(CIRCLE ONE NUMBER FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/PURCHASES)

	Likely Maximum Allowed Volume Percent Benzene in 1995:			
	1.00% or Below	1.01% - 2.00%	2.01% - 5.0%	No Requirement
a. **North Europe**				
(1) France	1	2	3	0
(2) Germany	1	2	3	0
(3) Netherlands	1	2	3	0
(4) Norway	1	2	3	0
(5) Sweden	1	2	3	0
(6) U.K.	1	2	3	0
b. **Mediterranean**				
(1) Greece	1	2	3	0
(2) Italy	1	2	3	0
(3) Spain	1	2	3	0
c. **Middle East**				
(1) Bahrain	1	2	3	0
(2) Saudi Arabia	1	2	3	0
(3) U.A.E.	1	2	3	0
d. **Far East**				
(1) Australia	1	2	3	0
(2) China	1	2	3	0
(3) India	1	2	3	0
(4) Indonesia	1	2	3	0
(5) Japan	1	2	3	0
(6) Malaysia	1	2	3	0
(7) Singapore	1	2	3	0
(8) South Korea	1	2	3	0
(9) Taiwan	1	2	3	0
(10) Thailand	1	2	3	0
e. **Canada**	1	2	3	0
f. **Other non-U.S. Western Hemisphere**				
(1) Argentina	1	2	3	0
(2) Brazil	1	2	3	0
(3) Caribbean	1	2	3	0
(4) Chile	1	2	3	0
(5) Mexico	1	2	3	0
(6) Venezuela	1	2	3	0

4. What is the most likely maximum allowed volume percent benzene for the year-round pool average of motor gasoline in each country in 2000?

(CIRCLE ONE NUMBER FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/PURCHASES)

	Likely Maximum Allowed Volume Percent Benzene in 2000:			
	1.00% or Below	1.01% - 2.00%	2.01% - 5.0%	No Requirement
a. **North Europe**				
(1) France	1	2	3	0
(2) Germany	1	2	3	0
(3) Netherlands	1	2	3	0
(4) Norway	1	2	3	0
(5) Sweden	1	2	3	0
(6) U.K.	1	2	3	0
b. **Mediterranean**				
(1) Greece	1	2	3	0
(2) Italy	1	2	3	0
(3) Spain	1	2	3	0
c. **Middle East**				
(1) Bahrain	1	2	3	0
(2) Saudi Arabia	1	2	3	0
(3) U.A.E.	1	2	3	0
d. **Far East**				
(1) Australia	1	2	3	0
(2) China	1	2	3	0
(3) India	1	2	3	0
(4) Indonesia	1	2	3	0
(5) Japan	1	2	3	0
(6) Malaysia	1	2	3	0
(7) Singapore	1	2	3	0
(8) South Korea	1	2	3	0
(9) Taiwan	1	2	3	0
(10) Thailand	1	2	3	0
e. **Canada**	1	2	3	0
f. **Other non-U.S. Western Hemisphere**				
(1) Argentina	1	2	3	0
(2) Brazil	1	2	3	0
(3) Caribbean	1	2	3	0
(4) Chile	1	2	3	0
(5) Mexico	1	2	3	0
(6) Venezuela	1	2	3	0

5. What is the <u>most likely</u> maximum allowed volume percent total aromatics for the year-round pool average of motor gasoline in each country in <u>1995</u>?

(CIRCLE ONE NUMBER FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/PURCHASES)

	Likely Maximum Allowed Total Aromatics Volume Percent in 1995:			
	25.0% or Below	25.1% - 35.0%	Above 35.0%	No Requirement
a. **North Europe**				
(1) France	1	2	3	0
(2) Germany	1	2	3	0
(3) Netherlands	1	2	3	0
(4) Norway	1	2	3	0
(5) Sweden	1	2	3	0
(6) U.K.	1	2	3	0
b. **Mediterranean**				
(1) Greece	1	2	3	0
(2) Italy	1	2	3	0
(3) Spain	1	2	3	0
c. **Middle East**				
(1) Bahrain	1	2	3	0
(2) Saudi Arabia	1	2	3	0
(3) U.A.E.	1	2	3	0
d. **Far East**				
(1) Australia	1	2	3	0
(2) China	1	2	3	0
(3) India	1	2	3	0
(4) Indonesia	1	2	3	0
(5) Japan	1	2	3	0
(6) Malaysia	1	2	3	0
(7) Singapore	1	2	3	0
(8) South Korea	1	2	3	0
(9) Taiwan	1	2	3	0
(10) Thailand	1	2	3	0
e. **Canada**	1	2	3	0
f. **Other non-U.S. Western Hemisphere**				
(1) Argentina	1	2	3	0
(2) Brazil	1	2	3	0
(3) Caribbean	1	2	3	0
(4) Chile	1	2	3	0
(5) Mexico	1	2	3	0
(6) Venezuela	1	2	3	0

6. What is the <u>most likely</u> maximum allowed volume percent total aromatics for the year-round pool average of motor gasoline in each country in <u>2000</u>?

(CIRCLE ONE NUMBER FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/PURCHASES)

	Likely Maximum Allowed Total Aromatics Volume Percent in 2000:			
	25.0% or Below	25.1% - 35.0%	Above 35.0%	No Requirement
a. **North Europe**				
(1) France	1	2	3	0
(2) Germany	1	2	3	0
(3) Netherlands	1	2	3	0
(4) Norway	1	2	3	0
(5) Sweden	1	2	3	0
(6) U.K.	1	2	3	0
b. **Mediterranean**				
(1) Greece	1	2	3	0
(2) Italy	1	2	3	0
(3) Spain	1	2	3	0
c. **Middle East**				
(1) Bahrain	1	2	3	0
(2) Saudi Arabia	1	2	3	0
(3) U.A.E.	1	2	3	0
d. **Far East**				
(1) Australia	1	2	3	0
(2) China	1	2	3	0
(3) India	1	2	3	0
(4) Indonesia	1	2	3	0
(5) Japan	1	2	3	0
(6) Malaysia	1	2	3	0
(7) Singapore	1	2	3	0
(8) South Korea	1	2	3	0
(9) Taiwan	1	2	3	0
(10) Thailand	1	2	3	0
e. **Canada**	1	2	3	0
f. **Other non-U.S. Western Hemisphere**				
(1) Argentina	1	2	3	0
(2) Brazil	1	2	3	0
(3) Caribbean	1	2	3	0
(4) Chile	1	2	3	0
(5) Mexico	1	2	3	0
(6) Venezuela	1	2	3	0

7. What is the <u>most likely</u> maximum allowed RVP for the year-round pool average of motor gasoline in each country in <u>1995</u>?

(CIRCLE ONE NUMBER FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/PURCHASES)

	Likely Maximum Allowed RVP in 1995:			
	9.0 psi or Below	9.1 - 11.0 psi	Above 11.0 psi	No Requirement
a. **North Europe**				
(1) France	1	2	3	0
(2) Germany	1	2	3	0
(3) Netherlands	1	2	3	0
(4) Norway	1	2	3	0
(5) Sweden	1	2	3	0
(6) U.K.	1	2	3	0
b. **Mediterranean**				
(1) Greece	1	2	3	0
(2) Italy	1	2	3	0
(3) Spain	1	2	3	0
c. **Middle East**				
(1) Bahrain	1	2	3	0
(2) Saudi Arabia	1	2	3	0
(3) U.A.E.	1	2	3	0
d. **Far East**				
(1) Australia	1	2	3	0
(2) China	1	2	3	0
(3) India	1	2	3	0
(4) Indonesia	1	2	3	0
(5) Japan	1	2	3	0
(6) Malaysia	1	2	3	0
(7) Singapore	1	2	3	0
(8) South Korea	1	2	3	0
(9) Taiwan	1	2	3	0
(10) Thailand	1	2	3	0
e. **Canada**	1	2	3	0
f. **Other non-U.S. Western Hemisphere**				
(1) Argentina	1	2	3	0
(2) Brazil	1	2	3	0
(3) Caribbean	1	2	3	0
(4) Chile	1	2	3	0
(5) Mexico	1	2	3	0
(6) Venezuela	1	2	3	0

8. What is the <u>most likely</u> maximum allowed RVP for the year-round pool average of motor gasoline in each country in <u>2000</u>?

(CIRCLE ONE NUMBER FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/PURCHASES)

	Likely Maximum Allowed RVP in 2000:			
	9.0 psi or Below	9.1 - 11.0 psi	Above 11.0 psi	No Requirement
a. North Europe				
(1) France	1	2	3	0
(2) Germany	1	2	3	0
(3) Netherlands	1	2	3	0
(4) Norway	1	2	3	0
(5) Sweden	1	2	3	0
(6) U.K.	1	2	3	0
b. Mediterranean				
(1) Greece	1	2	3	0
(2) Italy	1	2	3	0
(3) Spain	1	2	3	0
c. Middle East				
(1) Bahrain	1	2	3	0
(2) Saudi Arabia	1	2	3	0
(3) U.A.E.	1	2	3	0
d. Far East				
(1) Australia	1	2	3	0
(2) China	1	2	3	0
(3) India	1	2	3	0
(4) Indonesia	1	2	3	0
(5) Japan	1	2	3	0
(6) Malaysia	1	2	3	0
(7) Singapore	1	2	3	0
(8) South Korea	1	2	3	0
(9) Taiwan	1	2	3	0
(10) Thailand	1	2	3	0
e. Canada	1	2	3	0
f. Other non-U.S. Western Hemisphere				
(1) Argentina	1	2	3	0
(2) Brazil	1	2	3	0
(3) Caribbean	1	2	3	0
(4) Chile	1	2	3	0
(5) Mexico	1	2	3	0
(6) Venezuela	1	2	3	0

9. What is the <u>most likely</u> minimum required weight percent oxygen content for the year-round pool average of motor gasoline in each country in <u>1995</u>?

(CIRCLE ONE NUMBER FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/PURCHASES)

	Likely Minimum Required Weight Percent Oxygen Content in 1995:			
	1.00% or Below	1.01% - 2.00%	Above 2.00%	No Requirement
a. **North Europe**				
(1) France	1	2	3	0
(2) Germany	1	2	3	0
(3) Netherlands	1	2	3	0
(4) Norway	1	2	3	0
(5) Sweden	1	2	3	0
(6) U.K.	1	2	3	0
b. **Mediterranean**				
(1) Greece	1	2	3	0
(2) Italy	1	2	3	0
(3) Spain	1	2	3	0
c. **Middle East**				
(1) Bahrain	1	2	3	0
(2) Saudi Arabia	1	2	3	0
(3) U.A.E.	1	2	3	0
d. **Far East**				
(1) Australia	1	2	3	0
(2) China	1	2	3	0
(3) India	1	2	3	0
(4) Indonesia	1	2	3	0
(5) Japan	1	2	3	0
(6) Malaysia	1	2	3	0
(7) Singapore	1	2	3	0
(8) South Korea	1	2	3	0
(9) Taiwan	1	2	3	0
(10) Thailand	1	2	3	0
e. **Canada**	1	2	3	0
f. **Other non-U.S. Western Hemisphere**				
(1) Argentina	1	2	3	0
(2) Brazil	1	2	3	0
(3) Caribbean	1	2	3	0
(4) Chile	1	2	3	0
(5) Mexico	1	2	3	0
(6) Venezuela	1	2	3	0

10. What is the most likely minimum required weight percent oxygen content for the year-round pool average of motor gasoline in each country in 2000?

(CIRCLE ONE NUMBER FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/PURCHASES)

	Likely Minimum Required Weight Percent Oxygen Content in 2000:			
	1.00% or Below	1.01% - 2.00%	Above 2.00%	No Requirement
a. **North Europe**				
(1) France	1	2	3	0
(2) Germany	1	2	3	0
(3) Netherlands	1	2	3	0
(4) Norway	1	2	3	0
(5) Sweden	1	2	3	0
(6) U.K.	1	2	3	0
b. **Mediterranean**				
(1) Greece	1	2	3	0
(2) Italy	1	2	3	0
(3) Spain	1	2	3	0
c. **Middle East**				
(1) Bahrain	1	2	3	0
(2) Saudi Arabia	1	2	3	0
(3) U.A.E.	1	2	3	0
d. **Far East**				
(1) Australia	1	2	3	0
(2) China	1	2	3	0
(3) India	1	2	3	0
(4) Indonesia	1	2	3	0
(5) Japan	1	2	3	0
(6) Malaysia	1	2	3	0
(7) Singapore	1	2	3	0
(8) South Korea	1	2	3	0
(9) Taiwan	1	2	3	0
(10) Thailand	1	2	3	0
e. **Canada**	1	2	3	0
f. **Other non-U.S. Western Hemisphere**				
(1) Argentina	1	2	3	0
(2) Brazil	1	2	3	0
(3) Caribbean	1	2	3	0
(4) Chile	1	2	3	0
(5) Mexico	1	2	3	0
(6) Venezuela	1	2	3	0

11. What is the most likely oxygenate compound that will be used in motor gasoline in each country in 1995?

(CIRCLE ONE NUMBER FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/PURCHASES)

	Most Likely Oxygenate Compound in 1995:			
	Ethers	Ethanol	Other Alcohols	None
a. **North Europe**				
(1) France	1	2	3	0
(2) Germany	1	2	3	0
(3) Netherlands	1	2	3	0
(4) Norway	1	2	3	0
(5) Sweden	1	2	3	0
(6) U.K.	1	2	3	0
b. **Mediterranean**				
(1) Greece	1	2	3	0
(2) Italy	1	2	3	0
(3) Spain	1	2	3	0
c. **Middle East**				
(1) Bahrain	1	2	3	0
(2) Saudi Arabia	1	2	3	0
(3) U.A.E.	1	2	3	0
d. **Far East**				
(1) Australia	1	2	3	0
(2) China	1	2	3	0
(3) India	1	2	3	0
(4) Indonesia	1	2	3	0
(5) Japan	1	2	3	0
(6) Malaysia	1	2	3	0
(7) Singapore	1	2	3	0
(8) South Korea	1	2	3	0
(9) Taiwan	1	2	3	0
(10) Thailand	1	2	3	0
e. **Canada**	1	2	3	0
f. **Other non-U.S. Western Hemisphere**				
(1) Argentina	1	2	3	0
(2) Brazil	1	2	3	0
(3) Caribbean	1	2	3	0
(4) Chile	1	2	3	0
(5) Mexico	1	2	3	0
(6) Venezuela	1	2	3	0

12. What is the most likely oxygenate compound that will be used in motor gasoline in each country in 2000?

(CIRCLE ONE NUMBER FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/PURCHASES)

	Most Likely Oxygenate Compound in 2000:			
	Ethers	Ethanol	Other Alcohols	None
a. **North Europe**				
(1) France	1	2	3	0
(2) Germany	1	2	3	0
(3) Netherlands	1	2	3	0
(4) Norway	1	2	3	0
(5) Sweden	1	2	3	0
(6) U.K.	1	2	3	0
b. **Mediterranean**				
(1) Greece	1	2	3	0
(2) Italy	1	2	3	0
(3) Spain	1	2	3	0
c. **Middle East**				
(1) Bahrain	1	2	3	0
(2) Saudi Arabia	1	2	3	0
(3) U.A.E.	1	2	3	0
d. **Far East**				
(1) Australia	1	2	3	0
(2) China	1	2	3	0
(3) India	1	2	3	0
(4) Indonesia	1	2	3	0
(5) Japan	1	2	3	0
(6) Malaysia	1	2	3	0
(7) Singapore	1	2	3	0
(8) South Korea	1	2	3	0
(9) Taiwan	1	2	3	0
(10) Thailand	1	2	3	0
e. **Canada**	1	2	3	0
f. **Other non-U.S. Western Hemisphere**				
(1) Argentina	1	2	3	0
(2) Brazil	1	2	3	0
(3) Caribbean	1	2	3	0
(4) Chile	1	2	3	0
(5) Mexico	1	2	3	0
(6) Venezuela	1	2	3	0

13. What was the **average sulfur content** in parts per million (PPM) for the year-round pool of motor gasoline in each country in 1989?

	Average Sulfur Content (PPM) in 1989
a. **North Europe**	
(1) France	______
(2) Germany	______
(3) Netherlands	______
(4) Norway	______
(5) Sweden	______
(6) U.K.	______
b. **Mediterranean**	
(1) Greece	______
(2) Italy	______
(3) Spain	______
c. **Middle East**	
(1) Bahrain	______
(2) Saudi Arabia	______
(3) U.A.E.	______
d. **Far East**	
(1) Australia	______
(2) China	______
(3) India	______
(4) Indonesia	______
(5) Japan	______
(6) Malaysia	______
(7) Singapore	______
(8) South Korea	______
(9) Taiwan	______
(10) Thailand	______
e. **Canada**	______
f. **Other non-U.S. Western Hemisphere**	
(1) Argentina	______
(2) Brazil	______
(3) Caribbean	______
(4) Chile	______
(5) Mexico	______
(6) Venezuela	______

14. What is the <u>most likely</u> maximum allowed parts per million (PPM) sulfur content for the year-round pool average of motor gasoline in each country in <u>2000</u>?

(CIRCLE ONE NUMBER FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/PURCHASES)

	Likely Maximum Allowed Sulfur Content (PPM) in 2000:				
	50 or Less	51-250	251-500	501 or More	No Requirement
a. **North Europe**					
(1) France	1	2	3	4	0
(2) Germany	1	2	3	4	0
(3) Netherlands	1	2	3	4	0
(4) Norway	1	2	3	4	0
(5) Sweden	1	2	3	4	0
(6) U.K.	1	2	3	4	0
b. **Mediterranean**					
(1) Greece	1	2	3	4	0
(2) Italy	1	2	3	4	0
(3) Spain	1	2	3	4	0
c. **Middle East**					
(1) Bahrain	1	2	3	4	0
(2) Saudi Arabia	1	2	3	4	0
(3) U.A.E.	1	2	3	4	0
d. **Far East**					
(1) Australia	1	2	3	4	0
(2) China	1	2	3	4	0
(3) India	1	2	3	4	0
(4) Indonesia	1	2	3	4	0
(5) Japan	1	2	3	4	0
(6) Malaysia	1	2	3	4	0
(7) Singapore	1	2	3	4	0
(8) South Korea	1	2	3	4	0
(9) Taiwan	1	2	3	4	0
(10) Thailand	1	2	3	4	0
e. **Canada**	1	2	3	4	0
f. **Other non-U.S. Western Hemisphere**					
(1) Argentina	1	2	3	4	0
(2) Brazil	1	2	3	4	0
(3) Caribbean	1	2	3	4	0
(4) Chile	1	2	3	4	0
(5) Mexico	1	2	3	4	0
(6) Venezuela	1	2	3	4	0

15. What was the average volume percent olefins content for the year-round pool of motor gasoline in each country in <u>1989</u>?

	Average Olefins Content (Vol. %) in 1989
a. **North Europe**	
(1) France	________
(2) Germany	________
(3) Netherlands	________
(4) Norway	________
(5) Sweden	________
(6) U.K.	________
b. **Mediterranean**	
(1) Greece	________
(2) Italy	________
(3) Spain	________
c. **Middle East**	
(1) Bahrain	________
(2) Saudi Arabia	________
(3) U.A.E.	________
d. **Far East**	
(1) Australia	________
(2) China	________
(3) India	________
(4) Indonesia	________
(5) Japan	________
(6) Malaysia	________
(7) Singapore	________
(8) South Korea	________
(9) Taiwan	________
(10) Thailand	________
e. **Canada**	________
f. **Other non-U.S. Western Hemisphere**	
(1) Argentina	________
(2) Brazil	________
(3) Caribbean	________
(4) Chile	________
(5) Mexico	________
(6) Venezuela	________

16. What is the most likely maximum allowed volume percent olefins content for the year-round pool average of motor gasoline in each country in 2000?

(CIRCLE ONE NUMBER FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/PURCHASES)

	Likely Maximum Allowed Olefins Content (Vol. %) in 2000:			
	5 or Less	6 to 10	11 to 15	No Requirement
a. **North Europe**				
(1) France	1	2	3	0
(2) Germany	1	2	3	0
(3) Netherlands	1	2	3	0
(4) Norway	1	2	3	0
(5) Sweden	1	2	3	0
(6) U.K.	1	2	3	0
b. **Mediterranean**				
(1) Greece	1	2	3	0
(2) Italy	1	2	3	0
(3) Spain	1	2	3	0
c. **Middle East**				
(1) Bahrain	1	2	3	0
(2) Saudi Arabia	1	2	3	0
(3) U.A.E.	1	2	3	0
d. **Far East**				
(1) Australia	1	2	3	0
(2) China	1	2	3	0
(3) India	1	2	3	0
(4) Indonesia	1	2	3	0
(5) Japan	1	2	3	0
(6) Malaysia	1	2	3	0
(7) Singapore	1	2	3	0
(8) South Korea	1	2	3	0
(9) Taiwan	1	2	3	0
(10) Thailand	1	2	3	0
e. **Canada**	1	2	3	0
f. **Other non-U.S. Western Hemisphere**				
(1) Argentina	1	2	3	0
(2) Brazil	1	2	3	0
(3) Caribbean	1	2	3	0
(4) Chile	1	2	3	0
(5) Mexico	1	2	3	0
(6) Venezuela	1	2	3	0

17. What was the average 90% distillation point (°C) for the year-round pool of motor gasoline in each country in 1989?

	Average 90% Distillation Point (°C) in 1989
a. **North Europe**	
(1) France	________
(2) Germany	________
(3) Netherlands	________
(4) Norway	________
(5) Sweden	________
(6) U.K.	________
b. **Mediterranean**	
(1) Greece	________
(2) Italy	________
(3) Spain	________
c. **Middle East**	
(1) Bahrain	________
(2) Saudi Arabia	________
(3) U.A.E.	________
d. **Far East**	
(1) Australia	________
(2) China	________
(3) India	________
(4) Indonesia	________
(5) Japan	________
(6) Malaysia	________
(7) Singapore	________
(8) South Korea	________
(9) Taiwan	________
(10) Thailand	________
e. **Canada**	________
f. **Other non-U.S. Western Hemisphere**	
(1) Argentina	________
(2) Brazil	________
(3) Caribbean	________
(4) Chile	________
(5) Mexico	________
(6) Venezuela	________

18. What is the most likely maximum allowed 90% distillation point (°C) for the year-round pool average of motor gasoline in each country in 2000?

(CIRCLE ONE NUMBER FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/PURCHASES)

	Likely Maximum Allowed 90% Distillation Point (°C) in 2000:				
	135 or Less (275°F)	136-149 (276-300°F)	150-163 (301-325°F)	164-177 (326-350°F)	No Requirement
a. **North Europe**					
(1) France	1	2	3	4	0
(2) Germany	1	2	3	4	0
(3) Netherlands	1	2	3	4	0
(4) Norway	1	2	3	4	0
(5) Sweden	1	2	3	4	0
(6) U.K.	1	2	3	4	0
b. **Mediterranean**					
(1) Greece	1	2	3	4	0
(2) Italy	1	2	3	4	0
(3) Spain	1	2	3	4	0
c. **Middle East**					
(1) Bahrain	1	2	3	4	0
(2) Saudi Arabia	1	2	3	4	0
(3) U.A.E.	1	2	3	4	0
d. **Far East**					
(1) Australia	1	2	3	4	0
(2) China	1	2	3	4	0
(3) India	1	2	3	4	0
(4) Indonesia	1	2	3	4	0
(5) Japan	1	2	3	4	0
(6) Malaysia	1	2	3	4	0
(7) Singapore	1	2	3	4	0
(8) South Korea	1	2	3	4	0
(9) Taiwan	1	2	3	4	0
(10) Thailand	1	2	3	4	0
e. **Canada**	1	2	3	4	0
f. **Other non-U.S. Western Hemisphere**					
(1) Argentina	1	2	3	4	0
(2) Brazil	1	2	3	4	0
(3) Caribbean	1	2	3	4	0
(4) Chile	1	2	3	4	0
(5) Mexico	1	2	3	4	0
(6) Venezuela	1	2	3	4	0

19. Of the total amount of **diesel fuel** (<u>ex</u>**cluding marine diesel and home heating oil)** that you anticipate will be sold in each country in <u>1995</u>, about what percentages will have the sulfur content specified in the column headings?

(ENTER ANTICIPATED PERCENTAGES OF SALES FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/ PURCHASES; **NOTE THAT THE PERCENTAGES ENTERED IN EACH ROW SHOULD SUM TO 100%)**

	Likely Percentages of Sales in 1995 with Sulfur Content of:				
	0.050% or Below	0.051% to 0.20%	0.21% to 0.30%	0.31% to 0.50%	Above 0.50%
a. **North Europe**					
(1) France	____%	____%	____%	____%	____%
(2) Germany					
(3) Netherlands					
(4) Norway					
(5) Sweden					
(6) U.K.					
b. **Mediterranean**					
(1) Greece					
(2) Italy					
(3) Spain					
c. **Middle East**					
(1) Bahrain					
(2) Saudi Arabia					
(3) U.A.E.					
d. **Far East**					
(1) Australia					
(2) China					
(3) India					
(4) Indonesia					
(5) Japan					
(6) Malaysia					
(7) Singapore					
(8) South Korea					
(9) Taiwan					
(10) Thailand					
e. **Canada**					
f. **Other non-U.S. Western Hemisphere**					
(1) Argentina					
(2) Brazil					
(3) Caribbean					
(4) Chile					
(5) Mexico					
(6) Venezuela					

20. Of the total amount of **diesel fuel** (<u>ex</u>cluding **marine diesel and home heating oil**) that you anticipate will be sold in each country in <u>2000</u>, about what percentages will have the sulfur content specified in the column headings?

(ENTER ANTICIPATED PERCENTAGES OF SALES FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/ PURCHASES; **NOTE THAT THE PERCENTAGES ENTERED IN EACH ROW SHOULD SUM TO 100%**)

	Likely Percentages of Sales in 2000 with Sulfur Content of:				
	0.050% or Below	0.051% to 0.20%	0.21% to 0.30%	0.31% to 0.50%	Above 0.50%
a. **North Europe**					
(1) France	______%	______%	______%	______%	______%
(2) Germany	______	______	______	______	______
(3) Netherlands	______	______	______	______	______
(4) Norway	______	______	______	______	______
(5) Sweden	______	______	______	______	______
(6) U.K.	______	______	______	______	______
b. **Mediterranean**					
(1) Greece	______	______	______	______	______
(2) Italy	______	______	______	______	______
(3) Spain	______	______	______	______	______
c. **Middle East**					
(1) Bahrain	______	______	______	______	______
(2) Saudi Arabia	______	______	______	______	______
(3) U.A.E.	______	______	______	______	______
d. **Far East**					
(1) Australia	______	______	______	______	______
(2) China	______	______	______	______	______
(3) India	______	______	______	______	______
(4) Indonesia	______	______	______	______	______
(5) Japan	______	______	______	______	______
(6) Malaysia	______	______	______	______	______
(7) Singapore	______	______	______	______	______
(8) South Korea	______	______	______	______	______
(9) Taiwan	______	______	______	______	______
(10) Thailand	______	______	______	______	______
e. **Canada**	______	______	______	______	______
f. **Other non-U.S. Western Hemisphere**					
(1) Argentina	______	______	______	______	______
(2) Brazil	______	______	______	______	______
(3) Caribbean	______	______	______	______	______
(4) Chile	______	______	______	______	______
(5) Mexico	______	______	______	______	______
(6) Venezuela	______	______	______	______	______

21. What was the average aromatics content (volume %) and/or cetane index of the diesel fuel (excluding marine diesel and home heating oil) for the year-round pool in each country in 1989?

Average Diesel Aromatics Content in 1989

	Vol. %	Cetane Index
a. **North Europe**		
(1) France	______	______
(2) Germany	______	______
(3) Netherlands	______	______
(4) Norway	______	______
(5) Sweden	______	______
(6) U.K.	______	______
b. **Mediterranean**		
(1) Greece	______	______
(2) Italy	______	______
(3) Spain	______	______
c. **Middle East**		
(1) Bahrain	______	______
(2) Saudi Arabia	______	______
(3) U.A.E.	______	______
d. **Far East**		
(1) Australia	______	______
(2) China	______	______
(3) India	______	______
(4) Indonesia	______	______
(5) Japan	______	______
(6) Malaysia	______	______
(7) Singapore	______	______
(8) South Korea	______	______
(9) Taiwan	______	______
(10) Thailand	______	______
e. **Canada**	______	______
f. **Other non-U.S. Western Hemisphere**		
(1) Argentina	______	______
(2) Brazil	______	______
(3) Caribbean	______	______
(4) Chile	______	______
(5) Mexico	______	______
(6) Venezuela	______	______

22. What is the most likely maximum allowed diesel aromatics content (volume %) (excluding marine diesel and home heating oil) for the year-round pool average in each country in 2000?

(CIRCLE ONE NUMBER FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/PURCHASES)

	Likely Maximum Allowed Diesel Aromatics Content (Vol. %) in 2000:				
	10 or Less	11 to 20	21 to 30	31 to 40	No Requirement
a. North Europe					
(1) France	1	2	3	4	0
(2) Germany	1	2	3	4	0
(3) Netherlands	1	2	3	4	0
(4) Norway	1	2	3	4	0
(5) Sweden	1	2	3	4	0
(6) U.K.	1	2	3	4	0
b. Mediterranean					
(1) Greece	1	2	3	4	0
(2) Italy	1	2	3	4	0
(3) Spain	1	2	3	4	0
c. Middle East					
(1) Bahrain	1	2	3	4	0
(2) Saudi Arabia	1	2	3	4	0
(3) U.A.E.	1	2	3	4	0
d. Far East					
(1) Australia	1	2	3	4	0
(2) China	1	2	3	4	0
(3) India	1	2	3	4	0
(4) Indonesia	1	2	3	4	0
(5) Japan	1	2	3	4	0
(6) Malaysia	1	2	3	4	0
(7) Singapore	1	2	3	4	0
(8) South Korea	1	2	3	4	0
(9) Taiwan	1	2	3	4	0
(10) Thailand	1	2	3	4	0
e. Canada	1	2	3	4	0
f. Other non-U.S. Western Hemisphere					
(1) Argentina	1	2	3	4	0
(2) Brazil	1	2	3	4	0
(3) Caribbean	1	2	3	4	0
(4) Chile	1	2	3	4	0
(5) Mexico	1	2	3	4	0
(6) Venezuela	1	2	3	4	0

23. Of the total amount of **stationary residual fuel oil** that you anticipate will be sold in each country in 1995, about what percentages will have the sulfur content specified in the column headings?

(ENTER ANTICIPATED PERCENTAGES OF SALES FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/ PURCHASES; **NOTE THAT THE PERCENTAGES ENTERED IN EACH ROW SHOULD SUM TO 100%**)

	Likely Percentages of Sales in 1995 with Sulfur Content of:			
	0.30% or Below	0.31% to 1.00%	1.01% to 2.00%	Above 2.00%
a. **North Europe**				
(1) France	______%	______%	______%	______%
(2) Germany	______	______	______	______
(3) Netherlands	______	______	______	______
(4) Norway	______	______	______	______
(5) Sweden	______	______	______	______
(6) U.K.	______	______	______	______
b. **Mediterranean**				
(1) Greece	______	______	______	______
(2) Italy	______	______	______	______
(3) Spain	______	______	______	______
c. **Middle East**				
(1) Bahrain	______	______	______	______
(2) Saudi Arabia	______	______	______	______
(3) U.A.E.	______	______	______	______
d. **Far East**				
(1) Australia	______	______	______	______
(2) China	______	______	______	______
(3) India	______	______	______	______
(4) Indonesia	______	______	______	______
(5) Japan	______	______	______	______
(6) Malaysia	______	______	______	______
(7) Singapore	______	______	______	______
(8) South Korea	______	______	______	______
(9) Taiwan	______	______	______	______
(10) Thailand	______	______	______	______
e. **Canada**	______	______	______	______
f. **Other non-U.S. Western Hemisphere**				
(1) Argentina	______	______	______	______
(2) Brazil	______	______	______	______
(3) Caribbean	______	______	______	______
(4) Chile	______	______	______	______
(5) Mexico	______	______	______	______
(6) Venezuela	______	______	______	______

24. Of the total amount of **stationary residual fuel oil** that you anticipate will be sold in each country in <u>2000</u>, about what percentages will have the sulfur content specified in the column headings?

(ENTER ANTICIPATED PERCENTAGES OF SALES FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/ PURCHASES; **NOTE THAT THE PERCENTAGES ENTERED IN EACH ROW SHOULD SUM TO 100%**)

	Likely Percentages of Sales in 2000 with Sulfur Content of:			
	0.30% or Below	0.31% to 1.00%	1.01% to 2.00%	Above 2.00%
a. **North Europe**				
(1) France	____%	____%	____%	____%
(2) Germany	____	____	____	____
(3) Netherlands	____	____	____	____
(4) Norway	____	____	____	____
(5) Sweden	____	____	____	____
(6) U.K.	____	____	____	____
b. **Mediterranean**				
(1) Greece	____	____	____	____
(2) Italy	____	____	____	____
(3) Spain	____	____	____	____
c. **Middle East**				
(1) Bahrain	____	____	____	____
(2) Saudi Arabia	____	____	____	____
(3) U.A.E.	____	____	____	____
d. **Far East**				
(1) Australia	____	____	____	____
(2) China	____	____	____	____
(3) India	____	____	____	____
(4) Indonesia	____	____	____	____
(5) Japan	____	____	____	____
(6) Malaysia	____	____	____	____
(7) Singapore	____	____	____	____
(8) South Korea	____	____	____	____
(9) Taiwan	____	____	____	____
(10) Thailand	____	____	____	____
e. **Canada**	____	____	____	____
f. **Other non-U.S. Western Hemisphere**				
(1) Argentina	____	____	____	____
(2) Brazil	____	____	____	____
(3) Caribbean	____	____	____	____
(4) Chile	____	____	____	____
(5) Mexico	____	____	____	____
(6) Venezuela	____	____	____	____

25. What is your best estimate of the typical year-average operating mode of refineries in each country for 1989?

(CIRCLE ALL THAT APPLY FOR THE COUNTRIES IN WHICH YOUR COMPANY HAS REFINING OR MARKETING FACILITIES)

	Motor Gasoline			Naphtha			Kerosene/Middle Distillate			Residual Fuel Oil		
	Max	Intermediate	Min	Max	Intermediate	Min	Max	Intermediate	Min	Max	Intermediate	Min
a. **North Europe**												
(1) France	1	2	3	1	2	3	1	2	3	1	2	3
(2) Germany	1	2	3	1	2	3	1	2	3	1	2	3
(3) Netherlands	1	2	3	1	2	3	1	2	3	1	2	3
(4) Norway	1	2	3	1	2	3	1	2	3	1	2	3
(5) Sweden	1	2	3	1	2	3	1	2	3	1	2	3
(6) U.K.	1	2	3	1	2	3	1	2	3	1	2	3
b. **Mediterranean**												
(1) Greece	1	2	3	1	2	3	1	2	3	1	2	3
(2) Italy	1	2	3	1	2	3	1	2	3	1	2	3
(3) Spain	1	2	3	1	2	3	1	2	3	1	2	3
c. **Middle East**												
(1) Bahrain	1	2	3	1	2	3	1	2	3	1	2	3
(2) Saudi Arabia	1	2	3	1	2	3	1	2	3	1	2	3
(3) U.A.E.	1	2	3	1	2	3	1	2	3	1	2	3
d. **Far East**												
(1) Australia	1	2	3	1	2	3	1	2	3	1	2	3
(2) China	1	2	3	1	2	3	1	2	3	1	2	3
(3) India	1	2	3	1	2	3	1	2	3	1	2	3
(4) Indonesia	1	2	3	1	2	3	1	2	3	1	2	3
(5) Japan	1	2	3	1	2	3	1	2	3	1	2	3
(6) Malaysia	1	2	3	1	2	3	1	2	3	1	2	3
(7) Singapore	1	2	3	1	2	3	1	2	3	1	2	3
(8) South Korea	1	2	3	1	2	3	1	2	3	1	2	3
(9) Taiwan	1	2	3	1	2	3	1	2	3	1	2	3
(10) Thailand	1	2	3	1	2	3	1	2	3	1	2	3
e. **Canada**	1	2	3	1	2	3	1	2	3	1	2	3
f. **Other non-U.S. Western Hemisphere**												
(1) Argentina	1	2	3	1	2	3	1	2	3	1	2	3
(2) Brazil	1	2	3	1	2	3	1	2	3	1	2	3
(3) Caribbean	1	2	3	1	2	3	1	2	3	1	2	3
(4) Chile	1	2	3	1	2	3	1	2	3	1	2	3
(5) Mexico	1	2	3	1	2	3	1	2	3	1	2	3
(6) Venezuela	1	2	3	1	2	3	1	2	3	1	2	3

26. Indicate actual 1989 crude inputs to all refineries in each country in which your company has refining operations.

	1989 Crude Inputs to All Refineries in Each Country			
	MB/CD	Average °API	Average Weight % Sulfur	Average Volume % Residual > 345°C (650°F)
a. North Europe				
(1) France				
(2) Germany				
(3) Netherlands				
(4) Norway				
(5) Sweden				
(6) U.K.				
b. Mediterranean				
(1) Greece				
(2) Italy				
(3) Spain				
c. Middle East				
(1) Bahrain				
(2) Saudi Arabia				
(3) U.A.E.				
d. Far East				
(1) Australia				
(2) China				
(3) India				
(4) Indonesia				
(5) Japan				
(6) Malaysia				
(7) Singapore				
(8) South Korea				
(9) Taiwan				
(10) Thailand				
e. Canada				
f. Other non-U.S. Western Hemisphere				
(1) Argentina				
(2) Brazil				
(3) Caribbean				
(4) Chile				
(5) Mexico				
(6) Venezuela				

27. 1989 Clean Petroleum Product Capability: 1989 annual average for each country.

(RESPOND TO EACH OF THE THREE QUESTIONS FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/PURCHASES)

	a. 1989 Petroleum Product Manufactured (MB/CD)		b. Could the industry have met additional clean product demand in 1989 without making additional residual fuel oil? (If "Yes," Answer Question "c.")		c. What additional clean products volume could the refining industry have made in 1989 before being limited by lack of residual fuel oil** outlet? (MB/CD)	
	Clean Products*	Residual Fuel Oil/ Bunkers	Yes	No	Motor Gasoline	Middle Distillate
a. North Europe						
(1) France	____	____	1	2	____	____
(2) Germany	____	____	1	2	____	____
(3) Netherlands	____	____	1	2	____	____
(4) Norway	____	____	1	2	____	____
(5) Sweden	____	____	1	2	____	____
(6) U.K.	____	____	1	2	____	____
b. Mediterranean						
(1) Greece	____	____	1	2	____	____
(2) Italy	____	____	1	2	____	____
(3) Spain	____	____	1	2	____	____
c. Middle East						
(1) Bahrain	____	____	1	2	____	____
(2) Saudi Arabia	____	____	1	2	____	____
(3) U.A.E.	____	____	1	2	____	____
d. Far East						
(1) Australia	____	____	1	2	____	____
(2) China	____	____	1	2	____	____
(3) India	____	____	1	2	____	____
(4) Indonesia	____	____	1	2	____	____
(5) Japan	____	____	1	2	____	____
(6) Malaysia	____	____	1	2	____	____
(7) Singapore	____	____	1	2	____	____
(8) South Korea	____	____	1	2	____	____
(9) Taiwan	____	____	1	2	____	____
(10) Thailand	____	____	1	2	____	____
e. Canada	____	____	1	2	____	____
f. Other non-U.S. Western Hemisphere						
(1) Argentina	____	____	1	2	____	____
(2) Brazil	____	____	1	2	____	____
(3) Caribbean	____	____	1	2	____	____
(4) Chile	____	____	1	2	____	____
(5) Mexico	____	____	1	2	____	____
(6) Venezuela	____	____	1	2	____	____

*Total motor gasoline, jet fuel, and diesel/heating oil.

**Assume incremental steps are not extraordinarily different from base operations. If additional capability is limited by government licensing/controls, indicate additional amounts up to physical capacity.

28. In 1995, which of the following countries will be capable of exporting to the U.S.A. on the order of 300,000 or more barrels per month of any one of the listed products?

(CIRCLE ALL THAT APPLY FOR EACH COUNTRY IN WHICH YOUR COMPANY HAS REFINING OR MARKETING OPERATIONS OR PRODUCT CARGO SALES/PURCHASES)

	In 1995, Countries Likely to Export on the Order of 300,000 Barrels Per Month of Product:		
	Unleaded Gasoline 87 (R+M)/2	RFG[1]	Diesel Less Than 0.050% S
a. **North Europe**			
(1) France	1	2	3
(2) Germany	1	2	3
(3) Netherlands	1	2	3
(4) Norway	1	2	3
(5) Sweden	1	2	3
(6) U.K.	1	2	3
b. **Mediterranean**			
(1) Greece	1	2	3
(2) Italy	1	2	3
(3) Spain	1	2	3
c. **Middle East**			
(1) Bahrain	1	2	3
(2) Saudi Arabia	1	2	3
(3) U.A.E.	1	2	3
d. **Far East**			
(1) Australia	1	2	3
(2) China	1	2	3
(3) India	1	2	3
(4) Indonesia	1	2	3
(5) Japan	1	2	3
(6) Malaysia	1	2	3
(7) Singapore	1	2	3
(8) South Korea	1	2	3
(9) Taiwan	1	2	3
(10) Thailand	1	2	3
e. **Canada**	1	2	3
f. **Other non-U.S. Western Hemisphere**			
(1) Argentina	1	2	3
(2) Brazil	1	2	3
(3) Caribbean	1	2	3
(4) Chile	1	2	3
(5) Mexico	1	2	3
(6) Venezuela	1	2	3

[1] See page iii for definition of reformulated gasoline.

29. For each country in which your company has a refinery, what level of financial impact (investment and operating costs) do you expect each of the following types of regulatory requirements/constraints to have on your refineries in that country between now and 1995 and between 1996 and 2000?

NOTE: We have provided pages for up to 5 countries. Copy these pages if you can respond for more than 5 countries.

Country #1: ______________________________

	Level of Financial Impact:					
Requirements for 1995	Doesn't apply: This country unlikely to have these requirements	None	Small	Moderate	Large	Have No Idea
a. Refinery air emission reductions	0	1	2	3	4	9
b. Water/effluent quality improvement	0	1	2	3	4	9
c. Solid waste treatment recycling/disposal	0	1	2	3	4	9
d. Process safety related equipment	0	1	2	3	4	9
e. More restrictive product specifications	0	1	2	3	4	9

	Level of Financial Impact:					
Requirements for 2000	Doesn't apply: This country unlikely to have these requirements	None	Small	Moderate	Large	Have No Idea
f. Refinery air emission reductions	0	1	2	3	4	9
g. Water/effluent quality improvement	0	1	2	3	4	9
h. Solid waste treatment recycling/disposal	0	1	2	3	4	9
i. Process safety related equipment	0	1	2	3	4	9
j. More restrictive product specifications	0	1	2	3	4	9

29. (continued) Likely financial impacts of regulatory requirements/constraints

Country #2: ______________________________

Requirements for 1995	Level of Financial Impact: Doesn't apply: This country unlikely to have these requirements	None	Small	Moderate	Large	Have No Idea
a. Refinery air emission reductions	0	1	2	3	4	9
b. Water/effluent quality improvement	0	1	2	3	4	9
c. Solid waste treatment recycling/disposal	0	1	2	3	4	9
d. Process safety related equipment	0	1	2	3	4	9
e. More restrictive product specifications	0	1	2	3	4	9

Requirements for 2000	Level of Financial Impact: Doesn't apply: This country unlikely to have these requirements	None	Small	Moderate	Large	Have No Idea
f. Refinery air emission reductions	0	1	2	3	4	9
g. Water/effluent quality improvement	0	1	2	3	4	9
h. Solid waste treatment recycling/disposal	0	1	2	3	4	9
i. Process safety related equipment	0	1	2	3	4	9
j. More restrictive product specifications	0	1	2	3	4	9

29. (continued) Likely financial impacts of regulatory requirements/constraints

Country #3: ______________________________

Requirements for 1995	Level of Financial Impact: Doesn't apply: This country unlikely to have these requirements	None	Small	Moderate	Large	Have No Idea
a. Refinery air emission reductions	0	1	2	3	4	9
b. Water/effluent quality improvement	0	1	2	3	4	9
c. Solid waste treatment recycling/disposal	0	1	2	3	4	9
d. Process safety related equipment	0	1	2	3	4	9
e. More restrictive product specifications	0	1	2	3	4	9

Requirements for 2000	Level of Financial Impact: Doesn't apply: This country unlikely to have these requirements	None	Small	Moderate	Large	Have No Idea
f. Refinery air emission reductions	0	1	2	3	4	9
g. Water/effluent quality improvement	0	1	2	3	4	9
h. Solid waste treatment recycling/disposal	0	1	2	3	4	9
i. Process safety related equipment	0	1	2	3	4	9
j. More restrictive product specifications	0	1	2	3	4	9

29. (continued) Likely financial impacts of regulatory requirements/constraints

Country #4: ______________________

Requirements for 1995	Doesn't apply: This country unlikely to have these requirements	None	Small	Moderate	Large	Have No Idea
	Level of Financial Impact:					
a. Refinery air emission reductions	0	1	2	3	4	9
b. Water/effluent quality improvement	0	1	2	3	4	9
c. Solid waste treatment recycling/disposal	0	1	2	3	4	9
d. Process safety related equipment	0	1	2	3	4	9
e. More restrictive product specifications	0	1	2	3	4	9

Requirements for 2000	Doesn't apply: This country unlikely to have these requirements	None	Small	Moderate	Large	Have No Idea
	Level of Financial Impact:					
f. Refinery air emission reductions	0	1	2	3	4	9
g. Water/effluent quality improvement	0	1	2	3	4	9
h. Solid waste treatment recycling/disposal	0	1	2	3	4	9
i. Process safety related equipment	0	1	2	3	4	9
j. More restrictive product specifications	0	1	2	3	4	9

29. (concluded) Likely financial impacts of regulatory requirements/constraints

Country #5: ______________________________

Requirements for 1995	Level of Financial Impact: Doesn't apply: This country unlikely to have these requirements	None	Small	Moderate	Large	Have No Idea
a. Refinery air emission reductions	0	1	2	3	4	9
b. Water/effluent quality improvement	0	1	2	3	4	9
c. Solid waste treatment recycling/disposal	0	1	2	3	4	9
d. Process safety related equipment	0	1	2	3	4	9
e. More restrictive product specifications	0	1	2	3	4	9

Requirements for 2000	Level of Financial Impact: Doesn't apply: This country unlikely to have these requirements	None	Small	Moderate	Large	Have No Idea
f. Refinery air emission reductions	0	1	2	3	4	9
g. Water/effluent quality improvement	0	1	2	3	4	9
h. Solid waste treatment recycling/disposal	0	1	2	3	4	9
i. Process safety related equipment	0	1	2	3	4	9
j. More restrictive product specifications	0	1	2	3	4	9

NATIONAL PETROLEUM COUNCIL
1991 SURVEY OF U.S. PETROLEUM REFINING INDUSTRY

SUPPLY AND DISTRIBUTION OF OXYGENATES BY BLENDERS

If you have questions, contact:

Benjamin Oliver, Jr., NPC, (202) 393-6100
FAX: (202) 331-8539
OR
Susan Russell, SRI International, (415) 859-2640
FAX: (415) 859-2861

Use the enclosed envelope to return this completed questionnaire **no later than January 31, 1992**, to:

Survey Research Program
SRI International
P.O. Box 2246
Menlo Park, CA 94026-2246

Whom should we contact if we have questions about your responses to this section?

Name: ______________________

Telephone: ______________________

FAX: ______________________

INTRODUCTION

In response to a request from the Secretary of Energy, the National Petroleum Council (NPC) is conducting a study of the U.S. refining industry's capability and flexibility to meet future product demand. Task groups consisting of representatives from NPC member companies have been responsible for identifying the data needs and specifying the content of the questionnaires.

The survey includes both existing and planned U.S. refineries, as follows:

- **All refineries with operable capacity as of January 1, 1991, regardless of whether they were actually in operation on that date.**

- **All refineries that are planned to be operable by January 1, 1996.**

Data Tabulations and Confidentiality

The NPC has retained SRI International to format the survey questionnaires and to collect and tabulate the survey data and provide aggregated data to the U.S. petroleum refining study participants, NPC staff, and contractors who will use the data in mathematical models. **The final report will be sent to all survey respondents.** SRI International--formerly Stanford Research Institute--is a broad-based, nonprofit research and consulting organization serving clients in industry, government, and service organizations worldwide.

Individual company data from the survey will be held strictly confidential by SRI and will not be released to government, study participants, NPC staff, or other contractors. The only SRI staff who will have access to the data are Survey Research Program staff and Ms. Susan Leiby, an SRI process engineer, who will assist Survey Research Program staff in reviewing the questionnaires and will be available in the event of any difficulties in questionnaire interpretation. Confidential Information Agreements prepared by the NPC have been executed by SRI management, individual Survey Research Program staff, and Ms. Leiby committing themselves to these data handling procedures.

SRI International will release the aggregated data to NPC study participants only when sufficient data are available to permit aggregation in a manner that would not disclose individual operations. Once the data have been aggregated, accepted by the NPC, and reported, all individual responses will be destroyed.

Overview of the Information Requested

The 1991 Survey of U.S. Petroleum Refining Industry consists of 11 sections, as outlined below. Sections I - X are for petroleum refining companies. This is the Blenders Section.

I. Perceptions of the impacts of regulatory requirements on the refinery's operations in 1995 and 2000.

II. Refinery facilities' capabilities and utilization, feedstocks, and product yields--actual 1990 data and as anticipated for 1995.

III. Refinery emission sources and controls.

IV. Economic impacts of environmental regulations on refineries--both historical and anticipated costs.

V. Distribution and transport modes of products from refineries among national regions--1990 and 1995.

VI. Expectations regarding the 1995 supply and distribution of oxygenates, corporate-wide.

VII. Various issues concerning terminals, including supply of product, capacity, and environmentally related costs.

VIII. Various issues concerning pipelines, including capacity, product segregations, and costs.

IX. Tanker, barge, rail, and truck transport costs.

X. Foreign refinery and supply issues, including likely product specifications in other nations in 1995 and 2000.

Blenders: Expectations regarding the 1995 supply and distribution of oxygenates, for companies that blend oxygenates with petroleum products but do not produce petroleum products. (This section is similar to Section VI.)

Purposes for the Information Requested

The NPC needs your company's responses to this questionnaire to help build an accurate picture of the current and anticipated future capability and flexibility of the nation's refining industry to supply its customers' needs. This information, aggregated across all respondents, will comprise a major component of the NPC's response to the Secretary of Energy. The aggregated survey results also will be used to validate industry models.

For use in the mathematical models, the survey results will be supplemented with aggregate 1990 operating data from the Department of Energy's Energy Information Administration reports and the judgments of the industry experts on the NPC study groups. Use of these three sources of information will help to ensure that the models provide valid representations of the industry and do not under- or over-state industry capability or flexibility.

INSTRUCTIONS AND DEFINITIONS

REPORT DATA ONLY ON THOSE LINES THAT ARE APPLICABLE TO YOUR OPERATION. IF THERE ARE NO DATA FOR A SPECIFIC LINE, LEAVE THE LINE BLANK; DO NOT ENTER ZERO.

Oxygenated gasoline (OG) = Finished gasoline that meets the minimum oxygen content requirement for gasoline sold in CO non-attainment areas in winter months but does not meet RFG specifications (see below) for ozone non-attainment areas.

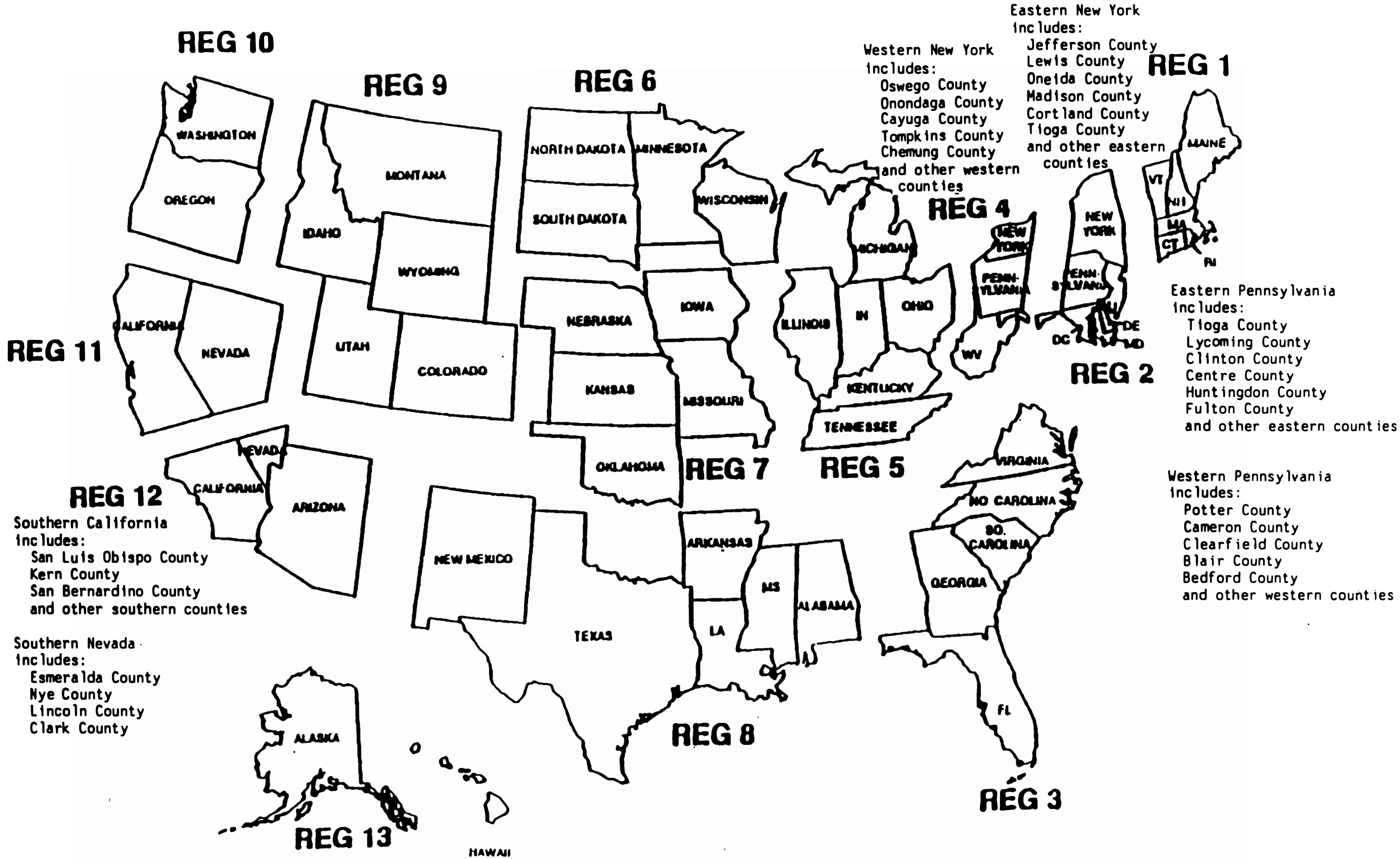
Reformulated gasoline (RFG) = Finished gasoline that meets all requirements for reformulated gasoline in ozone non-attainment areas and, if necessary, for CO non-attainment areas.

Survey Acronyms and Abbreviations

NOTE: The abbreviations below refer to the way in which they are used in this section of the questionnaire.

CO	Carbon monoxide
MGal	Thousand gallons

U.S. REGIONS
NATIONAL PETROLEUM COUNCIL REFINING STUDY



1. Volume of oxygenates to be blended: **In 1995**, approximately what total volume of ethers and alcohols (that is, oxygenates) do you anticipate your company will blend in each region (see map on facing page)? *Include only oxygenates blended with stocks to which your company holds title; exclude volumes blended for refiners. Answer in terms of thousand gallons per year (MGal/Year).*

Volume of Ethers and Alcohols to Be Blended in Each Region in 1995 (Thousand Gallons/Year)

	REGION:												
Oxygenate	1	2	3	4	5	6	7	8	9	10	11	12	13
Ethers													
Alcohols													

2. Sources of oxygenates for blending: **In 1995**, approximately what volume of your company's ethers and alcohols do you anticipate will be supplied from each region of the U.S., from foreign regions, or from unknown sources?

Note: Include oxygenates produced by your company as well as those purchased. The total of the volume reported for each product in this question should equal the total reported for each product in Question 1. If you don't know where the oxygenates were produced, enter volume under "Unknown Sources." Answer in terms of thousand gallons per year (MGal/Year).

Foreign Region Codes:

14 = North Europe
15 = Mediterranean
16 = Middle East
17 = Far East
18 = Western Hemisphere other than U.S. or Canada
19 = Western Canada
20 = Eastern Canada

Ethers/Alcohols Supplied by Each Region or From Unknown Sources in 1995 (Thousand Gallons/Year)

	U.S. REGIONS:													FOREIGN REGIONS:							
Oxygenate	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Unknown Sources
Ethers																					
Alcohols																					

N-196

3. Transport mode of oxygenates received for blending: **In 1995**, about what volume of ethers and alcohols that your company will blend with stocks to which you hold title do you anticipate will be transported to each region by each of the listed transport modes? *Note: If any given shipment of product will be moved by more than one mode of transportation, include only the mode by which the shipment will be moved the greatest distance. The total of the volume of each product reported in this question should equal the total of each product reported in Question 1. Answer in terms of thousand gallons per year (MGal/Year).*

	Volume of Oxygenates Received for Blending That Will Be Transported to Each Region in 1995 by Each Transport Mode (MGal)												
	REGION:												
Transport Mode	1	2	3	4	5	6	7	8	9	10	11	12	13
For ethers:													
Pipeline	___	___	___	___	___	___	___	___	___	___	___	___	___
Tanker	___	___	___	___	___	___	___	___	___	___	___	___	___
Barge	___	___	___	___	___	___	___	___	___	___	___	___	___
Rail	___	___	___	___	___	___	___	___	___	___	___	___	___
Truck	___	___	___	___	___	___	___	___	___	___	___	___	___
For alcohols:													
Pipeline	___	___	___	___	___	___	___	___	___	___	___	___	___
Tanker	___	___	___	___	___	___	___	___	___	___	___	___	___
Barge	___	___	___	___	___	___	___	___	___	___	___	___	___
Rail	___	___	___	___	___	___	___	___	___	___	___	___	___
Truck	___	___	___	___	___	___	___	___	___	___	___	___	___

4. **In 1995**, what is the maximum storage capacity that your company will own in each region that you anticipate being available for the storage of your company's ethers and alcohols? *Answer in thousand gallons.*

Anticipated 1995 Maximum Available Alcohol/Ether Storage Capacity Owned and Used by Your Company, by Region (Thousand Gallons)

	REGION: 1	2	3	4	5	6	7	8	9	10	11	12	13
Ethers													
Alcohols													

5. What is the maximum alcohol/ether storage capacity in each region that your company will lease from others in 1995, and what are the anticipated 1995 costs for this leased alcohol/ether storage capacity? *(Note: The capacity reported here is in addition to the capacity reported in Question 4.)*

Alcohol/Ether Storage Capacity that Will Be Leased from Others in 1995

	REGION: 1	2	3	4	5	6	7	8	9	10	11	12	13
Maximum capacity to be leased from others (thousand gallons):													
Estimated 1995 leasing costs (thousands $, in 1991 $):													

N-197

6. How much of the alcohol/ether storage capacity in each region shown in Question 4 do you anticipate will be capacity that your company will build or convert from other uses between January 1, 1991, and December 31, 1995, and what are the anticipated costs for this additional alcohol/ether storage capacity? *(Note: This capacity is a subset of the capacity reported in Question 4.)*

	Alcohol/Ether Storage Capacity That Will Be Built or Converted from Other Uses												
	REGION:												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Capacity to be built or converted from other uses (thousand gallons):													
Total estimated capital costs, 1/1/91 - 12/31/95 (thousands $, in 1991 $):													

7. Does your company have any deep-water terminals that are capable of receiving ocean-going tankers?

Yes . . . . . 1 --> If you have not received the tan questionnaire titled "SECTION VII. ISSUES CONCERNING TERMINALS FOR TERMINAL OPERATORS," call the SRI NPC-study "hot line" at (415) 859-2640.

No 2

PART II

SURVEY RESULTS
U.S. TOTALS

SECTION I

PERCEPTIONS OF REGULATORY IMPACTS ON INDIVIDUAL REFINERIES

		MEAN ** RESPONSE	NUMBER OF RESPONSES
		======	=======
1.	FINANCIAL IMPACT BY 1995		
	MOTOR GASOLINE		
a.	Reduction in RVP	1.8	148
b.	Reduction in Benzene	1.5	148
c.	Reduction in VOC	1.7	148
d.	Air Toxic Requirements	1.5	148
e.	Addition of Oxygenates	1.7	148
f.	Reduction in Sulfur Content	1.2	148
g.	Additional State/Local Laws	1.2	148
	DIESEL FUEL		
h.	Reduction in Sulfur Content	2.1	150
i.	Additional State/Local Laws	0.9	150
	FACILITIES		
j.	Air Emissions (Pollutants)	2.1	150
k.	Air Emissions (Toxics)	2.1	150
l.	Waste Water Quality	1.9	149
m.	RCRA Requirements	2.1	149
n.	OSHA Requirements	2.3	150
o.	Remediation (Soil/Water)	2.1	148
p.	Additional State/Local Laws	1.7	149
2.	1995 REGULATORY CONSTRAINTS ON MEETING CUSTOMERS' SUPPLY REQUIREMENTS		
a.	Obtain Construction Permits	1.6	146
b.	Meet Product Quality Specifications	1.6	150
c.	Product Quality Enforcement	1.4	150
d.	Facility Emissions	1.4	150
e.	Facility Emissions Enforcement	1.2	150
f.	Facility Safety	1.2	150
g.	Facility Safety Enforcement	1.2	150
3.	FINANCIAL IMPACT BETWEEN 1996 and 2000		
	MOTOR GASOLINE		
a.	Reduction in RVP	1.8	146
b.	Reduction in VOC	2.1	145
c.	Air Toxic Requirements	2.0	146
d.	Addition of Oxygenates	1.6	146
e.	Reduction in Sulfur Content	2.0	146
f.	Additional State/Local Laws	1.3	146

SECTION I

PERCEPTIONS OF REGULATORY IMPACTS ON INDIVIDUAL REFINERIES

		MEAN ** RESPONSE	NUMBER OF RESPONSES
		======	=======
DIESEL FUEL			
g.	Reduction in Sulfur Content	1.5	148
h.	Reduction in Aromatics	1.7	148
i.	Additional State/Local Laws	1.0	148
FACILITIES			
j.	Air Emissions (Pollutants)	2.1	149
k.	Air Emissions (Toxics)	2.2	149
l.	Waste Water Quality	1.9	149
m.	RCRA Requirements	2.1	148
n.	OSHA Requirements	2.0	148
o.	Remediation (Soil/Water)	2.1	148
p.	Additional State/Local Laws	1.8	148

4. 2000 REGULATORY CONSTRAINTS ON MEETING CUSTOMERS' SUPPLY REQUIREMENTS

a.	Obtain Construction Permits	1.7	144
b.	Meet Product Quality Specifications	1.7	148
c.	Product Quality Enforcement	1.5	148
d.	Facility Emissions	1.6	148
e.	Facility Emissions Enforcement	1.4	148
f.	Facility Safety	1.3	148
g.	Facility Safety Enforcement	1.3	148

5. REFINERY STRATEGIES FOR MAKING RFG IN 1995 ... ONLY THOSE REFINERIES THAT INDICATE THEY WILL MAKE RFG IN 1995

a.	Quality Give-away	1.2	57
b.	Rework Off-Spec Product	1.0	57
c.	Increase Tankage	1.2	57
d.	Statistical Quality Control	1.8	57
e.	Reduce Throughputs	0.9	57
f.	Blocked Production of RFG	0.7	57
g.	Use RFG Specs for Conventional	0.9	57
h.	Buy, Sell Blendstocks	1.3	57
i.	Buy, Sell Finished Gasoline	1.8	57
j.	Credit Trading/Averaging	1.2	57

SECTION I

PERCEPTIONS OF REGULATORY IMPACTS ON INDIVIDUAL REFINERIES

		MEAN ** RESPONSE	NUMBER OF RESPONSES
		======	=======
k.	Change Boiling Ranges	1.6	57
l.	Withdraw From Markets	0.4	57
m.	No Mid-Grade Gasoline	1.4	57
n.	Produce Subgrades	0.7	57
o.	Produce only one RFG Grade	0.2	57
p.	Make Oxygenates	1.4	57
q.	Buy Oxygenates	2.4	57
r.	Shut Down Marginal Units	0.3	57
s.	Build New Facilities	2.0	57
t.	Modify Existing Units	1.9	57
u.	Realign Distribution System	1.3	57

** MEAN RESPONSE -- 4-point scale ... NONE=0, SOME=1, QUITE A BIT=2, and A GREAT DEAL=3.

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	========	======	====	========
A. CAPABILITIES AND UTILIZATION				
1. ATMOSPHERIC CRUDE OIL DISTILLATION				
a. Number of units				
as of 1/1/90	224		143	12,566
as of 1/1/91	222		144	12,566
as of 1/1/96 (anticipated)	214		141	13,316
b. Operable Capacity				
as of 1/1/90	14,761.69	MB/SD	143	12,566
as of 1/1/91	14,819.73	MB/SD	145	12,566
as of 1/1/96 (anticipated)	14,756.20	MB/SD	141	13,316
c. Average Gross Feed Rate				
1990 actual	12,565.74	MB/CD	142	12,566
1995 anticipated	13,315.69	MB/CD	138	13,316
2. VACUUM CRUDE OIL DISTILLATION				
a. Number of units				
as of 1/1/90	185		123	12,008
as of 1/1/91	183		123	12,008
as of 1/1/96 (anticipated)	178		122	12,723
b. Operable Capacity				
as of 1/1/90	6,538.36	MB/SD	123	12,008
as of 1/1/91	6,541.56	MB/SD	123	12,008
as of 1/1/96 (anticipated)	6,482.14	MB/SD	122	12,723
c. Average Feed Rate				
1990 actual	5,256.64	MB/CD	119	11,861
1995 anticipated	5,602.26	MB/CD	116	12,521
3. SOLVENT DEASPHALTING				
a. Number of units				
as of 1/1/90	29		27	2,723
as of 1/1/91	29		27	2,723
as of 1/1/96 (anticipated)	30		28	3,285
b. Operable Capacity				
as of 1/1/90	292.20	MB/SD	27	2,723
as of 1/1/91	301.40	MB/SD	27	2,723
as of 1/1/96 (anticipated)	319.00	MB/SD	28	3,285
c. Average Feed Rate				
1990 actual	208.32	MB/CD	26	2,595
1995 anticipated	267.59	MB/CD	27	3,155
D. Average yield deasphalted oil				
1990 actual	97.77	MB/CD	24	2,402
1995 anticipated	145.79	MB/CD	25	2,962

SECTION II

REFINERY FACILITIES -- CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	========	======	====	========
4. HYDROTREATING (INCLUDING NAPHTHA, KEROSENE/MIDDLE DISTILLATE, GAS OILS, AND RESIDUA)				
a. Number of units				
as of 1/1/90	373		125	12,148
as of 1/1/91	374		126	12,148
as of 1/1/96 (anticipated)	423		124	12,802
Naphtha and Reformer Feed Hydrotreating				
b. Operable Capacity				
as of 1/1/90	3,809.49	MB/SD	122	11,922
as of 1/1/91	3,811.41	MB/SD	123	11,922
as of 1/1/96 (anticipated)	3,847.33	MB/SD	120	12,408
c. Average Fresh Feed Rate				
1990 actual	2,840.68	MB/CD	120	11,838
1995 anticipated	2,951.24	MB/CD	117	12,309
d. Percentage cracker or thermal naphtha of total naphtha and reformer feed				
1990 actual	9.25	%	113	11,482
1995 anticipated	9.69	%	111	12,073
Distillate Hydrotreating				
e. Operable Capacity				
as of 1/1/90	2,729.88	MB/SD	83	10,097
as of 1/1/91	2,739.88	MB/SD	83	10,097
as of 1/1/96 (anticipated)	3,609.45	MB/SD	101	11,421
f. Actual 1990 operation				
(1) Kerosene/kerosene jet fuel				
Average Fresh Feed Rate	793.81	MB/CD	61	8,609
Sulfur Content (Wt. %)				
Feed	0.36	%	57	7,990
Product	0.07	%	59	8,383
Max Desulf (% Sulfur Reduct)	84.32	%	58	8,302
(2) Middle Distillates				
Average Fresh Feed Rate	1,209.47	MB/CD	76	9,585
Sulfur Content (Wt. %)				
Feed	1.15	%	73	9,190
Product	0.21	%	74	9,358
Max Desulf (% Sulfur Reduct)	83.16	%	72	9,145
(3) Percent cracker or thermal feedstock of kerosene/kerosene jet and middle distillate in total feed	30.46	%	75	9,484

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

		U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
g.	Estimated 1995 operation				
	(1) Kerosene/kerosene jet fuel				
	Average Fresh Feed Rate	932.89	MB/CD	65	8,775
	Sulfur Content (Wt. %)				
	Feed	0.40	%	62	8,495
	Product	0.06	%	62	8,656
	Max Desulf (% Sulfur Reduct)	87.61	%	63	8,718
	(2) Middle Distillates				
	Average Fresh Feed Rate	1,873.21	MB/CD	95	10,847
	Sulfur Content (Wt. %)				
	Feed	0.99	%	93	10,615
	Product	0.08	%	93	10,775
	Max Desulf (% Sulfur Reduct)	91.18	%	93	10,831
	(3) Percent cracker or thermal feedstock of kerosene/kerosene jet and middle distillate in total feed	25.73	%	95	11,199
Gas Oil/Catallytic Cracker Feed Hydrotreating (Minimal or no residua in feed)					
h.	Operable Capacity				
	as of 1/1/90	1,706.30	MB/SD	44	6,147
	as of 1/1/91	1,744.70	MB/SD	45	6,204
	as of 1/1/96 (anticipated)	2,021.90	MB/SD	51	7,249
i.	Average Fresh Feed Rate				
	1990 actual	1,296.59	MB/CD	45	6,204
	1995 anticipated	1,791.85	MB/CD	51	7,249
j.	Sulfur content of feed				
	1990 actual	1.61	wt. %	43	5,980
	1995 anticipated	1.70	wt. %	50	7,131
k.	Percentage cracker or thermal feedstock in total feed				
	1990 actual	20.27	%	45	6,204
	1995 anticipated	20.13	%	51	7,249
l.	Hydrogen consumption				
	1990 actual	459.63	SCF/B	44	6,086
	1995 anticipated	557.63	SCF/B	49	7,080
m.	Actual 1990 product rates and sulfur content				
	(1) Hydrotreated cat-cracker feed (620+ F)				
	Average Rate	1,135.44	MB/CD	40	5,813
	Sulfur Content (Wt. %)				
	Product	0.32	%	39	5,544
	Max Desulf (% Sulfur Reduct)	87.15	%	38	5,463

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	========	======	====	========
(2) Other hydrotreated gas oil (620+ F)				
Average Rate	36.15	MB/CD	9	727
Sulfur Content (Wt. %)				
Product	0.36	%	9	727
Max Desulf (% Sulfur Reduct)	75.45	%	8	683
(3) Hydrotreated distillate (350-620 F)				
Average Rate	83.36	MB/CD	27	3,775
Sulfur Content (Wt. %)				
Product	0.08	%	25	3,505
(4) Hydrotreated naphtha (C5-350 F)				
Average Rate	23.14	MB/CD	29	4,086
Sulfur Content (Wt. %)				
Product	0.07	%	24	3,540
n. Estimated 1995 product rates and sulfur content				
(1) Hydrotreated cat-cracker feed (620+ F)				
Average Rate	1,599.35	MB/CD	46	7,012
Sulfur Content (Wt. %)				
Product	0.28	%	42	6,532
Max Desulf (% Sulfur Reduct)	88.70	%	41	6,584
(2) Other hydrotreated gas oil (620+ F)				
Average Rate	36.74	MB/CD	6	525
Sulfur Content (Wt. %)				
Product	0.40	%	5	491
Max Desulf (% Sulfur Reduct)	77.02	%	5	491
(3) Hydrotreated distillate (350-620 F)				
Average Rate	102.51	MB/CD	26	4,123
Sulfur Content (Wt. %)				
Product	0.06	%	22	3,662
(4) Hydrotreated naphtha (C5-350 F)				
Average Rate	34.85	MB/CD	29	4,292
Sulfur Content (Wt. %)				
Product	0.06	%	25	3,841
Residua Hydrotreating				
o. Operable Capacity				
as of 1/1/90	307.00	MB/SD	6	823
as of 1/1/91	308.00	MB/SD	6	823
as of 1/1/96 (anticipated)	334.00	MB/SD	7	973
p. Atmospheric residua feed rate				
1990 actual	224.20	MB/CD	6	823
1995 anticipated	229.39	MB/CD	7	973

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

		U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
		========	======	====	========
q.	Atmospheric residua sulfur content of feed				
	1990 actual	2.61	wt. %	6	823
	1995 anticipated	2.81	wt. %	7	973
r.	Vacuum residua feed rate				
	1990 actual	*	MB/CD	*	*
	1995 anticipated	*	MB/CD	*	*
s.	Vacuum residua sulfur content				
	1990 actual	*	wt. %	*	*
	1995 anticipated	*	wt. %	*	*
t.	Hydrogen consumption				
	1990 actual	887.06	SCF/B	6	823
	1995 anticipated	938.88	SCF/B	7	973
u.	Actual 1990 product rates and sulfur content				
	(1) Hydrotreated atmospheric residua				
	Average Rate	234.49	MB/CD	6	823
	Sulfur Content (Wt. %)				
	Product	0.36	%	5	685
	Max Desulf (% Sulfur Reduct)	86.74	%	6	823
	(2) Hydrotreated vacuum residua (1050+ F)				
	Average Rate	*	MB/CD	*	*
	Sulfur Content (Wt. %)				
	Product	*	%	*	*
	Max Desulf (% Sulfur Reduct)	*	%	*	*
	(3) Hydrotreated VGO (620-1050 F)				
	Average Rate	*	MB/CD	*	*
	Sulfur Content (Wt. %)				
	Product	*	%	*	*
	(4) Hydrotreated distillate (350-620 F)				
	Average Rate	20.83	MB/CD	4	578
	Sulfur Content (Wt. %)				
	Product	0.06	%	4	578
	(5) Hydrotreated naphtha (C5-350F)				
	Average Rate	10.16	MB/CD	4	578
	Sulfur Content (Wt. %)				
	Product	0.02	%	4	578

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REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	========	======	====	========
v. Estimated 1995 product rates and sulfur content				
(1) Hydrotreated atmospheric residua (620+ F)				
Average Rate	253.67	MB/CD	7	973
Sulfur Content (Wt. %)				
Product	0.34	%	5	733
Max Desulf (% Sulfur Reduct)	86.44	%	6	868
(2) Hydrotreated vacuum residua (1050+ F)				
Average Rate	*	MB/CD	*	*
Sulfur Content (Wt. %)				
Product	*	%	*	*
Max Desulf (% Sulfur Reduct)	*	%	*	*
(3) Hydrotreated VGO (620-1050 F)				
Average Rate	*	MB/CD	*	*
Sulfur Content (Wt. %)				
Product	*	%	*	*
(4) Hydrotreated distillate (350-620 F)				
Average Rate	21.24	MB/CD	5	674
Sulfur Content (Wt. %)				
Product	0.06	%	5	674
(5) Hydrotreated naphtha (C5-350 F)				
Average Rate	11.01	MB/CD	5	674
Sulfur Content (Wt. %)				
Product	0.02	%	5	674
5. AROMATICS SATURATION				
a. Number of units				
as of 1/1/90	11		10	1,195
as of 1/1/91	11		10	1,195
as of 1/1/96 (anticipated)	22		17	1,944
b. Operable Capacity				
1. Light naphtha/gasoline blendstocks				
as of 1/1/90	11.30	MB/SD	3	342
as of 1/1/91	11.30	MB/SD	3	342
as of 1/1/96 (anticipated)	44.32	MB/SD	10	1,455
2. Kerosene/kerosene-type jet fuel blendstocks				
as of 1/1/90	55.41	MB/SD	7	853
as of 1/1/91	55.41	MB/SD	7	853
as of 1/1/96 (anticipated)	56.01	MB/SD	6	951

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SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	========	======	====	========
3. Middle distillate blendstocks				
as of 1/1/90		MB/SD	0	
as of 1/1/91		MB/SD	0	
as of 1/1/96 (anticipated)	66.98	MB/SD	4	332
c. Average Product Rates				
1. Light naphtha/gasoline blendstocks				
1990 actual	9.80	MB/CD	3	342
1995 anticipated	25.99	MB/CD	9	1,168
2. Kerosene/kerosene-type jet fuel blendstocks				
1990 actual	37.65	MB/CD	7	853
1995 anticipated	40.73	MB/CD	7	969
3. Middle distillate blendstocks				
1990 actual	0.00	MB/CD	0	0
1995 anticipated	40.73	MB/CD	4	332
6. DELAYED COKING				
a. Number of operable units				
as of 1/1/90	57		43	5,948
as of 1/1/91	57		43	5,948
as of 1/1/96 (anticipated)	60		46	6,806
b. Operable Capacity				
as of 1/1/90	1,301.50	MB/SD	43	5,948
as of 1/1/91	1,328.50	MB/SD	43	5,948
as of 1/1/96 (anticipated)	1,433.55	MB/SD	46	6,806
c. Average Fresh Feed Rate				
1990 actual	1,120.38	MB/CD	43	5,948
1995 anticipated	1,304.82	MB/CD	46	6,806
d. Average Feed Properties				
1. Conradson Carbon				
1990 actual	16.61	wt. %	43	5,948
1995 anticipated	17.46	wt. %	46	6,806
2. Sulfur				
1990 actual	2.84	wt. %	42	5,789
1995 anticipated	2.94	wt. %	45	6,658
e. Average Product Rates				
1. Fuel Gas (FOE)				
1990 actual	73.96	MB/CD	41	5,774
1995 anticipated	87.91	MB/CD	44	6,627

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SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	========	======	====	========
2. Total C3/C4 recovered				
1990 actual	59.62	MB/CD	40	5,818
1995 anticipated	73.43	MB/CD	43	6,666
(a) Propylene				
1990 actual	7.21	MB/CD	33	4,608
1995 anticipated	9.29	MB/CD	37	5,640
(b) Isobutane				
1990 actual	5.24	MB/CD	33	4,825
1995 anticipated	5.62	MB/CD	36	5,615
(c) Isobutylene				
1990 actual	3.10	MB/CD	30	4,249
1995 anticipated	3.40	MB/CD	31	4,567
(d) Other Butylenes				
1990 actual	7.12	MB/CD	32	4,825
1995 anticipated	9.78	MB/CD	34	5,632
3. Thermal Naphtha (C5-350)				
1990 actual	190.63	MB/CD	42	5,948
1995 anticipated	225.28	MB/CD	46	6,806
4. Thermal Distillate (350-620)				
1990 actual	270.77	MB/CD	42	5,924
1995 anticipated	319.38	MB/CD	45	6,751
5. Thermal Gas Oil (620+)				
1990 actual	343.01	MB/CD	42	5,904
1995 anticipated	396.69	MB/CD	45	6,758
6. Marketable Coke (dry 400 lb/B)				
1990 actual	280.79	MB/CD	43	5,948
1995 anticipated	319.53	MB/CD	46	6,806
7. FLUID COKING AND FLEXICOKING				
a. Number of operable units				
as of 1/1/90	7		7	924
as of 1/1/91	7		7	924
as of 1/1/96 (anticipated)	7		7	941
b. Operable Capacity				
as of 1/1/90	184.70	MB/SD	7	924
as of 1/1/91	193.70	MB/SD	7	924
as of 1/1/96 (anticipated)	190.70	MB/SD	7	941

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	========	======	====	========
c. Average Fresh Feed Rate				
1990 actual	167.78	MB/CD	7	924
1995 anticipated	173.70	MB/CD	7	941
d. Average Feed Properties				
1. Conradson Carbon				
1990 actual	22.06	wt.%	7	924
1995 anticipated	21.96	wt.%	7	941
2. Sulfur				
1990 actual	3.05	wt.%	7	924
1995 anticipated	3.05	wt.%	7	941
e. Average Product Rates				
1. Fuel Gas (FOE)				
1990 actual	27.43	MB/CD	7	924
1995 anticipated	29.81	MB/CD	7	941
2. Total C3/C4 recovered				
1990 actual	17.74	MB/CD	7	924
1995 anticipated	18.51	MB/CD	7	941
(a) Propylene				
1990 actual	5.07	MB/CD	7	924
1995 anticipated	5.28	MB/CD	7	941
(b) Isobutane				
1990 actual	0.57	MB/CD	7	924
1995 anticipated	0.59	MB/CD	7	941
(c) Isobutylene				
1990 actual	1.06	MB/CD	6	592
1995 anticipated	1.06	MB/CD	6	628
(d) Other Butylenes				
1990 actual	3.43	MB/CD	7	924
1995 anticipated	3.52	MB/CD	7	941
3. Thermal Naphtha (C5-350)				
1990 actual	32.96	MB/CD	7	924
1995 anticipated	36.20	MB/CD	7	941
4. Thermal Distillate (350-620)				
1990 actual	28.04	MB/CD	7	924
1995 anticipated	29.67	MB/CD	7	941
5. Thermal Gas Oil (620+)				
1990 actual	49.69	MB/CD	7	924
1995 anticipated	47.41	MB/CD	7	941
6. Marketable Coke (dry 400 lb/B)				
1990 actual	30.32	MB/CD	7	924
1995 anticipated	29.27	MB/CD	7	941

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
8. VISBREAKING/THERMAL CRACKING/OTHER THERMAL				
a. Number of operable units				
as of 1/1/90	10		9	1,389
as of 1/1/91	10		9	1,389
as of 1/1/96 (anticipated)	10		9	1,445
b. Operable Capacity				
as of 1/1/90	123.61	MB/SD	9	1,389
as of 1/1/91	123.61	MB/SD	9	1,389
as of 1/1/96 (anticipated)	113.00	MB/SD	9	1,445
c. Average Fresh Feed Rate				
1990 actual	72.66	MB/CD	8	1,312
1995 anticipated	74.21	MB/CD	8	1,353
d. Average Feed Properties				
1. Gravity (API)				
1990 actual	7.58	deg API	8	1,312
1995 anticipated	5.79	deg API	8	1,353
2. Conradson Carbon				
1990 actual	15.85	wt. %	6	978
1995 anticipated	16.87	wt. %	5	939
3. Sulfur				
1990 actual	2.34	wt. %	8	1,312
1995 anticipated	3.03	wt. %	8	1,353
e. Average Product Rates				
1. Fuel Gas (FOE)				
1990 actual	4.55	MB/CD	8	1,312
1995 anticipated	2.98	MB/CD	8	1,353
2. Ethylene (as recovered)				
1990 actual	*	MB/CD	*	*
1995 anticipated	*	MB/CD	*	*
3. Total C3/C4 recovered				
1990 actual	0.47	MB/CD	5	887
1995 anticipated	0.99	MB/CD	6	1,024
(a) Propylene				
1990 actual	0.06	MB/CD	5	887
1995 anticipated	0.09	MB/CD	5	989
(b) Isobutane				
1990 actual	0.03	MB/CD	4	671
1995 anticipated	0.04	MB/CD	4	759

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
(c) Isobutylene				
1990 actual	0.04	MB/CD	4	661
1995 anticipated	0.07	MB/CD	4	774
(d) Other Butylenes				
1990 actual	0.03	MB/CD	4	779
1995 anticipated	0.07	MB/CD	4	825
4. Thermal Naphtha (C5-350)				
1990 actual	5.72	MB/CD	8	1,312
1995 anticipated	5.85	MB/CD	8	1,353
5. Thermal Distillate (350-620)				
1990 actual	4.23	MB/CD	7	1,108
1995 anticipated	4.82	MB/CD	7	1,144
6. Thermal Gas Oil (620+)				
1990 actual	12.45	MB/CD	6	1,034
1995 anticipated	10.44	MB/CD	6	1,019
7. Thermal residua (1050+ F)				
1990 actual	53.90	MB/CD	8	1,312
1995 anticipated	55.85	MB/CD	8	1,353
9. CATALYTIC CRACKING (ALL KINDS)				
a. Number of operable units				
as of 1/1/90	126		108	11,396
as of 1/1/91	126		108	11,396
as of 1/1/96 (anticipated)	124		106	12,113
b. Operable Capacity				
as of 1/1/90	5,129.70	MB/SD	108	11,396
as of 1/1/91	5,155.87	MB/SD	108	11,396
as of 1/1/96 (anticipated)	5,221.24	MB/SD	106	12,113
c. Average Fresh Feed Rate				
(1) Straight-run gas oil				
1990 actual				
Total Fresh Feed	3,258.18	MB/CD	98	10,889
% Hydrotreated	31.80	%	95	10,658
1995 anticipated				
Total Fresh Feed	3,529.63	MB/CD	96	11,603
% Hydrotreated	38.95	%	93	11,354

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	========	======	====	========
(2) Coker/thermal gas oil				
1990 actual				
Total Fresh Feed	371.89	MB/CD	46	6,458
% Hydrotreated	53.13	%	45	6,377
1995 anticipated				
Total Fresh Feed	406.53	MB/CD	50	7,575
% Hydrotreated	70.06	%	47	7,319
(3) Deasphalted oil				
1990 actual				
Total Fresh Feed	83.04	MB/CD	19	1,821
% Hydrotreated	52.11	%	16	1,591
1995 anticipated				
Total Fresh Feed	89.10	MB/CD	17	1,787
% Hydrotreated	61.27	%	15	1,593
(4) Atmospheric residua				
1990 actual				
Total Fresh Feed	348.18	MB/CD	34	3,252
% Hydrotreated	24.74	%	32	3,052
1995 anticipated				
Total Fresh Feed	377.58	MB/CD	28	2,699
% Hydrotreated	26.14	%	24	2,180
(5) Vacuum residua				
1990 actual				
Total Fresh Feed	65.86	MB/CD	21	2,733
% Hydrotreated	47.33	%	19	2,539
1995 anticipated				
Total Fresh Feed	85.82	MB/CD	19	3,070
% Hydrotreated	38.73	%	17	2,934
(6) Hydrocracked gas oil				
1990 actual				
Total Fresh Feed	52.69	MB/CD	10	2,104
% Hydrotreated	42.99	%	9	1,953
1995 anticipated				
Total Fresh Feed	64.68	MB/CD	13	2,467
% Hydrotreated	49.71	%	13	2,467
(7) Hydrotreated cat-cracked gas oil				
1990 actual				
Total Fresh Feed	41.10	MB/CD	9	1,424
% Hydrotreated	100.00	%		

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	========	======	====	========
1995 anticipated				
Total Fresh Feed	38.90	MB/CD	7	1,332
% Hydrotreated	100.00	%		
(8a) Lube extracts				
1990 actual				
Total Fresh Feed	51.54	MB/CD	13	2,154
% Hydrotreated	19.55	%	12	2,073
1995 anticipated				
Total Fresh Feed	44.83	MB/CD	10	1,943
% Hydrotreated	22.92	%	9	1,862
(8b) Other Feed				
1990 actual				
Total Fresh Feed	80.78	MB/CD	7	440
% Hydrotreated	57.75	%	7	440
1995 anticipated				
Total Fresh Feed	79.29	MB/CD	7	632
% Hydrotreated	59.10	%	6	577
TOTAL 1990 FRESH FEED	4,353.27	MB/CD	106	11,118
% Hydrotreated	34.81	%	103	10,887
TOTAL 1995 FRESH FEED	4,716.35	MB/CD	103	11,835
% Hydrotreated	41.86	%	100	11,587
d. Average feedstock quality to cat cracking unit				
(1) Gravity (API)				
1990 actual	24.52	deg API	105	11,094
1995 anticipated	24.00	deg API	102	11,821
(2) Conradson Carbon				
1990 actual	0.85	wt. %	105	11,094
1995 anticipated	0.83	wt. %	102	11,812
(3) Sulfur				
1990 actual	0.71	wt. %	100	10,693
1995 anticipated	0.82	wt. %	95	11,448
e. Average Product Yields				
1. Fuel Gas (FOE)				
1990 actual	209.45	MB/CD	105	11,131
1995 anticipated	218.88	MB/CD	101	11,844

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SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

		U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
		========	======	====	========
2.	Total C3/C4 recovered				
	1990 actual	1,054.09	MB/CD	104	11,102
	1995 anticipated	1,168.26	MB/CD	101	11,844
	(a) Propylene				
	1990 actual	296.93	MB/CD	101	10,593
	1995 anticipated	337.95	MB/CD	98	11,563
	(b) Isobutane				
	1990 actual	192.21	MB/CD	98	10,246
	1995 anticipated	224.16	MB/CD	96	11,231
	(c) Isobutylene				
	1990 actual	91.76	MB/CD	89	9,426
	1995 anticipated	104.40	MB/CD	87	10,191
	(d) Other Butylenes				
	1990 actual	233.82	MB/CD	97	10,427
	1995 anticipated	274.85	MB/CD	95	11,316
3.	Cat cracked naphtha (C5-430 F)				
	1990 actual	2,487.18	MB/CD	108	11,396
	1995 anticipated	2,701.62	MB/CD	103	12,085
4.	Light cycle oil (430 - 630 F)				
	1990 actual	819.16	MB/CD	107	11,315
	1995 anticipated	886.10	MB/CD	102	12,004
5.	Heavy cycle/slurry/decant oil (630+ F)				
	1990 actual	340.19	MB/CD	107	11,389
	1995 anticipated	341.91	MB/CD	102	12,079
6.	Coke, wt. percent of feed				
	1990 actual	5.25	wt. %	104	11,085
	1995 anticipated	5.20	wt. %	100	11,797
	Conversion (vol. % of feed)				
	1990 actual	73.83	vol. %	105	11,037
	1995 anticipated	74.37	vol. %	100	11,726

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
10. HYDROCRACKING				
a. Number of operable units				
as of 1/1/90	45		40	6,171
as of 1/1/91	44		40	6,171
as of 1/1/96 (anticipated)	49		45	6,715
b. Operable Capacity				
as of 1/1/90	1,173.33	MB/SD	40	6,171
as of 1/1/91	1,177.33	MB/SD	40	6,171
as of 1/1/96 (anticipated)	1,325.89	MB/SD	45	6,715
c. Average Fresh Feed Rate				
(1) Straight-run gas oil				
1990 actual	519.01	MB/CD	35	5,537
1995 anticipated	589.76	MB/CD	37	5,169
(2) Coker/thermal gas oil				
1990 actual	92.75	MB/CD	18	2,563
1995 anticipated	105.40	MB/CD	17	2,577
(3) Deasphalted gas oil				
1990 actual	*	MB/CD	*	*
1995 anticipated	*	MB/CD	*	*
(4) FCC products				
1990 actual	221.04	MB/CD	29	4,661
1995 anticipated	343.05	MB/CD	33	5,565
(5) Hydrotreater/hydrocracker products				
1990 actual	9.94	MB/CD	3	782
1995 anticipated	22.27	MB/CD	4	562
(6) Atmospheric residua				
1990 actual		MB/CD		
1995 anticipated		MB/CD		
(7) Vacuum residua				
1990 actual	*	MB/CD	*	*
1995 anticipated	*	MB/CD	*	*
(8) Diesel feed				
1990 actual	14.22	MB/CD	6	637
1995 anticipated	38.31	MB/CD	7	753
(8) Other Feed				
1990 actual	5.88	MB/CD	3	621
1995 anticipated	*	MB/CD	*	*
Total average fresh feed rate				
1990 actual	937.86	MB/CD	40	6,171
1995 anticipated	1,202.62	MB/CD	45	6,715

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SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

		U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
d.	Average chemical hydrogen consumption				
	1990 actual	2,096.65	SCF/B	40	6,171
	1995 anticipated	2,060.62	SCF/B	44	6,682
e.	Average Product Yields				
	(1) Fuel Gas (FOE)				
	1990 actual	48.18	MB/CD	35	5,512
	1995 anticipated	48.52	MB/CD	37	5,859
	(2) Propane (as recovered)				
	1990 actual	33.91	MB/CD	30	5,015
	1995 anticipated	37.35	MB/CD	30	5,172
	(3) Isobutane				
	1990 actual	66.85	MB/CD	34	5,225
	1995 anticipated	75.73	MB/CD	36	5,804
	(4) Normal Butane				
	1990 actual	38.04	MB/CD	34	5,225
	1995 anticipated	44.45	MB/CD	36	5,804
	(5) Hydrocracked light gasoline (C5-180 F)				
	1990 actual	178.85	MB/CD	37	5,864
	1995 anticipated	228.79	MB/CD	40	6,325
	(6) Hydrocracked gasoline (180 - 300 F)				
	1990 actual	300.89	MB/CD	36	5,622
	1995 anticipated	395.82	MB/CD	40	6,369
	(7) Hydrocracked heavy gasoline (300 - 350 F)				
	1990 actual	127.13	MB/CD	30	4,865
	1995 anticipated	139.62	MB/CD	30	4,630
	(8) Hydrocracked kerosene (350 - 500 F)				
	1990 actual	148.56	MB/CD	27	4,337
	1995 anticipated	204.14	MB/CD	33	4,809
	(9) Hydrocracked distillate (500 - 620 F)				
	1990 actual	59.22	MB/CD	21	3,392
	1995 anticipated	126.31	MB/CD	25	3,808
	(10) Hydrocracked heavy gas oil (620 - 1050 F)				
	1990 actual	92.15	MB/CD	13	2,585
	1995 anticipated	108.29	MB/CD	18	2,667
	(11) Hydrocracked residua (1050+ F)				
	1990 actual	24.46	MB/CD	3	649
	1995 anticipated	22.75	MB/CD	4	710

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
f. Maximum yield capability at operable capacity (% fresh feed)				
(1) Maximum gasoline mode				
(a) Gasoline (C5 - 350 F)				
1990 actual	76.85	%	33	5,236
1995 anticipated	73.50	%	34	5,433
(b) Kerosene (350 - 500 F)				
1990 actual	11.73	%	30	4,995
1995 anticipated	10.95	%	31	5,191
(2) Maximum kerosene mode				
(a) Gasoline (C5 - 350 F)				
1990 actual	50.56	%	24	4,048
1995 anticipated	50.06	%	27	4,354
(b) Kerosene (350 - 500 F)				
1990 actual	28.94	%	23	3,852
1995 anticipated	27.23	%	28	4,446
11. CATALYTIC REFORMING--HIGH PRESSURE SEMI-REGENERATIVE OR CYCLIC UNITS				
a. Number of operable units				
as of 1/1/90	104		75	7,298
as of 1/1/91	104		76	7,298
as of 1/1/96 (anticipated)	82		63	6,421
b. Operable Capacity				
as of 1/1/90	1,484.70	MB/SD	74	7,284
as of 1/1/91	1,483.50	MB/SD	76	7,298
as of 1/1/96 (anticipated)	1,174.40	MB/SD	63	6,421
c. Maximum reformate octane at operable capacity				
as of 1/1/90	96.56	RONC	73	7,235
as of 1/1/91	96.20	RONC	73	7,169
as of 1/1/96 (anticipated)	95.50	RONC	60	6,241
d. Average feed rate				
1990 actual				
Annual average	1,062.92	MB/CD	75	7,298
Summer	1,029.61	MB/CD	69	6,834
1995 anticipated				
Annual average	841.81	MB/CD	59	5,993

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

		U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
		========	======	====	========
e.	Average feed, 10% distilled (degree F)				
	1990 actual				
	Annual average	213.77	deg F	68	6,749
	Summer	212.98	deg F	65	6,596
	1995 anticipated				
	Annual average	215.89	deg F	51	5,500
f.	Average feed, 90% distilled (degree F)				
	1990 actual				
	Annual average	321.83	deg F	68	6,749
	Summer	328.34	deg F	65	6,596
	1995 anticipated				
	Annual average	321.02	deg F	51	5,500
g.	Average C+ reformate production rate, before any aromatics extraction				
	1990 actual				
	Annual average	785.56	MB/CD	73	7,089
	Summer	748.34	MB/CD	67	6,625
	1995 anticipated				
	Annual average	615.08	MB/CD	56	5,775
h.	Average C+ reformate octane				
	1990 actual				
	Annual average	94.28	RONC	73	7,089
	Summer	94.24	RONC	67	6,625
	1995 anticipated				
	Annual average	93.45	RONC	56	5,775
12.	CATALYTIC REFORMING--LOW PRESSURE SEMI-REGENERATIVE OR CYCLIC UNITS				
a.	Number of operable units				
	as of 1/1/90	68		57	6,664
	as of 1/1/91	68		57	6,664
	as of 1/1/96 (anticipated)	71		59	7,413
b.	Operable Capacity				
	as of 1/1/90	1,572.62	MB/SD	57	6,664
	as of 1/1/91	1,590.95	MB/SD	57	6,664
	as of 1/1/96 (anticipated)	1,665.47	MB/SD	59	7,413
c.	Maximum reformate octane at operable capacity				
	as of 1/1/90	98.85	RONC	56	6,655
	as of 1/1/91	98.86	RONC	56	6,655
	as of 1/1/96 (anticipated)	99.14	RONC	57	7,370

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	========	======	====	========
d. Average feed rate				
1990 actual				
Annual average	1,242.05	MB/CD	57	6,664
Summer	1,320.25	MB/CD	57	6,664
1995 anticipated				
Annual average	1,356.96	MB/CD	57	7,318
e. Average feed, 10% distilled (degree F)				
1990 actual				
Annual average	198.31	deg F	55	6,597
Summer	203.91	deg F	53	6,482
1995 anticipated				
Annual average	199.05	deg F	52	7,111
f. Average feed, 90% distilled (degree F)				
1990 actual				
Annual average	318.00	deg F	55	6,597
Summer	321.86	deg F	53	6,482
1995 anticipated				
Annual average	318.89	deg F	52	7,111
g. Average C+ reformate production rate, before any aromatics extraction				
1990 actual				
Annual average	996.37	MB/CD	57	6,664
Summer	1,040.32	MB/CD	57	6,664
1995 anticipated				
Annual average	1,075.30	MB/CD	56	7,270
h. Average C+ reformate octane				
1990 actual				
Annual average	97.22	RONC	56	6,655
Summer	97.58	RONC	56	6,655
1995 anticipated				
Annual average	96.81	RONC	54	7,209

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SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	========	======	====	========
13. CATALYTIC REFORMING--CONTINUOUS CATALYST REGENERATION UNITS				
a. Number of operable units				
as of 1/1/90	20		19	2,688
as of 1/1/91	20		19	2,688
as of 1/1/96 (anticipated)	29		26	3,325
b. Operable Capacity				
as of 1/1/90	577.40	MB/SD	19	2,688
as of 1/1/91	574.20	MB/SD	19	2,688
as of 1/1/96 (anticipated)	782.60	MB/SD	26	3,325
c. Maximum reformate octane at operable capacity				
as of 1/1/90	99.14	RONC	19	2,688
as of 1/1/91	99.28	RONC	19	2,688
as of 1/1/96 (anticipated)	100.38	RONC	26	3,325
d. Average feed rate				
1990 actual				
Annual average	482.64	MB/CD	19	2,688
Summer	511.38	MB/CD	19	2,688
1995 anticipated				
Annual average	691.89	MB/CD	26	3,325
e. Average feed, 10% distilled (degree F)				
1990 actual				
Annual average	192.36	deg F	19	2,688
Summer	194.70	deg F	18	2,582
1995 anticipated				
Annual average	193.86	deg F	25	3,299
f. Average feed, 90% distilled (degree F)				
1990 actual				
Annual average	314.59	deg F	19	2,688
Summer	319.17	deg F	18	2,582
1995 anticipated				
Annual average	322.87	deg F	25	3,299
g. Average C+ reformate production rate, before aromatics extraction				
1990 actual				
Annual average	374.72	MB/CD	19	2,688
Summer	397.95	MB/CD	19	2,688
1995 anticipated				
Annual average	553.83	MB/CD	26	3,325

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SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	========	======	====	========
h. Average C+ reformate octane				
1990 actual				
Annual average	98.33	RONC	19	2,688
Summer	98.50	RONC	19	2,688
1995 anticipated				
Annual average	97.93	RONC	26	3,325
14. ISOMERIZATION				
a. Number of operable units				
as of 1/1/90	57		52	5,029
as of 1/1/91	57		52	5,029
as of 1/1/96 (anticipated)	81		69	7,174
b. Operable Capacity				
(1) Isobutane (net)				
as of 1/1/90	53.34	MB/SD	17	1,282
as of 1/1/91	50.81	MB/SD	17	1,282
as of 1/1/96 (anticipated)	111.84	MB/SD	27	2,277
(2) Pentane/hexane (once through)				
as of 1/1/90	187.98	MB/SD	26	2,066
as of 1/1/91	187.98	MB/SD	26	2,066
as of 1/1/96 (anticipated)	312.20	MB/SD	41	3,704
(3) Pentane/hexane (recycle, net)				
as of 1/1/90	193.84	MB/SD	18	2,626
as of 1/1/91	194.18	MB/SD	18	2,626
as of 1/1/96 (anticipated)	211.94	MB/SD	21	3,002
c. Isomerized product rate				
(1) Isobutane (net)				
1990 actual				
Annual average	32.95	MB/CD	13	1,124
Summer	33.75	MB/CD	13	1,124
1995 anticipated				
Annual average	79.53	MB/CD	26	2,229
(2) Pentane/hexane (once through)				
1990 actual				
Annual average	125.93	MB/CD	25	2,000
Summer	127.94	MB/CD	25	2,000
1995 anticipated				
Annual average	243.02	MB/CD	40	3,657

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
(3) Pentane/hexane (recycle, net)				
1990 actual				
Annual average	133.31	MB/CD	18	2,626
Summer	143.65	MB/CD	18	2,626
1995 anticipated				
Annual average	147.47	MB/CD	20	2,931
15. ALKYLATION				
a. Number of operable units				
as of 1/1/90	107		99	11,065
as of 1/1/91	108		100	11,183
as of 1/1/96 (anticipated)	109		100	11,878
b. Operable Capacity (debutanized alkylate)				
as of 1/1/90	1,016.20	MB/SD	99	11,065
as of 1/1/91	1,036.61	MB/SD	100	11,183
as of 1/1/96 (anticipated)	1,115.41	MB/SD	100	11,878
c. Capacity of hydrofluoric acid type of units (% of total)				
as of 1/1/90	53.07	%	95	10,644
as of 1/1/91	52.01	%	96	10,762
as of 1/1/96 (anticipated)	49.52	%	96	11,417
d. Average feed rates of:				
(1) Propylenes				
1990 actual				
Annual average	96.57	MB/CD	72	7,163
Summer	100.75	MB/CD	69	6,962
1995 anticipated				
Annual average	118.58	MB/CD	70	7,513
(2) Butylenes				
1990 actual				
Annual average	322.46	MB/CD	91	10,015
Summer	330.18	MB/CD	88	9,832
1995 anticipated				
Annual average	332.91	MB/CD	90	10,620
(3) Amylenes				
1990 actual				
Annual average	14.14	MB/CD	22	3,633
Summer	15.45	MB/CD	22	3,633
1995 anticipated				
Annual average	36.26	MB/CD	32	4,833

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

		U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	Average Annual feed rates of total olefins				
	1990 actual				
	Annual average	433.17	MB/CD	91	10,015
	Summer	446.38	MB/CD	88	9,832
	1995 anticipated				
	Annual average	487.75	MB/CD	90	10,620
e.	Total debutanized alkylate production rate				
	1990 actual				
	Annual average	771.18	MB/CD	96	10,712
	Summer	785.32	MB/CD	92	10,273
	1995 anticipated				
	Annual average	860.27	MB/CD	95	11,352
16.	POLYMERIZATION/DIMERSOL				
a.	Number of polymerization units	22		31	3,235
	Number of dimersol units	9		31	3,235
b.	Operable Capacity (of polymerized product)				
	as of 1/1/90	90.18	MB/SD	33	3,491
	as of 1/1/91	90.48	MB/SD	33	3,491
	as of 1/1/96 (anticipated)	91.48	MB/SD	33	3,701
c.	Average feed rates of:				
	(1) Propylenes				
	1990 actual				
	Annual average	59.64	MB/CD	27	2,860
	Summer	59.65	MB/CD	25	2,590
	1995 anticipated				
	Annual average	61.87	MB/CD	24	2,830
	(2) Butylenes				
	1990 actual				
	Annual average	7.96	MB/CD	14	1,244
	Summer	3.21	MB/CD	11	1,067
	1995 anticipated				
	Annual average	6.82	MB/CD	11	1,198
d.	Total debutanized production rate				
	1990 actual				
	Annual average	49.57	MB/CD	31	3,182
	Summer	47.64	MB/CD	28	2,846
	1995 anticipated				
	Annual average	54.41	MB/CD	28	3,168

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
e. Percent of debutanized product to gasoline blending				
1990 actual				
Annual average	73.77	%	30	3,121
Summer	72.80	%	27	2,785
1995 anticipated				
Annual average	68.88	%	26	3,031
17. OXYGENATE PRODUCTION AT REFINERY SITE				
a. Operable Capacity				
(1) MTBE				
as of 1/1/90	36.11	MB/SD	18	2,652
as of 1/1/91	39.51	MB/SD	19	2,859
as of 1/1/96 (anticipated)	160.71	MB/SD	55	8,271
(2) ETBE				
as of 1/1/90		MB/SD		
as of 1/1/91		MB/SD		
as of 1/1/96 (anticipated)		MB/SD		
(3) TAME				
as of 1/1/90		MB/SD		
as of 1/1/91		MB/SD		
as of 1/1/96 (anticipated)	62.61	MB/SD	24	4,005
(4) OTHER				
as of 1/1/90		MB/SD		
as of 1/1/91		MB/SD		
as of 1/1/96 (anticipated)		MB/SD		
b. Operable capacity for in-refinery isobutane dehydrogenation for oxygenate production				
as of 1/1/96 (anticipated)	*	MB/SD	*	*
c. Average production rate (report oxygenate production only)				
(1) MTBE				
1990 actual	20.24	MB/CD	18	2,652
1995 anticipated	137.61	MB/CD	54	8,209
(2) ETBE				
1990 actual		MB/CD		
1995 anticipated		MB/CD		

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
(3) TAME				
1990 actual		MB/CD		
1995 anticipated	55.03	MB/CD	24	4,005
(4) OTHER				
1990 actual		MB/CD		
1995 anticipated		MB/CD		
18. AROMATICS EXTRACTION				
a. Operable Capacity of aromatics extraction feed				
as of 1/1/90	535.95	MB/SD	25	4,844
as of 1/1/91	536.75	MB/SD	25	4,844
as of 1/1/96 (anticipated)	587.05	MB/SD	26	4,813
b. Operable Capacity of total aromatics products				
as of 1/1/90	204.20	MB/SD	27	4,903
as of 1/1/91	204.05	MB/SD	26	4,878
as of 1/1/96 (anticipated)	228.24	MB/SD	26	4,877
c. Average aromatics extraction feed				
1990 actual	410.96	MB/CD	24	4,684
1995 anticipated	487.91	MB/CD	24	4,629
d. Average aromatics production rate				
1990 actual	146.98	MB/CD	25	4,901
1995 anticipated	184.20	MB/CD	24	4,824
19. TOLUENE DEALKYLATION				
a. Operable Capacity of benezen product				
as of 1/1/90	19.16	MB/SD	6	1,203
as of 1/1/91	19.16	MB/SD	6	1,203
as of 1/1/96 (anticipated)	19.06	MB/SD	5	952
b. Average benzene production rate				
1990 actual	11.38	MB/CD	6	1,203
1995 anticipated	10.50	MB/CD	5	952

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SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	========	======	====	========
20. HYDROGEN MANUFACTURING UNITS				
a. Number of operable units				
as of 1/1/90	48		41	5,153
as of 1/1/91	48		41	5,153
as of 1/1/96 (anticipated)	69		54	6,690
b. Operable Capacity (MMSCF/SD of 100% H2)				
(1) Total from all feeds				
as of 1/1/90	2,223.05	MMSCF/SD	41	5,153
as of 1/1/91	2,241.15	MMSCF/SD	41	5,153
as of 1/1/96 (anticipated)	2,739.90	MMSCF/SD	55	6,820
(2) Maximum percent from pentane or heavier feeds				
as of 1/1/90	16.89	%	38	4,842
as of 1/1/91	16.74	%	38	4,842
as of 1/1/96 (anticipated)	16.80	%	51	6,367
c. Average 100% H2 product rates				
(1) Total from all feeds				
1990 actual	1,633.57	MMSCF/SD	40	5,138
1995 anticipated	2,089.25	MMSCF/SD	53	6,503
(2) Percent from natural gas, fuel gas, or propane/butane feeds				
1990 actual	92.34	%	39	5,020
1995 anticipated	94.50	%	50	6,238
(3) Percent from pentane or heavier feeds				
1990 actual	7.84	%	36	4,799
1995 anticipated	5.87	%	45	5,812
21. HYDROGEN PURIFICATION UNITS				
a. Total operable capacity (MMSCF/SD of 100% H2)				
as of 1/1/90	327.10	MMSCF/SD	16	2,755
as of 1/1/91	331.10	MMSCF/SD	17	2,803
as of 1/1/96 (anticipated)	537.50	MMSCF/SD	28	3,965
b. Average purified H2 recovered				
1990 actual	249.00	MMSCF/CD	15	2,487
1995 anticipated	469.30	MMSCF/CD	28	3,965

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	========	======	====	========
22. SECONDARY GASOLINE FRACTIONATION				
a. Number of columns				
as of 1/1/90	149		44	5,620
as of 1/1/91	149		44	5,620
as of 1/1/96 (anticipated)	201		58	7,677
b. Total feed capacity				
as of 1/1/90	2,380.73	MB/SD	44	5,620
as of 1/1/91	2,380.73	MB/SD	44	5,620
as of 1/1/96 (anticipated)	3,573.68	MB/SD	58	7,677
23. SULFUR RECOVERY				
(includes H2S coversion by others for this refinery				
a. Total operable capacity				
as of 1/1/90	18,979.10	LT/SD	107	11,699
as of 1/1/91	19,234.60	LT/SD	107	11,699
as of 1/1/96 (anticipated)	22,394.20	LT/SD	112	12,461
b. Average purified H2 recovered				
1990 actual	11,289.30	LT/CD	106	11,692
1995 anticipated	14,360.00	LT/CD	112	11,600
B. REFINERY FEEDSTOCKS				
1. CRUDE OIL INPUTS				
a. 1990				
Sweet (<0.5 wt.% sulfur)				
(1) Light -- volume	4,439.83	MB/CD	104	10,143
Light -- gravity	38.10	API	102	10,035
Light -- sulfur	0.25	wt %	100	9,928
Light -- residua content	7.73	vol. %	94	9,481
(2) Heavy -- volume	541.86	MB/CD	36	4,590
Heavy -- gravity	31.55	API	35	4,506
Heavy -- sulfur	0.20	wt %	34	4,463
Heavy -- residua content	22.80	vol. %	35	4,548
Medium (0.5 - 1.0 wt. % sulfur)				
(3) Light -- volume	611.23	MB/CD	41	4,951
Light -- gravity	36.08	API	40	4,867
Light -- sulfur	0.71	wt %	40	4,867
Light -- residua content	11.00	vol. %	39	4,765

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SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

		U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
		========	======	====	========
(4)	Heavy -- volume	1,538.92	MB/CD	46	6,421
	Heavy -- gravity	27.34	API	32	6,287
	Heavy -- sulfur	0.97	wt %	32	6,244
	Heavy -- residua content	21.83	vol. %	32	6,119
High (>1.0 wt. % sulfur)					
(5)	Light -- volume	800.60	MB/CD	32	4,092
	Light -- gravity	34.14	API	32	4,092
	Light -- sulfur	1.66	wt %	32	4,092
	Light -- residua content	12.48	vol. %	31	4,011
(6)	Heavy -- volume	4,547.34	MB/CD	88	9,113
	Heavy -- gravity	25.95	API	88	9,113
	Heavy -- sulfur	2.10	wt %	87	9,070
	Heavy -- residua content	25.25	vol. %	82	8,751
(7)	1990 TOTAL -- volume	12,479.78	MB/CD	144	12,562
	1990 TOTAL -- average gravity	31.67	API	142	12,454
	1990 TOTAL -- average sulfur	1.16	wt %	140	12,347
	1990 TOTAL -- average residua	17.10	vol. %	130	11,788
b.	1995				
Sweet (<0.5 wt.% sulfur)					
(1)	Light -- volume	4,105.20	MB/CD	85	8,045
	Light -- gravity	37.84	API	83	7,954
	Light -- sulfur	0.27	wt %	82	7,890
	Light -- residua content	8.02	vol. %	79	7,724
(2)	Heavy -- volume	571.41	MB/CD	27	2,933
	Heavy -- gravity	32.47	API	26	2,849
	Heavy -- sulfur	0.20	wt %	26	2,849
	Heavy -- residua content	21.94	vol. %	26	2,907
Medium (0.5 - 1.0 wt. % sulfur)					
(3)	Light -- volume	594.17	MB/CD	29	3,135
	Light -- gravity	36.08	API	29	3,135
	Light -- sulfur	0.71	wt %	29	3,135
	Light -- residua content	11.11	vol. %	28	3,054
(4)	Heavy -- volume	1,659.95	MB/CD	42	4,915
	Heavy -- gravity	27.85	API	40	4,781
	Heavy -- sulfur	0.98	wt %	40	4,781
	Heavy -- residua content	21.02	vol. %	40	4,857

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

		U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
		=======	======	====	=======
	High (>1.0 wt. % sulfur)				
(5)	Light -- volume	994.41	MB/CD	27	3,516
	Light -- gravity	33.56	API	27	3,516
	Light -- sulfur	1.73	wt %	27	3,516
	Light -- residua content	12.96	vol. %	26	3,509
(6)	Heavy -- volume	5,159.36	MB/CD	80	8,467
	Heavy -- gravity	25.43	API	80	8,467
	Heavy -- sulfur	2.17	wt %	80	8,467
	Heavy -- residua content	25.61	vol. %	78	8,341
(7)	1995 TOTAL -- volume	13,084.51	MB/CD	138	12,167
	1995 TOTAL -- average gravity	30.99	API	136	12,077
	1995 TOTAL -- average sulfur	1.28	wt %	135	12,012
	1995 TOTAL -- average residua	17.81	vol. %	130	11,774
2.	PERCENT OF REFINERIES RUNNING "SWEET" CRUDE IN 1991	73.94%		142	12,022
3.	SWEET CRUDE REDUCED	464.23	MB/CD	105	9,722
4.	HIGH SULFUR CRUDE REPLACED	402.66	MB/CD	94	9,257
		MEAN ** RESPONSE			
		=======			
5.	CONSTRAINTS ON RUNNING HIGH SULFUR CRUDE OIL IN 1995				
a.	Sulfur content of products	1.94		141	13,285
b.	Sulfur content of refinery fuels	1.20		141	13,285
c.	Stationary-source air emissions	1.74		141	13,285
d.	Effluent water quality	1.03		140	13,228
e.	Metallurgy	1.43		141	13,285
f.	Sulfur plant capacity	1.40		140	13,204
g.	Residua processing capacity	1.56		140	13,172

** MEAN RESPONSE -- 4-point scale ... NONE=0, SOME =1, QUITE A BIT=2, and A GREAT DEAL=3.

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

		U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
		========	======	====	========
a.	Fuel Gas (FOE)				
	1990 Actual	647.64	MB/CD	130	11,863
	1995 Anticipated	656.72	MB/CD	122	12,227
b.	C2's including Ethylene				
	1990 Actual	34.56	MB/CD	12	2,398
	1995 Anticipated	29.70	MB/CD	7	1,470
c.	C3's including Propylene				
	1990 Actual	374.25	MB/CD	102	10,976
	1995 Anticipated	405.38	MB/CD	94	11,097
d.	C4's including Butylene				
	1990 Actual	109.70	MB/CD	73	7,874
	1995 Anticipated	152.66	MB/CD	60	7,409
e.	Oxygenates				
	1990 Actual	3.49	MB/CD	7	648
	1995 Anticipated	29.86	MB/CD	11	1,655
f.	Total Motor Gasoline				
	1990 Actual	6,482.72	MB/CD	128	12,200
	1995 Anticipated	7,276.92	MB/CD	120	12,626
g.	Aviation Gasoline				
	1990 Actual	31.49	MB/CD	25	3,078
	1995 Anticipated	18.92	MB/CD	20	2,515
h.	Special Naphthas (solvents)				
	1990 Actual	53.91	MB/CD	21	2,444
	1995 Anticipated	56.07	MB/CD	18	2,544
i.	Naphtha-Type Jet Fuel				
	1990 Actual	124.50	MB/CD	44	4,514
	1995 Anticipated	19.80	MB/CD	10	604
k.	Kerosene-Type Jet Fuel				
	1990 Actual	1,237.42	MB/CD	98	11,093
	1995 Anticipated	1,394.72	MB/CD	91	11,091
k.	Kerosene/#1 Fuel Oil				
	1990 Actual	79.92	MB/CD	67	5,997
	1995 Anticipated	83.02	MB/CD	54	4,898
l.	#2 Diesel Fuel/#2 Fuel Oil				
	1990 Actual	2,528.69	MB/CD	137	12,072
	1995 Anticipated	2,540.01	MB/CD	129	12,800
m.	Other Finished Diesel/Distillate Fuel Oil				
	1990 Actual	28.83	MB/CD	21	2,040
	1995 Anticipated	15.44	MB/CD	11	984

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	========	======	====	========
n. Residual Fuel Oil				
1. <0.30 wt, % S				
1990 Actual	49.78	MB/CD	12	1,118
1995 Anticipated	41.82	MB/CD	9	465
2. 0.30 - 1.00 wt. % S				
1990 Actual	143.98	MB/CD	40	3,842
1995 Anticipated	115.11	MB/CD	28	2,898
3. >1.00 wt. % S				
1990 Actual	551.37	MB/CD	86	9,019
1995 Anticipated	422.69	MB/CD	58	6,263
o. Asphalt and Road Oils				
1990 Actual	373.36	MB/CD	63	5,231
1995 Anticipated	360.73	MB/CD	57	4,632
p. Lubes/Waxes				
1990 Actual	149.33	MB/CD	24	3,478
1995 Anticipated	157.80	MB/CD	21	3,368
q. Benzene				
1990 Actual	42.03	MB/CD	20	3,326
1995 Anticipated	58.53	MB/CD	18	3,449
r. Toluene				
1990 Actual	25.31	MB/CD	17	2,575
1995 Anticipated	48.96	MB/CD	15	2,638
s. Xylenes				
1990 Actual	50.70	MB/CD	16	2,960
1995 Anticipated	65.50	MB/CD	14	2,956
t. Petrochemical Naphthas (<400 F)				
1990 Actual	220.35	MB/CD	21	3,778
1995 Anticipated	261.63	MB/CD	16	2,960
u. Petrochemical Feedstocks (400+ F)				
1990 Actual	96.62	MB/CD	11	1,939
1995 Anticipated	164.53	MB/CD	11	2,064
v. Unfinished Oils				
1. LSR Gasoline				
1990 Actual	44.93	MB/CD	44	4,238
1995 Anticipated	36.25	MB/CD	16	1,049
2. Heavy Naphtha				
1990 Actual	100.95	MB/CD	55	4,993
1995 Anticipated	56.06	MB/CD	20	1,952
3. Other Gasoline Blendstocks				
1990 Actual	103.90	MB/CD	58	6,752
1995 Anticipated	49.22	MB/CD	23	2,598

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	========	======	====	========
4. Middle Distillate/Cutter Stock				
1990 Actual	59.30	MB/CD	37	3,764
1995 Anticipated	90.95	MB/CD	23	2,335
5. HGO/Cracker Feeds				
1990 Actual	290.44	MB/CD	66	6,413
1995 Anticipated	199.09	MB/CD	36	3,186
6. Residua				
1990 Actual	120.08	MB/CD	43	4,630
1995 Anticipated	122.26	MB/CD	21	2,116
w. Marketable Coke (dry 400 lb./B)				
1990 Actual	306.82	MB/CD	50	6,873
1995 Anticipated	331.86	MB/CD	51	7,436
x. Catalytic Coke (400 lb./B)				
1990 Actual	140.24	MB/CD	76	8,174
1995 Anticipated	160.41	MB/CD	75	8,922
y. Miscellaneous Products				
1. Decant Oil				
1990 Actual	40.67	MB/CD	18	2,578
1995 Anticipated	36.03	MB/CD	16	2,628
2. Other Products				
1990 Actual	166.72	MB/CD	50	5,713
1995 Anticipated	123.08	MB/CD	34	4,123
z. Total Products				
1990 Actual	14,803.63	MB/CD	147	12,441
1995 Anticipated	15,581.04	MB/CD	140	12,945
aa. REFINERY LOSS (GAIN)				
1990 Actual	(393.72)	MB/CD	142	12,414
1995 Anticipated	(463.91)	MB/CD	133	12,686
bb. TOTAL CRUDE OIL AND RAW MATERIALS				
1990 Actual	14,528.26	MB/CD	148	12,566
1995 Anticipated	15,278.36	MB/CD	142	13,066
cc. Sulfur				
1990 Actual	11,289.30	LT/CD	106	11,692
1995 Anticipated	14,360.00	LT/CD	112	12,478

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	========	======	====	========
2. 1990 MOTOR GASOLINE GRADES				
a. LEADED				
1. Regular				
Octane Rating	87.96	(R+M)/2	75	5,525
Lead Content	0.08	g/gal	71	5,699
1990 Annual Production	286.67	MB/CD	75	5,525
2. Other Leaded				
Octane Rating	89.22	(R+M)/2	11	804
Lead Content	0.19	g/gal	10	799
1990 Annual Production	9.98	MB/CD	11	804
b. CONVENTIONAL UNLEADED				
1. Regular				
Octane Rating	87.02	(R+M)/2	121	11,916
Oxygen Content	0.20	wt. %	87	8,745
1990 Annual Production	3,846.64	MB/CD	122	11,944
2. Mid-Grade				
Octane Rating	89.06	(R+M)/2	70	8,543
Oxygen Content	0.17	wt. %	55	6,604
1990 Annual Production	579.68	MB/CD	70	8,543
3. Premium				
Octane Rating	92.35	(R+M)/2	116	11,561
Oxygen Content	0.36	wt. %	86	8,835
1990 Annual Production	1,241.03	MB/CD	116	11,561
4. Other				
Octane Rating	91.57	(R+M)/2	25	3,142
Oxygen Content	0.31	wt. %	19	2,528
1990 Annual Production	196.64	MB/CD	25	3,142
c. OXYGENATED				
1. Unleaded Regular				
Octane Rating	87.00	(R+M)/2	13	723
Oxygen Content	2.35	wt. %	13	723
1990 Annual Production	24.79	MB/CD	13	723
2. Unleaded Mid-Grade				
Octane Rating	88.17	(R+M)/2	7	752
Oxygen Content	1.27	wt. %	7	752
1990 Annual Production	21.54	MB/CD	7	752
3. Unleaded Premium				
Octane Rating	92.11	(R+M)/2	15	1,273
Oxygen Content	1.61	wt. %	15	1,273
1990 Annual Production	42.71	MB/CD	15	1,273

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

		U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
4.	Leaded				
	Octane Rating	88.48	(R+M)/2	5	162
	Oxygen Content	2.68	wt. %	5	162
	Lead Content	*	g/gal	*	*
	1990 Annual Production	3.37	MB/CD	5	162
5.	Other Oxygenated				
	Octane Rating	*	(R+M)/2	*	*
	Oxygen Content	*	wt. %	*	*
	Lead Content	*	g/gal	*	*
	1990 Annual Production	*	MB/CD	*	*
d.	TOTAL FINISHED GASOLINE	6,252.66	MB/CD	124	11,955.48
e.	SUBGRADES AND OTHER				
	Octane Rating	85.16	(R+M)/2	21	1,196
	Oxygen Content	0.09	wt. %	18	933
	Lead Content	0.02	g/gal	12	715
	1990 Annual Production	100.17	MB/CD	25	1,501
f.	TOTAL SUBGRADES	100.17	MB/CD	25	1,501
g.	TOTAL SUBGRADES AND FINISHED	6,481.67	MB/CD	128	12,200
3.	1995 MOTOR GASOLINE GRADES				
a.	LEADED				
1.	Regular				
	Octane Rating	87.30	(R+M)/2	9	354
	Lead Content	0.10	g/gal	7	304
	1995 Anticipated Production	10.45	MB/CD	9	354
2.	Other Leaded				
	Octane Rating	*	(R+M)/2	*	*
	Lead Content	*	g/gal	*	*
	1995 Anticipated Production	*	MB/CD	*	*

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SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

		U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
b.	CONVENTIONAL UNLEADED				
1.	Regular				
	Octane Rating	86.95	(R+M)/2	91	9,907
	Oxygen Content	0.10	wt. %	61	6,973
	1995 Anticipated Production	2,652.80	MB/CD	99	10,811
2.	Mid-Grade				
	Octane Rating	88.95	(R+M)/2	62	7,288
	Oxygen Content	0.08	wt. %	46	5,374
	1995 Anticipated Production	431.82	MB/CD	66	7,905
3.	Premium				
	Octane Rating	92.42	(R+M)/2	88	9,720
	Oxygen Content	0.25	wt. %	63	7,344
	1995 Anticipated Production	842.12	MB/CD	94	10,343
4.	Other				
	Octane Rating	91.49	(R+M)/2	10	1,102
	Oxygen Content	0.62	wt. %	7	880
	1995 Anticipated Production	91.25	MB/CD	11	1,215
c.	REFORMULATED GASOLINE				
1.	Regular				
	Octane Rating	87.08	(R+M)/2	56	8,393
	Oxygen Content	2.12	wt. %	54	8,107
	1995 Anticipated Production	1,530.51	MB/CD	57	8,472
2.	Mid-Grade				
	Octane Rating	89.03	(R+M)/2	35	5,588
	Oxygen Content	2.14	wt. %	35	5,588
	1995 Anticipated Production	291.11	MB/CD	36	5,667
3.	Premium				
	Octane Rating	92.60	(R+M)/2	54	8,132
	Oxygen Content	2.20	wt. %	52	7,846
	1995 Anticipated Production	802.70	MB/CD	55	8,211
4.	Other				
	Octane Rating	93.07	(R+M)/2	3	465
	Oxygen Content	2.00	wt. %	3	465
	1995 Anticipated Production	16.37	MB/CD	3	465

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SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

			U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
			========	======	====	========
d.	OXYGENATED					
	1.	Unleaded Regular				
		Octane Rating	86.72	(R+M)/2	33	3,113
		Oxygen Content	2.34	wt. %	33	3,073
		1995 Anticipated Production	252.61	MB/CD	36	3,212
	2.	Unleaded Mid-Grade				
		Octane Rating	88.70	(R+M)/2	21	2,061
		Oxygen Content	2.30	wt. %	22	2,092
		1995 Anticipated Production	52.00	MB/CD	23	2,146
	3.	Unleaded Premium				
		Octane Rating	92.27	(R+M)/2	32	2,994
		Oxygen Content	2.39	wt. %	32	2,954
		1995 Anticipated Production	102.05	MB/CD	35	3,093
	4.	Leaded				
		Octane Rating	87.43	(R+M)/2	5	262
		Oxygen Content	2.95	wt. %	5	262
		Lead Content	0.09	g/gal	3	194
		1995 Anticipated Production	2.84	MB/CD	5	262
	5.	Other Oxygenated				
		Octane Rating	89.74	(R+M)/2	4	495
		Oxygen Content	1.93	wt. %	4	495
		Lead Content	*	g/gal	*	*
		1995 Anticipated Production	15.25	MB/CD	4	495
e.	SUBGRADES AND OTHER					
		Octane Rating	86.05	(R+M)/2	6	442
		Oxygen Content	0.00	wt. %	5	272
		Lead Content	*	g/gal	*	*
		1995 Anticipated Production	157.85	MB/CD	13	960
f.	TOTAL SUBGRADES AND FINISHED		7,291.42	MB/CD	121	12,718

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SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	========	======	====	========
4. 1990 and 1995 PRODUCTION OF #2 DIESEL FUEL and #2 FUEL OIL GRADES				
TYPES OF #2 DIESEL FUEL and #2 FUEL OIL GRADES				
a. SULFUR CONTENT < 0.05 wt. %				
1. Common #2 Diesel Fuel/#2 Fuel Oil				
1990 Actual	76.99	MB/CD	10	635
1995 Anticipated	1,342.66	MB/CD	81	8,551
2. #2 Diesel Fuel				
1990 Actual	25.71	MB/CD	6	703
1995 Anticipated	102.55	MB/CD	13	801
3. #2 Fuel Oil				
1990 Actual	0.00	MB/CD	0	0
1995 Anticipated	35.69	MB/CD	3	285
4. California Diesel				
1990 Actual	NA	MB/CD		
1995 Anticipated	74.59	MB/CD	*	*
b. SULFUR CONTENT 0.05 - 0.20 wt. %				
1. Common #2 Diesel Fuel/#2 Fuel Oil				
1990 Actual	801.09	MB/CD	46	4,936
1995 Anticipated	416.81	MB/CD	21	3,110
2. #2 Diesel Fuel				
1990 Actual	63.84	MB/CD	7	909
1995 Anticipated	0.00	MB/CD	0	0
3. #2 Fuel Oil				
1990 Actual	87.16	MB/CD	4	556
1995 Anticipated	149.70	MB/CD	6	744
c. SULFUR CONTENT > 0.20 wt. %				
1. Common #2 Diesel Fuel/#2 Fuel Oil				
1990 Actual	1,171.26	MB/CD	66	6,447
1995 Anticipated	295.36	MB/CD	24	2,565
2. #2 Diesel Fuel				
1990 Actual	183.30	MB/CD	20	2,083
1995 Anticipated	13.51	MB/CD	5	219
3. #2 Fuel Oil				
1990 Actual	87.81	MB/CD	14	1,283
1995 Anticipated	66.51	MB/CD	8	506
d. TOTAL PRODUCTION				
1990 Actual	2,528.69	MB/CD	137	12,072
1995 Anticipated	2,540.01	MB/CD	129	12,800

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
5. 1990 GASOLINE COMPONENTS				
a. 1990 PRODUCTION				
Full Range Reformate	1,123.29	(MB/CD)	95	8,278
Light Reformate	101.98	(MB/CD)	16	2,021
Heavy Reformate	425.90	(MB/CD)	38	6,235
Straight-Run Naphtha	260.53	(MB/CD)	70	7,186
Natural Gasoline/Condensate	106.73	(MB/CD)	34	3,414
Full Range Naphtha	1,181.98	(MB/CD)	69	5,640
Light FCC Naphtha	767.78	(MB/CD)	42	6,589
Heavy FCC Naphtha	533.46	(MB/CD)	39	6,031
Pentane/Hexane Isomerate (once thru)	168.58	(MB/CD)	24	2,389
Pentane/Hexane Isomerate (recycle)	115.94	(MB/CD)	15	2,356
Coker Gasoline	48.80	(MB/CD)	15	2,111
Hydrocracker Gasoline	174.12	(MB/CD)	28	3,922
Alkylate	773.24	(MB/CD)	96	10,711
b. GRAVITY				
Full Range Reformate	45.05	API	90	7,806
Light Reformate	61.80	API	14	1,688
Heavy Reformate	34.36	API	38	6,235
Straight-Run Naphtha	75.30	API	65	6,774
Natural Gasoline/Condensate	78.61	API	32	3,102
Full Range Naphtha	57.12	API	66	5,197
Light FCC Naphtha	66.32	API	41	6,333
Heavy FCC Naphtha	43.27	API	38	5,774
Pentane/Hexane Isomerate (once thru)	85.41	API	22	2,033
Pentane/Hexane Isomerate (recycle)	84.57	API	14	2,294
Coker Gasoline	71.13	API	14	1,960
Hydrocracker Gasoline	80.49	API	27	3,772
Alkylate	71.50	API	91	10,193
c. ROAD OCTANE				
Full Range Reformate	97.43	RONC	91	8,063
Light Reformate	90.98	RONC	15	1,944
Heavy Reformate	104.56	RONC	37	6,127
Straight-Run Naphtha	73.43	RONC	66	6,845
Natural Gasoline/Condensate	76.20	RONC	33	3,359
Full Range Naphtha	92.06	RONC	66	5,197

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

		U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	Light FCC Naphtha	92.55	RONC	42	6,589
	Heavy FCC Naphtha	91.72	RONC	38	5,923
	Pentane/Hexane Isomerate (once thru)	82.62	RONC	24	2,389
	Pentane/Hexane Isomerate (recycle)	87.73	RONC	14	2,294
	Coker Gasoline	80.62	RONC	12	1,726
	Hydrocracker Gasoline	82.77	RONC	27	3,772
	Alkylate	93.62	RONC	90	10,166
d.	MOTOR OCTANE				
	Full Range Reformate	87.26	MONC	89	7,818
	Light Reformate	75.83	MONC	15	1,944
	Heavy Reformate	94.18	MONC	37	6,127
	Straight-Run Naphtha	71.08	MONC	66	6,845
	Natural Gasoline/Condensate	73.35	MONC	33	3,359
	Full Range Naphtha	80.65	MONC	66	5,197
	Light FCC Naphtha	80.80	MONC	42	6,589
	Heavy FCC Naphtha	81.10	MONC	38	5,923
	Pentane/Hexane Isomerate (once thru)	80.54	MONC	23	2,257
	Pentane/Hexane Isomerate (recycle)	84.33	MONC	14	2,294
	Coker Gasoline	71.99	MONC	12	1,726
	Hydrocracker Gasoline	80.52	MONC	27	3,772
	Alkylate	91.24	MONC	91	10,282
e.	RVP				
	Full Range Reformate	5.09	psi	90	7,986
	Light Reformate	8.22	psi	15	1,871
	Heavy Reformate	1.40	psi	38	6,235
	Straight-Run Naphtha	11.90	psi	67	6,971
	Natural Gasoline/Condensate	13.40	psi	33	3,359
	Full Range Naphtha	7.27	psi	66	5,197
	Light FCC Naphtha	9.27	psi	42	6,589
	Heavy FCC Naphtha	2.94	psi	37	5,699
	Pentane/Hexane Isomerate (once thru)	15.39	psi	24	2,389
	Pentane/Hexane Isomerate (recycle)	16.13	psi	14	2,294
	Coker Gasoline	10.06	psi	13	1,852
	Hydrocracker Gasoline	12.89	psi	27	3,772
	Alkylate	7.46	psi	90	10,419

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

		U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
f.	BENZENE CONTENT				
	Full Range Reformate	3.33	vol %	86	7,500
	Light Reformate	6.98	vol %	13	1,769
	Heavy Reformate	1.15	vol %	34	5,936
	Straight-Run Naphtha	1.69	vol %	59	5,983
	Natural Gasoline/Condensate	0.85	vol %	30	2,821
	Full Range Naphtha	0.99	vol %	59	4,764
	Light FCC Naphtha	1.25	vol %	35	5,524
	Heavy FCC Naphtha	0.53	vol %	33	5,271
	Pentane/Hexane Isomerate (once thru)	0.03	vol %	19	1,818
	Pentane/Hexane Isomerate (recycle)	0.01	vol %	10	1,747
	Coker Gasoline	0.96	vol %	12	1,726
	Hydrocracker Gasoline	1.33	vol %	27	3,772
	Alkylate	0.01	vol %	80	8,823
g.	AROMATIC CONTENT				
	Full Range Reformate	62.22	vol %	87	7,612
	Light Reformate	29.48	vol %	14	1,920
	Heavy Reformate	84.94	vol %	36	6,134
	Straight-Run Naphtha	7.20	vol %	63	6,658
	Natural Gasoline/Condensate	2.40	vol %	29	2,713
	Full Range Naphtha	27.88	vol %	62	5,074
	Light FCC Naphtha	16.99	vol %	40	6,395
	Heavy FCC Naphtha	47.17	vol %	35	5,603
	Pentane/Hexane Isomerate (once thru)	0.22	vol %	20	1,946
	Pentane/Hexane Isomerate (recycle)	0.14	vol %	11	1,820
	Coker Gasoline	6.36	vol %	10	1,304
	Hydrocracker Gasoline	2.83	vol %	27	3,772
	Alkylate	0.47	vol %	85	9,391
h.	OLEFIN CONTENT				
	Full Range Reformate	0.65	vol %	78	6,978
	Light Reformate	1.85	vol %	14	1,920
	Heavy Reformate	0.74	vol %	32	5,315
	Straight-Run Naphtha	0.62	vol %	57	5,784
	Natural Gasoline/Condensate	0.90	vol %	28	2,396

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

		U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	Full Range Naphtha	28.42	vol %	62	4,932
	Light FCC Naphtha	37.62	vol %	39	6,132
	Heavy FCC Naphtha	17.49	vol %	35	5,603
	Pentane/Hexane Isomerate (once thru)	0.29	vol %	21	1,974
	Pentane/Hexane Isomerate (recycle)	0.28	vol %	12	1,889
	Coker Gasoline	38.95	vol %	12	1,714
	Hydrocracker Gasoline	0.12	vol %	27	3,772
	Alkylate	0.28	vol %	83	9,538
i.	SULFUR				
	Full Range Reformate	9.39	PPM wt	77	6,336
	Light Reformate	0.65	PPM wt	10	1,060
	Heavy Reformate	3.76	PPM wt	28	4,512
	Straight-Run Naphtha	120.69	PPM wt	59	6,030
	Natural Gasoline/Condensate	277.85	PPM wt	28	2,544
	Full Range Naphtha	836.79	PPM wt	58	4,560
	Light FCC Naphtha	326.68	PPM wt	37	5,906
	Heavy FCC Naphtha	859.33	PPM wt	33	5,240
	Pentane/Hexane Isomerate (once thru)	2.40	PPM wt	21	1,975
	Pentane/Hexane Isomerate (recycle)	10.20	PPM wt	13	2,026
	Coker Gasoline	2,693.71	PPM wt	13	1,852
	Hydrocracker Gasoline	9.77	PPM wt	23	2,922
	Alkylate	16.64	PPM wt	76	8,422
j.	ASTM 10% DISTILLATION POINT				
	Full Range Reformate	172.18	F	88	7,865
	Light Reformate	140.90	F	15	1,944
	Heavy Reformate	255.89	F	35	5,946
	Straight-Run Naphtha	117.53	F	63	6,368
	Natural Gasoline/Condensate	108.20	F	31	3,071
	Full Range Naphtha	128.48	F	62	4,872
	Light FCC Naphtha	119.32	F	41	6,321
	Heavy FCC Naphtha	210.15	F	39	6,031
	Pentane/Hexane Isomerate (once thru)	100.84	F	21	1,818
	Pentane/Hexane Isomerate (recycle)	95.75	F	12	1,868
	Coker Gasoline	127.87	F	13	1,852
	Hydrocracker Gasoline	104.02	F	26	3,503
	Alkylate	146.76	F	90	10,329

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

		U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
k.	ASTM 50% DISTILLATION POINT				
	Full Range Reformate	259.79	F	88	7,778
	Light Reformate	183.75	F	15	1,944
	Heavy Reformate	295.48	F	35	5,946
	Straight-Run Naphtha	147.04	F	62	6,216
	Natural Gasoline/Condensate	135.03	F	31	3,071
	Full Range Naphtha	217.66	F	62	4,809
	Light FCC Naphtha	170.72	F	41	6,321
	Heavy FCC Naphtha	295.03	F	39	6,031
	Pentane/Hexane Isomerate (once thru)	112.89	F	21	1,818
	Pentane/Hexane Isomerate (recycle)	106.24	F	12	1,868
	Coker Gasoline	169.54	F	13	1,852
	Hydrocracker Gasoline	130.94	F	27	3,772
	Alkylate	215.27	F	90	10,242
l.	ASTM 90% DISTILLATION POINT				
	Full Range Reformate	335.26	F	89	7,949
	Light Reformate	230.26	F	15	1,944
	Heavy Reformate	350.81	F	35	5,946
	Straight-Run Naphtha	208.29	F	64	6,452
	Natural Gasoline/Condensate	186.27	F	31	3,071
	Full Range Naphtha	362.36	F	63	4,956
	Light FCC Naphtha	272.53	F	42	6,589
	Heavy FCC Naphtha	386.72	F	39	6,031
	Pentane/Hexane Isomerate (once thru)	145.27	F	21	1,818
	Pentane/Hexane Isomerate (recycle)	132.37	F	12	1,868
	Coker Gasoline	227.69	F	13	1,852
	Hydrocracker Gasoline	177.60	F	27	3,772
	Alkylate	276.83	F	91	10,413

NOTE: The sum of the responses are reported for each survey item except percentages, feed and product properties which are reported as weighted averages.

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

	U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
	========	======	====	========
6. REFINERY'S SHORT-TERM CAPABILITY TO PRODUCE SELECTED PRODUCTS				
MAXIMUM PRODUCTION OF:				
a. SUMMER MOTOR GASOLINE	6,773.01	MB/CD	112	11,167
if MAX MOTOR GASOLINE, produce:				
1. Kerosene-Type Jet Fuel	1,307.05	MB/CD	89	9,962
2. #2 Diesel/#2 Fuel Oil	2,392.20	MB/CD	110	11,110
3. Residual Fuel Oil	695.75	MB/CD	80	7,831
b. WINTER KEROSENE-TYPE JET FUEL	1,691.07	MB/CD	96	10,248
if MAX KERO-JET, produce:				
1. Motor Gasoline	5,912.40	MB/CD	98	10,578
2. #2 Diesel/#2 Fuel Oil	2,364.18	MB/CD	100	10,544
3. Residual Fuel Oil	771.70	MB/CD	77	7,800
c. WINTER #2 DIESEL/#2 FUEL OIL	2,971.24	MB/CD	115	10,317
if MAX #2 FUEL, produce:				
1. Motor Gasoline	5,931.04	MB/CD	106	10,248
2. Kerosene-Type Jet Fuel	951.50	MB/CD	73	8,364
3. Residual Fuel Oil	693.99	MB/CD	79	7,238
7. EFFECTS OF RUNNING 5% LESS CRUDE				
a. CHANGE IN REFINERY STOCK BALANCE				
1. Change in Crude Run	(562.83)	MB/CD	122	11,257
a. Gravity	31.90	API	121	11,246
b. Sulfur	1.08	wt. %	121	11,246
c. 1050 + Residua	15.73	vol %	117	11,215
2. Change in Other Feeds	81.34	MB/CD	71	8,119
Change in Production of:				
3. Motor Gasoline	(139.49)	MB/CD	99	9,529
4. Kerosene-Type Jet Fuel	(61.28)	MB/CD	64	7,391
5. #2 Diesel/#2 Fuel Oil	(126.56)	MB/CD	110	10,374
6. Residual Fuel Oil	(42.27)	MB/CD	66	5,976
7. Other Products Sold	(51.56)	MB/CD	104	9,616

* DATA WIHTHHELD, TOO FEW RESPONSES TO REPORT

SECTION II

REFINERY FACILITIES --
CAPABILITIES AND UTILIZATION, FEEDSTOCKS, AND PRODUCT YIELDS

		U.S. RESPONSE	UNITS of MEASURE	# of RESP	ASSOCIATED CRUDE OIL CAPACITY (MB/CD)
		========	======	====	========
b.	CHANGE IN PROCESS UTILIZATION				
	1. Catalytic Reforming	(62.91)	MB/CD	85	7,725
	2. Alkylation	(11.51)	MB/CD	46	4,486
	3. Polymerization/Dimersol	(1.76)	MB/CD	17	1,386
	4. Catalytic Cracking	(55.94)	MB/CD	53	4,306
	5. Hydrocracking	(11.83)	MB/CD	10	1,501
	6. Coking	(32.07)	MB/CD	28	2,935
	7. Mid Distillate Hydrotreating	(66.50)	MB/CD	56	6,913
	8. Gas Oil/Cat Cracker Feed Hydrotreating	(31.30)	MB/CD	16	1,943
c.	CHANGE IN TOTAL OPERATING COSTS	(406,612)	$/CD	108	10,024
8.	EFFECTS OF RUNNING 5% MORE CRUDE				
a.	CHANGE IN REFINERY STOCK BALANCE				
	1. Change in Crude Run	514.47	MB/CD	115	10,255
	a. Gravity	32.23	API	114	10,244
	b. Sulfur	1.17	wt. %	114	10,244
	c. 1050 + Residua	16.16	vol %	109	10,211
	2. Change in Other Feeds	(43.08)	MB/CD	63	6,612
	Change in Production of:				
	3. Motor Gasoline	104.68	MB/CD	94	8,848
	4. Kerosene-Type Jet Fuel	45.57	MB/CD	57	6,597
	5. #2 Diesel/#2 Fuel Oil	122.02	MB/CD	106	9,687
	6. Residual Fuel Oil	48.97	MB/CD	61	5,827
	7. Other Products Sold	55.91	MB/CD	100	8,972
b.	CHANGE IN PROCESS UTILIZATION				
	1. Catalytic Reforming	47.06	MB/CD	76	7,007
	2. Alkylation	8.66	MB/CD	40	4,074
	3. Polymerization/Dimersol	1.26	MB/CD	15	1,126
	4. Catalytic Cracking	44.56	MB/CD	45	3,824
	5. Hydrocracking	8.00	MB/CD	8	1,294
	6. Coking	22.09	MB/CD	21	2,100
	7. Mid Distillate Hydrotreating	62.74	MB/CD	50	6,352
	8. Gas Oil/Cat Cracker Feed Hydrotreating	19.99	MB/CD	15	1,725
c.	CHANGE IN TOTAL OPERATING COSTS	336,259	$/CD	100	9,171

* DATA WIHTHHELD, TOO FEW RESPONSES TO REPORT

SECTION III

REFINERY EMISSION SOURCES AND CONTROLS

		U.S. RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
1.	PERCENT OF REFINERIES IN ATTAINMENT AREAS				
	a. Ozone	49.0	NA	%	145
	b. Carbon Monoxide	75.9	NA	%	145
	c. Particulates	80.7	NA	%	145
	d. Sulfur Dioxide	90.3	NA	%	145
	e. Nitrogen Oxides	95.1	NA	%	143
2.	REDUNDANCY FOR UNPLANNED SHUTDOWNS OF SULFUR PLANTS IN 1995				
	a. Largest Sulfur Plant	5,879.7	52.5	LT/D	112
	b. Largest Sulfur Tail Gas Plant	4,251.8	51.9	LT/D	82
	c. Largest FCCU FPCD, % of Capacity	NA	76.3	%	83
	d. Refineries with FCCU FPCD				
	Wet Scrubber	15.3	NA	%	85
	Electrostatic Precipitator	56.5	NA	%	85
	Baghouse	0.0	NA	%	85
	Cyclones	25.9	NA	%	85
	Other	2.4	NA	%	85
3.	REFINERIES WITH PRESSURE RELIEF VALVES (PRV's) IN 1995				
	10 or fewer	44.3	NA	%	140
	11 to 100	40.7	NA	%	140
	101 to 200	6.4	NA	%	140
	over 200	8.6	NA	%	140
4.	IN 1995, CRUDE COLUMNS WITH PRV's RELEASING TO ATMOSPHERE				
	a. Crude Columns	155.0	1.2	#	134
	b. Other Fractionators	910.0	7.0	#	130
5.	AVERAGE DAILY VOLUME OF TREATED WATER EFFLUENT IN 1990				
	a. Process Water	332.6	2.3	MMG/D	143
	b. Storm Water	97.5	0.9	MMG/D	112
6.	REFINERIES WITH HIGHEST LEVEL OF WASTE WATER TREATMENT IN 1995				
	Primary Waste Water Treatment	16.0	NA	%	144
	Secondary Waste Water Treatment	52.8	NA	%	144
	Tertiary Waste Water Treatment	31.3	NA	%	144
7.	IN 1995, LIKELIHOOD THAT RECEIVING BODY SEDIMENTS ARE AN ISSUE				
	Highly Unlikely	19.9	NA	%	146
	Unlikely	20.5	NA	%	146
	Possible	23.3	NA	%	146
	Likely	15.1	NA	%	146
	Highly Likely	21.2	NA	%	146

NA = NOT APPLICABLE

SECTION III

REFINERY EMISSION SOURCES AND CONTROLS

		U.S. RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
		=======	=======	=======	=======
8.	BY 1995, STORMWATER SURGE CAPACITY	2,642.5	19.4	MMG/D	136
9.	STORMWATER SURGE CAPACITY NEEDED FOR 10-YEAR, 24-HOUR STORM	2,937.9	23.3	MMG/D	126
10.	By 1995, PROCESS WASTE WATER SEGREGATED FROM STORMWATER				
	<25 percent	35.9	NA	%	145
	26 to 50 percnt	11.0	NA	%	145
	51 to 75 percent	10.3	NA	%	145
	over 75 percent	42.8	NA	%	145
11.	By 1995, PROCESS WASTE WATER PIPING ABOVE GROUND				
	<25 percent	71.0	NA	%	145
	26 to 50 percnt	12.4	NA	%	145
	51 to 75 percent	7.6	NA	%	145
	over 75 percent	9.0	NA	%	145
12.	By 1995, LINEAR FEET OF BELOW GROUND SEWER SYSTEM PIPING				
	10,000 or fewer linear feet	27.1	NA	%	140
	10,001 to 50,000 linear feet	44.3	NA	%	140
	50,001 to 100,000 linear feet	12.1	NA	%	140
	100,001 to 500,000 linear feet	12.1	NA	%	140
	over 500,000 linear feet	4.3	NA	%	140
13.	By 1995, LINEAR FEET OF BELOW GROUND HYDROCARBON SYSTEM PIPING				
	10,000 or fewer linear feet	45.7	NA	%	140
	10,001 to 50,000 linear feet	36.4	NA	%	140
	50,001 to 100,000 linear feet	13.6	NA	%	140
	100,001 to 500,000 linear feet	2.1	NA	%	140
	over 500,000 linear feet	2.1	NA	%	140
14.	MTR SURFACE IMPOUNDMENTS TO BE MODIFIED UNDER RCRA				
	a. Acreage upgraded to MTR after 1995	449.0	16.0	acres	28
	b. Replaced by tanks by 1995	839.8	16.5	MMGal	51
	c. Acreage closed and not replaced by 1995	550.0	13.8	acres	40
15.	REFINERIES W/ RCRA "B" APPLICATIONS	44.8	NA	%	143
	a. Non-hazardous SWMU's inactive after 1995	54,344.7	1,006.2	MCuYd	40
	b. Hazardous SWMU's inactive after 1995	21,639.7	441.6	MCuYd	49
	c. Hazardous Waste Cleaned up by 1995	NA	52.5	%	40

NA = NOT APPLICABLE

SECTION III

REFINERY EMISSION SOURCES AND CONTROLS

	U.S. RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
16. REFINERIES HAVING ACTIVE SWMU's by 1995	49.4	NA	%	79
17. ACTIVE SWMU's in 1995				
a. Hazardous Waste				
1. Waste Volumes	540.1	36.0	MCuYd	15
2. Waste Capacity	1,016.8	72.6	MCuYd	14
3. Remaining Waste Capacity	434.2	33.4	MCuYd	13
b. Non-hazardous Waste				
1. Waste Volumes	2,952.9	101.8	MCuYd	29
2. Waste Capacity	6,720.3	224.0	MCuYd	30
3. Remaining Waste Capacity	2,986.3	119.0	MCuYd	25
18. HYDROCARBON-CONTAMINATED SOIL THAT REQUIRES REMEDIATION AFTER 1995	34,801.5	424.4	MCuYd	82
19. GROUND WATER MONITORING SYSTEM IN 1995				
None	12.1	NA	%	141
Perimeter	64.5	NA	%	141
Groups of SWMU's	40.4	NA	%	141
Individual SWMU's	51.8	NA	%	141
20. HYDROCARBON/GROUND WATER RECOVERY SYSTEMS IN 1995				
None	25.7	NA	%	140
Perimeter	45.0	NA	%	140
Barrier	37.1	NA	%	140
Groups of SWMU's	26.4	NA	%	140
Individual SWMU's	34.3	NA	%	140
21. TANKS AVAILABLE FOR HYDROCARBON SERVICE IN 1995				
a. Light Hydrocarbons				
Number	6,069.0	42.7	#	142
Capacity	423.0	3.1	MMB	137
Percent Equipped with Leak Detection	NA	19.5	%	139
Percent Equipped with Double Seals	NA	67.1	%	138
a. Heavy Hydrocarbons				
Number	9,674.0	68.1	#	142
Capacity	369.6	2.7	MMB	139
Percent Equipped with Leak Detection	NA	14.2	%	140
22. AGE OF TANKS IN 1995				
a. Less Than 40 Years				
Number	7,914.0	56.5	#	140
Capacity	469.7	3.5	MMB	136
b. 40 Years or More				
Number	7,346.0	56.9	#	129
Capacity	337.5	3.4	MMB	99

NA = NOT APPLICABLE

SECTION IV

ECONOMIC IMPACTS OF ENVIRONMENTAL REGULATIONS ON REFINERIES

	U.S. RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
1. HISTORICAL ENVIRONMENTAL EXPENDITURES (1986 THRU 1990)				
a. Air-Related Costs				
O & M -- 1986	775.1	9.6	$MM	81
Capital -- 1986	238.0	4.4	$MM	54
O & M -- 1987	272.6	7.0	$MM	39
Capital -- 1987	229.1	7.9	$MM	29
O & M -- 1988	823.1	8.4	$MM	98
Capital -- 1988	186.9	2.6	$MM	71
O & M -- 1989	986.3	9.5	$MM	104
Capital -- 1989	139.5	1.8	$MM	77
O & M -- 1990	1,111.5	10.1	$MM	110
Capital -- 1990	398.9	4.2	$MM	95
b. Water-Related Costs				
O & M -- 1986	376.8	4.2	$MM	89
Capital -- 1986	77.1	1.6	$MM	49
O & M -- 1987	113.7	2.5	$MM	45
Capital -- 1987	42.5	1.3	$MM	32
O & M -- 1988	408.4	4.0	$MM	102
Capital -- 1988	166.3	2.7	$MM	61
O & M -- 1989	504.2	4.7	$MM	107
Capital -- 1989	190.5	2.4	$MM	80
O & M -- 1990	585.5	5.1	$MM	115
Capital -- 1990	376.3	3.9	$MM	96
c. Hazardous/Non-Hazardous Solid Waste-Related Costs				
O & M -- 1986	96.1	1.2	$MM	80
Capital -- 1986	17.5	0.5	$MM	38
O & M -- 1987	44.2	1.0	$MM	43
Capital -- 1987	15.7	0.7	$MM	21
O & M -- 1988	167.6	1.7	$MM	96
Capital -- 1988	140.9	2.3	$MM	61
O & M -- 1989	309.9	3.0	$MM	104
Capital -- 1989	81.0	1.6	$MM	52
O & M -- 1990	482.7	4.5	$MM	107
Capital -- 1990	87.6	1.3	$MM	68
TOTAL Environmental Expenditures				
O & M -- 1986	1,248.0	13.9	$MM	90
Capital -- 1986	332.6	4.8	$MM	69
O & M -- 1987	430.5	9.2	$MM	89
Capital -- 1987	287.3	7.6	$MM	38
O & M -- 1988	1,399.1	13.3	$MM	105
Capital -- 1988	494.1	5.6	$MM	88
O & M -- 1989	1,800.4	16.1	$MM	112
Capital -- 1989	411.0	4.2	$MM	99
O & M -- 1990	2,179.7	18.8	$MM	116
Capital -- 1990	862.8	7.8	$MM	110

SECTION IV

ECONOMIC IMPACTS OF ENVIRONMENTAL REGULATIONS ON REFINERIES

	U.S. RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
	=======	=======	=======	======
d. Percent of Total O & M Expenses that Include Operating Unit Costs				
O & M -- 1986	70.8	NA	%	50
O & M -- 1987	69.7	NA	%	28
O & M -- 1988	57.1	NA	%	52
O & M -- 1989	56.3	NA	%	55
O & M -- 1990	59.7	NA	%	60
2. PROJECTED ENVIRONMENTAL EXPENDITURES (1991 THRU 1995)				
a. Air-Related Costs				
O & M -- 1995	1,511.5	12.7	$MM	119
One-Time -- 1991-1995	784.2	9.0	$MM	87
Capital -- 1991-1995	5,556.8	46.7	$MM	119
b. Water-Related Costs				
O & M -- 1995	688.9	5.9	$MM	117
One-Time -- 1991-1995	435.1	5.2	$MM	83
Capital -- 1991-1995	2,230.9	19.9	$MM	112
c. Hazardous/Non-Hazardous Solid Waste-Related Costs				
O & M -- 1995	582.7	5.0	$MM	117
One-Time -- 1991-1995	1,435.1	12.6	$MM	114
Capital -- 1991-1995	923.7	8.6	$MM	108
d. Reformulated Fuels-Related Costs				
O & M -- 1995	1,154.3	12.2	$MM	95
One-Time -- 1991-1995	1,290.0	19.8	$MM	65
Capital -- 1991-1995	10,970.3	101.6	$MM	108
e. Process Safety-Related Costs				
O & M -- 1995	144.3	1.6	$MM	88
One-Time -- 1991-1995	346.2	4.3	$MM	81
Capital -- 1991-1995	1,005.3	10.0	$MM	101
TOTAL Environmental Expenditures				
O & M -- 1995	4,081.7	33.5	$MM	122
One-Time -- 1991-1995	4,290.6	36.4	$MM	118
Capital -- 1991-1995	20,687.0	165.5	$MM	125
3. COSTS IN QUESTION #2 THAT ARE DUE TO REGULATORY REQUIREMENTS				
a. Air-Related Expenditures				
(1) CAAA of 1990				
O & M -- 1995	214.8	2.4	$MM	89
One-Time -- 1991-1995	112.9	1.7	$MM	67
Capital -- 1991-1995	1,134.8	12.8	$MM	89
(2) Benxzene Waste NESHAP				
O & M -- 1995	145.6	2.0	$MM	72
One-Time -- 1991-1995	95.8	1.5	$MM	64
Capital -- 1991-1995	1,576.6	20.0	$MM	79

SECTION IV

ECONOMIC IMPACTS OF ENVIRONMENTAL REGULATIONS ON REFINERIES

		U.S. RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
		=======	=======	=======	======
	(3) Local Air District Requirements				
	O & M -- 1995	314.0	5.2	$MM	60
	One-Time -- 1991-1995	456.2	10.6	$MM	43
	Capital -- 1991-1995	1,875.6	30.7	$MM	61
b.	Water-Related Expenditures				
	(1) CWA Water Quality Standards/NPDES				
	O & M -- 1995	335.8	3.6	$MM	94
	One-Time -- 1991-1995	164.7	2.5	$MM	65
	Capital -- 1991-1995	1,030.5	11.8	$MM	87
c.	Solid Waste-Related Expenditures				
	(1) Waste Treatment, Recycle, and Disposal				
	O & M -- 1995	322.0	3.2	$MM	100
	One-Time -- 1991-1995	217.1	2.7	$MM	79
	Capital -- 1991-1995	427.4	5.0	$MM	86
	(2) RCRA Facility Closures				
	O & M -- 1995	22.4	0.7	$MM	34
	One-Time -- 1991-1995	230.0	4.2	$MM	55
	Capital -- 1991-1995	136.9	4.6	$MM	30
	(3) Corrective Actions and Remediation				
	O & M -- 1995	100.2	1.4	$MM	74
	One-Time -- 1991-1995	799.8	9.4	$MM	85
	Capital -- 1991-1995	214.9	3.2	$MM	67
d.	Reformulated-Fuels-Related Expenditures				
	(1) Low-Sulfur Diesel				
	O & M -- 1995	240.9	3.2	$MM	75
	One-Time -- 1991-1995	553.0	10.4	$MM	53
	Capital -- 1991-1995	3,164.7	37.2	$MM	85
	(2) Oxygenated Gasoline (OG)				
	O & M -- 1995	162.3	3.0	$MM	54
	One-Time -- 1991-1995	163.3	4.0	$MM	41
	Capital -- 1991-1995	1,710.4	29.0	$MM	59
	(3) Reformulated Gasoline (RFG)				
	O & M -- 1995	526.8	7.7	$MM	68
	One-Time -- 1991-1995	456.6	10.1	$MM	45
	Capital -- 1991-1995	3,979.3	52.4	$MM	76
	(4) State & Local Regulations				
	O & M -- 1995	174.9	11.7	$MM	15
	One-Time -- 1991-1995	84.1	10.5	$MM	8
	Capital -- 1991-1995	1,914.7	119.7	$MM	16

SECTION IV

ECONOMIC IMPACTS OF ENVIRONMENTAL REGULATIONS ON REFINERIES

		U.S. RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
		=======	=======	=======	======
4.	NEW OR REVAMPED REFINERY PROCESS EQUIPMENT AS A RESULT OF ENVIRONMENTAL REGULATIONS -- IN SERVICE BY 1/1/1996				
a.	Atmospheric Crude Oil Distillation				
	Capital Expenditures	98.45	14.06	$MM	7
	Months to Obtain Permit	NA	10.8	Months	5
	Application to Start-Up	NA	22.8	Months	4
b.	Vacuum Crude Oil Distillation				
	Capital Expenditures	74.80	14.96	$MM	5
	Months to Obtain Permit	NA	8.8	Months	4
	Application to Start-Up	NA	21.8	Months	4
c.	Solvent Deasphalting				
	Capital Expenditures	0.00	0.00	$MM	0
	Months to Obtain Permit	NA	0.00	Months	0
	Application to Start-Up	NA	0.00	Months	0
d.	Hydrotreating				
	Capital Expenditures	2,852.20	37.53	$MM	76
	Months to Obtain Permit	NA	8.2	Months	71
	Application to Start-Up	NA	22.4	Months	67
e.	Aromatics Saturation				
	Capital Expenditures	192.00	27.43	$MM	7
	Months to Obtain Permit	NA	11.3	Months	6
	Application to Start-Up	NA	23.2	Months	6
f.	Delayed Coking				
	Capital Expenditures	11.54	2.31	$MM	5
	Months to Obtain Permit	NA	6.7	Months	3
	Application to Start-Up	NA	14.7	Months	3
g.	Fluid Coking and Flexicoking				
	Capital Expenditures	0.00	0.00	$MM	0
	Months to Obtain Permit	NA	0.00	Months	0
	Application to Start-Up	NA	0.00	Months	0
h.	Visbreaking/Thermal Cracking				
	Capital Expenditures	0.00	0.00	$MM	0
	Months to Obtain Permit	NA	0.00	Months	0
	Application to Start-Up	NA	0.00	Months	0
i.	Catalytic Cracking				
	Capital Expenditures	435.94	16.77	$MM	26
	Months to Obtain Permit	NA	10.5	Months	24
	Application to Start-Up	NA	22.8	Months	21
j.	Hydrocracking				
	Capital Expenditures	380.90	43.32	$MM	9
	Months to Obtain Permit	NA	8.2	Months	10
	Application to Start-Up	NA	22.0	Months	9

SECTION IV

ECONOMIC IMPACTS OF ENVIRONMENTAL REGULATIONS ON REFINERIES

		U.S. RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
		=======	=======	=======	======
k.	Catalytic Reforming				
	Capital Expenditures	348.77	19.38	$MM	18
	Months to Obtain Permit	NA	9.6	Months	16
	Application to Start-Up	NA	19.8	Months	12
l.	Isomerization				
	Capital Expenditures	543.35	22.64	$MM	24
	Months to Obtain Permit	NA	10.5	Months	22
	Application to Start-Up	NA	24.7	Months	20
m.	Alkylation				
	Capital Expenditures	951.95	39.66	$MM	24
	Months to Obtain Permit	NA	10.7	Months	20
	Application to Start-Up	NA	24.7	Months	19
n.	Polymerization/Dimersol				
	Capital Expenditures	0.00	0.00	$MM	0
	Months to Obtain Permit	NA	0.00	Months	0
	Application to Start-Up	NA	0.00	Months	0
o.	Oxygenate Production				
	Capital Expenditures	1,784.65	45.76	$MM	39
	Months to Obtain Permit	NA	9.2	Months	39
	Application to Start-Up	NA	21.6	Months	36
p.	Aromatics Extraction				
	Capital Expenditures	81.50	20.38	$MM	4
	Months to Obtain Permit	NA	9.0	Months	4
	Application to Start-Up	NA	15.4	Months	3
q.	Toluene Dealkylation				
	Capital Expenditures	0.00	0.00	$MM	0
	Months to Obtain Permit	NA	0.00	Months	0
	Application to Start-Up	NA	0.00	Months	0
r.	Hydrogen Manufacturing				
	Capital Expenditures	635.00	39.69	$MM	16
	Months to Obtain Permit	NA	10.3	Months	17
	Application to Start-Up	NA	25.3	Months	16
s.	Hydrogen Purification				
	Capital Expenditures	63.20	15.80	$MM	4
	Months to Obtain Permit	NA	7.4	Months	5
	Application to Start-Up	NA	21.0	Months	4
t.	Secondary Gasoline Fractionation				
	Capital Expenditures	561.16	18.10	$MM	31
	Months to Obtain Permit	NA	9.7	Months	27
	Application to Start-Up	NA	22.7	Months	23
u.	Sulfur Recovery				
	Capital Expenditures	662.80	15.78	$MM	42
	Months to Obtain Permit	NA	6.9	Months	37
	Application to Start-Up	NA	21.4	Months	33

SECTION IV

ECONOMIC IMPACTS OF ENVIRONMENTAL REGULATIONS ON REFINERIES

		U.S. RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
v.	Waste Water Treatment				
	Capital Expenditures	1,440.69	22.87	$MM	63
	Months to Obtain Permit	NA	7.8	Months	56
	Application to Start-Up	NA	19.0	Months	50
w.	Off-Site Facilities				
	Capital Expenditures	1,735.14	26.69	$MM	65
	Months to Obtain Permit	NA	8.1	Months	54
	Application to Start-Up	NA	21.6	Months	44
	TOTALS FOR ALL UNITS				
	Capital Expenditures	12,854.04	27.64	$MM	114
	Months to Obtain Permit	NA	8.8	Months	109
	Application to Start-Up	NA	21.9	Months	104
5.	PROCESS HAZARDS ANAYLSES (PHA) COMPLETED ON REFINERY PROCESS EQUIPMENT				
a.	Atmospheric Crude Oil Distillation				
	Percent of Units with PHA Completed	NA	31.4	%	12
	Expenditures for RESOLVED PHA's	1.15	0.14	$MM	8
	Budgeted for remaining PHAs	2.50	0.31	$MM	8
b.	Vacuum Crude Oil Distillation				
	Percent of Units with PHA Completed	NA	33.7	%	10
	Expenditures for RESOLVED PHA's	0.74	0.15	$MM	5
	Budgeted for remaining PHAs	2.00	0.33	$MM	6
c.	Solvent Deasphalting				
	Percent of Units with PHA Completed	NA	0.0	%	0
	Expenditures for RESOLVED PHA's	0.00	0.00	$MM	0
	Budgeted for remaining PHAs	0.00	0.00	$MM	0
d.	Hydrotreating				
	Percent of Units with PHA Completed	NA	27.3	%	22
	Expenditures for RESOLVED PHA's	4.87	0.30	$MM	16
	Budgeted for remaining PHAs	48.06	3.00	$MM	16
e.	Aromatics Saturation				
	Percent of Units with PHA Completed	NA	0.0	%	0
	Expenditures for RESOLVED PHA's	0.00	0.00	$MM	0
	Budgeted for remaining PHAs	0.00	0.00	$MM	0
f.	Delayed Coking				
	Percent of Units with PHA Completed	NA	59.5	%	8
	Expenditures for RESOLVED PHA's	1.39	0.28	$MM	5
	Budgeted for remaining PHAs	7.72	1.29	$MM	6

NA = NOT APPLICABLE

SECTION IV

ECONOMIC IMPACTS OF ENVIRONMENTAL REGULATIONS ON REFINERIES

		U.S. RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
		=======	=======	=======	======
g.	Fluid Coking and Flexicoking				
	Percent of Units with PHA Completed	NA	0.0	%	0
	Expenditures for RESOLVED PHA's	0.00	0.00	$MM	0
	Budgeted for remaining PHAs	0.00	0.00	$MM	0
h.	Visbreaking/Thermal Cracking				
	Percent of Units with PHA Completed	NA	0.0	%	0
	Expenditures for RESOLVED PHA's	0.00	0.00	$MM	0
	Budgeted for remaining PHAs	0.00	0.00	$MM	0
i.	Catalytic Cracking				
	Percent of Units with PHA Completed	NA	41.5	%	10
	Expenditures for RESOLVED PHA's	3.24	0.41	$MM	8
	Budgeted for remaining PHAs	3.52	0.50	$MM	7
j.	Hydrocracking				
	Percent of Units with PHA Completed	NA	36.6	%	15
	Expenditures for RESOLVED PHA's	3.37	0.26	$MM	13
	Budgeted for remaining PHAs	5.84	0.49	$MM	12
k.	Catalytic Reforming				
	Percent of Units with PHA Completed	NA	36.8	%	19
	Expenditures for RESOLVED PHA's	2.22	0.17	$MM	13
	Budgeted for remaining PHAs	8.58	0.61	$MM	14
l.	Isomerization				
	Percent of Units with PHA Completed	NA	61.8	%	5
	Expenditures for RESOLVED PHA's	0.80	0.20	$MM	4
	Budgeted for remaining PHAs	*	*	$MM	*
m.	Alkylation				
	Percent of Units with PHA Completed	NA	44.3	%	41
	Expenditures for RESOLVED PHA's	69.58	1.83	$MM	38
	Budgeted for remaining PHAs	155.15	4.31	$MM	36
n.	Polymerization/Dimersol				
	Percent of Units with PHA Completed	NA	28.0	%	4
	Expenditures for RESOLVED PHA's	0.50	0.13	$MM	4
	Budgeted for remaining PHAs	9.24	2.31	$MM	4
o.	Oxygenate Production				
	Percent of Units with PHA Completed	NA	96.0	%	5
	Expenditures for RESOLVED PHA's	0.30	0.06	$MM	5
	Budgeted for remaining PHAs	*	*	$MM	*
p.	Aromatics Extraction				
	Percent of Units with PHA Completed	NA	0.0	%	0
	Expenditures for RESOLVED PHA's	0.00	0.00	$MM	0
	Budgeted for remaining PHAs	0.00	0.00	$MM	0

NA = NOT APPLICABLE

SECTION IV

ECONOMIC IMPACTS OF ENVIRONMENTAL REGULATIONS ON REFINERIES

		U.S. RESPONSE		MEAN RESPONSE	UNITS OF MEASURE	# of RESP
q.	Toluene Dealkylation					
	Percent of Units with PHA Completed	NA		0.0	%	0
	Expenditures for RESOLVED PHA's	0.00		0.00	$MM	0
	Budgeted for remaining PHAs	0.00		0.00	$MM	0
r.	Hydrogen Manufacturing					
	Percent of Units with PHA Completed	NA		27.5	%	6
	Expenditures for RESOLVED PHA's	0.46		0.12	$MM	4
	Budgeted for remaining PHAs	0.94		0.24	$MM	4
s.	Hydrogen Purification					
	Percent of Units with PHA Completed	NA		0.0	%	0
	Expenditures for RESOLVED PHA's	0.00		0.00	$MM	0
	Budgeted for remaining PHAs	0.00		0.00	$MM	0
t.	Secondary Gasoline Fractionation					
	Percent of Units with PHA Completed	NA		29.3	%	7
	Expenditures for RESOLVED PHA's	0.70		0.14	$MM	5
	Budgeted for remaining PHAs	2.60		0.52	$MM	5
u.	Sulfur Recovery					
	Percent of Units with PHA Completed	NA		44.8	%	27
	Expenditures for RESOLVED PHA's	5.63		0.28	$MM	20
	Budgeted for remaining PHAs	30.74		1.54	$MM	20
v.	Waste Water Treatment					
	Percent of Units with PHA Completed	NA		46.0	%	5
	Expenditures for RESOLVED PHA's	0.16		0.04	$MM	4
	Budgeted for remaining PHAs	0.34		0.09	$MM	4
w.	Off-Site Facilities					
	Percent of Units with PHA Completed	NA		39.9	%	27
	Expenditures for RESOLVED PHA's	15.60		0.74	$MM	21
	Budgeted for remaining PHAs	39.35		1.87	$MM	21
	TOTALS FOR ALL UNITS					
	Percent of Units with PHA Completed	NA		40.6	%	64
	Expenditures for RESOLVED PHA's	110.71	**	0.64	$MM	57
	Budgeted for remaining PHAs	155.00	**	2.05	$MM	54

NA = NOT APPLICABLE

SECTION V

DISTRIBUTION AND TRANSPORT MODE OF PRODUCTS FROM REFINERIES

	U.S. RESPONSE	UNITS of MEASURE	# of RESP
1. VOLUME AND MODE OF PRODUCT MOVED IN 1990			
Finished Motor Gasoline			
Pipeline	4,760.90	MB/CD	105
Tanker	273.60	MB/CD	20
Barge	735.70	MB/CD	51
Rail	14.70	MB/CD	5
Truck	903.40	MB/CD	96
Motor Gasoline Subgrades			
Pipeline	29.40	MB/CD	7
Tanker	*	MB/CD	*
Barge	25.90	MB/CD	5
Rail	0.00	MB/CD	0
Truck	15.50	MB/CD	8
#2 Diesel Fuel/#2 Fuel Oil			
Pipeline	1,652.90	MB/CD	108
Tanker	115.40	MB/CD	19
Barge	388.70	MB/CD	54
Rail	15.60	MB/CD	12
Truck	348.30	MB/CD	100
Kerosene-Type Jet Fuel			
Pipeline	1,002.00	MB/CD	93
Tanker	81.80	MB/CD	19
Barge	116.00	MB/CD	34
Rail	16.90	MB/CD	4
Truck	66.90	MB/CD	70
2. PERCENT OF GASOLINE IN 1995 THAT WILL BE DISTRIBUTED TO NON-REQUIRED AREAS			
Oxygenated Gasoline	4.30	%	29
Reformulated Gasoline	4.60	%	39
3. PERCENT OF DIESEL FUEL IN 1995 THAT WILL BE DISTRIBUTED TO NON-REQUIRED AREAS			
Federal or California Diesel	18.80	%	67

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION VI

CORPORATE SUPPLY/DISTRIBUTION OF OXYGENATES AND BLENDERS IN 1995

	U.S. RESPONSE	UNITS of MEASURE	# of RESP
	========	======	====
1. REFINERY BLENDING OF OXYGENATES IN 1995			
Ethers	359,616.90	B/CD	46
Alcohols	9,732.50	B/CD	71
2. SOURCES OF REFINERY-BLENDED OXYGENATES IN 1995			
Ethers by Region			
1, 2 and 3	15,800.00	B/CD	5
4, 5, 6 and 7	21,380.80	B/CD	10
8	194,750.80	B/CD	36
9	*	B/CD	*
10, 11, 12 and 13	9,740.00	B/CD	4
North Europe	*	B/CD	*
Mediterranean	0.00	B/CD	0
Middle East	23,100.00	B/CD	5
Far East	*	B/CD	*
Western Hemisphere	16,500.00	B/CD	4
Western Canada	16,127.00	B/CD	6
Eastern Canada	0.00	B/CD	0
Unknown Sources	57,811.00	B/CD	16
	------		--
Total	360,416.60	B/CD	46
Alcohols by Region			
1, 2, 3, and 4	0.00	B/CD	0
5, 6, and 7	6,664.90	B/CD	58
8	1,760.10	B/CD	7
9	24.40	B/CD	4
10, 11, 12 and 13	307.00	B/CD	3
North Europe	0.00	B/CD	0
Middle East	*	B/CD	*
Far East	0.00	B/CD	0
Western Hemisphere	250.50	B/CD	3
Western Canada	0.00	B/CD	0
Eastern Canada	0.00	B/CD	0
Unknown Sources	163.00	B/CD	3
	------		--
Total	9,169.90	B/CD	66

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

SECTION VII

ISSUES CONCERNING TERMINALS FOR TERMINAL OPERATORS

	U.S. RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
	=========	=========	=========	=====
1. TERMINAL THROUGHPUTS, STORAGE CAPACITY AND PRODUCT SEGREGATIONS				
Total Throughput in 1990				
Region 1	482.7	30.4	MB/CD	16
Region 2	5,463.2	210.1	MB/CD	26
Region 3	2,128.6	81.9	MB/CD	26
Region 4	323.9	14.6	MB/CD	16
Region 5	2,198.1	66.6	MB/CD	33
Region 6	404.9	27.0	MB/CD	15
Region 7	739.2	37	MB/CD	20
Region 8	5344.6	144.4	MB/CD	37
Region 9	215.3	21.5	MB/CD	10
Region 10	522.1	43.5	MB/CD	12
Region 11	656.8	73.0	MB/CD	9
Region 12	2191.9	168.6	MB/CD	13
Region 13	159.6	12.3	MB/CD	13
1990 Motor Gasoline Segregations	MAXIMUM	MEAN		
Region 1	4.7	3.7	#	10
Region 2	5.0	3.2	#	17
Region 3	4.0	3.2	#	21
Region 4	4.0	2.9	#	15
Region 5	5.7	3.4	#	30
Region 6	3.0	2.5	#	12
Region 7	3.7	2.9	#	20
Region 8	8.7	3.9	#	31
Region 9	5.0	3.7	#	9
Region 10	3.3	3.0	#	11
Region 11	4.0	3.3	#	7
Region 12	7.7	4.3	#	11
Region 13	3.7	2.9	#	11
1990 #2 Diesel Fuel/ #2 Fuel Oil Segregations				
Region 1	2.0	1.4	#	16
Region 2	2.3	1.5	#	25
Region 3	2.0	1.1	#	25
Region 4	2.0	1.2	#	16
Region 5	2.3	1.3	#	33
Region 6	2.7	1.5	#	15
Region 7	2.0	1.5	#	20
Region 8	4.7	1.6	#	37
Region 9	2.3	1.4	#	9
Region 10	2.0	1.3	#	12
Region 11	1.7	1.3	#	7
Region 12	3.3	1.9	#	11
Region 13	2.3	1.5	#	13

NA=NOT APPLICABLE

SECTION VII

ISSUES CONCERNING TERMINALS FOR TERMINAL OPERATORS

	U.S. RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
	=========	=========	=========	=====
1990 Aviation Gasoline, Jet Fuel, Kerosene/#1 Fuel Oil Segregations				
Region 1	2.3	1.3	#	13
Region 2	2.0	1.2	#	21
Region 3	2.3	1.3	#	18
Region 4	2.0	1.3	#	11
Region 5	3.0	1.5	#	31
Region 6	1.7	1.2	#	12
Region 7	3.0	1.6	#	17
Region 8	4.7	1.9	#	26
Region 9	2.7	1.6	#	9
Region 10	2.3	1.6	#	10
Region 11	2.7	1.9	#	8
Region 12	3.0	2.3	#	9
Region 13	3.7	2.6	#	10
1995 Anticipated Motor Gasoline Segregations				
Region 1	6.3	4.6	#	10
Region 2	7.0	3.8	#	20
Region 3	5.3	3.5	#	21
Region 4	5.0	3.5	#	15
Region 5	6.7	4.0	#	30
Region 6	3.7	2.8	#	12
Region 7	5.3	3.1	#	19
Region 8	13.3	4.8	#	31
Region 9	5.3	3.8	#	9
Region 10	4.7	3.3	#	11
Region 11	4.0	3.3	#	7
Region 12	11.7	5.5	#	11
Region 13	3.3	2.6	#	11
1995 Anticipated #2 Diesel Fuel/ #2 Fuel Oil Segregations				
Region 1	3.0	1.9	#	15
Region 2	3.7	1.9	#	24
Region 3	2.3	2.4	#	25
Region 4	2.0	1.4	#	16
Region 5	3.7	1.8	#	32
Region 6	3.3	1.9	#	14
Region 7	3.0	1.8	#	20
Region 8	7.3	2.1	#	37
Region 9	2.7	1.8	#	9
Region 10	2.3	1.5	#	12
Region 11	1.7	1.3	#	7
Region 12	3.7	2.2	#	11
Region 13	2.3	1.7	#	13

NA=NOT APPLICABLE

SECTION VII

ISSUES CONCERNING TERMINALS FOR TERMINAL OPERATORS

	U.S. RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
1995 Anticipated Aviation Gasoline, Jet Fuel, Kerosene/#1 Fuel Oil Segregations				
Region 1	2.3	1.3	#	12
Region 2	2.7	1.4	#	21
Region 3	2.3	1.5	#	15
Region 4	2.0	1.3	#	12
Region 5	3.3	1.6	#	30
Region 6	2.3	1.4	#	11
Region 7	3.7	1.8	#	16
Region 8	5.0	2.0	#	28
Region 9	2.7	1.6	#	9
Region 10	2.3	1.5	#	10
Region 11	2.7	1.8	#	8
Region 12	3.0	2.2	#	10
Region 13	3.3	2.4	#	10
2. ABLE TO RECEIVE DEEP-WATER TANKERS	35	NA	%	115
3. 1990 VOLUMES THROUGH DEEP-WATER TERMINALS				
RECEIPTS				
a. Crude Oil	4,523.8	NA	MB/CD	21
b. Clean Products and Blendstocks	4,380.5	NA	MB/CD	31
c. Dirty Products and Blendstocks	4,139.8	NA	MB/CD	19
SHIPMENTS				
a. Crude Oil	72.1	NA	MB/CD	3
b. Clean Products and Blendstocks	1,059.3	NA	MB/CD	25
c. Dirty Products and Blendstocks	605.0	NA	MB/CD	19
4. 1995 ANTICIPATED RECEIPTS THROUGH DEEP-WATER TERMINALS				
a. Crude Oil	5,389.8	NA	MB/CD	25
b. Clean Products and Blendstocks	5,759.6	NA	MB/CD	33
c. Dirty Products and Blendstocks	5,066.7	NA	MB/CD	19
5. 1995 ANTICIPATED SHIPMENTS THROUGH DEEP-WATER TERMINALS				
a. Crude Oil	212.6	NA	MB/CD	5
b. Clean Products and Blendstocks	3,628.9	NA	MB/CD	28
c. Dirty Products and Blendstocks	906.3	NA	MB/CD	20

NA=NOT APPLICABLE

SECTION VII

ISSUES CONCERNING TERMINALS FOR TERMINAL OPERATORS

		U.S. RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
6.	1990 ENVIRONMENTAL EXPENDITURES FOR TERMINALS				
a.	Capital	197.6	2.5	$ Mil	79
b.	O & M Expenses	145.4	1.8	$ Mil	81
7.	1991-1995 ENVIRONMENTAL/PROCESS SAFETY EXPENDITURES FOR TERMINALS				
a.	Capital	1,582.7	18.6	$ Mil	85
b.	One-Time Expenditures	534.4	7.2	$ Mil	74
b.	O & M Expenses	227.9	3.0	$ Mil	77
8.	1991-1995 COSTS TO INCREASE THROUGHPUT OR SEGREGATIONS	484.8	9.9	$ Mil	49
9.	TERMINAL PROFILE				
a.	Total Terminals	1108	9.4	#	118
b.	Percent with marine facilities	NA	45.8	%	116
c.	Hydrocarbon Storage Tanks				
	1. Number	11,365.0	98.0	#	116
	2. Capacity	484.7	4.2	MMB	116
	3. With Leak Dection	NA	16.4	%	109
	4. With Double Seals	NA	25.9	%	110
	5. Less Than 40 Years Old	7,468.0	63.8	#	117
	6. Capacity of tanks <40 Years	344.1	3.1	MMB	110
	7. Over 40 Years Old	3,836.0	33.4	#	115
	8. Capacity of tanks >40 Years	140.3	2.3	MMB	61
10.	TERMINALS PROFILE				
a.	With Groundwater Monitoring	611	5.4	#	114
b.	With Groundwater Recovery	275	2.5	#	111
c.	With Contaminated Soil	427	3.9	#	109

NA=NOT APPLICABLE

SECTION VIII

ISSUES CONCERNING CLEAN PRODUCT PIPELINES FOR PIPELINE OPERATORS

		U.S. RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
1.	PIPELINE CAPACITIES				
	a. Nominal 1990 Capacity	7,393.0	171.9	MB/CD	43
	b. Average 1990 Utilization	5,155.0	119.9	MB/CD	43
	c. Anticipated 1995 Capacity	7,442.0	173.1	MB/CD	43
	d. Percent of Product Moved				
	Motor Gasoline	65.0	NA	%	43
	Distillate Fuel Oil	28.0	NA	%	43
	Jet Fuel	7.0	NA	%	43
2.	BY 1996, CHANGE IN PER-BARREL RATES DUE TO INCREASED CAPACITY				
	1 to 10 % Decrease	0	NA	%	9
	No Change	56	NA	%	9
	1 to 10 % Increase	11	NA	%	9
	11 to 20 % Increase	22	NA	%	9
	More Than 20 % Increase	11	NA	%	9
3.	BY 1996, CHANGE IN PER-BARREL RATES DUE TO ENVIRONMENTAL/SAFETY REGS				
	No Change	16	NA	%	31
	Less Than 10 % Increase	45	NA	%	31
	10 to 20 % Increase	19	NA	%	31
	More Than 20 % Increase	19	NA	%	31
4.	CHANGE IN PIPELINE CAPACITY IF GASOLINE SEGREGATIONS INCREASE BY 6 AND DISTILLATE SEGREGATIONS INCREASE BY 1, DUE TO CAAA of 1990				
	No Decrease	39	NA	%	31
	1 to 10 % Decrease	26	NA	%	31
	11 to 15 % Decrease	16	NA	%	31
	16 to 20 % Decrease	10	NA	%	31
	21 to 25 % Decrease	0	NA	%	31
	More Than 25 % Decrease	10	NA	%	31
5.	CHANGE IN PIPELINE CAPACITY IF GASOLINE SEGREGATIONS INCREASE BY 3 AND DISTILLATE SEGREGATIONS INCREASE BY 1, DUE TO CAAA of 1990				
	No Decrease	41	NA	%	32
	1 to 10 % Decrease	41	NA	%	32
	11 to 15 % Decrease	12	NA	%	32
	16 to 20 % Decrease	0	NA	%	32
	21 to 25 % Decrease	0	NA	%	32
	More Than 25 % Decrease	6	NA	%	32

NA = NOT APPLICABLE

SECTION VIII

ISSUES CONCERNING CLEAN PRODUCT PIPELINES FOR PIPELINE OPERATORS

		U.S. RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
6.	CHANGE IN PIPELINE TARIFFS IF GASOLINE SEGREGATIONS INCREASE BY 6 AND DISTILLATE SEGREGATIONS INCREASE BY 1, DUE TO CAAA of 1990				
	No Decrease	47	NA	%	30
	1 to 10 % Decrease	27	NA	%	30
	11 to 15 % Decrease	0	NA	%	30
	16 to 20 % Decrease	13	NA	%	30
	21 to 25 % Decrease	3	NA	%	30
	More Than 25 % Decrease	10	NA	%	30
7.	CHANGE IN PIPELINE TARIFFS IF GASOLINE SEGREGATIONS INCREASE BY 3 AND DISTILLATE SEGREGATIONS INCREASE BY 1, DUE TO CAAA of 1990				
	No Decrease	48	NA	%	31
	1 to 10 % Increase	29	NA	%	31
	11 to 15 % Increase	10	NA	%	31
	16 to 20 % Increase	10	NA	%	31
	21 to 25 % Increase	0	NA	%	31
	More Than 25 % Increase	3	NA	%	31
8.	PIPELINE EXPANSION PLANS BY 1996				
a.	Gasoline, Distillate, Jet	15	NA	%	34
b.	Months required to permits etc	NA	12.5	months	6
9.	POTENTIAL FOR SHIPPING ALCOHOL GASOLINES IN 1995				
a.	Alcohol-Blended Gasoline				
	Less than 10% Likelihood	82	NA	%	34
	10 to 50 % Likelihood	6	NA	%	34
	More Than 50 % Likelihood	12	NA	%	34
b.	Neat Methanol				
	Less than 10% Likelihood	94	NA	%	34
	10 to 50 % Likelihood	6	NA	%	34
	More Than 50 % Likelihood	0	NA	%	34
c.	Neat Ethanol				
	Less than 10% Likelihood	97	NA	%	34
	10 to 50 % Likelihood	3	NA	%	34
	More Than 50 % Likelihood	0	NA	%	34

NA = NOT APPLICABLE

SECTION IX

TANKER, BARGE, RAIL, AND TRUCK TRANSPORT COSTS

	U.S. RESPONSE	MEAN ** RESPONSE	UNITS OF MEASURE	# of RESP
	=========	=========	========	=====
1. ADDITIONAL TANKER CAPITAL, ONE-TIME AND O & M COSTS DUE TO ENVIRONMENTAL/SAFETY REGS				
ATRS (U.S. Flag)				
a. Less Than 30,000 DWT	NA	*	pts ***	*
b. 30,000 - 40,000 DWT	NA	19.4	pts ***	5
c. Over 40,000 DWT	NA	8.2	pts ***	6
World-Scale (Foreign Flag)				
a. Less Than 25,000 DWT	NA	0.0	pts ***	0
b. 25,000 - 30,000 DWT	NA	0.0	pts ***	0
c. 30,100 - 40,000 DWT	NA	*	pts ***	*
d. Over 40,000 DWT	NA	11.9	pts ***	3
2. 1990 BARGE RATES AND INCREASES DUE TO ENVIRONMENTAL ISSUES BY 1995				
Clean Products				
a. New York - Boston				
1990 Barge Rate	NA	0.54	$/B	7
Anticipated Increase by 1995	NA	24.40	%	7
b. New York - Port Everglades				
1990 Barge Rate	NA	0.00	$/B	0
Anticipated Increase by 1995	NA	0.00	%	0
c. Louisville - Pittsburgh				
1990 Barge Rate	NA	*	$/B	*
Anticipated Increase by 1995	NA	*	%	*
d. Houston - Pittsburgh				
1990 Barge Rate	NA	*	$/B	*
Anticipated Increase by 1995	NA	*	%	*
e. Houston - Louisville				
1990 Barge Rate	NA	*	$/B	*
Anticipated Increase by 1995	NA	*	%	*
f. Houston - Twin Cities				
1990 Barge Rate	NA	*	$/B	*
Anticipated Increase by 1995	NA	*	%	*
g. Houston - Kansas City				
1990 Barge Rate	NA	0.00	$/B	0
Anticipated Increase by 1995	NA	0.00	%	0

* DATA WITHELD, TOO FEW RESPONSES TO REPORT
** MEAN RESPONSE -- sum of responses/number of repsonses
*** Points based on 1991 Rate Schedules

NA = NOT APPLICABLE

SECTION IX

TANKER, BARGE, RAIL, AND TRUCK TRANSPORT COSTS

			U.S. RESPONSE	MEAN ** RESPONSE	UNITS OF MEASURE	# of RESP
	h.	New Orleans - Peoria, IL				
		1990 Barge Rate	NA	*	$/B	*
		Anticipated Increase by 1995	NA	*	%	*
	Barge Transport of Oxygenates					
	i.	Clinton, IA - Louisville				
		1990 Barge Rate	NA	*	$/B	*
		Anticipated Increase by 1995	NA	*	%	*
	j.	Peoria - Kansas City				
		1990 Barge Rate	NA	0.00	$/B	0
		Anticipated Increase by 1995	NA	0.00	%	0
	k.	Peoria - Houston				
		1990 Barge Rate	NA	0.00	$/B	0
		Anticipated Increase by 1995	NA	0.00	%	0
	OVERALL RATE CHANGES		NA	22.50	%	13
3.	1990 NET RAIL COSTS					
	a.	Motor Gasoline/Distillates	NA	0.10	c/Gal-Mile	7
	b.	Oxygenates	NA	0.10	c/Gal-Mile	13
4.	1990 NET TRUCK COSTS					
	a.	Motor Gasoline/Distillates	NA	0.05	c/Gal-Mile	38
	b.	Oxygenates	NA	0.03	c/Gal-Mile	8
5.	ANTICIPATED 1995 INCREASE IN TRUCKING COSTS					
		DUE TO ENVIRONMENTAL REGS	NA	23.0	%	38

* DATA WITHELD, TOO FEW RESPONSES TO REPORT
** MEAN RESPONSE -- sum of responses/number of responses
*** Points based on 1991 Rate Schedules

NA = NOT APPLICABLE

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

	RESPONSE	UNITS OF MEASURE	# of RESP
	=========	========	=====
1. ANTICIPATED GASOLINE SITUATION IN 1995			
a. North Europe			
Maximum Lead Content **	0.17	g/l	72
Percent Unleaded **	77.5	%	73
Pool Octane **	90.4	(R+M)/2	70
Percent Allowable Manganese **	12.9	%	56
b. Mediterranean			
Maximum Lead Content **	0.17	g/l	31
Percent Unleaded **	42.4	%	30
Pool Octane **	90.0	(R+M)/2	27
Percent Allowable Manganese **	34.0	%	20
c. Middle East			
Maximum Lead Content **	0.22	g/l	7
Percent Unleaded **	52.4	%	7
Pool Octane **	89.3	(R+M)/2	4
Percent Allowable Manganese **	*	%	*
d. Far East			
Maximum Lead Content **	0.20	g/l	43
Percent Unleaded **	81.0	%	46
Pool Octane **	88.1	(R+M)/2	21
Percent Allowable Manganese **	12.7	%	25
e. Canada			
Maximum Lead Content **	0.15	g/l	3
Percent Unleaded **	100.0	%	4
Pool Octane **	89.3	(R+M)/2	3
Percent Allowable Manganese **	75.0	%	4
f. Other Non-U.S. Western Hemsiphere			
Maximum Lead Content **	0.36	g/l	11
Percent Unleaded **	50.5	%	12
Pool Octane **	85.2	(R+M)/2	8
Percent Allowable Manganese **	38.3	%	10
2. ANTICIPATED GASOLINE SITUATION IN 2000			
a. North Europe			
Maximum Lead Content **	0.16	g/l	66
Percent Unleaded **	96.2	%	73
Pool Octane **	90.6	(R+M)/2	70
Percent Allowable Manganese **	12.6	%	56

NA = NOT APPLICABLE
* DATA WITHHELD, TOO FEW RESPONSES TO REPORT
** POOL AVERAGE

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

	RESPONSE	UNITS OF MEASURE	# of RESP
b. Mediterranean			
Maximum Lead Content **	0.17	g/l	30
Percent Unleaded **	74.8	%	31
Pool Octane **	90.5	(R+M)/2	29
Percent Allowable Manganese **	14.7	%	19
c. Middle East			
Maximum Lead Content **	0.15	g/l	6
Percent Unleaded **	99.3	%	7
Pool Octane **	*	(R+M)/2	*
Percent Allowable Manganese **	*	%	*
d. Far East			
Maximum Lead Content **	0.19	g/l	44
Percent Unleaded **	94.6	%	47
Pool Octane **	88.3	(R+M)/2	21
Percent Allowable Manganese **	11.7	%	25
e. Canada			
Maximum Lead Content **	*	g/l	*
Percent Unleaded **	100.0	%	4
Pool Octane **	89.3	(R+M)/2	3
Percent Allowable Manganese **	50.0	%	4
f. Other Non-U.S. Western Hemsiphere			
Maximum Lead Content **	0.25	g/l	11
Percent Unleaded **	75.4	%	12
Pool Octane **	87.2	(R+M)/2	8
Percent Allowable Manganese **	32.7	%	10
3. MOST LIKELY ALLOWABLE BENZENE CONTENT IN GASOLINE -- 1995			
a. Northern Europe			
< = 1.0	0.6	%	79
1.01 - 2.0	2.8	%	79
2.01 - 5.0	96.6	%	79
No Requirement	0.0	%	79
b. Mediterranean			
< = 1.0	0.0	%	33
1.01 - 2.0	0.0	%	33
2.01 - 5.0	100.0	%	33
No Requirement	0.0	%	33

NA = NOT APPLICABLE

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

** POOL AVERAGE

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

	RESPONSE	UNITS OF MEASURE	# of RESP
	=========	========	=====
c. Middle East			
< = 1.0	0.0	%	10
1.01 - 2.0	0.0	%	10
2.01 - 5.0	26.3	%	10
No Requirement	73.7	%	10
d. Far East			
< = 1.0	3.8	%	58
1.01 - 2.0	0.0	%	58
2.01 - 5.0	50.0	%	58
No Requirement	46.2	%	58
e. Canada			
< = 1.0	50.0	%	4
1.01 - 2.0	0.0	%	4
2.01 - 5.0	25.0	%	4
No Requirement	25.0	%	4
f. Other Non-U.S. Western Hemisphere			
< = 1.0	7.1	%	17
1.01 - 2.0	0.0	%	17
2.01 - 5.0	19.0	%	17
No Requirement	73.9	%	17
4. MOST LIKELY ALLOWABLE BENZENE CONTENT IN GASOLINE -- 2000			
a. Northern Europe			
< = 1.0	45.5	%	79
1.01 - 2.0	0.0	%	79
2.01 - 5.0	54.5	%	79
No Requirement	0.0	%	79
b. Mediterranean			
< = 1.0	33.3	%	33
1.01 - 2.0	8.6	%	33
2.01 - 5.0	58.1	%	33
No Requirement	0.0	%	33
c. Middle East			
< = 1.0	26.3	%	10
1.01 - 2.0	21.2	%	10
2.01 - 5.0	0.0	%	10
No Requirement	52.5	%	10

NA = NOT APPLICABLE

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

** POOL AVERAGE

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

	RESPONSE	UNITS OF MEASURE	# of RESP
d. Far East			
< = 1.0	21.0	%	58
1.01 - 2.0	14.7	%	58
2.01 - 5.0	26.1	%	58
No Requirement	38.2	%	58
e. Canada			
< = 1.0	75.0	%	4
1.01 - 2.0	0.0	%	4
2.01 - 5.0	0.0	%	4
No Requirement	25.0	%	4
f. Other Non-U.S. Western Hemisphere			
< = 1.0	7.1	%	16
1.01 - 2.0	0.0	%	16
2.01 - 5.0	19.1	%	16
No Requirement	73.8	%	16
5. MOST LIKELY ALLOWABLE AROMATICS CONTENT IN GASOLINE -- 1995			
a. Northern Europe			
25.0 % or below	0.6	%	79
25.1 - 35.0%	5.6	%	79
Above 35.0 %	11.9	%	79
No Requirement	82.0	%	79
b. Mediterranean			
25.0 % or below	0.0	%	33
25.1 - 35.0%	8.6	%	33
Above 35.0 %	20.8	%	33
No Requirement	70.6	%	33
c. Middle East			
25.0 % or below	0.0	%	10
25.1 - 35.0%	0.0	%	10
Above 35.0 %	26.3	%	10
No Requirement	73.7	%	10
d. Far East			
25.0 % or below	0.0	%	58
25.1 - 35.0%	7.6	%	58
Above 35.0 %	38.7	%	58
No Requirement	53.7	%	58

NA = NOT APPLICABLE
* DATA WITHHELD, TOO FEW RESPONSES TO REPORT
** POOL AVERAGE

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

		RESPONSE	UNITS OF MEASURE	# of RESP
		=========	========	=====
e.	Canada			
	25.0 % or below	25.0	%	4
	25.1 - 35.0%	0.0	%	4
	Above 35.0 %	0.0	%	4
	No Requirement	75.0	%	4
f.	Other Non-U.S. Western Hemisphere			
	25.0 % or below	7.1	%	17
	25.1 - 35.0%	26.1	%	17
	Above 35.0 %	0.0	%	17
	No Requirement	66.9	%	17
6.	MOST LIKELY ALLOWABLE AROMATICS CONTENT IN GASOLINE -- 2000			
a.	Northern Europe			
	25.0 % or below	15.0	%	77
	25.1 - 35.0%	25.8	%	77
	Above 35.0 %	14.3	%	77
	No Requirement	45.0	%	77
b.	Mediterranean			
	25.0 % or below	13.3	%	33
	25.1 - 35.0%	24.7	%	33
	Above 35.0 %	17.2	%	33
	No Requirement	44.8	%	33
c.	Middle East			
	25.0 % or below	28.3	%	7
	25.1 - 35.0%	0.0	%	7
	Above 35.0 %	0.0	%	7
	No Requirement	71.7	%	7
d.	Far East			7
	25.0 % or below	22.5	%	46
	25.1 - 35.0%	12.9	%	46
	Above 35.0 %	22.9	%	46
	No Requirement	41.7	%	46
e.	Canada			
	25.0 % or below	25.0	%	4
	25.1 - 35.0%	25.0	%	4
	Above 35.0 %	0.0	%	4
	No Requirement	50.0	%	4
f.	Other Non-U.S. Western Hemisphere			
	25.0 % or below	26.1	%	17
	25.1 - 35.0%	7.1	%	17
	Above 35.0 %	5.3	%	17
	No Requirement	61.5	%	17

NA = NOT APPLICABLE

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

** POOL AVERAGE

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

	RESPONSE	UNITS OF MEASURE	# of RESP
7. MOST LIKELY MAXIMUM RVP ALLOWED IN GASOLINE -- 1995			
a. Northern Europe			
9.0 psi or below	0.0	%	70
9.1 to 11.0 psi	28.5	%	70
Above 11.0 psi	71.2	%	70
No Requirement	0.2	%	70
b. Mediterranean			
9.0 psi or below	6.2	%	30
9.1 to 11.0 psi	89.4	%	30
Above 11.0 psi	4.3	%	30
No Requirement	0.0	%	30
c. Middle East			
9.0 psi or below	52.5	%	10
9.1 to 11.0 psi	21.2	%	10
Above 11.0 psi	26.3	%	10
No Requirement	0.0	%	10
d. Far East			
9.0 psi or below	23.1	%	48
9.1 to 11.0 psi	53.6	%	48
Above 11.0 psi	22.6	%	48
No Requirement	0.7	%	48
e. Canada			
9.0 psi or below	33.3	%	3
9.1 to 11.0 psi	33.3	%	3
Above 11.0 psi	33.3	%	3
No Requirement	0.0	%	3
f. Other Non-U.S. Western Hemisphere			
9.0 psi or below	62.3	%	11
9.1 to 11.0 psi	25.7	%	11
Above 11.0 psi	11.9	%	11
No Requirement	0.0	%	11
8. MOST LIKELY MAXIMUM RVP ALLOWED IN GASOLINE -- 2000			
a. Northern Europe			
9.0 psi or below	2.0	%	71
9.1 to 11.0 psi	77.7	%	71
Above 11.0 psi	20.1	%	71
No Requirement	0.2	%	71
b. Mediterranean			
9.0 psi or below	32.5	%	29
9.1 to 11.0 psi	63.0	%	29
Above 11.0 psi	4.5	%	29
No Requirement	0.0	%	29

NA = NOT APPLICABLE

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

** POOL AVERAGE

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

		RESPONSE	UNITS OF MEASURE	# of RESP
		=========	========	=====
c.	Middle East			
	9.0 psi or below	71.7	%	7
	9.1 to 11.0 psi	28.3	%	7
	Above 11.0 psi	0.0	%	7
	No Requirement	0.0	%	7
d.	Far East			
	9.0 psi or below	37.8	%	49
	9.1 to 11.0 psi	40.5	%	49
	Above 11.0 psi	9.2	%	49
	No Requirement	12.5	%	49
e.	Canada			
	9.0 psi or below	66.7	%	3
	9.1 to 11.0 psi	33.3	%	3
	Above 11.0 psi	0.0	%	3
	No Requirement	0.0	%	3
f.	Other Non-U.S. Western Hemisphere			
	9.0 psi or below	62.3	%	11
	9.1 to 11.0 psi	37.7	%	11
	Above 11.0 psi	0.0	%	11
	No Requirement	0.0	%	11

9. MOST LIKELY MINIMUM OXYGEN CONTENT IN GASOLINE -- 1995

		RESPONSE	UNITS OF MEASURE	# of RESP
a	Northern Europe			
	1.0 % or below	0.0	%	78
	1.01 - 2.0 %	0.0	%	78
	Above 2.0 %	7.5	%	78
	No Requirement	92.5	%	78
b.	Mediterranean			
	1.0 % or below	0.0	%	33
	1.01 - 2.0 %	0.0	%	33
	Above 2.0 %	8.6	%	33
	No Requirement	91.4	%	33
c.	Middle East			
	1.0 % or below	0.0	%	13
	1.01 - 2.0 %	0.0	%	13
	Above 2.0 %	0.0	%	13
	No Requirement	100.0	%	13
d.	Far East			
	1.0 % or below	10.3	%	63
	1.01 - 2.0 %	3.8	%	63
	Above 2.0 %	8.0	%	63
	No Requirement	85.1	%	63

NA = NOT APPLICABLE

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

** POOL AVERAGE

	RESPONSE	UNITS OF MEASURE	# of RESP
e. Canada			
1.0 % or below	0.0	%	4
1.01 - 2.0 %	0.0	%	4
Above 2.0 %	25.0	%	4
No Requirement	75.0	%	4
f. Other Non-U.S. Western Hemisphere			
1.0 % or below	0.0	%	13
1.01 - 2.0 %	19.0	%	13
Above 2.0 %	18.8	%	13
No Requirement	62.2	%	13
10. MOST LIKELY MINIMUM OXYGEN CONTENT IN GASOLINE -- 2000			
a. Northern Europe			
1.0 % or below	7.6	%	72
1.01 - 2.0 %	8.1	%	72
Above 2.0 %	8.1	%	72
No Requirement	76.3	%	72
b. Mediterranean			
1.0 % or below	5.1	%	30
1.01 - 2.0 %	15.7	%	30
Above 2.0 %	9.4	%	30
No Requirement	69.8	%	30
c. Middle East			
1.0 % or below	0.0	%	10
1.01 - 2.0 %	0.0	%	10
Above 2.0 %	0.0	%	10
No Requirement	100.0	%	10
d. Far East			
1.0 % or below	9.8	%	63
1.01 - 2.0 %	8.6	%	63
Above 2.0 %	1.6	%	63
No Requirement	79.9	%	63
e. Canada			
1.0 % or below	0.0	%	4
1.01 - 2.0 %	25.0	%	4
Above 2.0 %	25.0	%	4
No Requirement	50.0	%	4
f. Other Non-U.S. Western Hemisphere			
1.0 % or below	0.0	%	13
1.01 - 2.0 %	23.6	%	13
Above 2.0 %	18.8	%	13
No Requirement	57.6	%	13

NA = NOT APPLICABLE

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

** POOL AVERAGE

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

		RESPONSE	UNITS OF MEASURE	# of RESP
		=========	========	=====
11.	MOST LIKELY OXYGATE COMPOUND IN GASOLINE -- 1995			
a.	Northern Europe			
	Ethers	100.0	%	78
	Ethanol	0.0	%	78
	Other Alcohol	0.0	%	78
	None	0.0	%	78
b.	Mediterranean			
	Ethers	100.0	%	33
	Ethanol	0.0	%	33
	Other Alcohol	0.0	%	33
	None	0.0	%	33
c.	Middle East			
	Ethers	20.8	%	13
	Ethanol	0.0	%	13
	Other Alcohol	0.0	%	13
	None	79.2	%	13
d.	Far East			
	Ethers	85.6	%	60
	Ethanol	0.0	%	60
	Other Alcohol	0.0	%	60
	None	14.4	%	60
e.	Canada			
	Ethers	100.0	%	4
	Ethanol	0.0	%	4
	Other Alcohol	0.0	%	4
	None	0.0	%	4
f.	Other non-U.S. Western Hemisphere			
	Ethers	55.9	%	14
	Ethanol	34.2	%	14
	Other Alcohol	11.9	%	14
	None	9.9	%	14
12.	MOST LIKELY OXYGATE COMPOUND IN GASOLINE -- 2000			
a.	Northern Europe			
	Ethers	100.0	%	78
	Ethanol	0.0	%	78
	Other Alcohol	0.0	%	78
	None	0.0	%	78
b.	Mediterranean			
	Ethers	100.0	%	33
	Ethanol	0.0	%	33
	Other Alcohol	0.0	%	33
	None	0.0	%	33

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

		RESPONSE	UNITS OF MEASURE	# of RESP
		=========	========	=====
c.	Middle East			
	Ethers	62.3	%	13
	Ethanol	0.0	%	13
	Other Alcohol	0.0	%	13
	None	37.7	%	13
d.	Far East			
	Ethers	89.6	%	60
	Ethanol	1.0	%	60
	Other Alcohol	0.0	%	60
	None	9.4	%	60
e.	Canada			
	Ethers	100.0	%	4
	Ethanol	0.0	%	4
	Other Alcohol	0.0	%	4
	None	0.0	%	4
f.	Other Non-U.S. Western Hemisphere			
	Ethers	57.3	%	14
	Ethanol	32.8	%	14
	Other Alcohol	11.9	%	14
	None	9.9	%	14
		MEAN RESPONSE		
13.	AVERAGE SULFUR CONTENT IN GASOLINE -- 1989			
a.	Northern Europe	647.2	ppm	29
b.	Mediterranean	966.1	ppm	9
c.	Middle East	598.9	ppm	4
d.	Far East	387.3	ppm	20
e.	Canada	566.7	ppm	3
f.	Other non-U.S. Western Hemisphere	868.4	ppm	7
14.	MOST LIKELY MAXIMUM SULFUR CONTENT IN GASOLINE -- 2000			
a.	Northern Europe			
	50 ppm or less	9.4	%	59
	51 to 250 ppm	31.5	%	59
	251 to 500 ppm	59.1	%	59
	501 ppm or more	0.0	%	59
	No Requirement	0.0	%	59
b.	Mediterranean			
	50 ppm or less	6.2	%	24
	51 to 250 ppm	21.7	%	24
	251 to 500 ppm	64.3	%	24
	501 ppm or more	7.9	%	24
	No Requirement	0.0	%	24

FOREIGN REFINERY AND SUPPLY ISSUES

		RESPONSE	UNITS OF MEASURE	# of RESP
c.	Middle East			
	50 ppm or less	0.0	%	7
	51 to 250 ppm	35.8	%	7
	251 to 500 ppm	28.3	%	7
	501 ppm or more	25.8	%	7
	No Requirement	0.0	%	7
d.	Far East			
	50 ppm or less	19.0	%	31
	51 to 250 ppm	31.4	%	31
	251 to 500 ppm	8.6	%	31
	501 ppm or more	13.0	%	31
	No Requirement	28.1	%	31
e.	Canada			
	50 ppm or less	0.0	%	3
	51 to 250 ppm	66.7	%	3
	251 to 500 ppm	0.0	%	3
	501 ppm or more	0.0	%	3
	No Requirement	33.3	%	3
f.	Other non-U.S. Western Hemisphere			
	50 ppm or less	0.0	%	10
	51 to 250 ppm	15.2	%	10
	251 to 500 ppm	32.7	%	10
	501 ppm or more	52.1	%	10
	No Requirement	0.0	%	10

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

	RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
15. AVERAGE OLEFIN CONTENT IN GASOLINE -- 1989				
a. Northern Europe	NA	12.5	%	29
b. Mediterranean	NA	12.4	%	9
c. Middle East	NA	*	%	*
d. Far East	NA	14.1	%	10
e. Canada	NA	*	%	*
f. Other non-U.S. Western Hemisphere	NA	9.6	%	3
16. MOST LIKELY MAXIMUM OLEFIN CONTENT IN GASOLINE -- 2000				
a. Northern Europe				
5 % or less	0.0	NA	%	58
6 to 10 %	5.6	NA	%	58
11 to 15 %	25.7	NA	%	58
No Requirement	68.7	NA	%	58
b. Mediterrean				
5 % or less	0.0	NA	%	22
6 to 10 %	10.5	NA	%	22
11 to 15 %	6.2	NA	%	22
No Requirement	83.3	NA	%	22
c. Middle East				
5 % or less	0.0	NA	%	10
6 to 10 %	0.0	NA	%	10
11 to 15 %	26.3	NA	%	10
No Requirement	73.7	NA	%	10
d. Far East				
5 % or less	0.0	NA	%	45
6 to 10 %	17.3	NA	%	45
11 to 15 %	14.1	NA	%	45
No Requirement	68.6	NA	%	45
e. Canada				
5 % or less	0.0	NA	%	4
6 to 10 %	25.0	NA	%	4
11 to 15 %	0.0	NA	%	4
No Requirement	75.0	NA	%	4

NA = NOT APPLICABLE
* DATA WITHHELD, TOO FEW RESPONSES TO REPORT
** POOL AVERAGE

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

		RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
		=========	=========	========	=====
f.	Other non-U.S. Western Hemisphere				
	5 % or less	0.0	NA	%	19
	6 to 10 %	12.7	NA	%	19
	11 to 15 %	0.0	NA	%	19
	No Requirement	87.3	NA	%	19
17.	AVERAGE 90% DISTILLATION POINT IN GASOLINE -- 1989				
a.	Northern Europe	NA	176.4	deg C	33
b.	Mediterranean	NA	174.0	deg C	9
c.	Middle East	NA	150.0	deg C	4
d.	Far East	NA	156.7	deg C	25
e.	Canada	NA	164.0	deg C	3
f.	Other non-U.S. Western Hemisphere	NA	186.9	deg C	7
18.	MOST LIKELY MAXIMUM 90% DISTILLATION POINT IN GASOLINE -- 2000				
a.	Northern Europe				
	135 deg C or less	0.0	NA	%	62
	136 - 149 deg C	0.8	NA	%	62
	150 - 163 deg C	29.2	NA	%	62
	164 - 177 deg C	46.7	NA	%	62
	No Requirement	23.3	NA	%	62
b.	Mediterranean				
	135 deg C or less	0.0	NA	%	24
	136 - 149 deg C	0.0	NA	%	24
	150 - 163 deg C	17.1	NA	%	24
	164 - 177 deg C	54.6	NA	%	24
	No Requirement	28.3	NA	%	24
c.	Middle East				
	135 deg C or less	0.0	NA	%	10
	136 - 149 deg C	26.3	NA	%	10
	150 - 163 deg C	0.0	NA	%	10
	164 - 177 deg C	26.3	NA	%	10
	No Requirement	47.5	NA	%	10
d.	Far East				
	135 deg C or less	1.7	NA	%	42
	136 - 149 deg C	27.3	NA	%	42
	150 - 163 deg C	19.1	NA	%	42
	164 - 177 deg C	19.6	NA	%	42
	No Requirement	32.2	NA	%	42

NA = NOT APPLICABLE

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** POOL AVERAGE

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

		RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
e.	Canada				
	135 deg C or less	0.0	NA	%	4
	136 - 149 deg C	25.0	NA	%	4
	150 - 163 deg C	0.0	NA	%	4
	164 - 177 deg C	0.0	NA	%	4
	No Requirement	75.0	NA	%	4
f.	Other non-U.S. Western Hemisphere				
	135 deg C or less	0.0	NA	%	16
	136 - 149 deg C	0.0	NA	%	16
	150 - 163 deg C	1.4	NA	%	16
	164 - 177 deg C	32.4	NA	%	16
	No Requirement	66.2	NA	%	16
19.	MOST LIKELY SULFUR CONTENT OF DIESEL FUEL -- 1995				
a.	Northern Europe				
	0.05 % or below	13.0	NA	%	76
	0.051 to 0.20 %	74.1	NA	%	76
	0.21 to 0.30 %	12.9	NA	%	76
	0.31 to 0.50 %	0.0	NA	%	76
	Above 0.50 %	0.0	NA	%	76
b.	Mediterranean				
	0.05 % or below	6.3	NA	%	29
	0.051 to 0.20 %	67.5	NA	%	29
	0.21 to 0.30 %	26.2	NA	%	29
	0.31 to 0.50 %	0.0	NA	%	29
	Above 0.50 %	0.0	NA	%	29
c.	Middle East				
	0.05 % or below	0.0	NA	%	7
	0.051 to 0.20 %	0.0	NA	%	7
	0.21 to 0.30 %	28.1	NA	%	7
	0.31 to 0.50 %	35.9	NA	%	7
	Above 0.50 %	35.9	NA	%	7
d.	Far East				
	0.05 % or below	0.0	NA	%	33
	0.051 to 0.20 %	49.3	NA	%	33
	0.21 to 0.30 %	21.6	NA	%	33
	0.31 to 0.50 %	10.0	NA	%	33
	Above 0.50 %	19.1	NA	%	33
e.	Canada				
	0.05 % or below	31.7	NA	%	3
	0.051 to 0.20 %	14.0	NA	%	3
	0.21 to 0.30 %	30.0	NA	%	3
	0.31 to 0.50 %	24.3	NA	%	3
	Above 0.50 %	0.0	NA	%	3

NA = NOT APPLICABLE

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

** POOL AVERAGE

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

		RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
f.	Other non-U.S. Western Hemisphere				
	0.05 % or below	0.0	NA	%	10
	0.051 to 0.20 %	28.3	NA	%	10
	0.21 to 0.30 %	2.2	NA	%	10
	0.31 to 0.50 %	20.9	NA	%	10
	Above 0.50 %	48.7	NA	%	10
20.	MOST LIKELY SULFUR CONTENT OF DIESEL FUEL -- 2000				
a.	Northern Europe				
	0.05 % or below	92.3	NA	%	79
	0.051 to 0.20 %	7.7	NA	%	79
	0.21 to 0.30 %	0.0	NA	%	79
	0.31 to 0.50 %	0.0	NA	%	79
	Above 0.50 %	0.0	NA	%	79
b.	Mediterranean				
	0.05 % or below	88.5	NA	%	32
	0.051 to 0.20 %	11.5	NA	%	32
	0.21 to 0.30 %	0.0	NA	%	32
	0.31 to 0.50 %	0.0	NA	%	32
	Above 0.50 %	0.0	NA	%	32
c.	Middle East				
	0.05 % or below	0.0	NA	%	4
	0.051 to 0.20 %	21.1	NA	%	4
	0.21 to 0.30 %	78.9	NA	%	4
	0.31 to 0.50 %	0.0	NA	%	4
	Above 0.50 %	0.0	NA	%	4
d.	Far East				
	0.05 % or below	44.2	NA	%	35
	0.051 to 0.20 %	33.2	NA	%	35
	0.21 to 0.30 %	1.7	NA	%	35
	0.31 to 0.50 %	3.3	NA	%	35
	Above 0.50 %	17.7	NA	%	35
e.	Canada				
	0.05 % or below	83.3	NA	%	3
	0.051 to 0.20 %	8.3	NA	%	3
	0.21 to 0.30 %	8.3	NA	%	3
	0.31 to 0.50 %	0.0	NA	%	3
	Above 0.50 %	0.0	NA	%	3
f.	Other non-U.S. Western Hemisphere				
	0.05 % or below	0.0	NA	%	10
	0.051 to 0.20 %	28.3	NA	%	10
	0.21 to 0.30 %	17.0	NA	%	10
	0.31 to 0.50 %	11.4	NA	%	10
	Above 0.50 %	43.4	NA	%	10

NA = NOT APPLICABLE
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** POOL AVERAGE

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

	RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
21. AROMATICS CONTENT AND CETANE INDEX OF DIESEL FUEL -- 1989				
a. Northern Europe				
Aromatics Content	NA	26.5	%	29
Cetane Index	NA	50.2	index pts	55
b. Mediterranean				
Aromatics Content	NA	27.0	%	9
Cetane Index	NA	51.5	index pts	18
c. Middle East				
Aromatics Content	NA	0.0	%	0
Cetane Index	NA	51.0	index pts	4
d. Far East				
Aromatics Content	NA	28.2	%	5
Cetane Index	NA	49.0	index pts	27
e. Canada				
Aromatics Content	NA	25.0	%	3
Cetane Index	NA	43.7	index pts	3
f. Other non-U.S. Western Hemisphere				
Aromatics Content	NA	*	%	*
Cetane Index	NA	48.9	index pts	8
22. MOST LIKELY MAXIMUM AROMATIC CONTENT IN DISTILLATE FUEL OIL -- 2000				
a. Northern Europe				
10% or below	2.7	NA	%	61
11 to 20 %	6.5	NA	%	61
21 to 30%	31.8	NA	%	61
31 to 40 %	4.5	NA	%	61
No Requirement	54.5	NA	%	61
b. Mediterranean				
10% or below	5.6	NA	%	23
11 to 20 %	0.0	NA	%	23
21 to 30%	27.3	NA	%	23
31 to 40 %	0.0	NA	%	23
No Requirement	67.1	NA	%	23
c. Middle East				
10% or below	0.0	NA	%	10
11 to 20 %	0.0	NA	%	10
21 to 30%	0.0	NA	%	10
31 to 40 %	0.0	NA	%	10
No Requirement	100.0	NA	%	10

NA = NOT APPLICABLE

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

** POOL AVERAGE

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

	RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
	=========	=========	========	=====
d. Far East				
10% or below	0.0	NA	%	46
11 to 20 %	0.0	NA	%	46
21 to 30%	13.2	NA	%	46
31 to 40 %	2.6	NA	%	46
No Requirement	84.2	NA	%	46
e. Canada				
10% or below	0.0	NA	%	4
11 to 20 %	25.0	NA	%	4
21 to 30%	0.0	NA	%	4
31 to 40 %	0.0	NA	%	4
No Requirement	75.0	NA	%	4
f. Other non-U.S. Western Hemisphere				
10% or below	0.0	NA	%	17
11 to 20 %	0.0	NA	%	17
21 to 30%	11.3	NA	%	17
31 to 40 %	0.0	NA	%	17
No Requirement	88.8	NA	%	17
23. MOST LIKELY SULFUR CONTENT OF STATIONARY FUEL OIL --- 1995				
a. Northern Europe				
0.30 % or better	1.4	NA	%	66
0.31 to 1.00%	58.5	NA	%	66
1.10 to 2.00 %	15.1	NA	%	66
Above 2.00 %	25.0	NA	%	66
b. Mediterranean				
0.30 % or better	2.3	NA	%	25
0.31 to 1.00%	43.0	NA	%	25
1.10 to 2.00 %	23.5	NA	%	25
Above 2.00 %	31.3	NA	%	25
c. Middle East				
0.30 % or better	0.0	NA	%	4
0.31 to 1.00%	0.0	NA	%	4
1.10 to 2.00 %	0.0	NA	%	4
Above 2.00 %	100.0	NA	%	4
d. Far East				
0.30 % or better	30.3	NA	%	35
0.31 to 1.00%	33.1	NA	%	35
1.10 to 2.00 %	12.3	NA	%	35
Above 2.00 %	24.3	NA	%	35

NA = NOT APPLICABLE

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

** POOL AVERAGE

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

	RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
e. Canada				
0.30 % or better	0.0	NA	%	3
0.31 to 1.00%	23.3	NA	%	3
1.10 to 2.00 %	63.3	NA	%	3
Above 2.00 %	13.3	NA	%	3
f. Other non-U.S. Western Hemisphere				
0.30 % or better	0.7	NA	%	11
0.31 to 1.00%	24.0	NA	%	11
1.10 to 2.00 %	7.3	NA	%	11
Above 2.00 %	68.0	NA	%	11
24. MOST LIKELY SULFUR CONTENT OF STATIONARY FUEL OIL --- 2000				
a. Northern Europe				
0.30 % or better	2.3	NA	%	68
0.31 to 1.00%	74.1	NA	%	68
1.10 to 2.00 %	9.9	NA	%	68
Above 2.00 %	13.8	NA	%	68
b. Mediterranean				
0.30 % or better	4.8	NA	%	25
0.31 to 1.00%	64.4	NA	%	25
1.10 to 2.00 %	18.9	NA	%	25
Above 2.00 %	12.0	NA	%	25
c. Middle East				
0.30 % or better	0.0	NA	%	4
0.31 to 1.00%	0.0	NA	%	4
1.10 to 2.00 %	21.9	NA	%	4
Above 2.00 %	78.1	NA	%	4
d. Far East				
0.30 % or better	35.6	NA	%	35
0.31 to 1.00%	36.3	NA	%	35
1.10 to 2.00 %	9.4	NA	%	35
Above 2.00 %	18.7	NA	%	35
e. Canada				
0.30 % or better	0.0	NA	%	3
0.31 to 1.00%	30.0	NA	%	3
1.10 to 2.00 %	65.0	NA	%	3
Above 2.00 %	5.0	NA	%	3
f. Other non-U.S. Western Hemisphere				
0.30 % or better	1.3	NA	%	10
0.31 to 1.00%	44.9	NA	%	10
1.10 to 2.00 %	14.6	NA	%	10
Above 2.00 %	39.1	NA	%	10

NA = NOT APPLICABLE

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** POOL AVERAGE

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

	RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
	=========	=========	========	=====
25. YEAR-ROUND OPERATING MODE FOR FUELS PRODUCTION --- 1989				
a. Northern Europe				
Motor Gasoline Production				
Maximum	51.3	NA	%	52
Intermediate	48.7	NA	%	52
Minimum	0.0	NA	%	52
Naphtha Production				
Maximum	2.2	NA	%	52
Intermediate	53.5	NA	%	52
Minimum	44.3	NA	%	52
Kerosene/Middle Distillate Production				
Maximum	28.5	NA	%	52
Intermediate	71.5	NA	%	52
Minimum	0.0	NA	%	52
Residual Fuel Oil Production				
Maximum	2.2	NA	%	52
Intermediate	2.1	NA	%	52
Minimum	95.7	NA	%	52
b. Mediterranean				
Motor Gasoline Production				
Maximum	42.1	NA	%	10
Intermediate	57.9	NA	%	10
Minimum	0.0	NA	%	10
Naphtha Production				
Maximum	0.0	NA	%	10
Intermediate	57.9	NA	%	10
Minimum	42.1	NA	%	10
Kerosene/Middle Distillate Production				
Maximum	50.2	NA	%	10
Intermediate	49.8	NA	%	10
Minimum	0.0	NA	%	10
Residual Fuel Oil Production				
Maximum	0.0	NA	%	10
Intermediate	0.0	NA	%	10
Minimum	100.0	NA	%	10
c. Middle East				
Motor Gasoline Production				
Maximum	64.8	NA	%	4
Intermediate	35.2	NA	%	4
Minimum	0.0	NA	%	4
Naphtha Production				
Maximum	*	NA	%	*
Intermediate	*	NA	%	*
Minimum	*	NA	%	*

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** POOL AVERAGE

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

	RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
Kerosene/Middle Distillate Production				
Maximum	*	NA	%	*
Intermediate	*	NA	%	*
Minimum	*	NA	%	*
Residual Fuel Oil Production				
Maximum	0.0	NA	%	15
Intermediate	0.0	NA	%	15
Minimum	100.0	NA	%	15
d. Far East				
Motor Gasoline Production				
Maximum	47.4	NA	%	18
Intermediate	44.1	NA	%	18
Minimum	8.5	NA	%	18
Naphtha Production				
Maximum	0.0	NA	%	12
Intermediate	60.0	NA	%	12
Minimum	40.0	NA	%	12
Kerosene/Middle Distillate Production				
Maximum	92.8	NA	%	19
Intermediate	7.2	NA	%	19
Minimum	0.0	NA	%	19
Residual Fuel Oil Production				
Maximum	11.2	NA	%	15
Intermediate	8.9	NA	%	15
Minimum	79.9	NA	%	15
e. Canada				
Motor Gasoline Production				
Maximum	*	NA	%	*
Intermediate	*	NA	%	*
Minimum	*	NA	%	*
Naphtha Production				
Maximum	*	NA	%	*
Intermediate	*	NA	%	*
Minimum	*	NA	%	*
Kerosene/Middle Distillate Production				
Maximum	*	NA	%	*
Intermediate	*	NA	%	*
Minimum	*	NA	%	*
Residual Fuel Oil Production				
Maximum	*	NA	%	*
Intermediate	*	NA	%	*
Minimum	*	NA	%	*

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** POOL AVERAGE

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

	RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
	=========	=========	========	=====
f. Other Non-US Western Hemisphere				
Motor Gasoline Production				
Maximum	19.4	NA	%	7
Intermediate	80.6	NA	%	7
Minimum	0.0	NA	%	7
Naphtha Production				
Maximum	22.2	NA	%	7
Intermediate	47.2	NA	%	7
Minimum	30.6	NA	%	7
Kerosene/Middle Distillate Production				
Maximum	53.3	NA	%	7
Intermediate	46.7	NA	%	7
Minimum	0.0	NA	%	7
Residual Fuel Oil Production				
Maximum	0.0	NA	%	7
Intermediate	58.0	NA	%	7
Minimum	42.0	NA	%	7
26. CRUDE INPUT CHARACTERISTICS -- 1989				
a. Northern Europe				
Crude inputs	6,626	NA	MB/CD	33
Average Gravity	36.0	NA	deg API	14
Average Sulfur	0.89	NA	% wt	14
Percent Residual >345	32.4	NA	%	20
b. Mediterranean				
Crude inputs	2,847	NA	MB/CD	14
Average Gravity	34.3	NA	deg API	3
Average Sulfur	1.24	NA	% wt	3
Percent Residual >345	34.8	NA	%	6
c. Middle East				
Crude inputs	1,668	NA	MB/CD	3
Average Gravity	*	NA	deg API	*
Average Sulfur	*	NA	% wt	*
Percent Residual >345	*	NA	%	*
d. Far East				
Crude inputs	9,782	NA	MB/CD	33
Average Gravity	34.1	NA	deg API	22
Average Sulfur	1.17	NA	% wt	20
Percent Residual >345	35.5	NA	%	20

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** POOL AVERAGE

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

		RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
		========	========	=======	=====
e.	Canada				
	Crude inputs	1,538	NA	MB/CD	3
	Average Gravity	*	NA	deg API	*
	Average Sulfur	*	NA	% wt	*
	Percent Residual >345	*	NA	%	*
f.	Other Non-US Western Hemisphere				
	Crude inputs	3,751	NA	MB/CD	10
	Average Gravity	31.0	NA	deg API	4
	Average Sulfur	1.59	NA	% wt	4
	Percent Residual >345	40.8	NA	%	6
27.	CLEAN PRODUCT CAPABILITY --- 1989				
a.	Products Manufactured -- 1989				
	Clean Products				
	Northern Europe	4,911.1	NA	MB/CD	36
	Mediterranean	1,785.4	NA	MB/CD	14
	Middle East	1,116.2	NA	MB/CD	6
	Far East	5,900.4	NA	MB/CD	35
	Canada	1,180.0	NA	MB/CD	3
	Other Western Hemisphere	1,810.8	NA	MB/CD	7
	Resdiual Fuel Oil/Bunkers				
	Northern Europe	1,043.1	NA	MB/CD	36
	Mediterranean	7,782.4	NA	MB/CD	14
	Middle East	564.5	NA	MB/CD	6
	Far East	1,778.0	NA	MB/CD	35
	Canada	150.0	NA	MB/CD	3
	Other Western Hemisphere	604.7	NA	MB/CD	7
b.	Make Additonal Clean Without Making Residual in 1989?				
	Percent "YES"				
	Northern Europe	0.0	NA	MB/CD	37
	Mediterranean	8.9	NA	MB/CD	14
	Middle East	29.6	NA	MB/CD	4
	Far East	27.3	NA	MB/CD	32
	Canada	*	NA	MB/CD	*
	Other Western Hemisphere	11.1	NA	MB/CD	7

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** POOL AVERAGE

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

		RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
		=========	=========	========	=====
c.	Additional Clean Products Made Before Limited By Lack of Residual Fuel Outlet in 1989?				
	Motor Gasoline				
	Northern Europe	0.0	NA	MB/CD	0
	Mediterranean	0.0	NA	MB/CD	0
	Middle East	0.0	NA	MB/CD	0
	Far East	142.5	NA	MB/CD	8
	Canada	0.0	NA	MB/CD	0
	Other Western Hemisphere	*	NA	MB/CD	*
	Middle Distillates				
	Northern Europe	0.0	NA	MB/CD	0
	Mediterranean	*	NA	MB/CD	*
	Middle East	0.0	NA	MB/CD	0
	Far East	*	NA	MB/CD	*
	Canada	0.0	NA	MB/CD	0
	Other Western Hemisphere	*	NA	MB/CD	*
28.	POTENTIAL FOR PRODUCT EXPORTS TO THE U.S. -- 1995				
	a. Northern Europe				
	Unleaded Gasoline (87)	100.0	NA	%	84
	RFG	66.7	NA	%	84
	Diesel (<0.05% S)	83.3	NA	%	84
	b. Mediterranean				
	Unleaded Gasoline (87)	100.0	NA	%	37
	RFG	66.7	NA	%	37
	Diesel (<0.05% S)	100.0	NA	%	37
	c. Middle East				
	Unleaded Gasoline (87)	100.0	NA	%	10
	RFG	100.0	NA	%	10
	Diesel (<0.05% S)	100.0	NA	%	10
	d. Far East				
	Unleaded Gasoline (87)	66.7	NA	%	48
	RFG	33.3	NA	%	48
	Diesel (<0.05% S)	22.2	NA	%	48
	e. Canada				
	Unleaded Gasoline (87)	60.0	NA	%	5
	RFG	40.0	NA	%	5
	Diesel (<0.05% S)	0.0	NA	%	5

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** POOL AVERAGE

SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

		RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
		=========	=========	========	=====
f.	Other Non-US Western Hemisphere				
	Unleaded Gasoline (87)	100.0	NA	%	15
	RFG	100.0	NA	%	15
	Diesel (<0.05% S)	50.0	NA	%	15

29. PERCEIVED FINANCIAL IMPACT OF REGULATORY REQUIREMENTS --- 1995
Northern Europe

		RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
1995					
a.	Refinery Air Emission Reductions				
	No Impact	8.0	NA	%	25
	Small impact	28.0	NA	%	25
	Moderate Impact	44.0	NA	%	25
	Large impact	20.0	NA	%	25
b.	Water/Effluent Quality Improvement				
	No Impact	4.5	NA	%	22
	Small impact	22.7	NA	%	22
	Moderate Impact	68.2	NA	%	22
	Large impact	4.5	NA	%	22
c.	Solid Waste Treatment Recycling/Disposal				
	No Impact	4.3	NA	%	23
	Small impact	34.8	NA	%	23
	Moderate Impact	43.5	NA	%	23
	Large impact	4.3	NA	%	23
d.	Process Safety-Related Equipment				
	No Impact	0.0	NA	%	23
	Small impact	60.9	NA	%	23
	Moderate Impact	34.8	NA	%	23
	Large impact	0.0	NA	%	23
e.	More Restrictive Product Specs				
	No Impact	0.0	NA	%	24
	Small impact	0.0	NA	%	24
	Moderate Impact	37.5	NA	%	24
	Large impact	62.5	NA	%	24
2000					
f.	Refinery Air Emission Reductions				
	No Impact	0.0	NA	%	24
	Small impact	12.5	NA	%	24
	Moderate Impact	33.3	NA	%	24
	Large impact	54.2	NA	%	24
g.	Water/Effluent Quality Improvement				
	No Impact	0.0	NA	%	23
	Small impact	26.1	NA	%	23
	Moderate Impact	65.2	NA	%	23
	Large impact	8.7	NA	%	23

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SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

	RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
h. Solid Waste Treatment Recycling/Disposal				
No Impact	0.0	NA	%	23
Small impact	34.8	NA	%	23
Moderate Impact	39.1	NA	%	23
Large impact	8.7	NA	%	23
i. Process Safety-Related Equipment				
No Impact	0.0	NA	%	23
Small impact	56.5	NA	%	23
Moderate Impact	39.1	NA	%	23
Large impact	0.0	NA	%	23
j. More Restrictive Product Specs				
No Impact	0.0	NA	%	23
Small impact	0.0	NA	%	23
Moderate Impact	17.4	NA	%	23
Large impact	82.6	NA	%	23
Mediterranean				
1995				
a. Refinery Air Emission Reductions				
No Impact	20.0	NA	%	5
Small impact	20.0	NA	%	5
Moderate Impact	40.0	NA	%	5
Large impact	20.0	NA	%	5
b. Water/Effluent Quality Improvement				
No Impact	0.0	NA	%	5
Small impact	20.0	NA	%	5
Moderate Impact	60.0	NA	%	5
Large impact	0.0	NA	%	5
c. Solid Waste Treatment Recycling/Disposal				
No Impact	0.0	NA	%	5
Small impact	40.0	NA	%	5
Moderate Impact	40.0	NA	%	5
Large impact	0.0	NA	%	5
d. Process Safety-Related Equipment				
No Impact	0.0	NA	%	5
Small impact	80.0	NA	%	5
Moderate Impact	20.0	NA	%	5
Large impact	0.0	NA	%	5
e. More Restrictive Product Specs				
No Impact	0.0	NA	%	5
Small impact	0.0	NA	%	5
Moderate Impact	80.0	NA	%	5
Large impact	20.0	NA	%	5

NA = NOT APPLICABLE

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SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

		RESPONSE	UNITS OF MEASURE	# of RESP
		------	-----	---
2000				
f.	Refinery Air Emission Reductions			
	No Impact	0.0	%	5
	Small impact	0.0	%	5
	Moderate Impact	20.0	%	5
	Large impact	80.0	%	5
g.	Water/Effluent Quality Improvement			
	No Impact	0.0	%	5
	Small impact	20.0	%	5
	Moderate Impact	80.0	%	5
	Large impact	0.0	%	5
h.	Solid Waste Treatment Recycling/Disposal			
	No Impact	0.0	%	5
	Small impact	20.0	%	5
	Moderate Impact	60.0	%	5
	Large impact	0.0	%	5
i.	Process Safety-Related Equipment			
	No Impact	0.0	%	5
	Small impact	40.0	%	5
	Moderate Impact	60.0	%	5
	Large impact	0.0	%	5
j.	More Restrictive Product Specs			
	No Impact	0.0	%	5
	Small impact	0.0	%	5
	Moderate Impact	20.0	%	5
	Large impact	80.0	%	5
Middle East				
1995				
a.	Refinery Air Emission Reductions	*	%	*
b.	Water/Effluent Quality Improvement	*	%	*
c.	Solid Waste Treatment Recycling/Disposal	*	%	*
d.	Process Safety-Related Equipment	*	%	*
e.	More Restrictive Product Specs	*	%	*
2000				
f.	Refinery Air Emission Reductions	*	%	*
g.	Water/Effluent Quality Improvement	*	%	*
h.	Solid Waste Treatment Recycling/Disposal	*	%	*
i.	Process Safety-Related Equipment	*	%	*
j.	More Restrictive Product Specs	*	%	*
Far East				
1995				
a.	Refinery Air Emission Reductions			
	No Impact	0.0	%	24
	Small impact	29.2	%	24
	Moderate Impact	37.5	%	24
	Large impact	29.2	%	24

NA = NOT APPLICABLE

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SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

		RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
		=========	=========	========	=====
b.	Water/Effluent Quality Improvement				
	No Impact	0.0	NA	%	24
	Small impact	45.8	NA	%	24
	Moderate Impact	41.7	NA	%	24
	Large impact	8.3	NA	%	24
c.	Solid Waste Treatment Recycling/Disposal				
	No Impact	0.0	NA	%	24
	Small impact	33.3	NA	%	24
	Moderate Impact	50.0	NA	%	24
	Large impact	12.5	NA	%	24
d.	Process Safety-Related Equipment				
	No Impact	0.0	NA	%	24
	Small impact	50.0	NA	%	24
	Moderate Impact	41.7	NA	%	24
	Large impact	4.2	NA	%	24
e.	More Restrictive Product Specs				
	No Impact	0.0	NA	%	24
	Small impact	12.5	NA	%	24
	Moderate Impact	33.3	NA	%	24
	Large impact	45.8	NA	%	24
2000					
f.	Refinery Air Emission Reductions				
	No Impact	0.0	NA	%	24
	Small impact	16.7	NA	%	24
	Moderate Impact	37.5	NA	%	24
	Large impact	41.7	NA	%	24
g.	Water/Effluent Quality Improvement				
	No Impact	0.0	NA	%	24
	Small impact	33.3	NA	%	24
	Moderate Impact	41.7	NA	%	24
	Large impact	20.8	NA	%	24
h.	Solid Waste Treatment Recycling/Disposal				
	No Impact	0.0	NA	%	24
	Small impact	2.0	NA	%	24
	Moderate Impact	33.3	NA	%	24
	Large impact	37.5	NA	%	24
i.	Process Safety-Related Equipment				
	No Impact	0.0	NA	%	24
	Small impact	45.8	NA	%	24
	Moderate Impact	45.8	NA	%	24
	Large impact	4.2	NA	%	24
j.	More Restrictive Product Specs				
	No Impact	0.0	NA	%	24
	Small impact	4.2	NA	%	24
	Moderate Impact	25.0	NA	%	24
	Large impact	62.5	NA	%	24

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SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

		RESPONSE	UNITS OF MEASURE	# of RESP
		------	-----	---
Canada				
1995				
a.	Refinery Air Emission Reductions	*	%	*
b.	Water/Effluent Quality Improvement	*	%	*
c.	Solid Waste Treatment Recycling/Disposal	*	%	*
d.	Process Safety-Related Equipment	*	%	*
e.	More Restrictive Product Specs	*	%	*
2000				
f.	Refinery Air Emission Reductions	*	%	*
g.	Water/Effluent Quality Improvement	*	%	*
h.	Solid Waste Treatment Recycling/Disposal	*	%	*
i.	Process Safety-Related Equipment	*	%	*
j.	More Restrictive Product Specs	*	%	*
Other Non-U.S. Western Hemisphere				
1995				
a.	Refinery Air Emission Reductions			
	No Impact	0.0	%	8
	Small impact	37.5	%	8
	Moderate Impact	12.5	%	8
	Large impact	50.0	%	8
b.	Water/Effluent Quality Improvement			
	No Impact	0.0	%	8
	Small impact	0.0	%	8
	Moderate Impact	37.5	%	8
	Large impact	62.5	%	8
c.	Solid Waste Treatment Recycling/Disposal			
	No Impact	0.0	%	8
	Small impact	37.5	%	8
	Moderate Impact	62.5	%	8
	Large impact	0.0	%	8
d.	Process Safety-Related Equipment			
	No Impact	0.0	%	8
	Small impact	12.5	%	8
	Moderate Impact	62.5	%	8
	Large impact	25.0	%	8
e.	More Restrictive Product Specs			
	No Impact	0.0	%	8
	Small impact	0.0	%	8
	Moderate Impact	75.0	%	8
	Large impact	25.0	%	8
2000				
f.	Refinery Air Emission Reductions			
	No Impact	0.0	%	8
	Small impact	25.0	%	8
	Moderate Impact	12.5	%	8
	Large impact	62.5	%	8

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SECTION X

FOREIGN REFINERY AND SUPPLY ISSUES

		RESPONSE	MEAN RESPONSE	UNITS OF MEASURE	# of RESP
g.	Water/Effluent Quality Improvement				
	No Impact	0.0	NA	%	8
	Small impact	0.0	NA	%	8
	Moderate Impact	37.5	NA	%	8
	Large impact	62.5	NA	%	8
h.	Solid Waste Treatment Recycling/Disposal				
	No Impact	0.0	NA	%	8
	Small impact	25.0	NA	%	8
	Moderate Impact	12.5	NA	%	8
	Large impact	62.5	NA	%	8
i.	Process Safety-Related Equipment				
	No Impact	0.0	NA	%	8
	Small impact	0.0	NA	%	8
	Moderate Impact	62.5	NA	%	8
	Large impact	37.5	NA	%	8
j.	More Restrictive Product Specs				
	No Impact	0.0	NA	%	8
	Small impact	0.0	NA	%	8
	Moderate Impact	0.0	NA	%	8
	Large impact	100.0	NA	%	8

NA = NOT APPLICABLE

* DATA WITHHELD, TOO FEW RESPONSES TO REPORT

recycled paper