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Draft Interim Validation Report Domestic Crude Oil Entitlements System

Phiroze J. Nagarvala, David Freedman,
Peter Hayes, Mahmut Karayel,
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December 1978

Lawrence Berkeley Laboratory University of California/Berkeley

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DRAFT INTERIM VALIDATION REPORT:

DOMESTIC CRUDE OIL ENTITLEMENTS SYSTEM

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PREFACE

In 1974, acting through the Federal Energy Administration, the President promulgated regulations creating the Domestic Crude Oil Entitlements (DCOE) Program to allocate equitably the benefit of access to low-cost old oil among domestic refiners. The mechanism for achieving equitable allocation of low-cost old oil is the entitlement. Each entitlement stands for the right to process one barrel of deemed old oil a month. Basically, the system requires refineries with above-average old oil inputs to buy entitlements from refineries that are old oil-deficient.

This is a draft interim report on the validation study of data for the DCOE Program. It consists of research conducted at the Lawrence Berkeley Laboratory through November 1, 1978. The purpose of the study was to assess the validity of the data collected by and used in the DCOE System and the validity of the systems and procedures used in processing this information in order to meet the stated goals of the program.

In order to conduct a validation study such as this one, access is required to the large amount of data collected by the system over time. Initial use of this data is by nature "exploratory"--a time when initial or preconceived notions and hypotheses are tested, often discarded, and new lines of inquiry initiated. Unfortunately, the study team was unable to obtain the free access to data necessary to conduct this exploratory research in an efficient and timely manner. The results reported in this draft interim report should therefore be considered preliminary.

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EXECUTIVE SUMMARY

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DOMESTIC CRUDE OIL ENTITLEMENTS SYSTEM

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EXECUTIVE SUMMARY

DOMESTIC CRUDE OIL ENTITLEMENTS PROGRAM

VALIDATION STUDY

I. SYSTEM IDENTIFICATION

A. HISTORICAL IDENTIFICATION

The Domestic Crude Oil Entitlements (DCOE) Program (10 C.F.R. Section 211.67 (1978)) was established in December 1974, pursuant to the Energency Petroleum Allocation Act of 1973 (EPAA). Pub. L. No. 93-159, 87 Stat. 627 (November 27, 1973), as amended, codified at 15 U.S.C.A. Section 751 et seq. (1978).

B. IDENTIFICATION OF PURPOSE

Section 4(a) of the EPAA required the President "to promulgate a regulation for the mandatory allocation of crude oil, residual fuel oil, and each refined petroleum product in amounts specified in (or determined in a manner prescribed by) and at prices specified in (or determined in a manner prescribed by) such regulation...(for all such products) produced in or imported into the United States." 15 U.S.C.A. Section 753(a) (1978). (See Appendix A.) Acting through the Federal Energy Administration, the President promulgated regulattions creating the DCOE Program to allocate equitably the benefit of access to low cost "old oil among all sectors of the petroleum industry, including independent and small refiners, and thereby to assure that domestically refined petroleum products are sold at equitable prices by all distributors of petroleum products." 39 F.R. 31650 (August 30, 1974).

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C. THE FORMS AND THE INFORMATION COLLECTED

The FEA promulgated requirements for the collection of information necessary to run the DCOE Program codified at 10 C.F.R. Section 211.66.

Information for the program is collected in a series of up to five mandatory monthly reports by refiners and eligible firms[a] (for a more detailed discussion of these reports, see Section I.B.2).

1. Entitlement Transactions Report

All program participants are required to submit the Entitlement Transactions Report on Form FEA-P103-M-0 (GAO B-181254 (R0110), approval expires January, 1979) pursuant to 10 C.F.R. Section 211.66(i). This form collects information concerning a respondent's sales and purchases of entitlements and its net entitlements position at the end of the previous month. This form has been in use since the beginning of the DCOE Program. It will be replaced by Form ERA-116. Non-refiner importers are not required to submit reports for months in which they did not receive entitlements.

2. Refiners Monthly Report

All refiners are required to submit the Refiners Monthly Report on Form ERA-49 (OMB 38R0215, approved July, 1978), pursuant to 10 C.F.R. Section211.66(h). Form ERA-49 collects information concerning respondent's crude oil receipts, costs and runs to stills, and the volume of residual fuel oil produced and sold by the respondent in, or into, the East Coast market. Form FEA-P102-M-0 was the original form used to

[a]See glossary for a definition of eligible firms.

collect monthly data from refiners. Forms FEA-P102-M-1, FEA-P102-M-2, and ERA-49 were successive replacements for this form.

3. Report on Imports of Residual Fuel Oil

All importers of residual fuel oil into the East Coast market are required to submit data on the volume of such imports on Form FEA-P113-M-0, Report of Oil Imports into the United States and Puerto Rico (GAO B-181-254CR0386), approval expires August 30, 1979, pursuant to 10 C.F.R. Section 211.66(j). Data on residual fuel oil imports are reported at Schedule T, column m of the form. Previously, this data was collected on a separate form (FEA-P126-M-0). This form will be replaced by ERA-60.

4. Naphtha Imports Monthly Report

All importers of foreign naphtha into Puerto Rico for use as a petrochemical feedstock are required to submit the Naphtha Imports Monthly Report on Form FEA-P129-M-0 pursuant to 10 C.F.R. Sections 211.66(h)(4) and 211.67(d)(5)(iv). This form collects information on the volume of foreign naphtha imported for such use, the total volume of imported naphtha and the volume of export sales of naphtha. OMB approval is not required because less than ten companies are required to submit this form. This form has been used since the DCOE Program was modified to provide additional entitlements for naphtha, effective July 1976.

5. Report of Imports to the Strategic Petroleum Reserve

All refiners and eligible firms delivering crude oil to the Strategic Petroleum Reserve (SPR) are required to submit a letter to the

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TABLE ES - 1

DOMESTIC CRUDE OIL ENTITLEMENTS PROGRAM

DATA COLLECTION

DOE Form No.	Respondents	Major Data Items	Frequency of Collection and Level of Resolution
P103-M-0 (ERA 116)	All Participants	Entitlements buy/sell transactions	monthly/company
ERA 49	Refiners	Crude oil receipts, crude oil costs, crude runs to stills, residual fuel oil, California oil	monthly/company
P113-M-0 Schedule T, Column m (ERA 60)	Importers of Residual fuel oil into the East Coast Market	Imports of Residual fuel oil	monthly/company
P-129-M-0	Importers of foreign Naphtha into Puerto Rico	Naphtha imports and costs	monthly/company
Letter	Importers of Strategic Petroleum Reserve Crude	SPR imports and costs	monthly/company

DCOE Program office, setting forth the total cost, weighted average cost, and volume of the imported crude oil accepted for delivery by the United States Government.

D. IDENTIFICATION OF THE COLLECTION AND COLLATION PROCESS

1. System Design

The DCOE target universe is all domestic refiners and importers of eligible products.[a] Domestic refineries include all refineries in any of the fifty states plus Puerto Rico, Virgin Islands, and Guam.[a] Eligible firms are importers of residual fuel oil into the East Coast market.[a] Data are also collected from naphtha importers to Puerto Rico, and from importers of crude oil to the Strategic Petroleum Reserve.

All refiners are included in the DCOE frame. Since it is normally advantageous for importers and new, small refiners to participate, the program is as concerned with the exclusion of non-eligible participants as it is with the inclusion of eligible firms.

Data are collected each month from all elements in the frame, i.e., the frame is not sampled. Response is mandatory. A current census of all participants is maintained in the program's computerized Administrative Log.

Data normally submitted by U.S. Mail. Occasionally when the data are late in arriving, or when clerical errors are discovered in the data submitted, data will be accepted by telephone. In the latter case,

[a]Entitlements Program Handbook, Economic Regulatory Administration, U.S. Department of Energy.

a certified hard copy of the data or changes is still required by mail.

2. System Implementation

The data are collected and processed by the Economic Regulatory Agency (ERA). ERA is aided in the processing of data by an EIA computer operator and three private subcontractors. These contractors are responsible for key punch and machine verification operations, rented computer capability, and computer program development and maintenance.

Approximately 4,000 pages of information are submitted to ERA each month. Every set of information is file-stored as hard copy in two forms, as an original unmarked copy, and as a "working copy" with ERA changes and annotations. The month's "Masterfile" (the complete computerized version of this information as used in the month's calculations) is archived with the computer subcontractor. A second, shortened version is archived with other DOE data on a data base management system. This second system, known as the Data Collation Project, is almost operational.

Data for a particular month are reported to ERA by the fifth day of the second month following the reporting month. The Entitlement Notice is published ten days later, i.e., by the fifteenth. The transactions required by the notice must be completed by the end of the month. ERA must be notified of these transactions by the tenth day of the next month, i.e., the third month following the period for which the data were reported.

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E. USES OF OUTPUT

The DCOE Program regulations (10 C.F.R. Sections 211.66, 211.67 (1978)) require the collection of necessary data, and specify the procedures to be used in developing the entitlement positions of participants. Pursuant to 10 C.F.R. Section 211.67(i), the ERA publishes the output, known as the Entitlement Notice, each month in the Federal Register. The Office of Energy Data, EIA, DOE, publishes the Entitlement Price, the National Old Oil Domestic Supply Ratio, and the Crude Oil Entitlement Benefit in The Monthly Energy Review.

F. RELATED SYSTEMS

Four other DOE data systems gather data that appear related to the information collected for the DCOE Program. Several states also collect similar information. These related systems and the common data elements are shown in Table 11 of the accompanying report. This table also lays out the status of the acquisition of this information, and includes comments on the differences between the various systems.

No model or forecast mechanism has been identified that can forecast the entitlement positions of the participants, or can substitute for the present system.

II. CONCLUSIONS AND RECOMMENDATIONS

This is a draft interim report on work done through November 1, 1978, on the validation of data for the DCOE System. During the course of the research, access to required data was difficult to obtain, therefore the conclusions reached are limited to those which could be drawn from available data, and are preliminary.

The Domestic Crude Oil Entitlements information system is basically sound.

Several potential problem areas are discussed below, and more may surface with additional research. At this stage, there is no reason to believe that the basic integrity of the system will be invalidated.

A. CONCLUSIONS

The major problem areas identified to date include:

- Lack of internal structural consistency:

  For the period of June 1977 through May 1978, crude runs to stills exceeded refinery receipts by about 105 million barrels. This internal inconsistency is being examined further. (See Section II.E.)

- Lack of consistency with other related data series:

  The examination of the consistency of DCOE data with other information has not proceeded far enough to be conclusive. (See Section II.E.)

- Errors in manual calculations:

  A number of errors are introduced during the manual calculations performed by ERA analysts. The most significant of these are corrected almost immediately. Smaller errors are not always discovered or corrected. (See Section II.D.)

A detailed sensitivity analysis (see Section II.E) indicates that the system is reasonably robust, i.e., inaccurate reporting by a single firm does not significantly affect other participants, though it does affect the entitlement position of the respondent.

The DCOE System was developed in response to specific legislation passed by Congress. The system is meaningful relevant to these goals, which could not otherwise be attained. Despite some nominal overlap, the Joint Petroleum Report System (JPRS) cannot substitute for the DCOE System, since it does not collect its information by oil tiers, the basic modus operandi of the DCOE System. Additionally, the DCOE System collects information necessary to verify certain pieces of data (e.g., processing agreements) that are not collected elsewhere. The information is collected and processed within sixty days of the end of the reporting period, as required by the regulations.

B. RECOMMENDATIONS

Based upon the investigations to date, current flaws in the existing system should not seriously impact the purpose for which the system was developed, i.e., an equalization of the crude input costs for all refiners and other selected participants.

There is an apparent tendency for the system also to encourage other petroleum production activities, such as synthetic fuels, SPR storage, and most recently, the increased lifting of California crude oils. Should this tendency become a dominant factor, the design of the information system might need to be reexamined.

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The monthly summaries of the DCOE System contain a great deal of information not available elsewhere. This is available only on an informal ad hoc basis. A systematic method of making available the non-proprietary parts of this data to interested users, both inside and outside DOE, should be investigated. Since some of the time series data are 'contaminated' by the rolling forward of corrections (rather than the a posteriori corrections normally made), the DCOE data should be so flagged for this extended audience.

The DCOE Program is subject to constant review, with a number of new provisions introduced or 'revisions' made each year. In spite of the programming loads associated with this changing system, the DCOE Program has developed fast and efficient procedures for completing their monthly assignment. One major area, the manual calculation of amendments in order to correct original data, needs to be addressed as soon as possible. These manual operations consume a significant portion of the analysts' time, and invite the possibility of large errors. ERA has had to correct a number of large errors resulting from this process, and a number of smaller errors have gone unnoticed. A computerized system has been developed to carry out these computations and should be implemented as soon as possible.

Due to the interim nature of this report, certain lines of investigation were begun but not completed. Research in the following areas needs to be continued:

- Cross-checks of the data with other data series. A number of 'parallel' data series have been identified in the report.

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These comparisons will be done initially on aggregated national data and, if necessary, for a small sample of firms. (See Section II.E.)

- Complete the internal structural consistency checks identified in the report. There are reasons to believe that there may have been either a structural change or a change in reporting behavior over time. It may be necessary to investigate a small sample of companies to understand the reasons for this. (See Section II.E.)

- Complete the checks on the manual calculations done for the amendments process. Those calculations are carried out in three basic steps. Two of these steps have been checked to date. (See Section II.D.)

- Develop a scheme for computerized monitoring of the input data to aid the present 'eyeballing' used by the analysts. This capability would greatly enhance the present manual, case-by-case approach. (See Section II.B.)

PROJECT CHRONOLOGY

May, 1978	Planning the validation effort, finding personnel for the study group
From June through November 1, 1978, the following tasks were undertaken:	1. Documentation of the system. 2. Identifying the legislation and regulations. 3. Economic impact analysis. 4. A study of the exceptions and appeals based on Federal Energy guidelines. 5. Forms analysis. 6. Analysis of algorithm and the code. 7. Sensitivity of calculations. 8. Internal consistency checks. 9. External consistency checks. 10. A study of the amendments. 11. Oil industry accounting. 12. Measurement practices. Three field trips to Washington, one trip to Los Angeles, and several in the Bay Area.
Begun October 25, 1978	Work on draft interim.
Completed November 30, 1978.	DRAFT INTERIM REPORT
Further research is still to be done (between January and April 1) in the following areas:	1. Internal consistency checks. 2. External consistency checks. 3. A study of the amendments. In addition to the above, the following new areas are going to be included in the second phase of the validation study of the DCOES. 1. A study of the adjustments process. 2. Pretest field interview questionnaire, update interview form and complete field interviews.

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3. Analyses of information obtained through interviews with the oil companies.

4. Four more trips to Washington.

5. Write final report.

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DOMESTIC CRUDE OIL ENTITLEMENTS SYSTEM

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I. SYSTEM IDENTIFICATION

A. HISTORICAL IDENTIFICATION: THE LEGISLATIVE FRAMEWORK

1. The Emergency Petroleum Allocation Act of 1973[1]

The Arab oil embargo, instituted in October, 1973, and the consequent four-fold rise in the price of OPEC oil, caused dislocations in the supply of oil and an increase in its price in the United States. One month later Congress reacted with the Emergency Petroleum Allocation Act of 1973 (EPAA).[a] The EPAA granted temporary authority to the President to minimize the adverse effects of the shortages of crude oil, residual fuel oil and petroleum products and resultant dislocations in their national distribution system on the American people.[2] Congress did not itself create a program to minimize these effects. Instead, it directed the President to accomplish this goal by promulgating regulations for the mandatory allocation and pricing of these products.[3] In effect, the President was given a broad mandate to act through the promulgation of regulations to deal with the crisis.[4]

Early in 1974 the Federal Energy Office (FEO),[5] which had been vested with responsibility for implementing the provisions of the Act, froze crude oil supplier/purchaser relationships as they existed in December, 1973.[6] The FEO also established the Crude Oil Buy/Sell Program[7] to distribute crude oil supplies among refiners in proportion to their capacity. In addition, the FEO continued the two-tier (Price controlled

[1]All numbered notes are found in a separate section at the end of the study Notes to this chapter are accurate as of November 1, 1978.

[a]Relevant portions of legislation are set out in Appendix A.

old oil* and uncontrolled new oil*) pricing system established by the Cost of Living Council.[8] Those refiners whose primary source of raw materials was lower cost old oil had a significant cost advantage over those companies (particularly small* and independent* refiners) dependent on imported oil.[9] Therefore, the Federal Energy Administration (FEA), the successor to the FEO, proposed the Domestic Crude Oil Entitlement (DCOE) Program to allocate equitably the benefit of access to low cost old oil among refiners.[10] The system required an exchange of funds between domestic refiners through the purchase or sale of entitlements (the right of the refiner owning the entitlement to include one barrel of deemed old oil* in its adjusted crude oil receipts for a particular month).

2. The Energy Policy and Conservation Act[11]

The Energy Policy and Conservation Act (EPCA), enacted in December, 1975, extended the life of the EPAA by forty months,[12] in recognition of the continuing substantial price difference between price-controlled domestic crude oil and uncontrolled imported oil.[13] The EPCA effected two particularly significant changes in the DCOE program:

- The act imposed price controls on new oil for the first time. It established a national maximum weighted average first sale* price of $7.66 per barrel for all domestic crude oil, both old and new.[14] This price ceiling was to be effective for forty months, subject to adjustments made to take into account the impact of inflation and to serve as a production incentive. Production incentive adjustments in the weighted average first sale price were limited to a 3% per annum increase (compounded annually).[15] For both reasons, the maximum price increase, subject to certain exceptions, was limited to 10% per annum (compounded annually).[16]

*Refer to Glossary. All technical terms defined in the glossary are signaled in the text with an *.

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- The act also granted refiners with capacities of less than 100,000 bbls/day an exemption from entitlement purchase obligations for their first 50,000 bbls/day of input.[17]

3. The Energy Conservation and Production Act[18]

The Energy Conservation and Production Act (ECPA), enacted in August, 1976, further modified the DCOE program. The ECPA: (1) lifted first purchase price controls from stripper well crude oil,*[19] (2) gave the President greater flexibility in establishing production incentives for domestic operations,[20] and (3) required the amendment of price regulations to correct unjustified regional price differentials.[21]

In May, 1979, the provisions of the EPAA requiring the President to operate a mandatory allocation program will expire.[22] Unless Congress enacts relevant legislation before that time, the President will have the discretionary authority to promulgate and amend any regulation or issue any order under the Act until September 30, 1981.[23]

B. THE PURPOSE OF THE SYSTEM

1. Basic Concepts and Procedures

The Economic Regulatory Administration (ERA) within the Department of Energy (DOE) currently has responsibility for administering the DCOE Program.[a, 24] The ERA allocates the benefit of access to price controlled domestic crude oil through a system of direct payments from entitlement buyers to entitlement sellers. Approximately 180 refiners and 25 (non-refiner) importers of eligible products participate in the program.[25]

Each month refiners are issued a number of entitlements, subject to certain adjustments (see section I.F.B.2)[b], equal to the number of barrels of crude oil in its crude runs to stills* multiplied by the National Domestic Crude Oil Supply Ratio or DOSR* (in essence, the national average proportion of deemed old oil receipts to crude runs to stills).[26] Refiners are required to possess a number of entitlements exactly equal to the number of barrels of deemed old oil shown in their crude oil receipts for that month.[27] To meet that requirement, refiners possessing insufficient entitlements to cover their receipts of deemed old oil must buy entitlements from refiners with excess entitlements.[28] Refiners with excess entitlements are required to sell them at the price set each month by the ERA.[29] The ERA determines the entitlement price by computing the exact differential between the weighted average cost per barrel of old oil and the

[a]The Department of Energy's regulations for the implementation of the DCOE program are published in the Code of Federal Regulations. Relevant portions of these regulations are set out in Appendix B.

[b]The Formula used to make the calculations necessary to operate the DCOE program is discussed in Appendix F.

weighted average cost per barrel of imported crude oil, Alaska North Slope (ANS) crude oil*, stripper well crude oil*, incremental tertiary crude oil*, and other first sale exempt domestic crude oil, less 21 cents.[30]

The ERA publishes a notice in the Federal Register aboux six weeks after the end of a reporting month setting forth for that month (1) the DOSR (2) the name of each refiner and other eligible firm to which entitlements have been issued, (3) the number of barrels of deemed old oil included in each refiner's adjusted crude receipts, (4) the number of entitlements issued to each such refiner or other firm, (5) the number of entitlements required to be purchased or sold by each such refiner and other firm, and (6) the price at which entitlements shall be purchased and sold.[31] These calculations are based on monthly data submitted to the ERA by all refiners and other eligible firms (see Section I.C.).

The cost equalization effected by the DCOE Program does not take place in the month the purchase and sale of the oil occurs. There is approximately a three month time lag between the end of the reporting period and the ERA's issuance of entitlement buy/sell requirements. Thus, the cost equalization is achieved over time as the crude oil moving through the refinery is tracked by the accounting system, and the data are captured and reported to the ERA.

2. Additions to the Basic Scheme

To compensate for inequities in the system and to

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improve the economic position of certain industries, Congress and the ERA (and its predecessors) have incorporated into the DCOE Program special standards of treatment for different types and sources of crude oil, as well as for certain classes of participants. A brief summary of these benefits and standards is presented below. Appendix C contains a more detailed description of these special benefits and standards.

a. Small Refiner Bias

Small refiners are issued extra entitlements to compensate them for the lack of scale enjoyed by the vertically integrated and large independent oil companies.

b. Residual Fuel Entitlements

Residual fuel entitlements are issued to improve the competitive position of the East Coast* residual fuel oil marketers supplied by Caribbean refiners, relative to marketers supplied by domestic refiners.

c. Naphtha Entitlements

To improve the competitive position of the Puerto Rican petrochemical industry relative to the domestic petrochemical industry entitlements are issued for the importation of naphtha feedstock into Puerto Rico for use by the petrochemical industry.

d. Petroleum Substitute Entitlements

To increase domestic production of synthetic fuels and thereby decrease the volume of crude oil imported by domestic refiners the ERA issues entitlements to refiners for those volumes of synthetic fuel that they utilize within their domestic refineries as a feedstock or fuel.

e. Strategic Petroleum Reserve Entitlements

The FEA allows firms selling imported crude oil to the

government for storage in the SPR to receive entitlements as if the oil had been processed in a domestic refinery.

f. California Low-Gravity, Hugh-Sulfur Crude Oil Entitlements

Under a special program designed to boost the market attractiveness of California low-gravity crude oil, the ERA grants refiners of the product additional entitlements.

g. Other Categories of Oil

Naval Petroleum Reserve (NPR), stripper well*, tertiary*, ANS and imported oil are all treated as uncontrolled oil for entitlement calculations.[32]

h. Exceptions and Appeals Relief

Firms can seek relief from compliance with the DCOE Program regulations by petitioning the DOE's Office of Hearings and Appeals (OHA).

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C. THE INFORMATION COLLECTED

1. The Reporting System

The DOE has promulgated regulations[a] (published in the Code of Federal Regulations) setting forth the information that must be submitted in each report.[32] The data elements required to be submitted in these reports includes the information necessary to operate the DCOE Program.[33]

The DCOE Program office within the ERA collects the data used to operate the entitlements program in a series of mandatory monthly reports. The ERA logs receipt of all reports, reviews them for accuracy and enters the data taken from the forms into a computer for processing.[34] The reporting, processing and aggregation of this data takes place over a 100-day period.[35]

A program participant may be required to submit several reports each month, depending upon the number of the following reporting categories within which it falls: (1) eligible firm or refiner delivering crude oil to the Strategic Petroleum Reserve; (2) refiner; (3) eligible firm; (4) naphtha importer; (5) eligible firm or refiner required to purchase or sell entitlements for the third month prior to the reporting month.

The first four of these reports are prepared specifically for the DCOE program.[36] The report required to be submitted by all eligible

[a]The Department of Energy's regulations for the implementation of the DCOE program are published in the Code of Federal Regulations. Relevant portions of these regulations are set out in Appendix B.

firms is prepared for the Office of Oil Imports. The DCOE Program office uses data taken from that report.

2. Reports Description

a. Strategic Petroleum Reserve Deliveries

The report by participants delivering crude oil to the Strategic Petroleum Reserve is submitted in a letter to the DCOE Program office, setting forth the total cost, weighted average cost, and volume of the domestic and imported crude oil accepted for delivery by the United States Government.[37]

b. Refiners' Monthly Report[38]

Form ERA-49 is used to document crude oil receipts, costs and runs to stills. For refiners who sell residual fuel oil in, or to, the East Coast market, the volume of residual fuel sold is also documented. Crude oil receipts are broken out for volumes and weighted average costs by the category of crude oil (old oil, new oil, imported oil, ANS oil, stripper well oil, synthetic crude, NPR oil, tertiary oil, and other domestic oil). For the first four categories, oil originating in or going to California is also reported. Crude oil receipts are also broken down by volumes processed for a refiner's own account at its refinery and at other refineries, and for non-refiners at its refinery. These figures are cross-checked at ERA.

Form ERA-49 replaced Form FEA-P102-M-2, which as FEA-P102-M-0 was the form used at the inception of the program. ERA-49 has been in use since February 1978. Approximately 180 companies currently file

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this form, which must be submitted to ERA on or before the fifth day of the second month following the reporting month.

c. Data on Product Imports[39]

Data on imports of residual fuel oil into the East Coast market are taken from Schedule T, column m of Form FEA-P113-M-0. This form must be submitted by all importers of crude and unfinished oils and refined products to the Office of Oil Imports in the ERA, no later than 15 working days after the end of each month. It is processed in that office before being sent for use in the entitlements program. This system replaces a separate report, Form FEA-P126-M-0, which was required by the FEA from importers of residual fuel oil into the East Coast market. The change was made in July, 1977.

d. Naphtha Importers' Monthly Report[40]

Form FEA-P129-M-0 is used to document imports of foreign naphtha into Puerto Rico for use as a petrochemical feedstock. Imported volumes are reported by individual shipments with the port of origin, total dollar cost, and weighted average cost per barrel listed. Export sales of naphtha-derived products and the total volume of naphtha imports are also reported. Export sales are subtracted from total imports to arrive at a total imported naphtha volume which is the basis for issuing naphtha entitlements. Only four companies are currently required to submit this report. They must do so even if the imported volume is zero. Reports are due by the fifth day of the second month following the month of importation.

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e. Entitlement Transactions Report[41]

Report Form FEA-P103-M-0 (which will be replaced by ERA-116) is used to document and account for all entitlement transactions. It is the basis of entitlement accounting and is the source document for the permanent record of entitlement transactions. It must be submitted by the tenth day of the third month following the month for which the entitlements were issued. The information to be submitted includes a list of the respondent's sales and purchases of entitlements position at the end of the previous month. This form must be submitted by all participants in the DCOE program. Importers are not required to submit reports for months in which they did not receive entitlements.

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D. SYSTEM IMPLEMENTATION

Sections I.A, I.B, and I.C presented an overview of the function of the Domestic Crude Oil Entitlements System. This section is a description of the processes and procedures currently in use to implement that system. It describes the data collection procedures, processing, storage and retrieval of information, and the other actions undertaken during the normal functioning of the DCOE Program at DOE.

1. Responsibility for System Implementation

For all practical purposes the responsibility for the day-to-day functioning of the Domestic Crude Oil Entitlements System falls under the Director, Crude Oil Supply and Allocation Division, Office of Fuel Regulation, Economic Regulatory Administration. ERA personnel collect, verify, process, and collate all the necessary information with major assistance from private sub-contractors. EIA personnel serve primarily as the project officer for these sub-contracts, and as the program operator in charge of running the computerized portion of the system. After each period's computations are completed, the Division of Oil and Gas Statistics (EIA) publishes selected statistics in the Monthly Energy Review. The month's "Entitlements Notice" is published in the Federal Register by the Office of General Council.

2. System Operation

A typical month's operation may be divided into the following seven procedures:

i Collation, verification, and computerization of input data.

ii Initial Calculations (Entitlement Price and Deemed Old Oil Ratio).

iii Calculation of Amendments (Manual).

iv Hearings and Appeals.

v The Entitlement Notice.

vi Clearance Procedures.

vii Closure and Storage.

Each one of the above seven procedures requires the handling and manipulation of information supplied by the participants either directly to the DCOE program (ERA), to other DOE programs, or as input from DOE's Office of Hearings and Appeals. The steps involved in handling this information are shown in Figure 1 and are discussed in detail below:

a. Collation, Verification and Computerization of Input Data

Step 1: ERA mails out blank forms to participants (ERA-49, P103-M-0, P126-M-0, P129-M-0 as appropriate) together with a copy of the last Entitlement Notice and Audit Trail.

Step 2: Two copies of the completed forms are returned by participants by the fifth day of the second month following the reporting month. See Figure 2 for a detailed timetable of the Entitlements System. All forms are returned by U.S. mail to a designated P.O. Box.

Step 3: Forms are moved from the P.O. Box to the DCOE office at least once a day, and often more frequently if needed.

Step 4: The forms are logged in and stamped with the date. One copy is permanently filed. The second, or "working copy,"

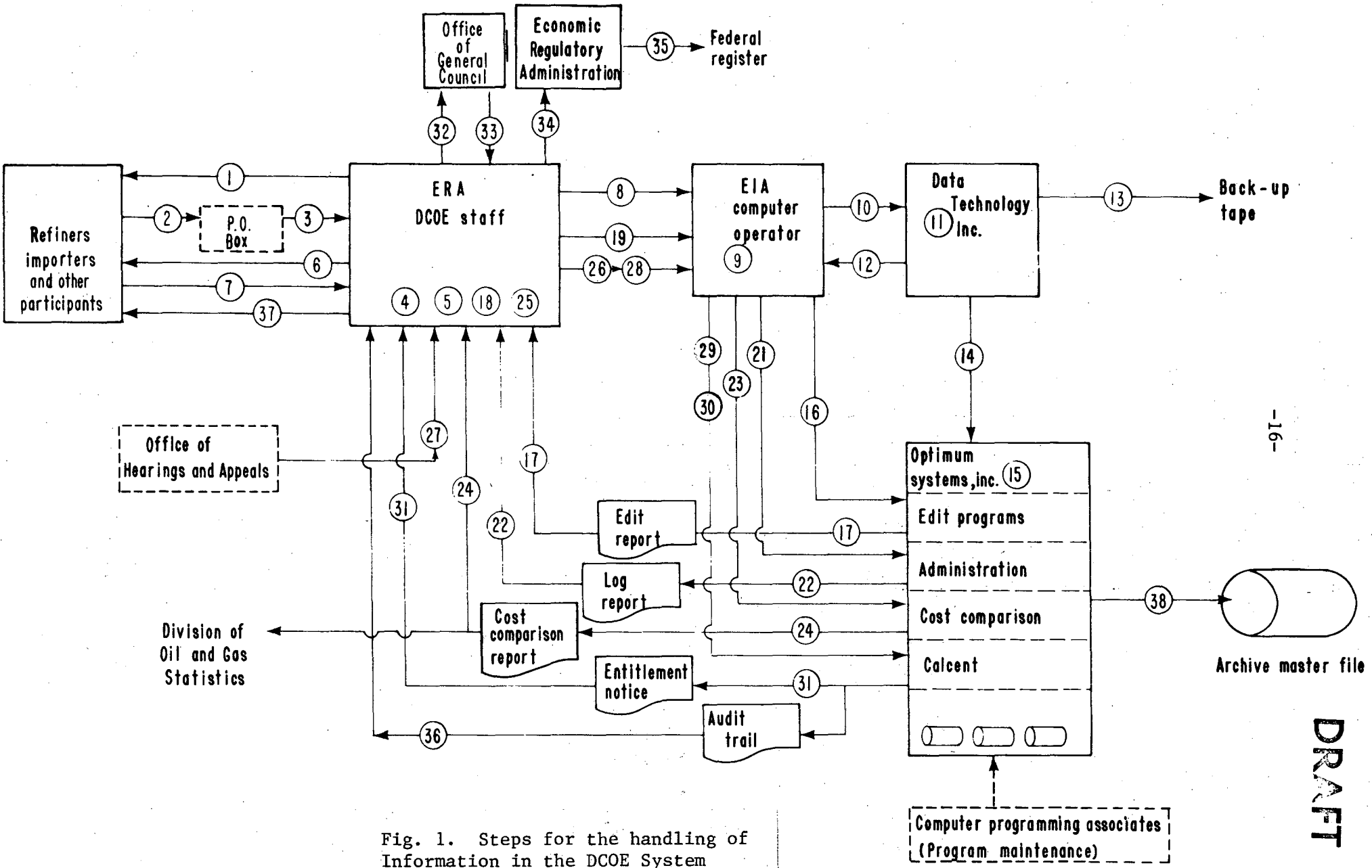

Fig. 1. Steps for the handling of Information in the DCOE System

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June	July	August	September
Reporting Month	1st Month Following Reporting Month	2nd Month Following Reporting Month	3rd Month Following Reporting Month
Crude Purchased Runs to Stills Resid Imported Naphtha Imported	Assemble Data Prepare Reports Submit Reports	Reports Received Data Processed Entitlement Notice Buy/Sell Entitlements	Assemble Data Prepare Transaction Report Submit Transaction Report

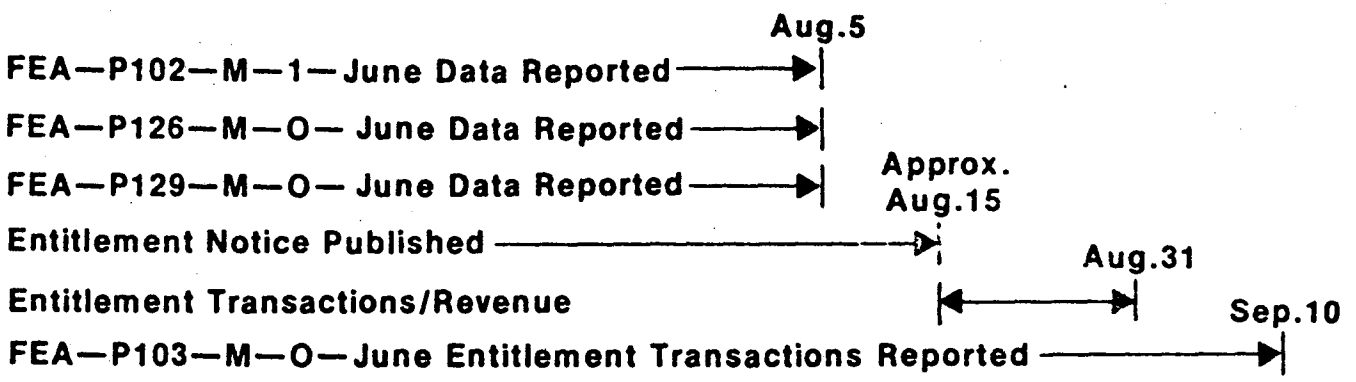

Fig. 2. Timetable of the Entitlements System.

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is given to one of the three ERA analysts (the approximately 180 participants are divided alphabetically and permanently assigned to an analyst). Most forms, due by the fifth of the month, arrive before the due date or at least before the deadline for beginning calculations (usually a few days after the due date).

Because the system cannot proceed without data from all participants, the program may occasionally accept data over the telephone. Officially authorized forms must always be submitted to back up such information. Any discrepancy between the telephone data and the written data must be resolved via the amendments processes.

Step 5: The forms are visually scanned by the analyst to ensure that all required information has been filled out and that dates and name abbreviations conform to computer specifications.

Step 6: If any "obvious" errors are detected, the analyst calls the company and verifies the suspect information.

Step 7: All information changes accepted by telephone are so noted on the working copy, and later verified against the certified and signed re-submission or amendment submitted by mail.

Step 8: After the forms have been "eyeballed" for completeness and gross data inaccuracies, they are forwarded to the EIA computer programmer/program operator.

Step 9: The programmer screens the forms again (mainly for the spelling of the short name used as identification in the computer programs), logs them into the ADMINLOG file[a], and assigns sequential accession numbers.

Step 10: The forms are picked up by a courier from a private subcontractor, Data Technology, Inc. (DTI).

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[a]See Appendix G for a detailed description of all computerized procedures, programs, and files.

Step 11: DTI personnel keypunch and machine verify the information on the forms.

Step 12: The original forms are returned by DTI to the EIA program operator. They are held until all the information has been processed by the EDIT programs to the satisfaction of the ERA program staff (steps 16 through 20).

Step 13: A back up tape of the keypunched information is maintained by DTI for several days.

Step 14: As the forms are keypunched and machine verified, tapes containing batches of forms are forwarded by DTI to another sub-contractor, Optimum Systems, Inc. (OSI).

Step 15: OSI converts the information from tape to disk. After about five working days the original tape is returned to the scratch tape pool.

Step 16: The EIA computer operator runs the necessary EDIT programs (see Appendix G for descriptions).

Step 17: The EIA computer operator forwards the EDIT reports to the ERA staff.

Step 18: ERA analysts scan the EDIT reports to reconcile the data with the error flags generated by the computerized edit procedures. This process may require telephone contact with the participants to verify or correct submitted data. If data are accepted over the phone, Step 7 will be repeated.

Step 19: The necessary changes are entered on a blank form and returned to the EIA operator.

Step 20: The EIA operator makes the necessary changes to the computerized file on an interactive basis.

After a number of changes have been made the EDIT programs are rerun, and the cycle of Steps 16 through 20 repeated. This cycle can be repeated up to a dozen times

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before all the data is considered "clean."

Step 21: Once the data is clean the ADMINLOG procedures are run.

Step 22: The ADMINLOG reports are used by ERA to ascertain which firms have or have not yet sumitted their monthly data.

If a company is late in submitting its forms, data may be acquired by telephone (see Step 4).

Successful completion of Step 22 concludes the first part of the information flow. At this point all information necessary for the initial calculations has been collected, entered in the month's computerized master file, and verified.

b. Initial Calculations

The initial calculations include the calculation of the month's Entitlement Price, the Domestic Oil Supply Ratio (DOSR), and the Deemed Old Oil Ratio (DOOR). These calculations (the COSTCOMP procedures) are based only on information collected on page 1 of Form ERA-49. No other information is necessary.

Step 23: The COSTCOMP procedure is executed by the EIA programmer.

Step 24: The cost comparison reports containing company specific and summary information on the receipts of various tiers, costs, the DOSR, DOOR, and the entitlement price are forwarded to the ERA analysts. A summary of this information is also forwarded to EIA's Division of Oil and Gas Statistics.

c. Calculations of Amendments

Amendments are corrections to previously submitted data made necessary due to internal company errors. To calculate the

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proper correction it is necessary to modify the volume correction requested by the firm to account for changes in the entitlement price and DOOR between the date the original data were submitted and the date the correction was submitted. The necessary calculations are laborious, often complex; they must be accurately done, and then verified for accuracy.

Step 25: These amendments are calculated manually at this stage.

Step 26: The amendments are entered on a blank form and forwarded to the EIA operator.

d. Hearings and Appeals

The entitlement program regulations provide that companies required to purchase entitlements may be granted partial or total relief from this obligation under certain circumstances. Each month appeals for exceptions relief are processed by the Office of Hearings and Appeals (H&A).

Step 27: A memo containing the month's approved exceptions relief is forwarded from H&A to the ERA program staff.

Step 28: Information contained in this memo is transcribed onto blank forms by the program staff and forwarded to the EIA program operator.

e. The Entitlement Notice

All the information necessary for the calculation of the participants' entitlement obligations has been obtained. The next step is initiating the calculation sequence.

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Step 29: The EIA program operator builds the amendments File and the H&A File, on an inter-active terminal. Print-outs of these files are verified (by eye) by the ERA staff prior to initiation of the next step.

Step 30: The EIA operator initiates the CALCENT program and generates the month's Entitlement Notice for DOE review.

Step 31: Copies of the Entitlement Notice are forwarded to ERA's program staff for review.

f. Clearance Procedures

After the Entitlement Notice has been calculated and checked over by the DCOE Program staff, the notice must be concurred with both within ERA and by the Office of General Council.

Step 32: After review by the DCOE Program staff, the Entitlement Notice and a draft Preamble to the notice is forwarded via channels to the Office of General Council (OGC) for concurrence.

Step 33: After the concurrence of OGC the notice is returned to the DCOE Program.

Step 34: The Entitlement Notice is forwarded via channels to the Administrator, Economic Regulatory Administration for concurrence.

Step 35: ERA publishes the Entitlement Notice in the Federal Register (usually within 4 to 5 days).

g. Closure and Storage

After the Entitlement Notice has been approved by the Office of General Council the month's calculations are considered complete, and the information to be published is considered public.

Step 36: Copies of the Entitlement Notice and Audit Trail are mailed out by the ERA program staff to the participants, together with the necessary blank forms for the next period.

Step 37: Usually within less than an hour "the street" is aware that the notice is public, and the program office is deluged with telephone calls. Company specific information is passed on to the participants by telephone, and most companies know their entitlement obligation within several hours.

Step 38: The EIA program operator achieves the data used in the monthly production cycle by copying all the monthly files to named disk files. These are in turn archived to tape using the DOE Data Set Management System.

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E. SYSTEM DESIGN

The above sections have discussed the mandated purpose of the Domestic Crude Oil Entitlements System, the regulations under which data may be collected, and the uses to which this information may be put. This section briefly describes the flow of liquid hydrocarbons from recovery through refining, from the point of view of the Entitlements Program, and the development of the calculation algorithms used to implement the regulations.

1. Flow of Liquid Hydrocarbons

The flow of liquid hydrocarbons, with a brief description of the measurement and accounting practices adopted in the industry, is discussed in Appendix J. The flow of liquid hydrocarbons, as viewed from the Entitlements System, is shown in Figure 3.[a] It includes domestic crude oil, liquid hydrocarbons from both associated and non-associated natural gas (domestic and Canada), and imported crude. The diagram shows the flow of the physical entities involved in the DCOE System, and to a more limited extent the measuring and accounting analog.

It is difficult directly to compare information collected by the DCOE System with similar information collected by other systems. The primary reason for this diffculty is ambiguous, incomplete, and even conflicting definitions of some of the physical substances used in the different systems. For example, the definition of crude oil used by the DCOE Program information collection system is different from the

[a]This diagram represents the current status of the study and should be considered preliminary.

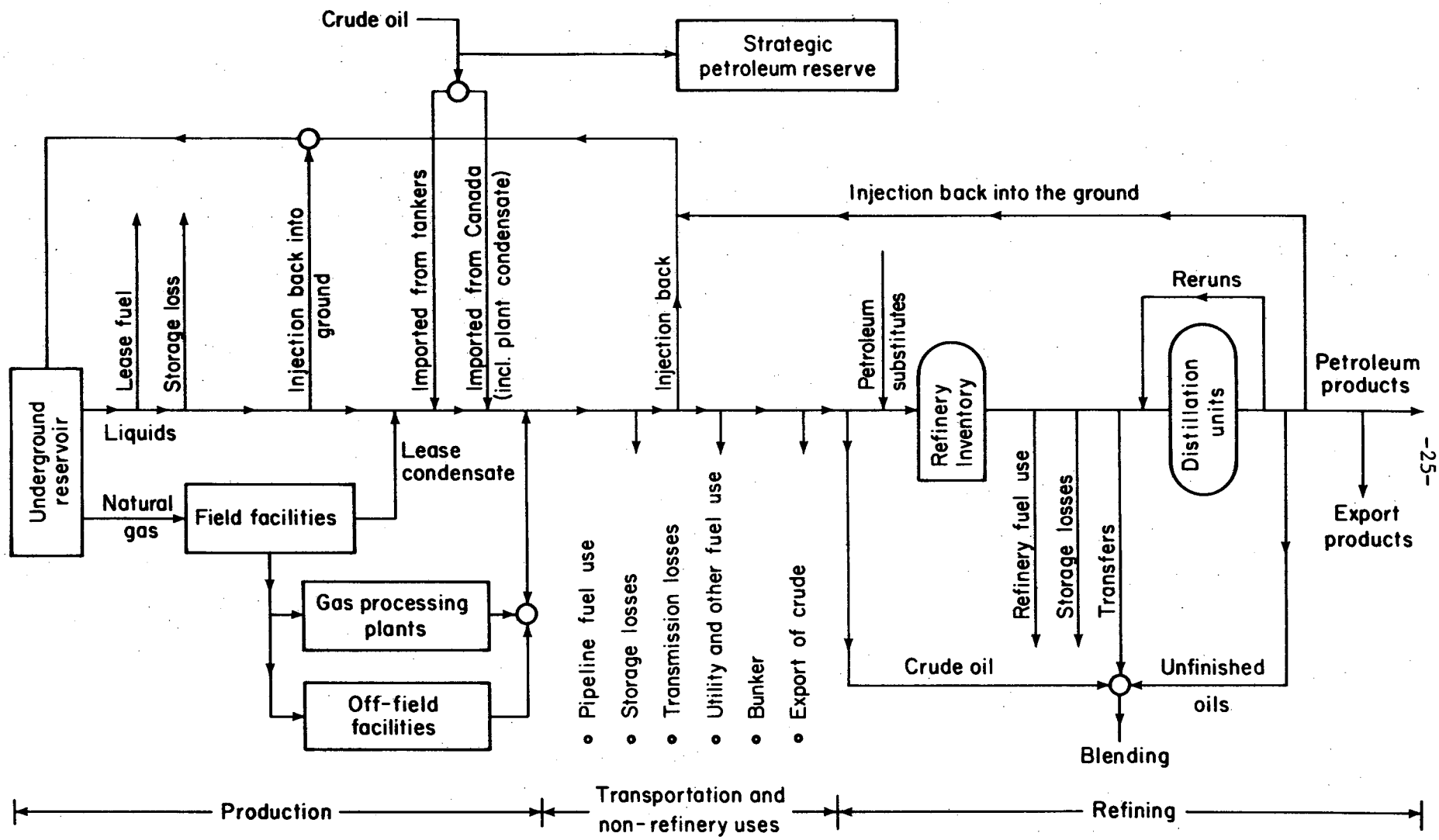

Fig. 3. Flow of liquid hydrocarbons as viewed from the Entitlements System.

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definition used by the Domestic Crude Oil First Purchaser System (DCOFPS).

For purposes of the DCOE Program system, crude oil is defined as "a mixture of liquid hydrocarbons including lease condensate that exists in natural underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities."[42]

For purposes of the DCOFP System, crude oil is defined as "a mixture of hydrocarbons that existed in liquid phase in underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities. 'Crude oil' includes condensate recovered in associated or non-associated production by mechanical separators, whether located on the lease, at central field facilities, or at the inlet side of a gas processing plant."[43]

Thus, the definition of crude oil used for the DCOFP System explicitly includes both lease and plant condensates while the definition for the DCOE System includes lease condensates but not plant condensates.

Another crude oil definitional problem is that the Mandatory Petroleum Allocation Regulations (10 C.F.R. Section 211 (1978)), the regulations pertaining to the DCOE System, do not define the term lease condensate. Consequently, system respondents may use different definitions of lease condensate in filling out the DCOE Program reporting forms.

Two other potential problems associated with the DCOE

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information system design are:

- Runs to Stills and Export Products. The volume of total crude oil runs to stills is a physical entity that can be closely monitored during the refining process. The quantity of each refined product may similarly be measured. However, tracking the quantity of specific types of products exported, or sold for export, is essentially an accounting problem, in which the data may not be recorded in the refinery's accounting system. By requiring that the runs volume be reduced for certain exports, the system design superimposes a fairly elaborate accounting and verification problem on a far more straightforward measurement system.

- Strategic Petroleum Reserves. Oil imported for the SPR may be reported as runs to stills by the importer or refiner. 10 C.F.R. Section 211.67 (1978) states that a refiner's runs to stills "shall include the total number of barrels of imported crude delivered to... the Strategic Petroleum Reserve...." Refiners and other importers of SPR crude are therefore instructed to increase their exported runs by an amount equal to the SPR imports. However, the DCOE computerized calculation system maintains its own computerized files[44] on SPR imports, and adds these figures to company figures during the entitlement calculation process. The possibility of double counting, and the granting of duplicate entitlements exists under these conditions. (See Section II.E.)

2. DCOE Calculation Algorithms

This section traces the development of the calculation algorithms in the currently operational DCOE System, and compares the existing algorithms (particularly CALCENT) to the regulation in 10 C.F.R. Section 211.67 (1978). This comparison permits the detection of those sections of the code where judgment or interpretation might be required from the DCOE Program staff to implement the regulations via a computerized calculation code.

- Data Collection Procedures. In addition to specifying particular data to be collected, 10 C.F.R. Section 211.66 provides a catchall phrase that permits the DCOE system

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to collect all necessary data. In order for the calculations to proceed all data must be collected in time. The system cannot proceed with incomplete data. To facilitate this the program staff will, if necessary, accept provisional data over the telephone, with certified data to follow by mail.

- Procedures specified in 10 C.F.R. The calculation of the entitlement position of a company requires the development of a number of national statistics. These are calculated explicitly as stated in 10 C.F.R. Section 211.67 (1978).

- Procedures Requiring Some Interpretation.

  i. In the calculation of the Naphtha Ratio, the regulations introduce the notion of the "entitlement value for a barrel of crude oil included in the volume of a refiner's crude oil runs to stills for total month." The CALCENT calculation code interprets this as DOSR x EP x 1, i.e., the marginal revenue a firm obtains by including one additional barrel of oil in their runs to stills. This interpretation is appropriate.

  ii. The exact method for including Exceptions and Appeals relief is not specified in 10 C.F.R. Section 211.67 (1978). The calculation code treats value exceptions for partial refief and blanket relief exceptions slightly differently. The difference is merely a matter of computational convenience and does not affect the final figures.

  iii. Crude runs to stills are subject to numerous adjustments as specified in 10 C.F.R. Section 211.67 (1978). Only in the treatment of the Strategic Petroleum Reserve (SPR) adjustment is there a strong possibility of an error. As discussed above, the data collection and calculation procedures may conflict with the definitions and lead to double counting of these adjustments. The recent change in the method of collection and input of SPR data to the system should help overcome this problem.

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F. USERS OF THE OUTPUT

The Domestic Crude Oil Entitlements Program was mandated essentially to equalize the input cost of crude oil to U.S. refiners, and to relieve any undue cost burden on other selected participants. Regulations provide for the collection of all necessary data and specify calculation procedures. These regulations also guarantee the proprietary nature of all company specific information supplied by the participants. The entitlement price, the entitlement position of the participants, and the exceptions relief granted are published monthly.

The primary use of the data collected by the DCOE Program is for the calculation of the entitlements position of the program participants. Data submitted by the participants is processed by the program staff, and (usually within two weeks) the results of the computations are made known to the respondents. The audit trail gives back to the companies sufficient information on the handling of the data for them to be able to detect any major errors. In the immediate sense the system may therefore be considered closed, with the primary use of the data being made by the entitlements program, and the most interested parties being the respondents.

The management of the DCOE Program also uses the data to investigate internal and external consistency. The most important example of this use of data is the continuing investigation of the relative decline rates of old oil and new oil. From the information available to this project it is difficult to determine how comprehensive, systematic, or thorough the use of the data for this purpose is.

There are however other uses and users of the DCOE information. These secondary users and their requirements are discussed below.

1. Publication in the Federal Register

The Economic Regulatory Administration is responsible for publication of the official Entitlement Notice in the Federal Register. This official publication process takes four to six days. The program participants are aware of the contents of the notice within hours after OGC and ERA concurrence, so the official notice is more of historic than of primary interest to the primary participants.

2. Publication in the Monthly Energy Review

A copy of the Cost Comparison Reports and the Entitlement Notice are provided to the Office of the Director, Division of Oil and Gas Statistics (EIA). This office is responsible for the publication of the "Entitlement Price," the "Crude Oil Entitlement Benefit," and the "Domestic Old Oil Supply Ratio" in the Monthly Energy Review.

EIA also compares the total "cost per barrel" as reported by the DCOE Program to the similar figure, Refinery Acquisition Cost, reported via the P110 system, i.e., the Refiner's Monthly Cost Allocation Report. There are several reasons for these figures to be close but not the same, and this office of the EIA attempts to investigate these differences on a low key basis. Occasionally EIA may contact a company by telephone to investigate further if discrepancies between the ERA-49 and P110 are "large." The process for follow-up action taken as a result of these investigations is not clear.

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3. Monthly Data Summary Sheets

Monthly Data Summary Sheets containing non-proprietary information are produced by the DCOE Program staff. These data are important for the program management's attempts to investigate consistency and data validity. These data are available to other DOE departments, and interested parties (law firms, oil companies, etc.) if picked up in person at the program office. They may occasionally be mailed out in response to a specific request. No official record is maintained of the distribution of these reports.

4. Compliance Reports

Compliance Reports consisting of DCOE Program information sorted by region are forwarded to all regional audit offices. The program says it has received no feedback on the usefulness of these reports. Investigation of the utility of these reports to the audit officers was not completed.

5. Freedom of Information Act

Interested parties, including oil companies and their representatives, have occasionally sought data under the Freedom of Information Act. To date no major problems concerning proprietary information have arisen due to this act.

6. Academic and Research Use

The DCOE Program has attracted a considerable degree of interest among academicians and research workers. The Entitlement Notice and the information published in the Monthly Energy Review constitute the only

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published information easily available to them. No attempt was made to determine the data needs of these users, or the uses to which they put available data.

7. United States Congress

The DCOE Program receives "frequent" requests from Congress, Congressional committees, and the Congressional staff for information and analysis. The nature of these requests, and the usefulness and meaningfulness of the data supplied for Congressional use were not investigated.

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G. VALIDATION CRITERIA

The following criteria may be applied to determine whether the information system supporting the Domestic Crude Oil Entitlements Program is valid: Is the system useful; is the system meaningful; is the system sufficient, and (conversely) are all its aspects necessary?

1. Is the System Useful?

A system may be considered useful if there exists a generally accepted body of knowledge (theory, law, etc.) which when applied to the data collected permits a user to take action that attain the stated goal of the system. In this study this criterion is used to judge whether the task, as laid forth in federal regulations, can be satisfactorily accomplished by the data collected and the procedures specified for processing the data.

The boundaries of this investigation were drawn to include the DCOE System as defined in federal regulations, but to exclude the intent of these regulations. Congressional intent requires the Administration "to preserve an economically sound and competitive petroleum industry, and in particular, to protect the competitive viability of the independent and small refiners."[45] Whether the DCOE Program has merely protected the specified sections of the industry, or provided them or others with an advantage is not the subject of this investigation. Questions such as these would require a definition of what constitutes a 'sound and competitive petroleum industry' and what constitutes 'competitive viability' for a smaller participant. The usefulness of the DCOE Program in achieving these larger goals has not been considered

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the prerogative of this investigation.

The system is useful (valid) in meeting the objectives specified in the regulations. No extrapolation of this statement to its usefulness in terms of the intent of Congress is attempted.

2. Is the System Meaningful?

Of primary concern here are questions of accuracy, i.e., definitional accuracy and physical accuracy. The terms should be sufficiently clearly defined so that user and respondent are in agreement as to what is required and what is reported; the information collected should be appropriate to accomplish the system objective; the data should be statistically accurate enough to meet the intent of the regulations and the computational requirements of the system.

Based upon the preliminary investigation to date, the system is meaningful (valid). However, further investigation is needed.

3. Is the System Sufficient and Necessary?

This last criterion attempts to determine whether all the DCOE System goals can be satisfied with the data collection and information processing procedures; and conversely, whether these goals could still be accomplished with reduced effort.

Again, based upon the preliminary investigation to date the system as it exists is both necessary and sufficient. A limited extension of the system could help resolve some ambiguities in system design and data definition, as well as serve as internal check points. Specific recommendations in this area, if needed, will be made in the final report.

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II. SYSTEM VALIDATION

A. FORMS ANALYSIS

The analysis of forms and instructions for the DCOE system is a necessary preliminary step for validation of the data collected by the system. This analysis is complicated by the fact that since the inception of the Domestic Crude Oil Allocations Program, the forms on which companies are required to report their data have undergone several major and numerous minor changes. These changes have been necessary because of the dynamic nature of the entitlements program. Almost continual changes in the law and accompanying regulations have meant that new, different, or additional data were periodically necessary. For the purpose of our analysis, the January, 1978 version of Form ERA-49 was used. A somewhat modified version of this form is currently in use.

A number of categories of possible faults in the forms and instructions were identified:

A. Lack of internal consistency.

B. Undefined terms in the instructions.

C. Ambiguous or insufficiently precise reference to regulations.

D. Concept or term not clearly defined.

E. Lack of Clarity in language.

F. Omission of an instruction.

Appendix D contains the details of this analysis, including location of possible faults and fault types, description of the discrepancy likely to follow from the fault, and recommendation as to how the fault

might be corrected. In addition to the Refiner's Monthly Report Form (ERA-49), some analysis has also been given to the Naphtha Imports Monthly Report (FEA-P-129-M-0), the Report of Oil Imports into the United States and Puerto Rico (FEA-P-113-M-0), and the Entitlement Transaction Report (FEA-P-103-M-0).

It was concluded that more emphasis should be given to clear, explicit and consistent definitions within the DCOE forms. Due to occasional unclear definitions and some omission of instructions, some double counting is possible, particularly when reporting crude runs volumes. The detailed analysis in Appendix D locates these problem areas in the forms and instructions.

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B. EDITING OF INPUT DATA

Editing of the entitlements data by the program staff is carried out both by 'eyeballing' and with the aid of computerized editing programs. Section I.D. discussed the implementation procedures of the DCOE Program, and itemized the steps in the flow of a typical month's information, from log-in through final calculations. Editing and verification of the input information is carried out in steps 5 through 20 (See Section I.D and Figure 1).

The editing and verification process can be divided into two parts: 'eyeballing' by the analyst, and a rather comprehensive computerized editorial process that checks basic arithmetic. Keypunching from the original hard copy to magnetic tape is done by a sub-contractor, who is also responsible for machine verification of the keypunch operation.

1. Eyeball Editing by DCOE Analysts

In step 5, when the original forms arrive at the program office, they are visually scanned to ensure that required information has been completed, and that dates, name abbreviations, etc. conform to computer specifications.

The approximately 180 refiners participating in the program are divided alphabetically into three groups, with an analyst permanently responsible for about 60 participants. When initially reviewing the incoming forms, the analyst also attempts to 'eyeball' the data to determine if it "looks right." The main information looked over during this process is consistency of the current month's volumes for various tiers with similar volumes reported for prior months, and the

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'reasonableness' of per barrel prices.

If any information appears 'unusual' the analyst will contact an authorized company representative by telephone and attempt to verify the item in question. Corrections, especially of clerical or typographical origin are accepted over the phone. The item in question is merely 'red-lined,' and the new value written in. Regulations require that a certified copy of these corrections, or 'resubmissions' be forwarded to the program as soon as possible. Any additional discrepancy between the numbers accepted over the phone and the resubmissions may have to be further resolved, via the amendments process.

Owing to the fairly heavy case load (60 companies per analyst, and a large amount of manual calculations for the amendments) only obvious and large clerical errors can be caught by this eyeball editing process. It would not be possible to detect, for example, long term shifts in reporting patterns or internal inconsistencies by this process. Some possible forms of inconsistency are discussed in section II.E. The use of an elementary moving average procedure to help the analyst verify incoming data is discussed below.

2. Computerized EDIT Procedures

The DCOE Sytem has a number of EDIT programs to permit verification and editing of the data keyed from the original documents.[46] These procedures permit the program staff to build or update a master file with those records that pass the computerized edit, to print a report displaying the state of the output master file, and to provide a listing of the records rejected and for the errors encountered in

records not rejected.

During typical operation the input to the specified EDIT program is from a working disk file (step 15 of the System Implementation) containing the transaction records keyed from the monthly report form. Output consists of basically two parts: a second working disk file containing the latest accumulation of records that have been successfully edited, and "Edit Work Lists" (hard copy) formatted to print the latest status of accepted and rejected files. The analyst works with these edit work lists to determine which must be verified, corrected, re-keyed, and resubmitted to subsequent EDIT runs. A summary list of error message counts accompanies each edit work list.

The EDIT programs edit information in two distinct categories: Prefix edits and Document edits.[47] Prefix edits consist of checking and identifying label or alphanumeric information, e.g., company name, month, etc. Records passing the prefix edit are passed onto the document edit.

The document edit is a fairly elaborate check of the numerical information for format, sign, and required records. Data in the wrong format (e.g., decimal points), of the wrong sign (e.g., negative prices), or with certain records missing (certain records are required) are flagged for analyst follow-up.

One of the most important functions of the document edit is 'data validation.' Various rows and columns of the input documents are interrelated, and the EDIT procedures make the calculations necessary to validate the immediate internal consistency of data among these

columns. When the calculated value does not equal the entered, the calculated value overrides the original entered value, and the associated error message is printed.

It should be noted that the above procedure assumes that the error detected and corrected is computational, i.e., due to addition or division. It may in fact be that the calculated number is correct as entered, and the number calculated by the EDIT procedure is in error due to a clerical error in one of its components. It is therefore up to the analyst to accept this override, or to verify whether the final component or the sub-components are actually in error by telephone contact with the respondent.

An additional check made during the document edit is a 'reasonableness' check on the reported crude runs to stills. In this check the ratio of crude runs to the registered capacity of the refiner (adjusted for the days in the month) is calculated. This ratio is required to be between 0.3 and 1.0; if not an error message is produced. Since it is to a refiner's benefit to show the largest possible crude runs, an upper bound of 1.0 is a strict but appropriate flag point. Crude runs exceeding registered capacity which are possible for short periods, will therefore be brought to the attention of the program.

3. Non-DCOE Program Data

A single piece of data, the imports of residual fuel oil, used in the DCOE calculations, are not collected by the program itself. This information is obtained from Form P113, Schedule T, column M.

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After verification by the P113 program office, a copy of P113, Schedule T, is forwarded to the DCOE program office. These schedules are keypunched, machine verified, and entered into the month's master file. If after the data has been forwarded to the DCOE office should the respondent update or amend the original data, this new information is not available to the DCOE office.

The impact this procedure could have on the program calculations has not been investigated to date. It is anticipated that the overall impact on other participants due to the change of data of a single respondent is probably small. The impact for that single respondent may or may not be significant. The cumulative impact of frequent changes or resubmission of this data by a company would, of course, depend on the frequency, magnitude and direction of such corrections.

4. Conclusions

The editorial procedures used by the DCOE Program are adequate to verify or edit the immediate month's data for label information and arithmetical internal consistency.

The program does not attempt to systematically monitor company specific data for long-term trends or long-term consistency. Preliminary investigations to date indicate the needs of both these types of validation procedures, either on a monthly or periodic (e.g., quarterly) basis. One important type of internal consistency validation is discussed in section II.E. The monitoring of long-term trends in input data is discussed below.

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5. Recommendations for Further Research

During this phase of the investigations, an attempt was made to test methods of monitoring company specific long-term trends in various data categories. Unfortunately, the unavailability of this data did not permit these investigations to proceed to any conclusion.

Based on the very limited company specific data available, a simple forecast model based on moving averages was used to test the 'validity' of the next input data. Figures 4 and 5 show the result of applying the mean and standard deviation associated with a five month moving average to monitor old oil receipts of two companies.[a] The asterisks(*) indicate input data that would have been flagged as "outlier," i.e., greater than two standard deviations from the mean, had the scheme been in effect. The solid points indicate 'good' data. Figure 4 for company A indicates that the two points of corrective sharp decline would have been brought to the analysts' attention. Similar data for company B is shown in Figure 5. While the input data for company B is apparently more stable (note the much smaller 'two sigma' bars), this company would have been flagged eight times in 21 months. Closer investigation of the two figures will indicate that while company A has a trend, company B's old oil receipts may be stepping downward in discrete jumps, perhaps deserving further investigation.

The above preliminary analysis indicates the reasons for, and

[a]These were the only companies on which data, though unavailable, could be developed from secondary sources.

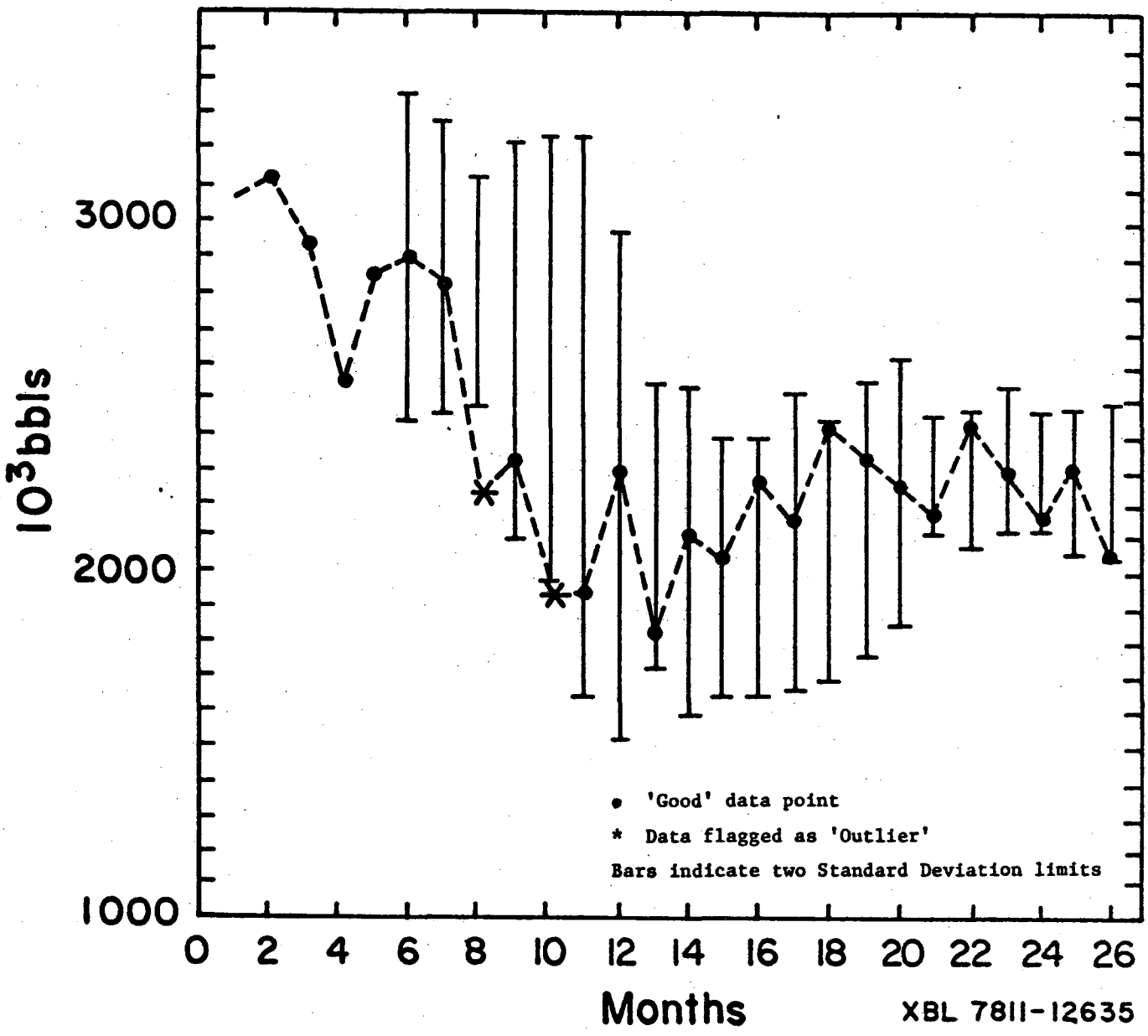

Figure 4. "Monitoring Scheme for Old Oil Receipts"
Five Month Moving Average - Company A

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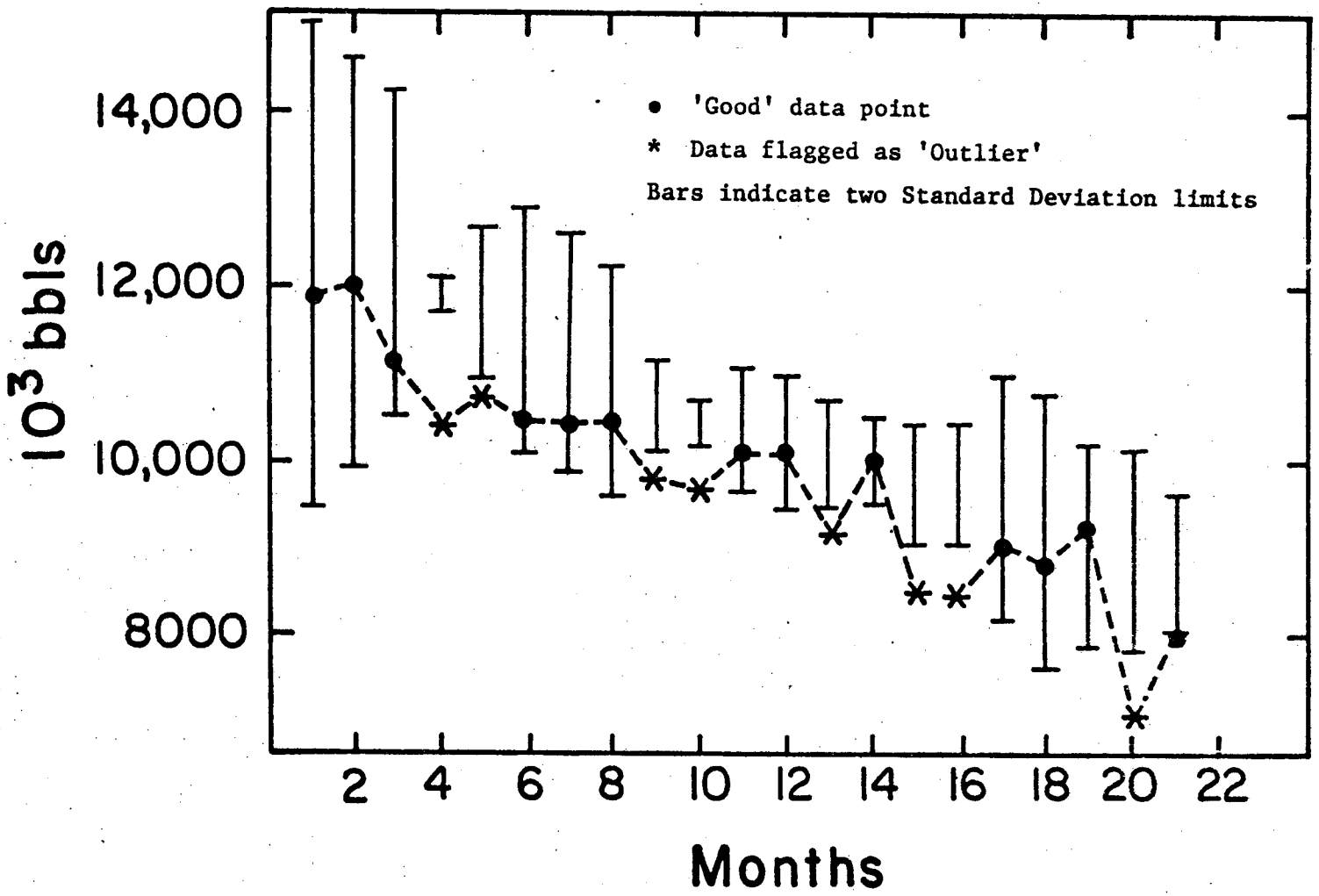

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Figure 5. "Monitoring Scheme for Old Oil Receipts" Five Month Moving Average - Company B

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the type of further investigation necessary to determine the need for a system to monitor longer-term trends in input data.

C. SENSITIVITY OF CALCULATIONS

1. Introduction

The purpose of this section is to investigate the sensitivity or robustness of the two major end products of the DCOE calculations (i.e., a company's entitlement position and the entitlement price) to variations in input data.

Both the entitlement price and a company's entitlement obligation are a function of the many data elements collected by the system. However, not all data elements will have an equal effect on these two primary outputs. In this section a number of "primary" input variables are identified, i.e., input data which could have the largest effect on the primary outputs. Each of these inputs is tested by two methods to determine variation in the primary outputs to changes in the inputs.

2. Primary Variables

Identification of the important or primary input variables will serve as a valuable guide to the remainder of the validation study. Input data elements that have a major impact on the entitlement price or a company's entitlement obligation will need to be validated more carefully than data that do not have a similar impact. Intentional and systematic incorrect reporting of information, if indulged in at all, is more likely to occur when this could lead to a clear advantage for the reporter. Unintentional though systematic incorrect reporting within the system needs to be identified particularly for those data elements that significantly affect the participants' monetary positions.

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The primary input data elements whose sensitivity was studied are:

1. Crude runs to stills
2. Upper tier receipts in conjunction with crude runs
3. Old oil reported as upper tier receipts
4. Exceptions and appeals entitlements
5. Prices of old oil, upper tier receipts, imported and stripper oil.

3. Test Procedures

Two procedures were used to test the relative sensitivity of the above data elements. They are: 1) an analysis of the formulae and calculation algorithm used by DCOE; 2) sensitivity tests conducted using the DCOE computer programs.

a. Analysis of the Formulae and Calculation Algorithm

There are four basic formulae which affect the calculation of the month's entitlement price and a particular company's entitlement buy/sell position. They are:

- the Domestic Oil Supply Ratio (DOSR)
- the Deemed Old Oil Ratio (DOOR)
- the Entitlement Price Formula
- the Buy/Sell Position Calculation

The effect of each of the input variables on the above four formulae was analyzed by taking the appropriate partial derivatives. The four formulae, their partial derivatives, and the sample data used to demonstrate the sensitvity of the entitlements price and buy/sell input

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parameters are discussed in detail in Appendix F, and summarized below.

b. Sensitivity Tests on DCOE

Due to delays in acquiring a working copy of these programs and the required data of a typical month's Master File, these tests have not yet been completed.

It is necessary to complete these sensitivity tests to ensure that the sensitivity or robustness of the actual computerized calculation procedures is the same as that of the analytic model.

4. General Observations on the Results of the Sensitivity Analysis

This section is presently based only on the analytic tests made. It is expected that results from running the computer programs themselves will be identical to those derived analytically.

a. Price versus Volume

The entitlement revenue of a company is more significantly affected by changes in reported volumes of the various tiers of oil than by variation of their corresponding unit prices. This is because changes in reported prices affect a company's entitlement revenue only via a change in the national entitlement price; they do not affect the number of entitlements the company may be required to buy or sell. A variation in reported volumes, however, may affect the entitlements revenue by modifying both the entitlement price and the entitlement buy/sell position. As shown in Figures 6 and 7, variations in reported volumes are generally more significant than variations in reported prices. Calculations supporting these graphs are shown in Appendix F.

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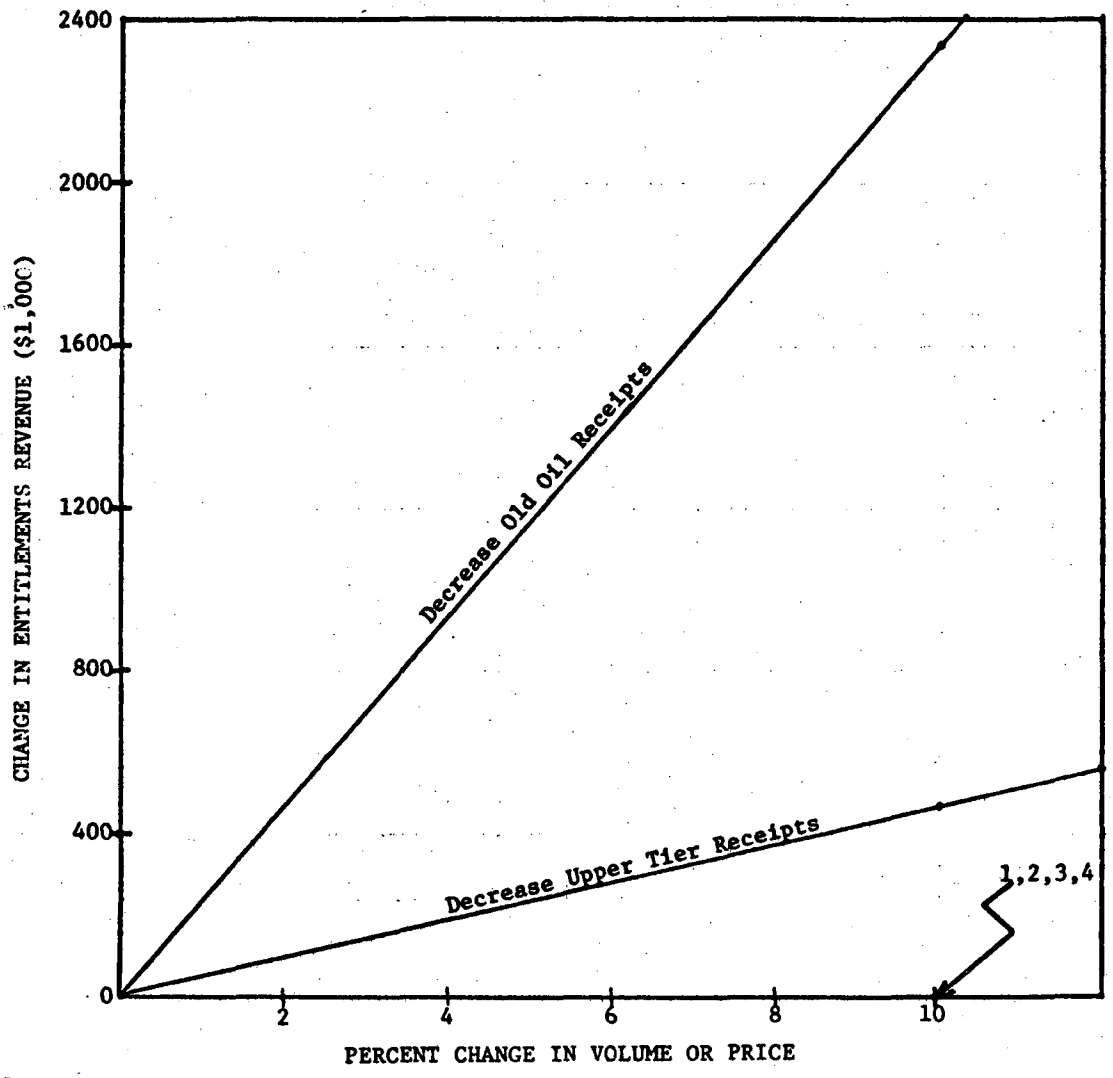

Fig. 6. Sensitivity of Entitlements Revenue to volume and price changes (large buyer).

[1]Change in Entitlements Revenue for a 10% decrease in the price of uncontrolled oil ≈ $17,000

[2]Change in Entitlements Revenue for a 10% increase in the price of old oil ≈ $9,000

[3]Change in Entitlements Revenue for a 10% decrease in the price of new oil ≈ $0

[4]Change in Entitlements Revenue for a 10% change in the volume of uncontrolled oil ≈ $0

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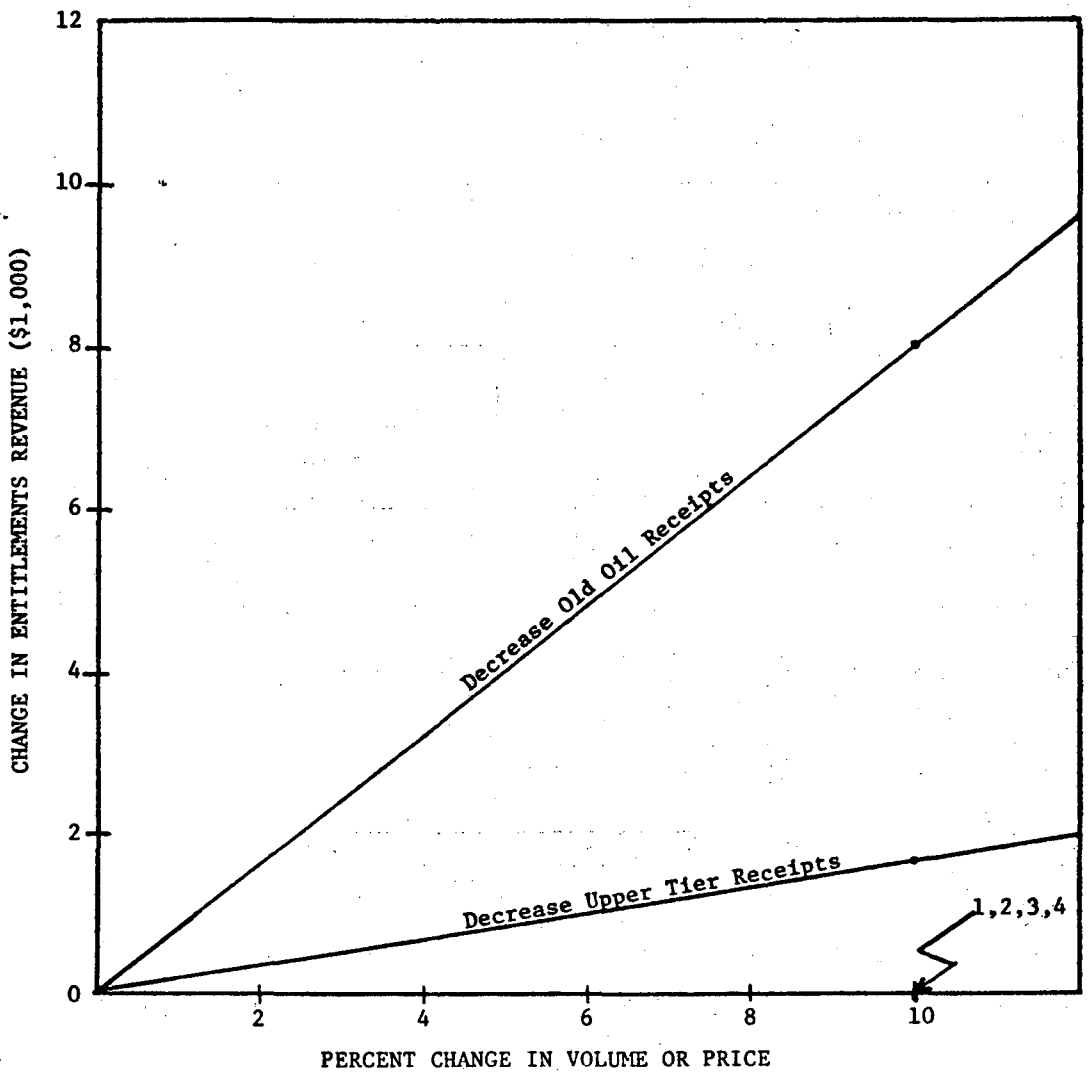

Fig. 7. Sensitivity of Entitlements Revenue to volume and price changes (small seller)

[1]Change in Entitlements Revenue for a 10% increase in uncontrolled oil price ≈ $1.12

[2]Change in Entitlements Revenue for a 10% increase in old oil price ≈ $0.60

[3]Change in Entitlements Revenue for a 10% change in uncontrolled oil receipts ≈ $0.00

[4]Change in Entitlements Revenue for a 10% decrease in upper tier prices ≈ $0.00

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b. Variations in Price

Variations in reported prices affect only the national entitlement price. Since the entitlement price is a weighted average price, the effect of price variations is proportional to the size of the company. Errors in the prices reported by large companies will affect the entitlement price to a much larger extent than errors in a smaller company's data.

c. Size of Company

The sensitivity analyses indicate that the net gain in entitlement revenue of larger companies is usually smaller than that of the smaller companies for similar variations in prices or volumes. This phenomenon is further magnified when relative gain (e.g., percentage change in the entitlement revenue) is used as a yardstick.

d. Special Entitlements

In addition to the basic entitlements granted to equalize the access costs of crude oil, special entitlements are granted for a number of reasons (naphtha imports into Puerto Rico, California Heavy Oil Benefits, etc.). The rate of return due to variations in these special entitlements is actually less than 100 percent. This is especially true for larger companies, where the rate of return can be as low as 95 percent, depending on the size of the company. This conclusion also holds for Exceptions and Appeals Relief (EAR) entitlements.

5. Sensitivity to Input Variables

This section describes the sensitivity of the two important system outputs, the entitlement price and a company's entitlement

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obligation, to variations in the selected input parameters. The equations, calculation methodology, and sample data used in the analysis are discussed in detail in Appendix F.

In the discussion that follows a large company may be thought of as one with a refining capacity of approximately 20 million barrels per month, while a small company is defined as one with a capacity of approximately 200,000 barrels per month.

a. Crude Runs to Stills

An increase in the reported Crude Runs to Stills improves a company's entitlement obligation. The net improvement for typical large and small companies is shown in Figure 8. Note that an increment of one barrel of crude oil to the crude runs to stills of a small company will have a slightly higher return than a similar increment for a large company.

After allowing for changes in inventory levels, crude runs to stills should not exceed total crude receipts. In section II.E., we note that this is in fact not so, indicating a possible problem of over-reporting runs to stills. This apparent anomaly is discussed in section II.E.

b. Runs to Stills/Upper Tier Receipts

To maintain an internally consistent data set, a systematic over-reporting of crude runs would have to be accompanied by an equivalent increase in crude receipts. Figure 9 shows improvements in a large and small company's entitlement position for concurrent increases in upper tier receipts and crude runs. Note that the potential gain in this case is

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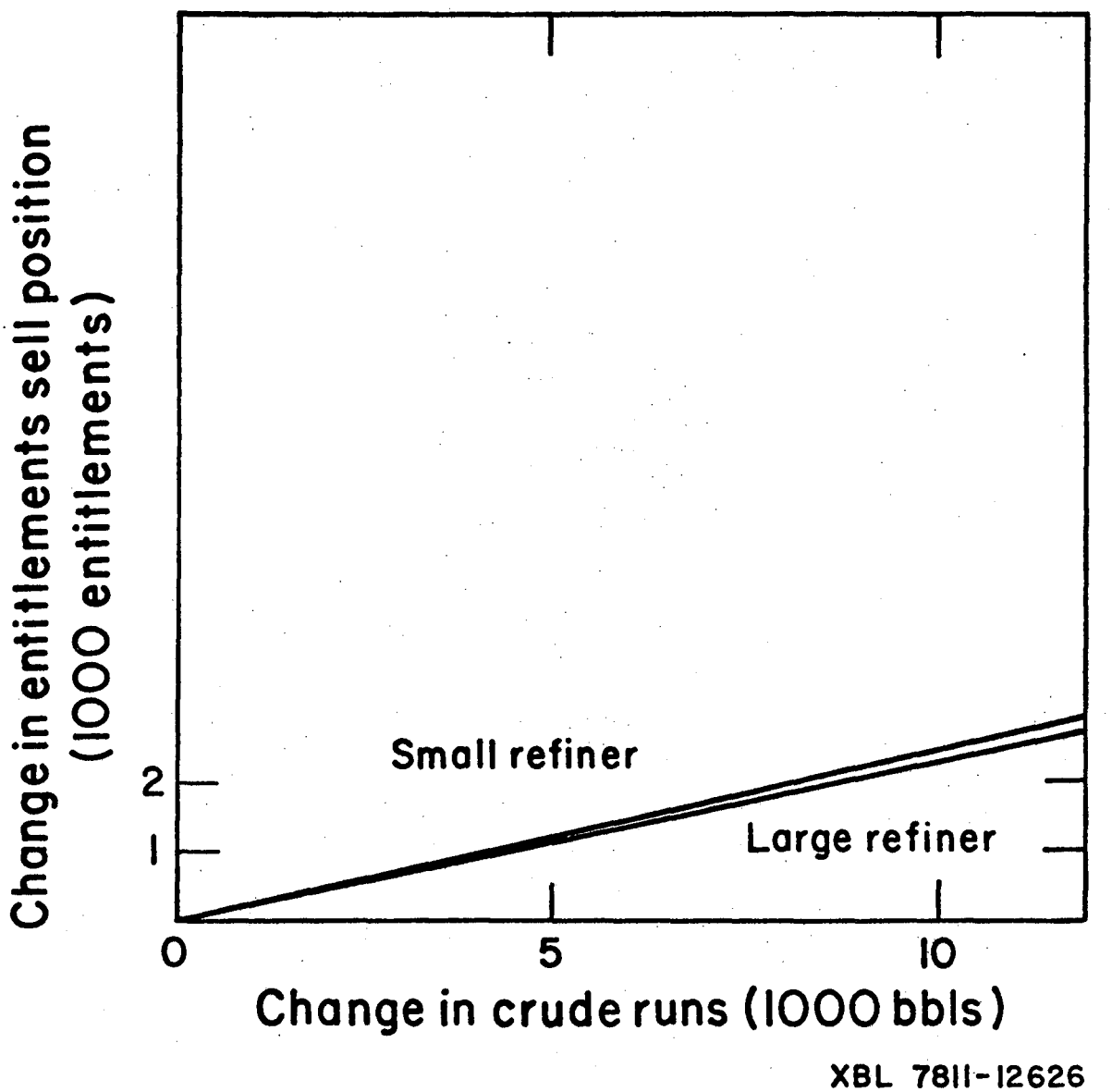

Fig. 8. Sensitivity of the DCOE System to changes in crude runs.

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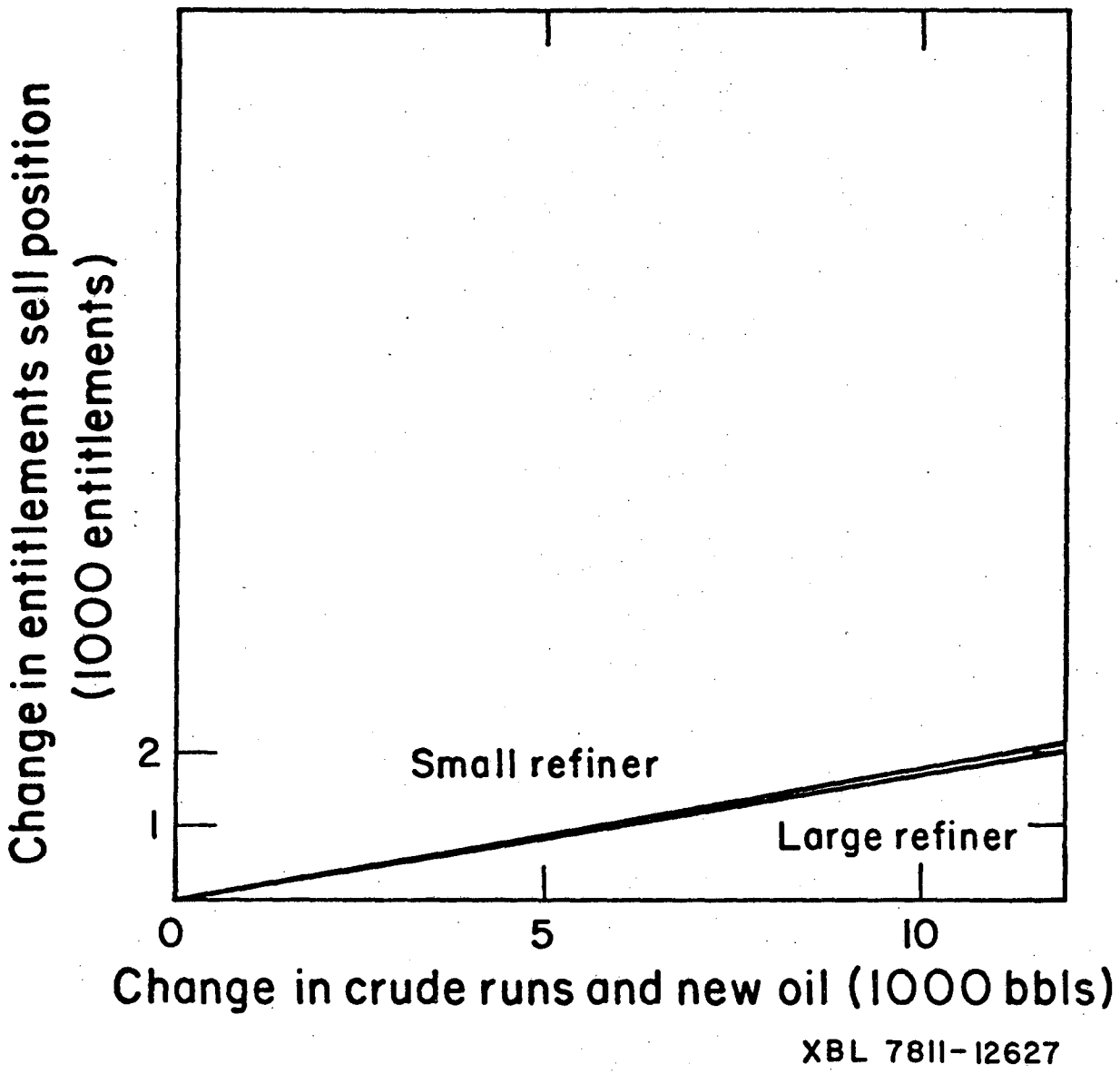

Fig. 9. Sensitivity of the DCOE System to changes in crude runs and new oil.

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smaller than that for over-stating crude runs alone.

c. Old Oil Reported as Upper Tier

Figure 10 shows the potential improvement in a company's entitlement position for reporting old oil as upper tier oil. Again, the potential advantage for a small company is slightly greater for a small company than for a larger one. In either case, the potential rate of return is high. As the Deemed Old Oil Ratio (DOOR) is decreasing over time, this rate of return is increasing the incentive to report old oil as upper tier receipts.

d. Exceptions and Appeals

As shown in Figure 11, EAR entitlements are just slightly less than 100 percent effective. The larger the company, the smaller the effective relief. However, the reduction in either case is minimal and does not seem to be a significant reason to overappeal.

e. Price Variations

As discussed earlier, variations in reported prices affect only the calculation of the month's entitlement price; they do not affect the company's entitlement buy/sell position. However, the entitlement revenue, which is the product of the entitlement price and entitlement position is obviously affected. Figures 12 through 14 show the effect of small deviations in the reported prices of stripper oil, imported oil, and old oil on a typical large and small company's entitlement revenues.

Note that the graphs are based on the analysis and "typical" data discussed in detail in Appendix F. Also note that while large

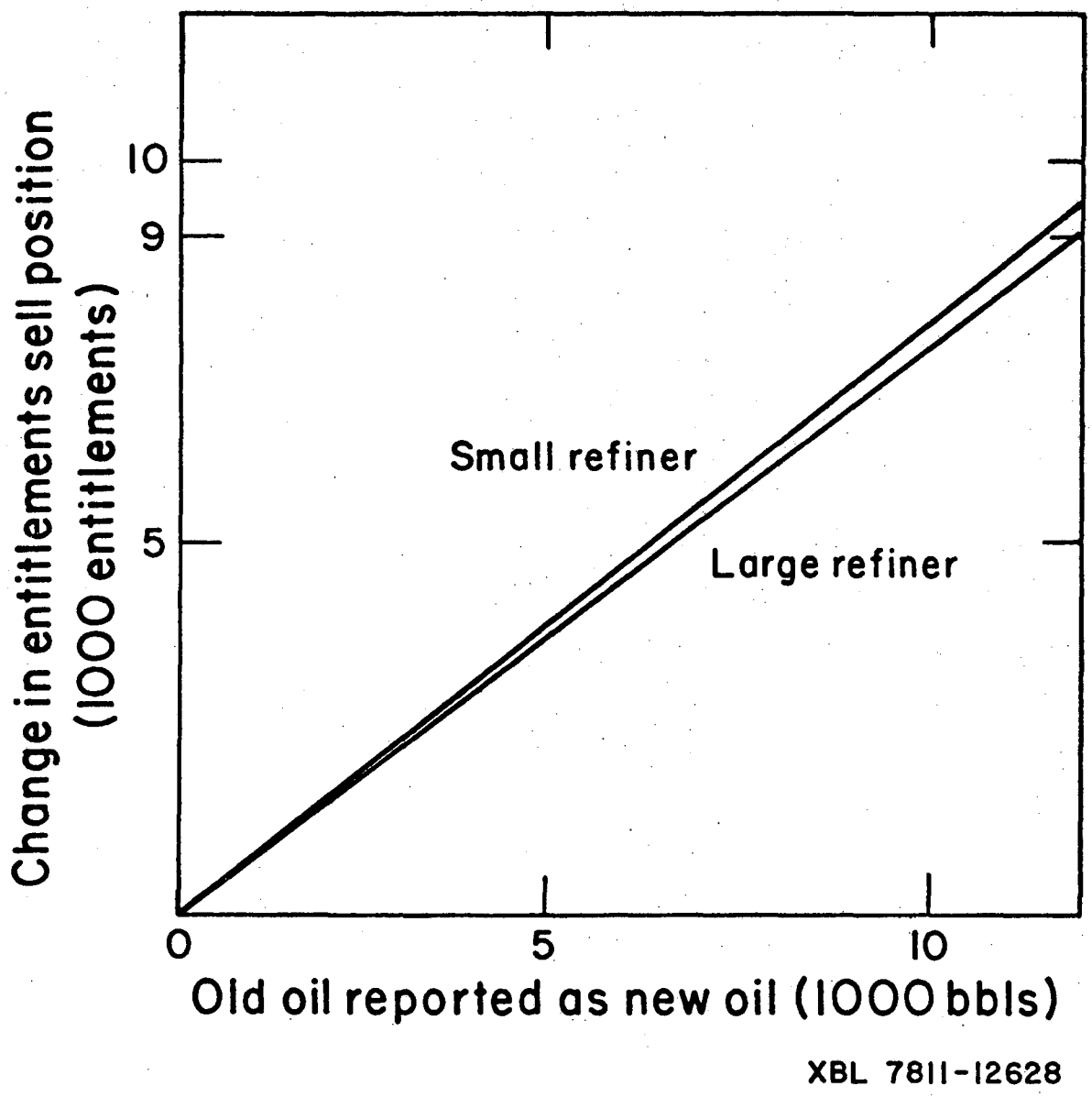

Fig. 10. Sensitivity of the DCOE System to changes in old oil reported as new oil.

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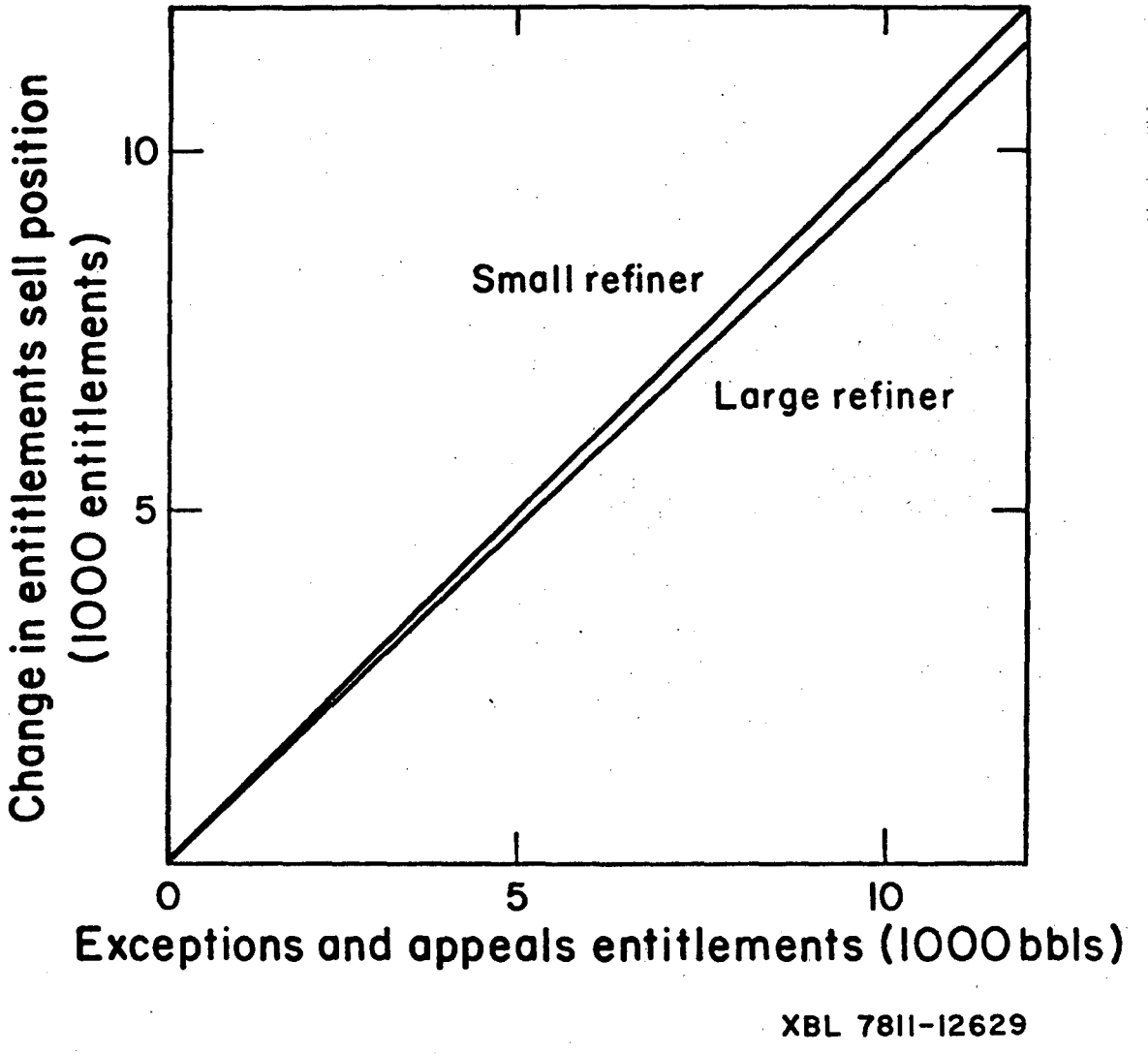

Fig. 11. Sensitivity of the DCOE System to changes in exceptions and appeals relief.

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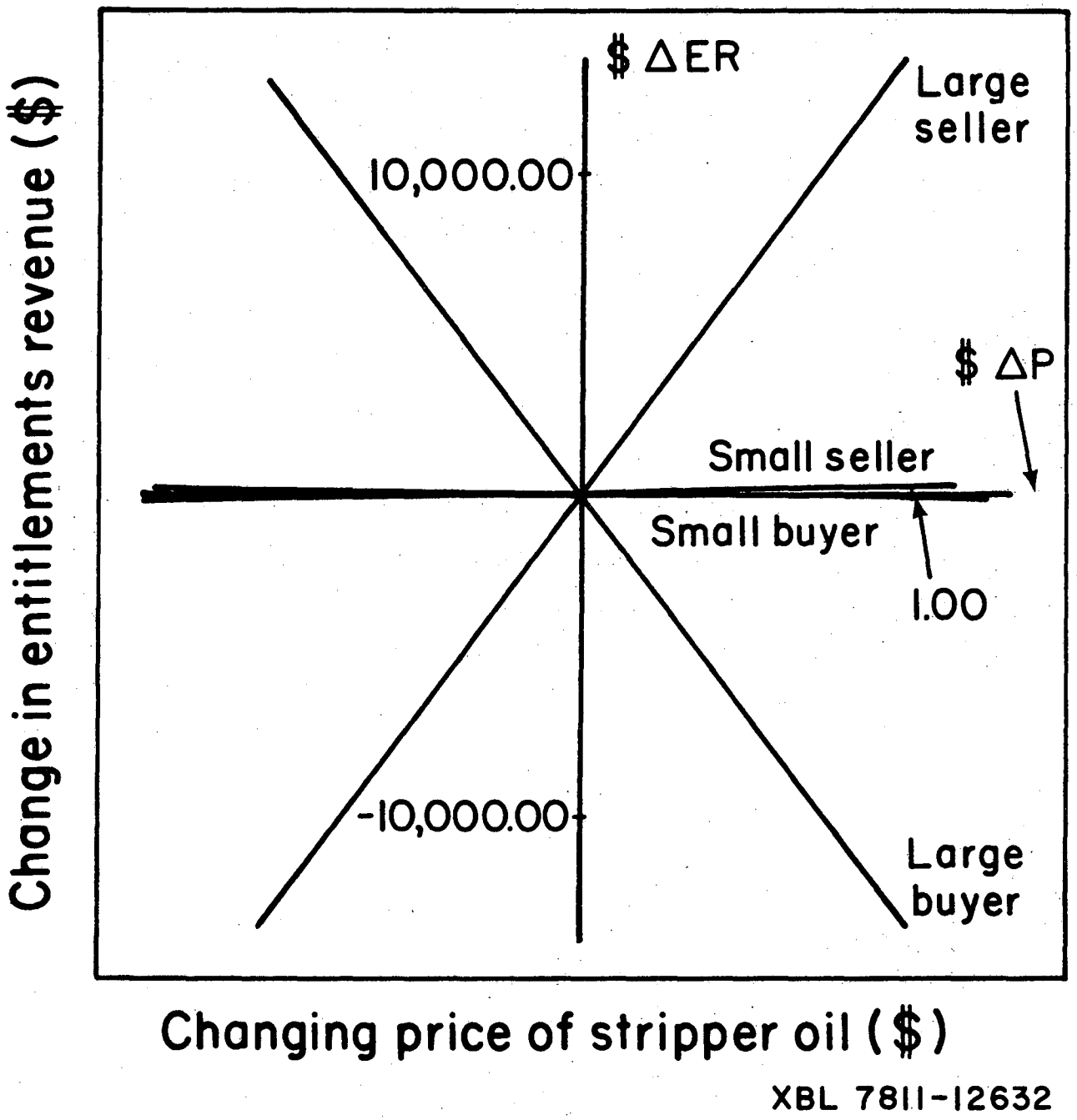

Fig. 12. Sensitivity of the DCOE System to changes in price of stripper oil.

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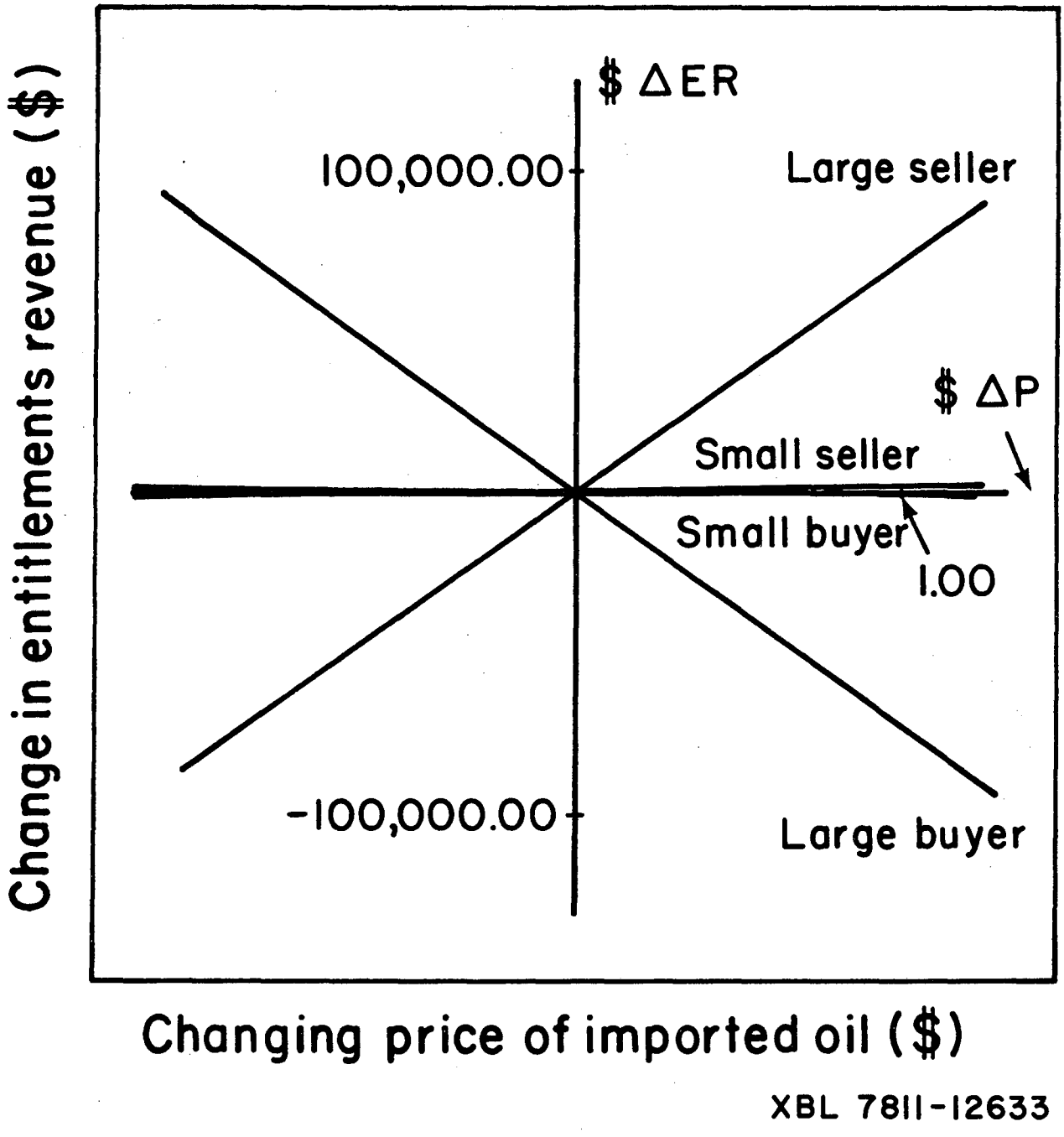

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Fig. 13. Sensitivity of the DCOE System to changes in the price of imported oil.

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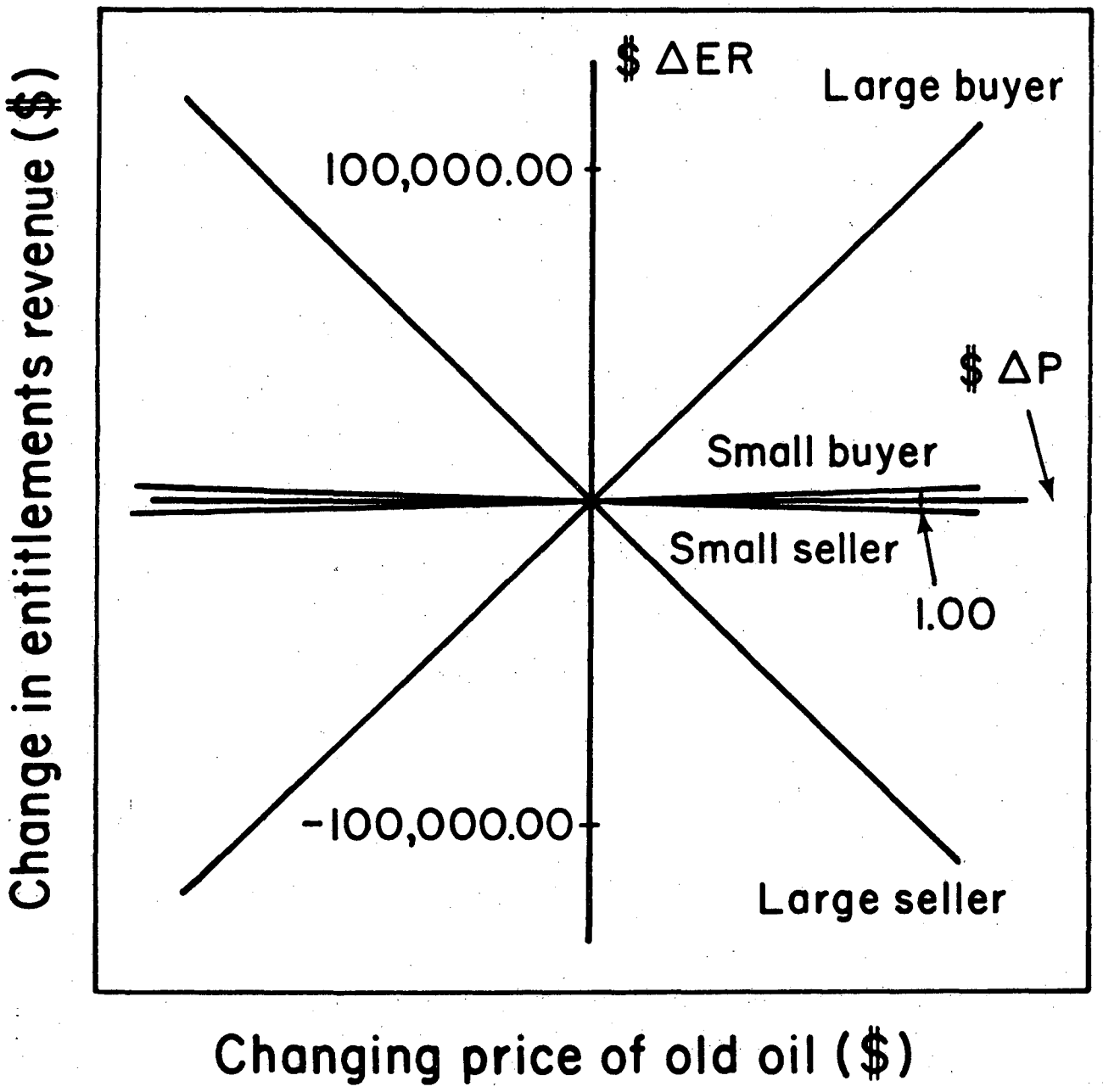

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Fig. 14. Sensitivity of the DCOE System to changes in the price of old oil.

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companies have a larger total dollar gain from similar changes in reported prices, the relative incentive for either large or small companies to mis-report price data is rather small.

D. AMENDMENTS

1. Introduction

Federal regulations require all participants in the DCOE System to submit data for a given month. Data are due by the fifth day of the second month following the report period. These regulations permit participants to correct or update the original information submitted by them in two distinct ways: (1) by 'Amendments' to the original data, or (2) by an 'Adjustment' of current data that will compensate for a past problem by modifying current information.[48]

The general instructions for Form ERA-49 describe an amendment as a: "resubmission of a previously filed report resulting from an internal company error," while an adjustment is: "an invoice of recertified crude oil previously booked . . . based on either a prior invoice or a good faith estimate . . . ." The specific instructions clearly state: "Do not include corrections resulting from internal errors" as adjustments.

Based on the investigation to date, it is not clear that participants scrupulously maintain the distinction between adjustments and amendments in their original data. However, as discussed below, the net affect on the DCOE System of not maintaining this distinction is small.

2. The Amendment Process

A refiner may file an amendment to previously supplied data, including previous amendments, during any subsequent month. An

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amendment is filed using the normal ERA-49 form (the amendment box is checked).

Companies may amend only their old oil receipts, upper tier oil receipts, and crude runs to stills. Volumes of uncontrolled crude oils may not be amended. Price figures may not be amended. The stated reasons for not accepting amendments to receipts of uncontrolled crudes or prices that these figures enter only into the calculation of the month's entitlement price (EP) and the Domestic Oil Supply Ratio (DOSR). Both are fairly robust (see section II.C.) to these changes. Therefore, the net effect on the participant's entitlement revenues are not significantly affected by limiting the amendments accepted.

Another possible reason for this limitation is the historical growth process of the DCOE System. As originally conceived, the entitlements system was limited in scope, intent, and possibly life-expectancy. The provision was not made in the original computerization of the calculation procedure to allow for automated calculations of amendments. As a result, these calculations have always been done by hand, with sub-results entered back into the main computerized calculation scheme.. Since the time and manpower available during the calculations period of each month (about 10 to 14 days) is limited, it would not be possible to accept additional amendments without increasing the manpower and/or time to do these manual calculations. An obvious solution to this problem is to computerize the process of dealing with amendments. Such a process would go a long way to reduce the strain and crisis atmosphere present during the monthly calculation process.

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The end result would be greater accuracy, speed and efficiency for all concerned. DOE has had such a project underway for sometime, but various higher priority tasks (resulting mainly from changes in regulations) have kept this work from being completed.

3. The Amendment Process and Data Quality

The amendment procedure can affect data quality in two distinct ways:

a. Errors introduced by DCOE manual procedures

b. Systematic and biased data reporting by participants.

Based on the preliminary assessment of the system to date, neither of the above problems significantly affect the purpose or intent of the DCOE Program.

a. Errors Introduced by DCOE Manual Procedures

As discussed above, the calculation of the amendments submitted by refiners is essentially a manual process. Based on the original volume data and the subsequent amendments the company wishes to make, the staff manually calculates the equivalent volume or "correction".[49] Calculation of this correction primarily involves the original and present month's DOOR and entitlement price. Because of the large number of amendments that may be submitted during a given month, and the crisis atmosphere in which most of these calculations are made, the likelihood of transcription and computational errors is ever-present.

In order to detect the magnitude of these possible

errors, amendments submitted between March, 1976 and June, 1978 were obtained.[50] Approximately 2350 such amendments were gathered and processed. It is estimated that approximately 100 additional amendments were submitted during this period, but have not yet been acquired for study.

Transcription Errors: Of the 2350 amendments, sixty randomly selected amendments were initially checked for accuracy of transcription between amendment forms and amendment worksheets. No transcription errors were found.[a]

Computational Errors: All 2350 of the amendments on the worksheets obtained were checked for computational errors. The manual procedures associated with the calculation of amendments are carried out in three basic steps. Two of these three steps have been checked to date. The third step has yet to be verified. Table H-2 in Appendix H shows in detail: (a) the type of error found in the first two steps, (b) the effect of the error on the company involved, and (c) the date that corrective action was taken. Computational errors discovered by the DCOE Program include the date that corrective action was taken. Errors without such a date indicate the computational error was not uncovered and/or corrected. Table 1 summarizes the errors found in the manual computation of amendments, and notes whether or not they were corrected. The largest error made by the program and corrected for was $4,135,478 in April 1978. The largest error believed not to have been corrected was $495,714 in

[a]A sample size of sixty from a population of over two thousand is not sufficient to make a statistically sound estimate of the transcription errors. It is planned to draw a larger sample and continue this investigation.

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TABLE 1

SUMMARY OF ERRORS IN THE AMENDMENT PROCESS *
(FEBRUARY 1976 THROUGH MAY 1978)

ERROR TYPE	NUMBER OF ERRORS	
	Discovered & Corrected By DOE	Not Discovered By DOE
1. Incorrect Sign for Δ	4	6
2. Incorrect DOOR used in Calculations	1	46
3. Incorrect Subtraction	-	9
4. Incorrect Entitlements Price used in Calculations	4	1
5. Possible Transcription Error	3	2
6. Amendment Calculated More Than Once	7	-
7. Incorrect Original Figure used in Calculations	2	-
8. Miscellaneous Errors	8	4

* The manual procedures associated with the calculation of amendments are carried out in three basic steps. Two of these three steps have been checked to date. The third step has yet to be verified.

Δ = The amended volume minus the original volume.

September 1977.[b]

The DCOE System is self-policing in the sense that the audit trail[c] returned to the participants each month allows companies to verify how their data was processed. All significant computational errors are therefore subject to verification by the refiner involved. No instance was found where a major computational error in the amendment process went undetected for more than one or two months. The errors shown as undetected in Table 1 normally increase or decrease a company's entitlement up to two to three thousand dollars per incident.

b. Systematic Biased Reporting by Participants

As discussed in the introduction to this section, corrections to data already submitted may be made in one of two ways: by adjustments made to the current month's volumes by the respondents themselves, or by amendments. In the latter case the DCOE staff calculates equivalent corrections. Regulations require that amendments are submitted only to "correct a previously filed report resulting from an internal company error." Corrections to data for other reasons should be made via adjustments to current volumes.

Tables H-3, H-4, and H-5 in Appendix H show the number of amendments filed by each participant for their old oil, upper tier

[b]These refer only to errors made in the processing of amendments, not to other error sources.

[c]The 'audit trail' is the company specific computation summary mailed to each company each month. It contains the important national constants of the DCOE System, and a summary of their effect on a company's special entitlements and entitlement position.

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receipts and crude runs to stills. Note that in each of these cases approximately 40% of all the amendments filed are filed by only five or six refiners. In fact, 40% of all old oil and upper tier amendments are filed by essentially the same group of large integrated refiners.[51] As shown in Table 2, small refiners are more likely to amend their crude runs than their old oil or upper tier receipts.

Not all large refiners (integrated or independent) file large numbers of amendments; indeed some large companies file very few amendments. Overall about half of all amendments are filed by large refiners and the remaining half by small refiners. For reasons not clearly understood at present some participants use the amendment system rather heavily. Possible reasons are discussed below.

Of the above three data series old oil receipts have the largest effect on a company's entitlement position, while the crude runs and upper tier receipts have relatively less effect.[52] A large portion of this section will therefore focus primarily on any possible systematic bias that may exist in the amendments to old oil receipts. To a large extent the analysis of the crude runs and upper tier receipts parallels this analysis of the old oil receipts.

Since the DCOE regulations require that an amendment be filed only to correct for "a previously filed report resulting from an internal company error", in the long run the average difference between the original and amended value, delta, should have a mean value of zero, and/or the fraction of positive deltas filed should equal the

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TABLE 2

NUMBER OF AMENDMENTS BY TYPE

(FEBRUARY 1976 THROUGH MAY 1978)

	NUMBER OF AMENDMENTS			
	TYPE			TOTAL
	OLD OIL	UPPER TIER	CRUDE RUNS	
LARGE INTEGRATEDS 15 Companies	317	287	183	787
LARGE INDEPENDENTS 15 Companies	57	46	48	151
SMALLS 153 Companies	234	273	275	782
	608	606	506	1720

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fraction of negative deltas for each of the data series.

For the purposes of this study participating refiners were stratified into three groups: large integrated companies, large independents, and small refiners. Tables 3, 4, and 5 show the basic statistics caluclated to test the null hypothesis that the changes in volumes (i.e., deltas) for each of the three series, comes from a population with zero mean. Observing the p values associated with these tests leads to the conclusion that amendments for old oil and crude runs for large integrated companies have a negative bias, i.e., they tend to report high original values and later amend them downwards. Large independent refiner's and smaller refiner's amendments are more likely to come from true zero mean populations.

On the assumption that amendments are mutually independent - they should be made only to correct for clerical error - the direction of an amendment should be independent of its magnitude. In other words, regardless of the mean value of an amendment, in the long run the number of positive amendments should equal the number of negative amendments.

A non-parametric sign test was run on the sign of the deltas for the largest five amenders in each of old oil, upper tier receipts, and crude runs. The results are shown Tables 6, 7 and 8. In ten out of fifteen cases, major users of the amendment process submit statistically equal numbers of positive and negative amendments.

0 0 0 0 3 2 0 0 9 4 9

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TABLE 3

STATISTICS OF OLD OIL AMENDMENTS (IN BARRELS)

(FEBRUARY 1976 THROUGH MAY 1978)

	Large Integrated	Large Independent	Small	Universe
Mean Delta ($\bar{x}$)	-31,584	3,523	1,911	-15,427
Standard Deviation of Delta (s)	143,702	50,052	40,627	109,088
No. of amendments(n)	317	57	234	608
%	52.1%	9.3%	38.6%	100%
z	-3.82	0.53	1.39	-3.45
p	- 0	0.3	0.08	- 0

Delta = Amended volume minus original volume.

$$z = \frac{\bar{x}}{\sqrt{\frac{\bar{x}^2 + s^2}{n}}}$$

p = prob(rejecting $H_0 | H_0$ is true)

H_0: $\mu = 0$

H_1: $\mu \neq 0$

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TABLE 4

STATISTICS OF UPPER TIER OIL AMENDMENTS (IN BARRELS)

	Large Integrated	Large Independent	Small	Universe
Mean Delta ($\bar{x}$)	-12,889	11,488	-4,476	-7,248
Standard Deviation of Delta (s)	149,143	106,063	79,885	119,441
N of cases	287	46	273	606
% N of cases	47.4%	7.6%	45%	100%
z	-1.46	1.52	-0.92	-1.49
p	0.072	0.06	0.18	0.068

Delta = Amended volume minus original volume.

$$z = \frac{\bar{x}}{\sqrt{\frac{\bar{x}^2 + S^2}{n}}}$$

p = prob(rejecting $H_0 | H_0$ is true)

H_0: $\mu = 0$

H_1: $\mu \neq 0$

0 0 0 0 5 2 0 0 9 5 0

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TABLE 5

STATISTICS OF CRUDE RUNS AMENDMENTS (IN BARRELS)

	Large Integrated	Large Independent	Small	Universe
Mean Delta ($\bar{x}$)	-61,256	23,913	10,431	-14,216
Standard Deviation of Delta (s)	304,138	663,326	75,606	280,463
N of cases	183	48	275	506
% N of cases	36.1%	9.5%	54.4%	100%
z	-2.67	0.25	2.27	-1.14
p	0.0038	0.4	0.0116	0.127

Delta = Amended volume minus original volume.

$$z = \frac{\bar{x}}{\sqrt{\frac{\bar{x}^2 + s^2}{n}}}$$

p = prob(rejecting $H_0 | H_0$ is true)

H_0: $\mu = 0$

H_1: $\mu = 0$

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TABLE 6

STATISTICS ON THE SIGN OF AMENDMENTS

FOR OLD OIL

DECEMBER 1974 THROUGH MAY 1978

	COMPANY NUMBER				
	116	135	28	32	163
n: Number of Amendments	102	84	80	66	43
r^+: Number of Positive Deltas	45	36	36	55	15
q':	.44	.43	.45	.83	.35
z:	-1.188	-1.309	-.894	5.416	1.982
p:	.12	.10	.19	.00	.02

Delta = Amended volume minus original volume.

$q' = \frac{r^+}{n}$

$z = (r^+ - n/2) / \sqrt{q^*(1-q^*)n} = (2r^+ - n) / \sqrt{n}$

$p = P(q \leq q' \mid q^* = 1/2)$ when $q' < 1/2$

or

$p = P(q \geq q' \mid q^* = 1/2)$ when $q' > 1/2$

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TABLE 7

STATISTICS ON THE SIGN

OF AMENDMENTS FOR UPPER TIER OIL

DECEMBER 1974 THROUGH MAY 1978

	COMPANY NUMBER				
	116	135	28	163	74
n: No. of Amendments	59	55	48	28	27
r^+: No. of Positive Deltas	32	25	37	14	10
q':	.54	.45	.77	.50	.37
z:	.651	-.674	3.753	.00	-1.347
p:	.26	.25	.00	.50	.09

Delta = Amended volume minus original volume.

$q' = \frac{r^+}{n}$

$z = (r^+ - n/2)/\sqrt{q^*(1-q^*)n} = (2r^+ - n)/\sqrt{n}$

$p = P(q \leq q' \mid q^* = 1/2)$ when $q' < 1/2$

or

$p = P(q \geq q' \mid q^* = 1/2)$ when $q' > 1/2$

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TABLE 8

STATISTICS ON THE SIGN OF

AMENDMENTS FOR CRUDE RUNS

DECEMBER 1974 THROUGH MAY 1978

	COMPANY NUMBER				
	135	93	151	161	121
n: No. of Amendments	56	71	64	32	32
r^+: No. of Positive Deltas	24	4	30	6	15
q':	.43	.06	.47	.19	.47
z:	-1.069	-7.477	-0.5	-3.536	.354
p:	.14	.00	.31	.00	.36

Delta = Amended volume minus original volume.

$$q' = \frac{r^+}{n}$$

$$z = (r^+ - n/2) / \sqrt{q^*(1-q^*)n} = (2r^+ - n) / \sqrt{n}$$

$$p = P(q \leq q' \mid q^* = 1/2) \quad \text{when } q' < 1/2$$

or

$$p = P(q \geq q' \mid q^* = 1/2) \quad \text{when } q' > 1/2$$

Based on the above two statistical tests, i.e., a test on the mean value of submitted changes and the random nature of their direction, the amendment process is probably not a major source of data quality problems. However, the high probability that amendments to old oil receipts of large integrated companies have a negative mean was investigated further.

Data on the five companies submitting the largest number of amendments to their old oil receipts were further analyzed to determine if their particular amendment patterns significantly affected their entitlement position. The basis hypothesis under investigation was, that under certain circumstances correction of data via the amendment process may be more desirable than making the same corrections via the adjustments process. The differences arise because in correcting for an amendment the relevant DOOR and entitlement prices are used, while an adjustment is rolled forward without correction for the changes in entitlement prices and the DOOR.

In order to determine the magnitude of this potential discrepancy, it was necessary to assume that all the company's amendments should, in fact, have been adjustments. This extreme assumption serves as upper bound on the gain or loss in entitlement revenues that could result from a mistaken use of the two correction processes. The results are shown in Table 9. It was found that if the five companies studies to date were using the amendment process when they should have been using the adjustment process, four of the five would have increased

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TABLE 9

REVENUE CHANGES FOR AMENDMENTS TO OLD OIL RECEIPTS

FEBRUARY 1976 THROUGH MAY 1978

COMPANY	NO. OF AMENDMENTS	TOTAL REVENUE CHANGE* (THOUSAND DOLLARS)	TOTAL REVENUE FROM THE ENTITLEMENTS PROGRAM (THOUSAND DOLLARS)
116	61	115	-9902
135	57	120	-87719
28	52	37	-27519
32	36	423	-13821
163	29	-975	-40052

*In order to determine the magnitude of the potential revenue change, it was assumed that all the company's amendments should have been adjustments.

their entitlement revenues. The fifth would in fact have lost revenue.

A second possible reason for the negative means to amendments to old oil receipts is the suggestion that companies tend to classify all crudes of unknown status as old oil.[53] These crudes are later re-classified to other status when the necessary information has been developed. As a consequence amendments to old oil receipts would have to be constantly corrected downwards. Achievement of this correction by the amendment process would explain the generally negative means for old oil receipts. However, if this was the explanation, then it would mean a misuse by companies of the amendment process that is adversely affecting their entitlement revenues.

This second explanation also raises the associated problem of internal consistency of data. If unknown crudes are temporarily classified as old oil, and later removed from this category and classified elsewhere, the reduction in old oil should approximately equal the increase in other tiers. However, amendments for upper tier receipts are also negative, indicating that the originally unclassified oils were in fact foreign or other uncontrolled. Since amendments are not reported or accepted for these tiers, the problem cannot be resolved in a straightforward manner.

4. Conclusions and Recommendations

A number of calculation errors result from the manual calculations involved in the amendment process. The more significant of these are quickly caught and corrected by the DCOE Program. Errors

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having a small effect on a company's entitlement position may not be noticed by either the program or the company, and may never be corrected. In either case, since the manual calculations absorb a significant portion of the program's manpower, and since the necessary computerized system has been suspended in an 'almost complete' state for sometime, it is recommended that the completion of this system be given high priority.

Based upon the very preliminary results to date, it is not clear why large integrated companies generally have significantly negative means for their amendments. Further analysis is needed in this area, both to resolve the question of largely negative amendments, and to verify their internal consistency.

E. CONSISTENCY CHECKS

1. Introduction

The accuracy of data reported to the DCOE System can be investigated by several methods. The most direct method of determining the accuracy of any piece of information is to audit it. No audit, or audit-like investigation was conducted during this study. However, two other approaches were used to determine the consistency of information reported into the entitlements data base. These are:

(1) Examination of the internal consistency of the data

(2) A comparative analysis for consistency with other data series

To assess the internal consistency of data, data reported by a company (or set of companies) is compared within itself either for one specific reporting period or over time. When a large amount of data is reported each month, there is reason to believe that many elements should bear a logical relationship to each other. These relationships may be obvious, e.g., reported totals should equal the sum of the parts as reported, per unit prices should be derivable from volumes and purchase prices, etc.; or the relationship may be structural and less obvious, e.g., the sum of total adjusted receipts, over time, must equal runs to stills plus other uses of crude.

In general, the first type of internal consistency check, the arithmetic type, can be, should be, and for the most part is conducted for data reported into the entitlements system (see section II.C). The second type of logical, or structurally based internal

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consistency checks are not currently being applied on a regular basis. As part of the data validation effort one structural internal consistency check, the relationship between crude runs and runs to stills, was examined. This relationship is important because the results indicate that the data (to the extent they were available and investigated) show some structural inconsistencies.

In the second approach - consistency checks with other data series - data from the entitlements system is compared with data that appears to be the same or similar. A comparison of the 'parallel' data series, with a logical accounting of the observed differences, could serve as an external validation check. If two data series do not concur within reasonable limits after their logical differences have been accounted for, the validity of the data series must be questioned further. Even if the entitlements data does match well with other data, this is a necessary but not sufficient condition for validation. A perfect match might, for example, indicate that all the reported data were drawn from the same place in a company's accounting system; it would not necessarily mean that that was the best place to acquire the data or that it was accurate in the audit sense.

The scope of this research includes a comparison of data from the entitlements system, particularly the ERA-49 form, with other data sources are discussed in detail below. However, since neither the basic entitlements data nor the alternative data series were acquired in time to conduct the necessary investigation, this

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portion of the analysis has been delayed.

2. Internal Consistency

As discussed above there are two types of consistency checks that can be made on data submitted to the entitlements system: the arithmetic check that verifies computational accuracy, such as additions, weighted averages, etc., and the logical or structural consistency check of the data, either for a given month or over time. The arithmetic type internal check is discussed in section II.C. This section details the results of one structural internal consistency check.

Over a period of time crude oil receipts booked into a refinery should bear a logical relationship to that refiner's runs to stills.

A draft report[54] prepared by the office of Energy Source Analysis compares Lower - 48 production data from three crude oil data systems (BOM, First Purchasers and Entitlements) and discusses the logical relationship, i.e., consistency, that should exist between them. The figure used in this report to locate points at which there are consistency of data problems is reproduced here as Figure 15. The lack of consistency between the various data series at points 1 and 2 is noted in the report. In this study, we have conceptually extended this data network to include runs to stills and non-refining uses of crude oil once it has entered the ERA-49 data system. This section deals with point 3 on this network, i.e., the lack of consistency

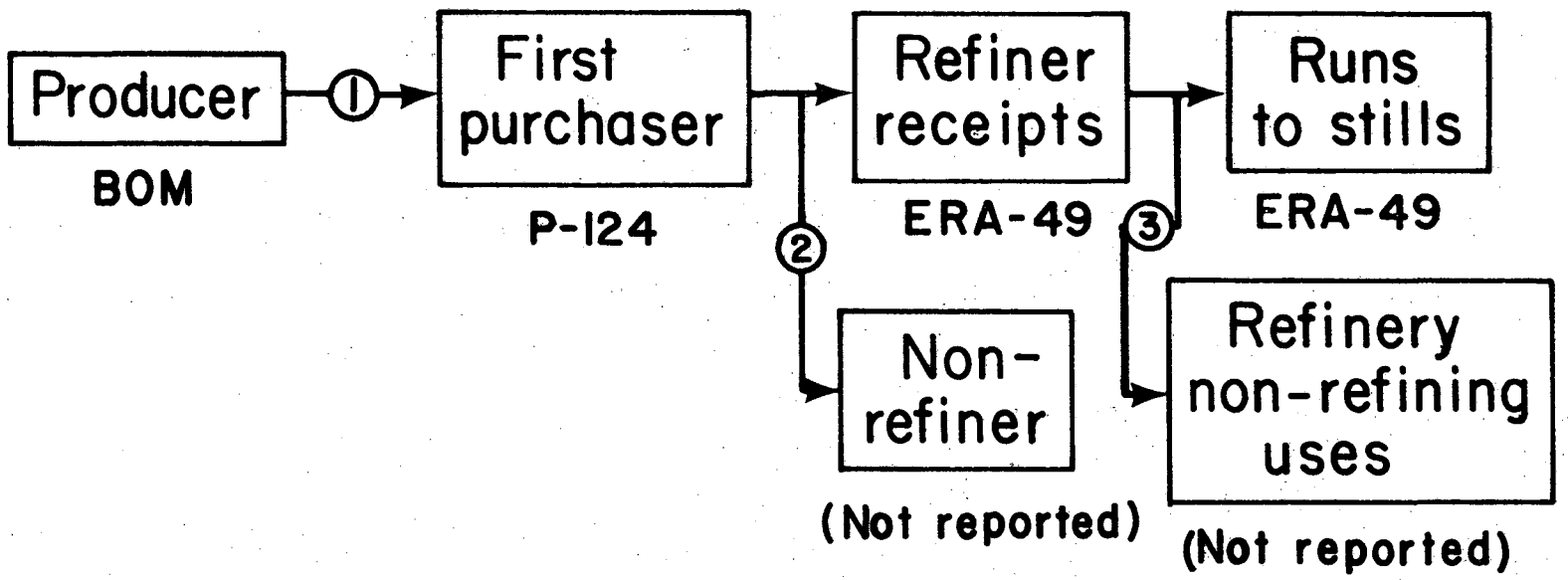

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Fig. 15. Crude oil data collection network.

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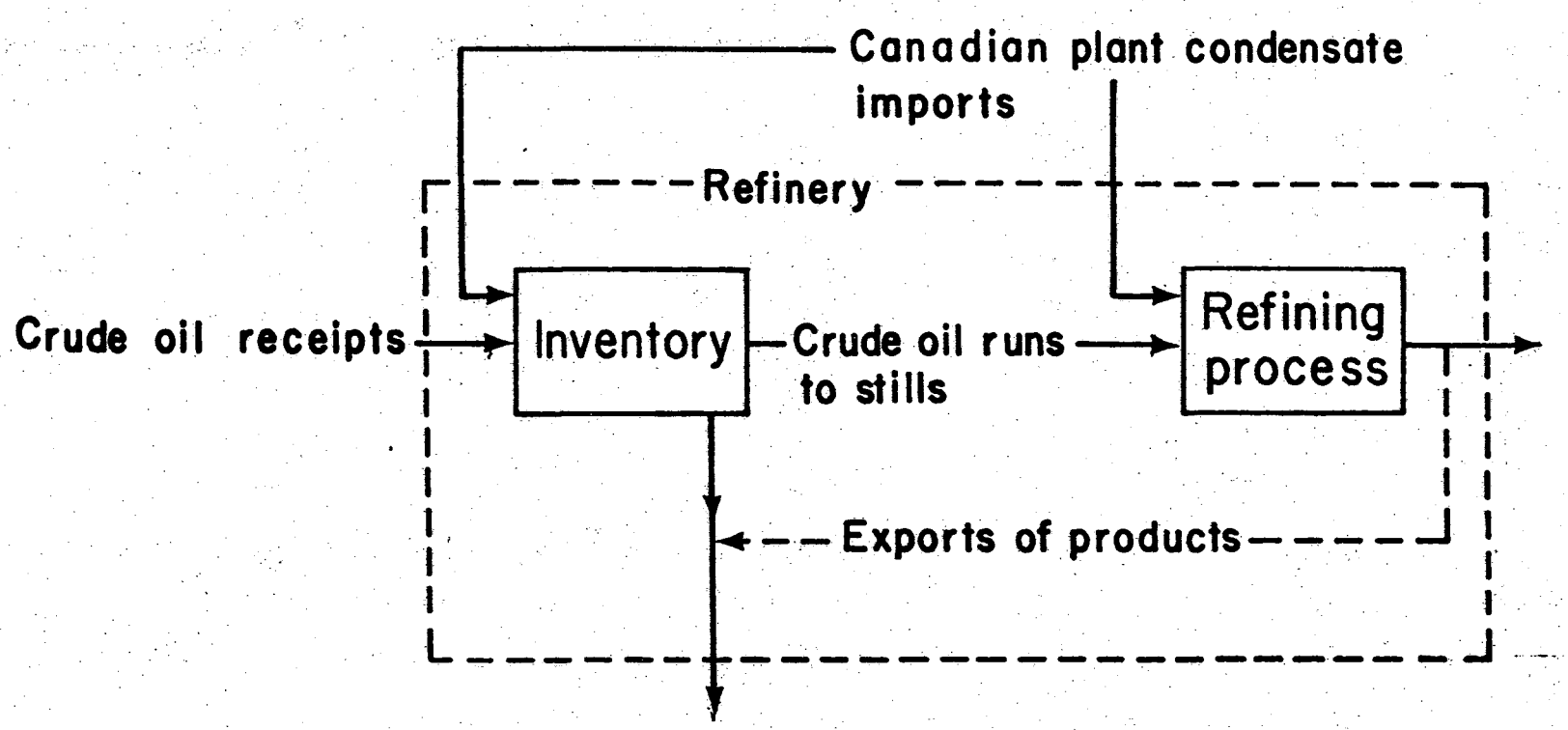
between refinery receipts and runs to stills due to inventory fluctuations, non-refining uses of crude, and other reasons.

Figure 16 is a more detailed diagram of the accounting for crude oil receipts and runs to stills within the DCOE System. Note that old oil and upper tier crude oil receipts may be both amended and adjusted (see section II.D and Appendix H). Uncontrolled crude oil receipts may be either adjusted or amended if initially erroneously reported. Runs to stills may be amended but not adjusted. The fact that certain figures, but not all, may be corrected after the original submission makes the task of conducting an internal consistency check such as that done in this report more difficult, but not less desirable. As will be discussed in detail below, there is a serious lack of internal consistency between the two data series.

Figure 17 shows the cumulative difference between crude oil receipts and refiner runs to stills over the life of the entitlements program. Beginning in January 1975, the crude oil receipts data in ERA-49 have on the average exceeded the crude oil runs to stills data that came from the same form. This build-up phenomenon reversed direction in June 1977, and crude oil runs to stills figures have consistently exceeded the crude oil receipts figures between June 1977 and August 1978. The latter phenomenon is contrary to intuition and hence deserves further analysis.

Logically, reported volumes of crude oil receipts should exceed reported volumes of crude oil runs to stills. Apparent losses



1. Refinery fuel use and storage losses
2. Refinery crude oil inventory adjustments
3. Net adjustments to controlled oil receipts and to crude oil runs to stills
4. Crude used as residual fuel oil and as distillate fuel oil (i.e. Blending or transfers)

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Fig. 16. DCOE accounting of crude receipts and runs to stills.

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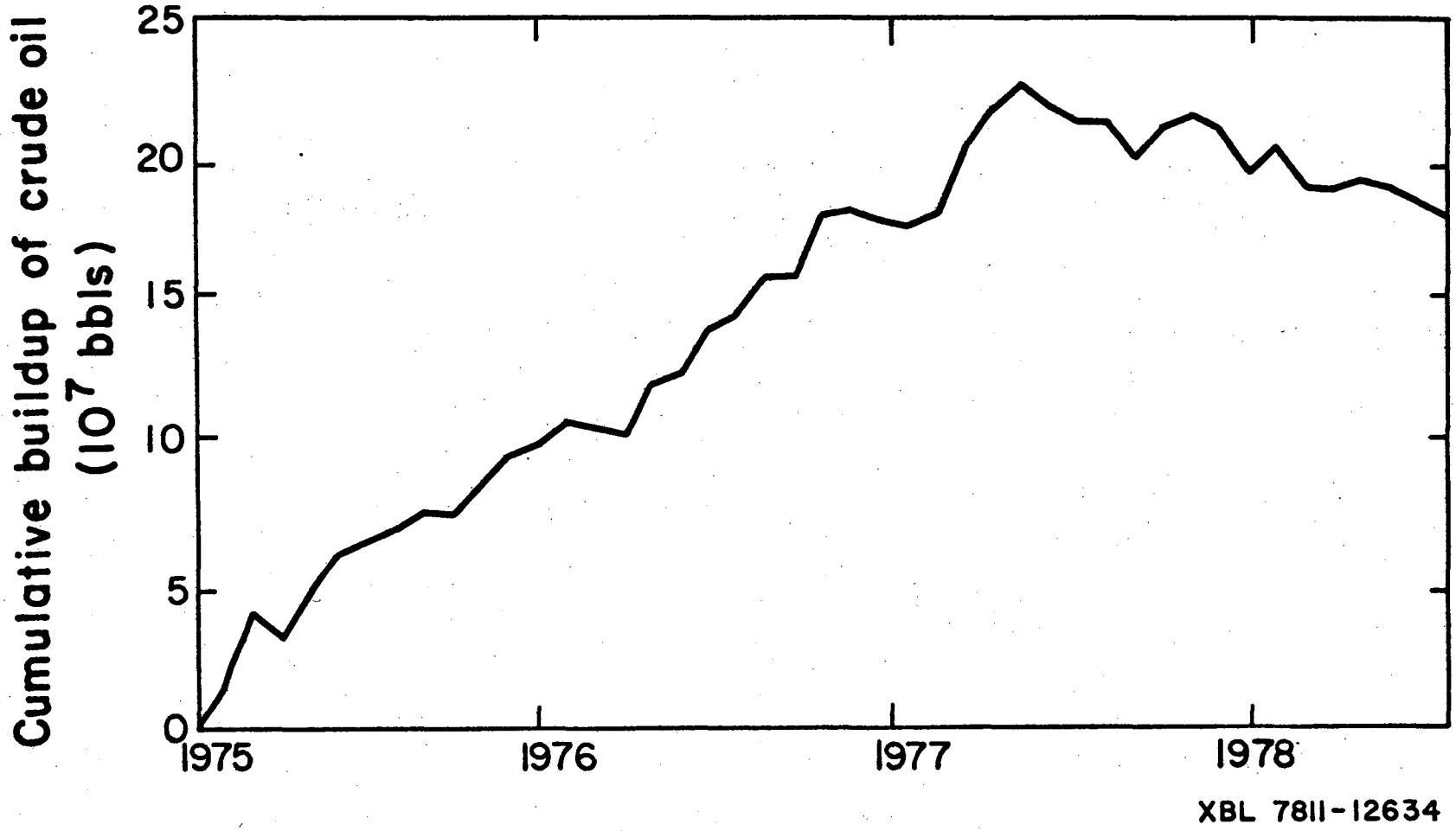

Fig. 17. Cumulative buildup of crude oil.

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of crude oil between receipts and runs to stills are attributable to:

a. Crude oil used as refinery fuel

b. Crude oil storage losses at the refinery

c. The treatment of exported products in the DCOE System[a]

d. Transfer of crude oil for distillate fuel oil or residual fuel oil blending

e. Changes in refinery crude oil inventory

f. Corrections to reported figures[b]

There are four questions that need to be answered in this section:

i. Can the factors a) through f) above explain the difference between the crude oil runs to stills and the crude oil receipts volumes of the refineries?

ii. If not, can problem areas be isolated to shed light on the unexplained difference?

iii. Are there certain time periods that apparently are problematic, and can these periods be isolated?

iv. Do all companies contribute to this apparent anomaly in a similar fashion, or is it the result of data supplied by some refiners?

3. A Simple Conservation of Oil Model

To answer the above questions, a simple flow, or conservation of oil model within a refinery is postulated. This flow model explicitly includes factors a) through f) above, and leads to the

[a]Exports of products, other than lubricating oil, are deducted from the crude oil runs to still volumes for the purposes of the Entitlements Program.

[b]The DCOE program allows refiners to correct their crude runs to stills, old oil, and upper tier receipts via amendments and/or adjustments. Other volumes may not be corrected.

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basic conservation of mass equation below for each time period:

$$CT_t = CR_t + I_{t+1} - I_t + RF_t + SL_t + T_t + EX_t + ADJ_t + \delta \quad (1)$$

where

ADJ = Adjustments to Crude Oil Receipts

CR = Crude runs to stills

CT = Crude Oil Receipts

EX = Exports of products

I = Inventory of Crude Oil at the Refinery

RF = Refinery Fuel Use

SL = Storage losses

T = Transfers to Distillate and Residual Oil

t = time period

δ = unexplained difference

Table 10 lists values of these variables for the time period under consideration. The first five figures in this table are from the Energy Data Reports, Petroleum Statement Monthly, shortened hereafter as EDR. EDR obtains the data from the Joint Petroleum Reporting System, JPRS. The data used in this analysis is shown in Table 10. The source for the CT, CR and ADJ figures is the Entitlements Program Monthly Summary Sheets which list the aggregated national ERA-49 data. Any figure in Table 10 that is obtained from another source or that is estimated is so indicated in the notes to the table.

TABLE 10

DATA FOR CONSERVATION OF MASS EQUATION

PERIOD		INVENTORY (10^6 bbls)	REFINERY FUEL AND STORAGE LOSSES (10^3 bbls)	TRANSFERRED[4] CRUDE OIL (10^3 bbls)	EXPORT[5] PRODUCTS (10^3 bbls)	CRUDE RUNS[6] (10^6 bbls)	CRUDE RECEIPTS[7] (10^6 bbls)	DELTA[8] (10^6 bbls)	CUMULATIVE DELTA (10^6 bbls)	ADJUSTMENTS[9] (10^6 bbls)
	t	I_t	$(RF_t + SL_t)$	T_t	EX_t	CR_t	CT_t	t	S_t	ADJ_t
	1975	86.8[1]	89.3	6203	65171	4809.2	4904.6	95.4	95.4	-40
1976	J	92.8		594		416.3	423.1	6.8	102.2	0.5
	F	85.8		549		399.4	397.9	-1.5	100.7	0.9
	M	89.5		550		424.8	420.6	-4.2	96.5	-1.7
	A	96.3		560		408.0	426.8	18.8	115.3	0.8
	M	91.1		559		427.3	437.6	10.3	125.6	-0.3
	J	95.3		561		440.2	455.6	15.4	141.0	-0.8
	J	100.0		557		455.2	477.0	21.8	162.8	5.8
	A	94.4		553		462.4	441.2	21.2	141.6	-0.3
	S	100.8		577		437.2	454.7	17.5	159.1	1.8
	O	103.2		597		443.1	465.5	22.4	181.5	-1.4
	N	103.1		605		450.3	451.5	1.2	182.7	-0.3
	D	95.6		596		474.3	468.6	-4.7	78.0	-0.7
	1976		1138	6838	69163					
1977	J	98.0[2]				467.8	466.6	-1.2	176.8	-1.6
	F	97.7[2]				440.2	444.0	3.8	180.6	1.0
	M	100.5[2]				465.4	489.1	23.7	204.3	-5.2
	A	106.2[2]				453.7	467.1	13.4	217.7	0.3
	M	109.5[2]				475.6	483.4	7.8	225.5	0.4
	TOTAL[10]	24.5[12]	3.0[13]	15.2	153.0[14]				225.5	-40.8
	J	109.5	60	440		469.6	462.1	-7.5	218.0	0.6
	J	110.0	41	424		490.6	486.2	-4.4	213.6	-0.1
	A	115.2	101	442		479.8	479.8	0.0	213.6	0.0
	S	111.6	101	423		479.1	466.9	-12.2	201.4	-0.1
	O	112.3	64	446		481.0	491.3	10.3	211.7	0.0
	N	114.0	49	414		467.2	471.3	4.1	215.8	0.1
	D	109.3	94	426		490.2	485.7	-4.5	211.3	0.0
	1977			5216	60689			33.3		-4.6
1978	J	110.4	111	448	2144	474.7	459.2	-15.5	195.8	0.0
	F	107.9	127	445	2199	423.5	431.4	7.9	203.7	-1.0
	M	109.4	108	474	2797	462.5	448.3	-14.2	189.5	0.0
	A	112.3	106	466	6301	441.6	442.0	[illegible].4	189.9	-3.2
	M	108.5	294	453	5132	489.1	490.6	1.5	191.4	-2.9
						474.6	474.[illegible]	-0.6	190.8	2.9
						493.9	488.9	-5.0	185.8	-0.6
						504.6	499.3	-5.3	180.5	-2.6
	TOTAL[11]	1.0	1.3	5.3	60.7[14]				-26.6	-11.5

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Notes to Table 10

[1]Inventory at the end of 1975.

[2]Estimated from the Monthly Energy Review, taking one-third of all the crude oil inventory as the refinery inventory.

[3]Only refinery fuel use.

[4]Indicated as "transfers" in the EDR. Data taken from the EDR does not include the Virgin Islands as part of the United States.

[5]Exports of Petroleum products not including lubricating oils.

[6]Indicates total losses at all stages.

[7]Adjusted figure.

[8]Unadjusted figure.

[9]Adjusted crude receipts less original crude receipts.

Until February 1976 only old oil receipts were adjusted. After February 1976, both old and new plus stripper oil figures were adjusted. Starting September 1976, only old and new oil figures were adjusted. Uncontrolled oil receipts were never adjusted.

[10]Total for January 1975 through May 1977.

[11]Total for June 1977 through May 1978.

[12]This figure is the reported increase in the refinery inventory level. Beginning refinery inventory was estimated as 85.0 million barrels in January 1975, from the Monthly Energy Review.

[13]Estimated by assuming that the first 29 months resemble on the average the data available on the table.

[14]Estimated by assuming that the first five months of 1977 resemble the first five months of 1978.

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For the period January 1975 through May 1977, total receipts exceed total runs to stills by +225.5 million barrels. However, after the other refinery uses of crude oil assumed in Equation 1 are accounted for, the unexplained difference is only -10.7 million barrels over the entire period, i.e., less than 0.1% of the crude runs for these thirty months. It would be reasonable to assume that this level of error is not significant.

However, for the second period of analysis, June 1977 through May 1978, the unexplained error, prior to the corrections implied by Equation 1, is -26.6 million barrels. After accounting for the non-refining uses this unexplained difference increases to -105.1 million barrels. Not only is the magnitude of this unexplained error much larger than before, but it also has the 'wrong' sign associated with it; i.e., for this period runs to stills have consistently exceeded refinery receipts even after all plausible corrections have been accounted for.

To date, it has not been possible to associate this reversal in the trend of the data with any change in reporting requirements, definitions, or other posited factors. The reporting characteristics for this period appear to have changed completely, and indicate a phenomena that is contrary to the basic intuition of the crude oil flow diagram, Figures 17 and 3. The mass balance of crude oil for this time period, therefore, deserves further investigation.

Second Order Corrections:

It should be noted that a small part of the unexplained differences may be accounted for by second order corrections not included in Equation 1. Since the unexplained differences increased in magnitude in the second period, it is believed that something could have changed in the reporting system. Additional factors that might explain the unexplained difference can be listed under two categories:

i. Factors that apply to both periods

ii. Factors that apply only to the second period

The three factors that apply to the first category are discussed below:

a. For the purposes of the Entitlements Program the Virgin Islands are included in the United States. Other data systems used in this analysis (inventory charges, refinery loss estimates, etc.) do not include data on the Virgin Islands. Amerada Hess has a large refinery in the Virgin Islands with a 700,000 bpd capacity. If it is assumed that this refinery resembles the national average, then it would increase, rather than decrease the unexplained differences by about 4%.

b. Canadian plant condensate may be included in the crude oil runs to stills reported to the DCOE System under certain provisions. However, it is not clearly stated in the Federal Energy Guidelines, Section 211.67, whether plant condensate imported from Canada is also included in the crude oil receipts of a refiner. This factor may have an inflating effect on the crude oil runs volumes reported on ERA-49 while not affecting the crude oil receipts volumes. However, consider-

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ing that plant condensate volumes imported from Canada are only about one million barrels a month, this factor would not significantly affect the unexplained difference for the second period.

c. Adjustments are made both to volumes of reported crude oil runs and volumes of reported controlled crude oil receipts. However, no adjustments are allowed for the uncontrolled crude oil receipts. If these adjustments were allowed, they may explain a part of the difference.

The main factor that applies only to the second period is a modification in the Entitlements Program that distributed entitlements for Strategic Petroleum Reserve purchases. Oil imported into the Strategic Petroleum Reserve may be included in a refiner's crude oil runs to stills. Entitlement Program personnel make this adjustment using data obtained from the office of Strategic Petroleum Reserve. However, it is not clear in the regulations that this correction should be made only by DOE. It is possible that some refiners are including their Strategic Petroleum Reserve imports in their reported crude oil runs to stills. This potential double counting could inflate crude run volumes by an unknown volume. Since the SPR as of May 1978 was 25.6 million barrels, the double counting must be upper bounded by this figure.

4. Impact of Inconsistency on the DCOE System

As noted above the nationwide internal inconsistency, or unexplained difference between crude receipts and runs to stills, is

approximately 105 million barrels for the period June 1977 through May 1978. To determine the significance of this discrepancy, a range on the possible impact this inconsistency has on the system will be estimated based on the work done in section II.B. To calculate this range the following assumptions need to be made:

i. That the 105 million barrels is spread evenly over the twelve month period, i.e., 8.75 million barrels a month.

ii. That the discrepancy is due solely to inflated crude runs to stills reporting.

iii. That, as an upper bound, all the discrepancy is due to a single company inflating its runs to stills volumes.

iv. That, as a lower bound, half the participating companies (weighted by volume) are responsible for the discrepancy by a single inflation of their runs to stills volumes. That the other half report accurately.

Each month 21 million entitlements are traded. Under the above assumptions the upper bound on the potential gain by the single company responsible for the discrepancy is about 1.75 million entitlements (8.3% of all entitlements traded). The lower bound is about 0.8 million entitlements (4.1% of all entitlements traded), shared (by volume) among those companies over-reporting their runs to stills.

Even if assumption (ii) is modified so that only half the internal inconsistency is due to inflated runs to stills volumes, the impact range would still be between 2.1% to 4.1% of all entitlements traded.

Since the above analyses are essentially linear, additional

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ranges of impacts for simple variations in the above assumptions may be calculated relatively easily.

5. Conclusions

The internal consistency check conducted on national aggregate totals of crude oil receipts and runs to stills indicates there is question concerning the quality of this data. The data supplied during the first thirty months appears to be consistent with a simple oil flow model; the data supplied during the next twelve months contradict this same model. No structural changes that could account for this contradiction have been identified.

6. Recommendations for Additional Research

The above contradiction is due either to an under-reporting of crude oil receipts or an over-reporting of crude runs to stills.

Since an over-reporting of crude runs would earn additional entitlements (see section II.C), and since there is a possibility that certain types of crude (i.e., SPR) may be double counted, the computational and inclusion process for runs to stills needs further investigation. This further investigation would need to take place in at least two areas:

i. The Refiner Accounting System: do they include SPR crude in their runs (they should not), how do they ensure that runs as reported do not include export products?

This investigation will be conducted via the field interview questionnaire (see Appendix E).

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ii. Analysis of Individual Company Data:

Based on national aggregate data there appear to be questions concerning either the crude receipts and/or the runs to stills data. An analysis of selected companies (see Appendix I for sample selection procedures) would indicate whether the apparent contradiction is widespread or attributable to a small set of refiners.

It should also be noted here that the lack of a large unexplained difference in the national figures for the first thirty months is only a necessary, but not sufficient, condition to consider the data internally consistent. Analysis of individual company data may indicate a consistency problem for individual refiners during this period.

Finally it should be noted that any findings that arise from an analysis of the second period should also be extended to the first period. It is always possible that any factors that 'validate' the second period may require a revision of the present assessment of the first period.

7. Consistency with other Data Series

In determining the accuracy and validity of the data collected by the DCOE Program, it is necessary to compare this data with similar information submitted to other data collection systems. A comparison of ERA-49 data with its 'parallel' data series, with a logical accounting of the observed differences, should serve as an external validation check. If the DCOE data and other data do not concur within

Of the approximately 180 refiners in the entitlements system, 15 can be classified as large-integrated, 15 as large-independent, and 150 as small. As large integrated companies own approximately 65% of U.S. refining capacity, and large independents an additional 20%, the first 30 account for a very large percentage of all oil refined. Hence they are most important in assessing the overall validity of the data. It is planned to cross-check data for as many of these 30 companies as possible. There are many provisions of the Entitlements System, however, which affect mainly the smaller refiners. Therefore they must be adequately checked too. A random sample of 15 has been chosen from this set of 150 (See Appendix I).

In case the data were unavailable for this larger sample, a smaller sample of 15 companies has also been drawn. Five companies from each of the first two categories, weighted by their capacity, are randomly sampled, and a simple random sample of five companies is drawn from the the small companies.

After the initial company data have been cross-checked, it is expected that this information will be coordinated with the development and administration of the Respondent Field Interview. Questions concerning definitional differences, time lags, data correction practices, and the point within the accounting system from which the data for each data system were derived, will all need to be further investigated.

reasonable limits after their logical differences have been accounted for, the validity of each data series must be questioned further. Even if the entitlements data do match with other data, caution must be exercised in pronouncing the data valid. As suggested earlier, a perfect match might only indicate that all the reported data were drawn from the same place in a company's accounting system; it would not necessarily mean that this was the best place to acquire the data, that it was accurate in the audit sense, or that it best represented the information being sought.

There are several general limitations that must be dealt with in comparing parallel data series:

- Since each data system was designed for a specific purpose, the same nominal item collected in two different systems might have a slightly different definition. For example, oil receipts for the various tiers might or might not include lease, field, or plant condensates, and imported and domestic condensates are treated differently by the various data systems.

- There are usually time differences between the submission requirements of the various systems. This can have two different types of impacts. For the physical flow, volumes are reported at different times, and might vary due to changes in stocks, etc. On the accounting side, this would imply that one of the systems allows for more time to adjust for late invoices and/or correction of internal company errors.

- The DCOE System has two mechanisms for correcting bad data. By use of the amendment process selected pieces of data for prior months may be corrected at virtually any time in the future. Most other systems have a time limit for making corrections. By use of the adjustment system, DCOE data may also be corrected for at any time, though in this case the correction is entered as present data and the original data is never modified.

Many of the limitations discussed above can be dealt with by a systematic analysis of the data. A systematic analysis of definitional discrepancies and correction procedures is essential to test the validity of DCOE data against other series. It would be naive to expect a perfect match for the various series for each period; however, the data should be consistent over time. Time series consistency checks rather than spot checks should help overcome discrepancies due to reporting time delays.

8. External Consistency Checks

The DCOE data that is to be cross-checked are listed on Table 11, along with the name of the external data series, the status of the data acquisition, and comments on cross-checking these data.

As can be seen from this table, most of the company level data that were requested have not arrived, and DCOE data arrived too late for any analysis to be done.

The data set names to be cross-checked were chosen for two reasons:

a. DCOE System is sensitive to this data set, and

b. This data set was expected to be accessible from the "parallel" source.

Clearly, data from every company cannot be validated at this level of detail. A sample of 45 companies has been selected for this validation effort.

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TABLE II

PRELIMINARY PLAN FOR EXTERNAL CONSISTENCY CHECKS OF ERA-49 DATA

Crosscheck	Data Set Names	Status of Data Acquisition	Comments
DOE Form P110: Refiners' Monthly Cost Allocation Report	Old Oil Volume Old Oil Cost Imported Oil Volume Imported Oil Cost	Requested but not received.	a) Have to clarify if only "controlled" oil is old oil for purposes of P110. b) A good crosscheck for large refiners that import their own crude oil.
DOE Form P124: First Purchasers' Report	Old Oil Volume Old Oil Cost New Oil Volume New Oil Cost Crude Oil Volume	Available	a) Universe might be different. b) Crude oil might include condensate. c) Nonrefinery uses are included. d) Pipeline fuel use is included. e) Exports by resellers are included. f) Resellers' inventory fluctuations might account for some differences. g) P124 is a better crosscheck for cost than for volume.
DOE Form P320: Refinery Report	Crude Runs to Stills Crude receipts - Domestic - Foreign	Requested but not received.	a) Treatment of processing agreements have to be clarified. b) Volumes include lease condensate. c) Universe might not be the same due to geographical differences. d) Canadian plant condensate volumes are not included.
DOE Form P103-Q-1: Allocation Program Refinery Quarterly Report	Crude Runs to Stills - Domestic - Foreign Processing Agreements Crude Processed for Non-Refiners	Requested but not received.	a) Monthly figures are available. b) Data is not processed on a computer. c) Stopped being mandatory on October 1977. Since October 1977 only the data for small refiners exist. d) Because of the allocated oil this seems like a good crosscheck for large refiners.
California State Data: Form OR-02	California Imported Oil Receipts (Total)	Available	a) The crosscheck can be done provided total for California is obtained from ERA-49.
Texas State Data	Crude Receipts Crude Runs Crude Imports (1 company)	Available	a) Have to clarify the definition
Louisiana State Data	Crude Receipts Crude Runs (5 companies)	Available	a) Includes plant condensate. b) Includes amount of crude used for blending.

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III. CONCLUSIONS AND RECOMMENDATIONS

This is a draft interim report on work done through November 1, 1978, on the validation of data for the DCOE System. During the course of the research, access to required data was difficult to obtain, therefore the conclusions reached are limited to those which could be drawn from available data, and are preliminary.

The Domestic Crude Oil Entitlements information system is basically sound.

Several potential problem areas are discussed below, and more may surface with additional research. At this stage, there is no reason to believe that the basic integrity of the system will be invalidated.

A. CONCLUSIONS

The major problem areas identified to date include:

- Lack of internal structural consistency:

  For the period of June 1977 through May 1978, crude runs to stills exceeded refinery receipts by about 105 million barrels. This internal inconsistency is being examined further. (See Section II.E.)

- Lack of consistency with other related data series:

  The examination of the consistency of DCOE data with other information has not proceeded far enough to be conclusive. (See Section II.E.)

- Errors in manual calculations:

  A number of errors are introduced during the manual calculations performed by ERA analysts. The most significant of these are corrected almost immediately. Smaller errors are not always discovered or corrected. (See Section II.D.)

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A detailed sensitivity analysis (see Section II.E) indicates that the system is reasonably robust, i.e., inaccurate reporting by a single firm does not significantly affect other participants, though it does affect the entitlement position of the respondent.

The DCOE System was developed in response to specific legislation passed by Congress. The system is meaningful relevant to these goals, which could not otherwise be attained. Despite some nominal overlap, the Joint Petroleum Report System (JPRS) cannot substitute for the DCOE System, since it does not collect its information by oil tiers, the basic modus operandi of the DCOE System. Additionally, the DCOE System collects information necessary to verify certain pieces of data (e.g., processing agreements) that are not collected elsewhere. The information is collected and processed within sixty days of the end of the reporting period, as required by the regulations.

B. RECOMMENDATIONS

Based upon the investigations to date, current flaws in the existing system should not seriously impact the purpose for which the system was developed, i.e., an equalization of the crude input costs for all refiners and other selected participants.

There is an apparent tendency for the system also to encourage other petroleum production activities, such as synthetic fuels, SPR storage, and most recently, the increased lifting of California crude oils. Should this tendency become a dominant factor, the design of the information system might need to be reexamined.

The monthly summaries of the DCOE System contain a great deal of information not available elsewhere. This is available only on an informal ad hoc basis. A systematic method of making available the non-proprietary parts of this data to interested users, both inside and outside DOE, should be investigated. Since some of the time series data are 'contaminated' by the rolling forward of corrections (rather than the a posteriori corrections normally made), the DCOE data should be so flagged for this extended audience.

The DCOE Program is subject to constant review, with a number of new provisions introduced or 'revisions' made each year. In spite of the programming loads associated with this changing system, the DCOE Program has developed fast and efficient procedures for completing their monthly assignment. One major area, the manual calculation of amendments in order to correct original data, needs to be addressed as soon as possible. These manual operations consume a significant portion of the analysts' time, and invite the possibility of large errors. ERA has had to correct a number of large errors resulting from this process, and a number of smaller errors have gone unnoticed. A computerized system has been developed to carry out these computations and should be implemented as soon as possible.

Due to the interim nature of this report, certain lines of investigation were begun but not completed. Research in the following areas needs to be continued:

- Cross-checks of the data with other data series. A number of 'parallel' data series have been identified in the report.

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These comparisons will be done initially on aggregated national data and, if necessary, for a small sample of firms. (See Section II.E.)

- Complete the internal structural consistency checks identified in the report. There are reasons to believe that there may have been either a structural change or a change in reporting behavior over time. It may be necessary to investigate a small sample of companies to understand the reasons for this. (See Section II.E.)

- Complete the checks on the manual calculations done for the amendments process. Those calculations are carried out in three basic steps. Two of these steps have been checked to date. (See Section II.D.)

- Develop a scheme for computerized monitoring of the input data to aid the present 'eyeballing' used by the analysts. This capability would greatly enhance the present manual, case-by-case approach. (See Section II.B.)

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NOTES

1. Pub. L. No. 93-159, 87 Stat. 627 (November 27, 1973), codified, as amended at 15 U.S.C.A. Section 751 et seq. (1978), hereinafter Pub. L. No. 93-159. The EPAA is set out in its entirety in Appendix A.

2. Pub. L. No. 93-159 Section 2b, codified at 15 U.S.C.A. Section 751(b) (1978). Congress set forth nine objectives in the Act for which the President's program was to provide "to the maximum extent practicable." Pub. L. No. 93-159 Section 4(b)(1), codified, as amended, at 15 U.S.C.A. Section 753(b)(1) (1978).

3. Pub. L. No. 93-159 Section 4(a), codified at 15 U.S.C.A. Section 753(a) (1978). Prior to enactment of the EPAA, the President had instituted a voluntary allocation program which was deemed to be a failure by both the Administration and the House. House Rep. No. 531, 93rd Cong., 1st Sess., 10-11, reprinted in 2 (1973) U.S. Code Cong. & Ad. News 2582, 2587-2588.

4. See Consumers Union of U.S., Inc. v. Sawhill, 525 F.2d 1068, 1077 (Temp. Emer. Ct. App., 1975) vacating 512 F.2nd 1112 (Temp. Emer. Ct. App., 1975) wherein the court stated that "the Congressional intent was to hew a sphere of responsibility within which the FEA could decide how to proceed against the crisis."

5. The President established on December 4, 1973, the Federal Energy Office (FEO) to promulgate and enforce crude oil allocation regulations, pursuant to Section 5(b) of the EPAA. Executive Order No. 11748, 3 C.F.R. (1971-1975 Comp.), implementing the EPAA by adopting Phase IV price regulations. The authority vested in the FEA was transferred to the Federal Energy Administration (FEA) on June 27, 1974, pursuant to the Federal Energy Administration Act of 1974, Pub. L. No. 93-275, 88 Stat. 96, codified, as amended, at 15 U.S.C.A. Section 761 et seq. (1978) and Executive Order No. 11790, 3 C.F.R. 882 (1971-1975 Comp.) On July 30, 1976, the President extended the FEA by Executive Order No. 11930, 3 C.F.R. 137 (1976 Comp.), changing the FEA to the FEO until an extension bill could pass Congress. On August 14, 1976, Congress enacted the Energy Conservation and Production Act (ECPA), extending the FEA until December 31, 1977. Pub.L. No. 94-385 Section 112, 90 Stat. 1125, 1132, codified at 15 US.C.A. Section 761 (1978). Effective October 1, 1977, all authority previously vested in the FEA was transferred to the Department of Energy under the Department of Energy Organization Act, Pub. L. No. 95-91, 91 Stat. 565 (August 4, 1977) codified at 42 U.S.C.A. Section 7101 et seq. (1977) and Executive Order No. 12009 (September 15, 1977), 3 C.F.R. 142.

6. Domestic Crude Oil Entitlements Program, Office of Regulatory Programs, FEA, Federal Energy Administration Entitlement Program Handbook 14-15 (1977); see 10 C.F.R. Section 211.63 (1978).

7. "Buy/Sell Program" is a common designation for the Mandatory Crude Oil Allocation Program promulgated in 10 C.F.R. Section 211.65. Kay Sherwood, National Energy Information Center, Federal Energy Administration, "Crude Oil Entitlements Program," 2 (date unknown).

8. Domestic Crude Oil Entitlements Program, note 6 above, at pages 14-15. In essence, under this sytem, a ceiling price was set for "old oil" (oil equivalent in volume to 1972 production at a property) at an artificially low level while "new oil" (oil produced at a property in excess of old oil) was uncontrolled and was sold at the market price. In August, 1974, old oil sold at an average ceiling price of $5/bbl, new oil (including released oil*) at approximately $10/bbl and imported crude oil at almost $13/bbl. Kay Sherwood, note 7 above, at page 2.

9. See Domestic Crude Oil Entitlements Program, note 6 above, at page 15.

10. 39 Fed. Reg. 31650 (August 30, 1974). The program was effective, November 29, 1974. 39 Fed. Reg. 42246 (December 4, 1974). The Congressional intent to, inter alia, preserve an economically sound and competitive petroleum industry and, in particular, to protect the competitive viability of the independent and small refiners and marketers of refined petroleum products is made clear by the objectives and the legislative history of the EPAA. See Pub. L. No. 93-159 Section 4(b)(1)(D), codified at 15 U.S.C.A. Section 753 (b)(1)(D) (1978); House Rep. No. 531, 93rd Cong., 1st Sess. 18-19, reprinted in 2 (1973) U.S. Code Cong. & Ad. News 2582, 2595-2596; House Conf. Rep. No. 628, 93rd Cong. 12, 24 reprinted in 2 (1973) U.S. Code Cong. & Ad. News 2688, 2689-2690, 2700-2701.

11. Pub. L. No. 94-163, 87 Stat. 871 (December 22, 1975) relevant sections codified at 15 U.S.C.A. Section 751 et seq. (1978), hereinafter Pub. L. No. 94-163.

12. Pub. L. No. 94-163 Section 461 (amending the EPAA by adding Section 18), codified at 15 U.S.C.A. Section 760g (1978).

13. House Rep. No. 340, 94th Cong., 1st Sess. 55, reprinted in 2 (1975) U.S. Code Cong. & Ad. News 1817.

14. Pub. L. No. 94-163 Section 401(a) (amending the EPAA by adding Sections 8 and 9, relevant portion at Section 8(a)) relevant portion codified at 15 U.S.C.A. Section 757(a) (1978).

15. Pub. L. No. 94-163 Section 401(a) (amending the EPAA by adding Sections 8 and 9, relevant portions at Sections 8(d)(1) and 8(d)(3)), repealed by the Energy Conservation and Production Act, Pub. L. No. 94-385 Section 122(3), codified at 15 U.S.C.A. Section 757(d)(1) (1978).

16. Pub. L. No. 94-163 Section 401(a) (amending the EPAA by adding Sections 8 and 9, relevant portion at Section 8(d)(1) relevant portion codified at 15 U.S.C.A. Section 753(d)(1) (1978).

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17. Pub. L. No. 94-163 Section 403 (amending the EPAA by adding Section 4(e)), codified at 15 U.S.C.A. Section 753(e) (1978).

18. Pub. L. No. 94-385, 90 Stat 1125, (August 14, 1976), relevant sections codified at 15 U.S.C.A. Sections 753 and 757, hereinafter Pub. L. No. 94-385.

19. Pub. L. No. 94-385 Section 121 (amending the EPAA by adding Section 8(i)), codified at 15 U.S.C.A. Section 757(i) (1978).

20. Pub. L. No. 94-385 Section 122 (amending Section 8 of the EPAA), codified at 15 U.S.C.A Section 757 (1978).

21. Pub. L. No. 94-385 Section 122 (amending Section 8 of the EPAA, relevant amendment adds Section 8(j)), codified at 15 U.S.C.A. Section 757(j) (1978).

22. Pub. L. No. 94-163 Section 461 (amending the EPAA by adding Section 18), codified at 15 U.S.C.A. Section 760g (1978); Domestic Crude Oil Entitlements Program, note 6 above, at pages 17 and 18.

23. Pub. L. No. 94-163 Section 461 (amending the EPAA by adding Section 18), codified at 15 U.S.C.A. Section 760g (1978).

24. See note 5 above.

25. See e.g., 43 Fed. Reg. 32,171 (July 25, 1978).

26. 10 C.F.R. Section 211.67(a) (1978).

27. 10 C.F.R. Section 211.67(b) (1978).

28. 10 C.F.R. Section 211.67(b) (1978).

29. 10 C.F.R. Section 211.67(c), (i)(2) (1978).

30. 10 C.F.R. Section 211.67(i)(4) (1978).

31. 10 C.F.R. Section 211.67(i)(2) (1978).

32. 10 C.F.R. Section 211.66 (1978).

33. The regulations authorizing the ERA to collect the monthly report by (1) refiners (10 C.F.R. Section 211.66(h) (1978)), (2) eligible firms (10 C.F.R. Section 211.66(j) (1978)), and (3) eligible firms and refiners delivering crude oil to the Strategic Petroleum Reserve (10 C.F.R. Section 211.66(k) (1978)) contains catch-all clauses providing that the ERA may require respondents to submit any information it may request. These provisions enable the ERA to collect data which it finds necessary to operate the DCOE program even though such information is not specifically required by the regulations. The catch-all provisions do not contain an explicit constraint on the type of

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information the ERA may collect pursuant to that authorization.

34. Domestic Crude Oil Entitlements Program, note 6 above, at page 119.

35. Domestic Crude Oil Entitlements Program, note 6 above, at page 119.

36. Conversation of November 8, 1978, with member of the Domestic Crude Oil Entitlements Program Office staff.

37. Conversation of November 8, 1978, with member of the Domestic Crude Oil Entitlements Program Office staff.

38. The instructions to form ERA 49 state that the form provides the means by which refiners report pursuant to 10 C.F.R. Section 211.66(h) (1978) and that it must be completed by all refiners of crude oil and eligible firms in compliance with 10 C.F.R. Sections 211.66(h), 211.66 (i), 211.66(j) (1978). The form provides that it is mandatory pursuant to Pub. L. No. 93-159 and 93-275 as amended.

39. The instructions to form FEA-P113-M-0 state that the form provides oil import data used for regulation and statistical purposes. Both the form and the instructions thereto provide that the report is required pursuant to 10 C.F.R. Sections 213.23 and 211.66(j) (1978) and Pub. L. Nos. 93-275 and 93-159.

40. The instructions to form FEA-P 129-M-0 state that the form provides the means by which refiners which import naphtha into Puerto Rico and process it for utilization as a petrochemical feedstock report to the FEA under the provisions of the DCOE program (10 C.F.R. Section 211.67 (1978)). The form provides that it is mandatory pursuant to Pub. L. No. 93-159. However, neither the form nor the instructions thereto, specify the administrative authority for collecting the data in the report. This authority is found at 10 C.F.R. Sections 211.66(h)(4) and 211.67(d)(5)(iv) (1978).

41. The instructions to form FEA-P113-M-0 state that the form provides the means by which refiners and eligible firms must certify purchases and sales of entitlements. Both the form and the instructions thereto provide that it is mandatory pursuant to Pub. L. No. 93-159. However, neither the form, nor the instructions thereto, specify the authority in the Code of Federal Regulations for collecting the data in the report. This authority is found at 10 C.F.R. Section 211.66(i) (1978).

42. 10 C.F.R. Section 211.51 (1978)

43. 10 C.F.R. Section 212.31 (1978)

44. The DCOE program until recently acquired this data from the SPR office. It is now obtained directly from the participants.

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45. See note 10.

46. Each of the input documents, i.e., Form ERA-49, P126-M-D, P129-M-0 has its own EDIT program. All are designed to work in essentially the same manner.

47. See the "Program Binder for the Domestic Crude Oil Cost Equalization System," Volume 1, 1976.

48. For an exact definition of what constitutes an amendment and an Adjustment, see page 2 and 10 of Appendix D, the ERA-49 Form and Instructions.

49. See Appendix H, Table H-15, for an example of the manual calculation in a typical amendment 'correction' calculation. Note the DOOR may be entered to ten decimal places.

50. After a calculation pertaining to an amendment has been completed, the original form, together with the calculation sheets, telephone follow-up notes, etc., are filed chronologically. A copy of the amendment is also filed with the original data.

51. See Appendix I for the classification of the participants into major groups.

52. See equation 1, Appendix F, for the calculation of a company's entitlement position, and see also the sensitivity analysis shown in Section II.C.

53. Interview with an oil company accountant.

54. Draft Report - Analysis Memorandum AM/ES/78 "A Comparison of Lower - 48 Production Data from three Crude Oil Data System," prepared by Division of Oil and Gas Analysis, Office of Energy Source Analysis, September, 1978.

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GLOSSARY

Accuracy:

A deviation of an indicated measurement from an accepted primary reference standard.

Adjusted Crude Oil Receipts:

The crude oil receipts of a refiner in a particular month, the composition of which has been adjusted to reflect any invoice which is received in that month for domestic crude oil (including crude oil sold under Section 211.65[a]) delivered to that refiner in any previous month (excluding, however, months prior to November 1974), and which has the effect of increasing or decreasing the volume of old or upper tier crude oil reported by that refiner under Section 211.66(h) for such previous month, in cases where such previously reported volume was based on either a prior invoice or a good faith estimate (based on that refiner's past experience as to the old and upper tier crude oil content of domestic crude oil of the same origin) as to the old and upper tier crude oil content of that crude oil delivery.

Adjustment of Registration:

The means by which the relationship between the volume indicated by the meter register and the actual volume of liquid passing through the meter is changed.

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a All references are to 10 C.F.R. (1978).

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Alaskan North Slope Crude Oil:

Crude oil transported through the trans-Alaska pipeline.

API Gravity:

An arbitrary scale expressing the gravity or density of liquid petroleum products. The measuring scale is calibrated in terms of degress API.

$$\text{Degree API} = \frac{141.5}{\text{sp. gr. } 60^{o}F/60^{o}F} - 131.5$$

Base Production Control Level (BPCL):

(a) Prior to February 1, 1976: the total number of barrels of domestic crude oil produced and sold from a particular property in the same month of 1972. If domestic crude oil was not produced and sold from that property in every month of 1972, the total number of barrels of domestic crude oil produced and sold from that property in 1972, divided by 12.

(b) Effective February 1, 1976: the total number of barrels of old crude oil produced and sold from the property during the calendar year 1975, divided by 365, and multiplied by the number of days in the particular month during 1975. A producer may elect to use the total number of barrels of crude oil produced and sold from the property during calendar year 1972, divided by 366 and multiplied by the number of days in the particular month during 1972.

Bureau of Mines East Coast Refining District:

The District of Columbia and the States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware, Maryland, Virginia, North Caroline, South Carolina, Georgia, Florida, and certain counties of the States of New York and Pennsylvania.

Control Chart:

A graphical record of the constancy of measurement.

Crude Oil Receipts:

As to a particular refiner, the volume of crude oil (i) booked into its refineries in accordance with accounting procedures generally accepted and consistently and historically applied by the refiner concerned, for its own account or for the account of a firm other than a refiner or (ii) if not previously so booked into its refineries, delivered by that refiner for its account to another refiner pursuant to a processing agreement with that other refiner. Crude oil receipts shall not include crude oil received by a refiner for the purpose of processing at its refineries for the account of another refiner. A particular crude oil receipt shall be deemed to have occurred when the related cost is booked into refinery inventory in accordance with accounting procedures generally accepted and consistently and historically applied by the refiner concerned, whether or not such crude oil has been actually received by that refiner, except that crude oil delivered by one

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refiner to another refiner pursuant to a processing agreement will be deemed to have been delivered by the delivering refiner to the other refiner when the risk of loss passes to the other refiner under the particular processing agreement or when the crude oil is received at the refinery of the other refiner, whichever occurs first. Crude oil which has been added by a refiner to its inventory and which is thereafter sold or otherwise disposed of without processing for the account of that refiner shall be deducted from its crude oil receipts at the time when the related cost is deducted from refinery inventory in accordance with accounting procedures generally accepted and consistently and historically applied by the refiner concerned. The volume of domestic crude oil included in a refiner's crude oil receipts shall be evidenced by and consistent with invoices received with respect to such crude oil receipts.

Crude Oil Runs to Stills:

The total number of barrels of crude oil input to distillation units of a refinery. For the purposes of DCOE Program Calculations, crude oil runs to stills are qualified as to what may be included and what must be excluded. Crude runs to stills include:

(1) Volumes processed by another refiner according to a processing agreement.

(2) Volumes processed for a non-refiner.

(3) Plant condensate and synthetic crude oil made from tar sands which are imported from Canada and input to distillation units,

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provided applicable import license fees have been paid.

Crude Oil Runs to Stills Exclude:

(1) Volumes processed from the account of another refinery according to a processing agreement.

(2) Volumes processed into refined products and residual fuel oil which are exported or constitute export sales. This exclusion does not apply to refined lubricating oils or Bunker C, Navy Special Fuel Oils, and No. 4 diesel which are sold for use as a marine fuel on a voyage deparing from a U.S. port.

Cumulative Deficiency:

A measure of the cumulative deficit of production below the BPCL after the first month in which new oil was produced and sold from a specific property.

Deemed Old Oil:

The sum of Old Oil Receipts (OOR) and a fraction of the Upper Tier Crude Oil Receipts (New Oil). This fraction is called that Deemed Old Oil Ratio (DOOR).

Domestic Oil Supply Ratio (DOSR):

Same as National Domestic Crude Oil Supply Ratio.

East Coast Market:

The geographical area coextensive with the Bureau of Mines East Coast Petroleum Refining District. The East Coast market shall

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also include the State of Michigan for the period July 1, 1978 through June 30, 1979.

Eligible Firm:

Any firm that imports an eligible product into the East Coast market for sale or use in that market area, that is the importer of record under a license issued pursuant to the Oil Import Regulations, Part 213 and that owns the eligible product at the time of importation thereof pursuant to that license.

Eligible Product:

Residual fuel oil imported into the East Coast market, except that an import of residual fuel oil into United States customs territory which has been processed in the U.S. Virgin Islands is not considered an eligible product. Canadian residual fuel oil imported into the State of Michigan also qualifies as an eligible product for the period of July 1, 1978 through June 30, 1979.

Error: The difference between the indicated value and true value. Error can be expressed by a variety of statistical measures such as the standard deviation, $\pm$ 0.

First Sale:

The first transfer for value by the producer or royalty owner. With respect to transfers between affiliated entities, the first sale is imputed to occur as if in arms-length transactions.

Independent Refiner:

A refiner which (a) obtained in the calendar quarter which ended immediately prior to November 27, 1973, more than 70 percent of its refinery input of domestic crude oil (or 70 percent of its refinery input of domestic and imported crude oil) from producers which do not control, are not controlled by, and are not under common control with, such a refiner and (b) marketed or distributed in such a quarter and continues to market and distribute a substantial volume of gasoline refined by it through independent marketers.

Lease Condensate:

A natural gas liquid recovered in lease separators or field facilities in associated or non-associated production.

Measuring Precision:

The variance of mean estimate of volume found in a series of comparable gaugings.

Meter, Positive Displacement:

A device installed in a piping system in which flowing liquid is constantly and mechnically isolated into segments of known volume. These segments of liquids are counted as they are displaced and their accumulated total continuously and instantaneously indicate in units of liquid quantity by the meter register.

Meter, Turbine:

A device that consists of a rotor or propeller which senses the linear velocity of a flowing stream. The moving liquid imparts

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a rotational or tangential velocity to the rotor which is proportional to the rate of flow.

Napthas:

Petroleum fractions made up predominantly of hydrocarbons whose boiling points fall within the temperature range of 85° to 430°F. This definition does not include specific hydrocarbon constituents such as hexane or special naphthas (solvents) as defined in Section 211.182.

National Domestic Crude Oil Supply Ratio (DOSR):

For a particular month, the volume of deemed old oil (as defined in Section 211.67(b)) included in the aggregate adjusted crude oil receipts of all refiners, decreased by a number of barrels of deemed old oil equal to the number of entitlements issuable under Section 211.67(a)(4) and Section 211.67(a)(5), divided by the sum of the total volume of the crude oil runs to stills for all refiners for that month and thirty percent (30%) of the total volume of imports of eligible products by eligible firms for that month, provided that, for the period July 1, 1978 through June 30, 1979, the reference herein to thirty percent (30%) shall read fifty percent (50%). The calculation of the national domestic crude oil supply ratio for each month shall take into account entitlement purchase or sale requirements resulting from the correction of reporting errors pursuant to paragraph (j) of Section 211.67.

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New Oil:

(a) Prior to February 1976: Total barrels of crude oil produced and sold in a month from a specific property less (i) the BPCL* (ii) the Current Cumulative Deficiency (CCD).

(b) February 1976 to date: Total barrels of crude oil produced and sold, less (i) property's BPCL (ii) CCD since February 1976.

New oil must be so certified within two months of production and sale.

Old Oil:

(a) Prior to February 1976: total barrels of crude produced and sold from a property in a spcific month, less (i) new oil, (ii) released crude oil.

(b) February 1976 to date: total barrels produced and sold, less new oil. Old oil included in a refiner's adjusted crude oil receipts shall not include condensate recovered at the inlet side of a gas processing plant.

Petroleum Substitute:

A liquid produced from oil shale found in the United States and used as a feedstock or fuel in a domestic refinery, and such other liquid synthetic fuels as are designated pursuant to orders issued by the ERA. Applications for such orders may be submitted to ERA under Subpart G of Part 205. In order to be designated a petroleum substitute, a liquid synthetic fuel must be found by the ERA to be derived from domestic biomass, coal, oil shale, solid waste materials or tar sands, and used in the United States as feedstock

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to a refinery, a blending feedstock or as a boiler fuel in a refinery or elsewhere. The ERA may, in its discretion, deny such designation if it determines that the liquid synthetic fuel in question does not result in a net gain of energy, considering the fuel consumption involved in its production, or requires the consumption of substantial quantities of a relatively scarce fuel for its production.

Plant Condensate:

A natural gas plant product, mostly pentanes and heavier hydrocarbons, recovered and separated as a liquid at gas inlet separators or scrubbers in processing plants or field facilities and which is not suitable for blending with naturl gasoline or refinery gasoline.

Prove: To determine the meter performance or the relationship between the volume of liquid which actually passes through a meter and the volume indicated by the meter (and its readout device).

Released Oil:

Prior to February 1976, production of one barrel of new oil released one barrel of old oil from the price ceiling. This category no longer exists.

Small Refiner:

A refiner, the sum of the capacity of the refineries of which (including the capacity of any person who controls, or is controlled by, or is under common control which such refiner)

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does not exceed 175,000 barrels per day.

Stripper Well Crude Oil:

For the purposes of the DCOE Program, crude oil certified as having come from a stripper well property.

Stripper Well Property:

A property whose average daily production of crude oil per well (excluding condensate recovered in non-associated production) did not exceed 10 barrels per day during any preceding consecutive 12-month period beginning after December 31, 1972.

Tertiary Oil:

Oil which is produced under a qualified tertiary enhanced recovery project.

Tertiary Recovery:

Use of heat and other methods (other than fluid injection) to augment oil recovery.

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LBL-8436
Draft Interim Report

APPENDICES

DRAFT INTERIM VALIDATION REPORT:

DOMESTIC CRUDE OIL ENTITLEMENTS SYSTEM

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APPENDIX A

RELEVANT LEGISLATION

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EMERGENCY PETROLEUM

ALLOCATION ACT OF 1973

Public Law 93-159

AN ACT

November 27, 1973
[S. 1570]

To authorize and require the President of the United States to allocate crude oil, residual fuel oil, and refined petroleum products to deal with existing or imminent shortages and dislocations in the national distribution system which jeopardize the public health, safety, or welfare; to provide for the delegation of authority; and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Emergency Petroleum Allocation Act of 1973".

Emergency Petroleum Allocation Act of 1973.

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FINDINGS AND PURPOSE

SEC. 2. (a) The Congress hereby determines that—

(1) shortages of crude oil, residual fuel oil, and refined petroleum products caused by inadequate domestic production, environmental constraints, and the unavailability of imports sufficient to satisfy domestic demand, now exist or are imminent;

(2) such shortages have created or will create severe economic dislocations and hardships, including loss of jobs, closing of factories and businesses, reduction of crop plantings and harvesting, and curtailment of vital public services, including the transportation of food and other essential goods; and

(3) such hardships and dislocations jeopardize the normal flow of commerce and constitute a national energy crisis which is a threat to the public health, safety, and welfare and can be averted or minimized most efficiently and effectively through prompt action by the Executive branch of Government.

(b) The purpose of this Act is to grant to the President of the United States and direct him to exercise specific temporary authority to deal with shortages of crude oil, residual fuel oil, and refined petroleum products or dislocations in their national distribution system. The authority granted under this Act shall be exercised for the purpose of minimizing the adverse impacts of such shortages or dislocations on the American people and the domestic economy.

DEFINITIONS

SEC. 3. For purposes of this Act:

(1) The term "branded independent marketer" means a person who is engaged in the marketing or distributing of refined petroleum products pursuant to—

(A) an agreement or contract with a refiner (or a person who controls, is controlled by, or is under common control with such refiner) to use a trademark, trade name, service mark, or other identifying symbol or name owned by such refiner (or any such person), or

(B) an agreement or contract under which any such person engaged in the marketing or distributing of refined petroleum products is granted authority to occupy premises owned, leased, or in any way controlled by a refiner (or person who controls, is controlled by, or is under common control with such refiner),

but who is not affiliated with, controlled by, or under common control with any refiner (other than by means of a supply contract, or an agreement or contract described in subparagraph (A) or (B)), and who does not control such refiner.

(2) The term "nonbranded independent marketer" means a person who is engaged in the marketing or distributing of refined petroleum products, but who (A) is not a refiner, (B) is not a person who controls, is controlled by, is under common control with, or is affiliated with a refiner (other than by means of a supply contract), and (C) is not a branded independent marketer.

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(3) The term "independent refiner" means a refiner who (A) obtained, directly or indirectly, in the calendar quarter which ended immediately prior to the date of enactment of this Act, more than 70 per centum of his refinery input of domestic crude oil (or 70 per centum of his refinery input of domestic and imported crude oil) from producers who do not control, are not controlled by, and are not under common control with, such refiner, and (B) marketed or distributed in such quarter and continues to market or distribute a substantial volume of gasoline refined by him through branded independent marketers or nonbranded independent marketers.

(4) The term "small refiner" means a refiner whose total refinery capacity (including the refinery capacity of any person who controls, is controlled by, or is under common control with such refiner) does not exceed 175,000 barrels per day.

(5) The term "refined petroleum product" means gasoline, kerosene, distillates (including Number 2 fuel oil), LPG, refined lubricating oils, or diesel fuel.

(6) The term "LPG" means propane and butane, but not ethane.

(7) The term "United States" when used in the geographic sense means the States, the District of Columbia, Puerto Rico, and the territories and possessions of the United States.

MANDATORY ALLOCATION

SEC. 4. (a) Not later than fifteen days after the date of enactment of this Act, the President shall promulgate a regulation providing for the mandatory allocation of crude oil, residual fuel oil, and each refined petroleum product, in amounts specified in (or determined in a manner prescribed by) and at prices specified in (or determined in a manner prescribed by) such regulation. Subject to subsection (f), such regulation shall take effect not later than fifteen days after its promulgation. Except as provided in subsection (e) such regulation shall apply to all crude oil, residual fuel oil, and refined petroleum products produced in or imported into the United States.

Regulation.

Effective date.

(b) (1) The regulation under subsection (a), to the maximum extent practicable, shall provide for—

(A) protection of public health, safety, and welfare (including maintenance of residential heating, such as individual homes, apartments, and similar occupied dwelling units), and the national defense;

(B) maintenance of all public services (including facilities and services provided by municipally, cooperatively, or investor owned utilities or by any State or local government or authority, and including transportation facilities and services which serve the public at large);

(C) maintenance of agricultural operations, including farming, ranching, dairy, and fishing activities, and services directly related thereto;

(D) preservation of an economically sound and competitive petroleum industry; including the priority needs to restore and foster competition in the producing, refining, distribution, mar-

keting, and petrochemical sectors of such industry, and to preserve the competitive viability of independent refiners, small refiners, nonbranded independent marketers, and branded independent marketers;

(E) the allocation of suitable types, grades, and quality of crude oil to refineries in the United States to permit such refineries to operate at full capacity;

(F) equitable distribution of crude oil, residual fuel oil, and refined petroleum products at equitable prices among all regions and areas of the United States and sectors of the petroleum industry, including independent refiners, small refiners, nonbranded independent marketers, branded independent marketers, and among all users;

(G) allocation of residual fuel oil and refined petroleum products in such amounts and in such manner as may be necessary for the maintenance of exploration for, and production or extraction of, fuels, and for required transportation related thereto;

(H) economic efficiency; and

(I) minimization of economic distortion, inflexibility, and unnecessary interference with market mechanisms.

Price regulations.

(2) In specifying prices (or prescribing the manner for determining them), such regulation shall provide for—

(A) a dollar-for-dollar passthrough of net increases in the cost of crude oil, residual fuel oil, and refined petroleum products to all marketers or distributors at the retail level; and

(B) the use of the same date in the computation of markup, margin, and posted price for all marketers or distributors of crude oil, residual fuel oil and refined petroleum products at all levels of marketing and distribution.

Allocation, consideration for certain persons.

(3) The President in promulgating the regulation under subsection (a) shall give consideration to allocating crude oil, residual fuel oil, and refined petroleum products in a manner which results in making available crude oil, residual fuel oil, or refined petroleum products to any person whose use of fuels other than crude oil, residual fuel oil, and refined petroleum products has been curtailed by, or pursuant to a plan filed in compliance with, a rule or order of a Federal or State agency, or where such person's supply of such other fuels is unobtainable by reason of an abandonment of service permitted or ordered by a Federal or State agency.

Refined petroleum and crude oil products.

(c)(1) To the extent practicable and consistent with the objectives of subsections (b) and (d), the mandatory allocation program established under the regulation under subsection (a) shall be so structured as to result in the allocation, during each period during which the regulation applies, of each refined petroleum product to each branded independent marketer, each nonbranded independent marketer, each small refiner and each independent refiner, and of crude oil to each small refiner and each independent refiner, in an amount not less than the amount sold or otherwise supplied to such marketer or refiner during the corresponding period of 1972, adjusted to provide—

Pro rata reductions.

(A) in the case of refined petroleum products, a pro rata reduction in the amount allocated to each person engaged in the marketing or distribution of a refined petroleum product if the aggregate amount of such product produced in and imported into the United States is less than the aggregate amount produced and imported in calendar year 1972; and

(B) in the case of crude oil, a pro rata reduction in the amount of crude oil allocated to each refiner if the aggregate amount

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produced in and imported into the United States is less than the aggregate amount produced and imported in calendar year 1972.

(2) (A) The President shall report to the Congress monthly, beginning not later than January 1, 1974, with respect to any change after calendar year 1972 in— Presidential report to Congress.

(i) the aggregate share of nonbranded independent marketers,

(ii) the aggregate share of branded independent marketers, and

(iii) the aggregate share of other persons engaged in the marketing or distributing of refined petroleum products,

of the national market or the regional market in any refined petroleum product (as such regional markets shall be determined by the President).

(B) If allocation of any increase of the amount of any refined petroleum product produced in or imported into the United States in excess of the amount produced or imported in calendar year 1972 contributes to a significant increase in any market share described in clause (i), (ii), or (iii) of subparagraph (A), the President shall by order require an equitable adjustment in allocations of such product under the regulation under subsection (a). Allocation adjustment.

(3) The President shall, by order, require such adjustments in the allocations of crude oil, residual fuel oil, and refined petroleum products established under the regulation under subsection (a) as may reasonably be necessary (A) to accomplish the objectives of subsection (b), or (B) to prevent any person from taking any action which would be inconsistent with such objectives.

(4) The President may, by order, require such adjustments in the allocations of refined petroleum products and crude oil established under the regulation under subsection (a) as he determines may reasonably be necessary—

(A) in the case of refined petroleum products (i) to take into consideration market entry by branded independent marketers and nonbranded independent marketers during or subsequent to calendar year 1972, or (ii) to take into consideration expansion or reduction of marketing or distribution facilities of such marketers during or subsequent to calendar year 1972, and

(B) in the case of crude oil (i) to take into consideration market entry by independent refiners and small refiners during or subsequent to calendar year 1972, or (ii) to take into consideration expansion or reduction of refining facilities of such refiners during or subsequent to calendar year 1972.

Any adjustments made under this paragraph may be made only upon a finding that, to the maximum extent practicable, the objectives of subsections (b) and (d) of this section are attained.

(5) To the extent practicable and consistent with the objectives of subsections (b) and (d), the mandatory allocation program established under the regulation under subsection (a) shall not provide for allocation of LPG in a manner which denies LPG to any industrial user if no substitute for LPG is available for use by such industrial user. LPG allocation.

(d) The regulation under subsection (a) shall require that crude oil, residual fuel oil, and all refined petroleum products which are produced or refined within the United States shall be totally allocated for use by ultimate users within the United States, to the extent practicable and necessary to accomplish the objectives of subsection (b). Oil produced or refined in U.S.

(e) (1) The provisions of the regulation under subsection (a) shall specify (or prescribe a manner for determining) prices of crude oil at the producer level, but, upon a finding by the President that to require Crude oil prices at producer level, exemption.

allocation at the producer level (on a national, regional, or case-by-case basis) is unnecessary to attain the objectives of subsection (b)(1)(E) or the other objectives of subsections (b), (c), and (d) of this section, such regulation need not require allocation of crude oil at such level. Any finding made pursuant to this subsection shall be transmitted to the Congress in the form of a report setting forth the basis for the President's finding that allocation at such level is not necessary to attain the objectives referred to in the preceding sentence.

Report to Congress.

(2)(A) The regulation promulgated under subsection (a) of this section shall not apply to the first sale of crude oil produced in the United States from any lease whose average daily production of crude oil for the preceding calendar year does not exceed ten barrels per well.

(B) To qualify for the exemption under this paragraph, a lease must be operating at the maximum feasible rate of production and in accord with recognized conservation practices.

(C) Any agency designated by the President under section 5(b) for such purpose is authorized to conduct inspections to insure compliance with this paragraph and shall promulgate and cause to be published regulations implementing the provisions of this paragraph.

Gasoline allocation.

(f)(1) The provisions of the regulation under subsection (a) respecting allocation of gasoline need not take effect until thirty days after the promulgation of such regulation, except that the provisions of such regulation respecting price of gasoline shall take effect not later than fifteen days after its promulgation.

(2) If—

85 Stat. 743. 12 USC 1904 note.

(A) an order or regulation under section 203(a)(3) of the Economic Stabilization Act of 1970 applies to crude oil, residual fuel oil, or a refined petroleum product and has taken effect on or before the fifteenth day after the date of enactment of this Act, and

(B) the President determines that delay in the effective date of provisions of the regulation under subsection (a) relating to such oil or product is in the public interest and is necessary to effectuate the transition from the program under such section 203 (a)(3) to the mandatory allocation program required under this Act,

he may in the regulation promulgated under subsection (a) of this section delay, until not later than thirty days after the date of the promulgation of the regulation, the effective date of the provisions of such regulation insofar as they relate to such oil or product. At the same time the President promulgates such regulation, he shall report to Congress setting forth his reasons for the action under this paragraph.

Presidential report to Congress.

Termination date.

(g)(1) The regulation promulgated and made effective under subsection (a) shall remain in effect until midnight February 28, 1975, except that (A) the President or his delegate may amend such regulation so long as such regulation, as amended, meets the requirements of this section, and (B) the President may exempt crude oil, residual fuel oil, or any refined petrolum product from such regulation in accordance with paragraph (2) of this subsection. The authority to promulgate and amend the regulation and to issue any order under this section, and to enforce under section 5 such regulation and any such order, expires at midnight February 28, 1975, but such expiration shall not affect any action or pending proceedings, civil or criminal, not finally determined on such date, nor any action or proceeding based upon any act committed prior to midnight February 28, 1975.

Exemption.

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(2) If at any time after the date of enactment of this Act the President finds that application of the regulation under subsection (a) to crude oil, residual fuel oil, or a refined petroleum product is not necessary to carry out this Act, that there is no shortage of such oil or product, and that exempting such oil or product from such regulation will not have an adverse impact on the supply of any other oil or refined petroleum products subject to this Act, he may prescribe an amendment to the regulation under subsection (a) exempting such oil or product from such regulation for a period of not more than ninety days. The President shall submit any such amendment and any such findings to the Congress. An amendment under this paragraph may not exempt more than one oil or one product. Such an amendment shall take effect on a date specified in the amendment, but in no case sooner than the close of the earliest period which begins after the submission of such amendment to the Congress and which includes at least five days during which the House was in session and at least five days during which the Senate was in session; except that such amendment shall not take effect if before the expiration of such period either House of Congress approves a resolution of that House stating in substance that such House disapproves such amendment.

Regulation amendment.

Effective date.

ADMINISTRATION AND ENFORCEMENT

SEC. 5. (a)(1) Except as provided in paragraph (2), (A) sections 205 through 211 of the Economic Stabilization Act of 1970 (as in effect on the date of enactment of this Act) shall apply to the regulation promulgated under section 4(a), to any order under this Act, and to any action taken by the President (or his delegate) under this Act, as if such regulation had been promulgated, such order had been issued, or such action had been taken under the Economic Stabilization Act of 1970; and (B) section 212 (other than 212(b)) and 213 of such Act shall apply to functions under this Act to the same extent such sections apply to functions under the Economic Stabilization Act of 1970.

85 Stat. 747, 748.
12 USC 1904 note.

(2) The expiration of authority to issue and enforce orders and regulations under section 218 of such Act shall not affect any authority to amend and enforce the regulation or to issue and enforce any order under this Act, and shall not effect any authority under sections 212 and 213 insofar as such authority is made applicable to functions under this Act.

(b) The President may delegate all or any portion of the authority granted to him under this Act to such officers, departments, or agencies of the United States, or to any State (or officer thereof), as he deems appropriate.

EFFECT ON OTHER LAWS AND ACTIONS TAKEN THEREUNDER

SEC. 6. (a) All actions duly taken pursuant to clause (3) of the first sentence of section 203(a) of the Economic Stabilization Act of 1970 in effect immediately prior to the effective date of the regulation promulgated under section 4(a) of this Act, shall continue in effect until modified pursuant to this Act.

(b) The regulation under section 4 and any order issued thereunder shall preempt any provision of any program for the allocation of crude oil, residual fuel oil, or any refined petroleum product established by any State or local government if such provision is in conflict with such regulation or any such order.

Immunity restrictions.

(c)(1) Except as specifically provided in this subsection, no provisions of this Act shall be deemed to convey to any person subject to this Act immunity from civil or criminal liability, or to create defenses to actions, under the antitrust laws.

"Antitrust laws."

(2) As used in this subsection, the term "antitrust laws" includes—

26 Stat. 209; 69 Stat. 282.

(A) the Act entitled "An Act to protect trade and commerce against unlawful restraints and monopolies", approved July 2, 1890 (15 U.S.C. 1 et seq.);

38 Stat. 730; 49 Stat. 1526.

(B) the Act entitled "An Act to supplement existing laws against unlawful restraints and monopolies, and for other purposes", approved October 15, 1914 (15 U.S.C. 12 et seq.);

38 Stat. 717; 52 Stat. 111.

(C) the Federal Trade Commission Act (15 U.S.C. 41 et seq.);

28 Stat. 570.

(D) sections 73 and 74 of the Act entitled "An Act to reduce taxation, to provide revenue for the Government, and for other purposes", approved August 27, 1894 (15 U.S.C. 8 and 9); and

(E) the Act of June 19, 1936, chapter 592 (15 U.S.C. 13, 13a, 13b, and 21a).

Report to President.

(3) The regulation promulgated under section 4(a) of this Act shall be forwarded on or before the date of its promulgation to the Attorney General and to the Federal Trade Commission, who shall, at least seven days prior to the effective date of such regulation, report to the President with respect to whether such regulation would tend to create or maintain anticompetitive practices or situations inconsistent with the antitrust laws, and propose any alternative which would avoid or overcome such effects while achieving the purposes of this Act.

Meeting.

(4) Whenever it is necessary, in order to comply with the provisions of this Act or the regulation or any orders under section 4 thereof, for owners, directors, officers, agents, employees, or representatives of two or more persons engaged in the business of producing, refining, marketing, or distributing crude oil, residual fuel oil, or any refined petroleum product to meet, confer, or communicate in such a fashion and to such ends that might otherwise be construed to constitute a violation of the antitrust laws, such persons may do so only upon an order of the President (or of an officer or agency of the United States to whom the President has delegated authority under section 5(b) of this Act); which order shall specify and limit the subject matter and objectives of such meeting, conference, or communication. Moreover, such meeting, conference, or communication shall take place only in the presence of a representative of the Antitrust Division of the Department of Justice, and a verbatim transcript of such meeting, conference, or communication shall be taken and deposited, together with any agreement resulting therefrom, with the Attorney General and the Federal Trade Commission, where it shall be made available for public inspection.

Antitrust laws or breach of contract, defense.

(5) There shall be available as a defense to any action brought under the antitrust laws, or for breach of contract in any Federal or State court arising out of delay or failure to provide, sell, or offer for sale or exchange crude oil, residual fuel oil, or any refined petroleum product, that such delay or failure was caused solely by compliance with the provisions of this Act or with the regulation or any order under section 4 of this Act.

(6) There shall be available as a defense to any action brought under the antitrust laws arising from any meeting, conference, or communication or agreement resulting therefrom, held or made solely for the purpose of complying with the provisions of this Act or the regulation or any order under section 4 thereof, that such meeting, conference, communication, or agreement was carried out or made in accordance with the requirements of paragraph (4) of this subsection.

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MONITORING BY FEDERAL TRADE COMMISSION

SEC. 7. (a) During the forty-five day period beginning on the effective date on which the regulation under section 4 first takes effect, the Federal Trade Commission shall monitor the program established under such regulation; and, not later than sixty days after such effective date, shall report to the President and to the Congress respecting the effectiveness of this Act and actions taken pursuant thereto.

Report to President and Congress.

(b) For purposes of carrying out this section, the Federal Trade Commission's authority, under sections 6, 9, and 10 of the Federal Trade Commission Act to gather and compile information and to require furnishing of information, shall extend to any individual or partnership, and to any common carrier subject to the Acts to regulate commerce (as such Acts are defined in section 4 of the Federal Trade Commission Act).

38 Stat. 721; 84 Stat. 929; 62 Stat. 909. 15 USC 46, 49, 50.

Approved November 27, 1973.

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ENERGY CONSERVATION AND PRODUCTION ACT

"(2) no amounts authorized to be appropriated in such paragraph may be used to carry out the functions identified as assigned to the Office of Nuclear Affairs as of January 1, 1976.

"(c) No amounts authorized to be appropriated in paragraph (7) of subsection (a) may be used to carry out solar energy research, development, or demonstration activities.".

COLLECTION OF INFORMATION CONCERNING EXPORTS OF COAL OR PETROLEUM PRODUCTS

15 USC 784.

SEC. 111. Section 25 of the Federal Energy Administration Act of 1974 is amended by adding at the end thereof the following new subsection:

"(d) The Administrator shall not be required to collect independently information described in subsection (a) if he can secure the information described in subsection (a) from other Federal agencies and the information secured from such agencies is available to the Congress pursuant to a request under subsection (b).".

FEDERAL ENERGY ADMINISTRATION ACT EXTENSION

15 USC 761 note.

SEC. 112. (a) The second sentence of section 30 of the Federal Energy Administration Act of 1974 is amended to read as follows: "This Act shall terminate December 31, 1977.".

Effective date.

(b) The amendment made by subsection (a) to section 30 of the Federal Energy Administration Act of 1974 shall take effect on July 30, 1976.

PROJECT INDEPENDENCE EVALUATION SYSTEM DOCUMENTATION AND ACCESS

15 USC 761 note.

SEC. 113. The Federal Energy Administration Act of 1974 is amended by adding at the end thereof the following new section:

"PROJECT INDEPENDENCE EVALUATION SYSTEM DOCUMENTATION AND ACCESS

15 USC 787.

"SEC. 31. The Administrator of the Federal Energy Administration shall—

"(1) submit to the Congress, not later than September 1, 1976, full and complete structural and parametric documentation, and not later than January 1, 1977, operating documentation, of the Project Independence Evaluation System computer model;

"(2) provide access to such model to representatives of committees of the Congress in an expeditious manner; and

"(3) permit the use of such model on the computer system maintained by the Federal Energy Administration by any member of the public upon such reasonable terms and conditions as the Administrator shall, by rule, prescribe. Such rules shall provide that any member of the public who uses such model may be charged a fair and reasonable fee, as determined by the Administrator, for using such model.".

PART B—PRODUCTION ENHANCEMENT AND OTHER RELATED MATTERS

EXEMPTION OF STRIPPER WELL PRODUCTION

15 USC 757.

SEC. 121. Section 8 of the Emergency Petroleum Allocation Act of 1973 is amended by adding at the end thereof the following new subsection:

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"(i) (1) The first sale price of stripper well crude oil shall be exempt from the regulation promulgated under section 4 of this Act as amended pursuant to the requirements of this section. For the purpose of this section, the President shall include in the computation of the actual weighted average first sale price for crude oil produced in the United States in any month subsequent to August 1976 the actual volume of stripper well crude oil produced in the United States in such subsequent month and such actual volume shall be deemed to have been sold at a first sale price equal to $11.63 per barrel plus the difference between the actual weighted average first sale price in August 1976, for crude oil, other than stripper well crude oil, produced in the United States, and the actual average first sale price in such subsequent month of all classifications of crude oil, other than stripper well crude oil, produced in the United States, weighted as if each such classification were produced in such subsequent month in the same proportion as such classification, or the most nearly comparable classification which existed on August 1, 1976, was produced in August 1976. 15 USC 753.

"(2) For the purposes of this subsection, 'stripper well crude oil' means crude oil produced and sold from a property whose maximum average daily production of crude oil per well during any consecutive 12-month period beginning after December 31, 1972, does not exceed 10 barrels. "Stripper well crude oil."

"(3) To qualify for the exemption under this subsection, a property must be producing crude oil at the maximum feasible rate throughout the 12-month qualifying period and in accordance with recognized conservation practices. Qualification.

"(4) The President may define terms used in this subsection consistent with the purposes thereof.".

ENHANCEMENT OF DOMESTIC PRODUCTION

SEC. 122. Section 8 of the Emergency Petroleum Allocation Act of 1973 (as amended by section 121 of this Act) is further amended— 15 USC 757.

(1) in subsection (d) (1), by striking out "any adjustment as a production incentive shall not permit an increase in the maximum weighted average first sale price in excess of 3 per centum per annum (compounded annually), unless modified pursuant to this section, and";

(2) in subsection (d) (3) (C), by striking out ", including production from stripper wells";

(3) in subsection (e) (1), by striking out "(A) a production incentive adjustment to the maximum weighted average first sale price in excess of the 3 per centum limitation specified in subsection (d) (1), (B)", and by striking out "such subsection, or (C) both.", and inserting in lieu thereof "subsection (d) (1).";

(4) in subsection (e) (2), by striking out "an additional adjustment as a production incentive, or", and by striking out ", or both,";

(5) in subsection (f) (1), by adding before the period at the end thereof the following: "and an analysis of the effects on price and the production of domestic crude oil resulting from the amendments made to this section by sections 121 and 122 of the Energy Conservation and Production Act";

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(6) in subsection (f)(2), by striking out "The President may" and inserting in lieu thereof "On March 15, 1977, the President may";

(7) in subsection (f)(2)(A), by striking out "or modification", and by striking out "as may have been amended pursuant to subsection (e)";

(8) in subsection (f)(5), by striking out "or modify", and by striking out "or of a modification of such adjustment"; and

(9) by adding at the end thereof the following new subsection:

"(j)(1) As soon as practicable after the date of enactment of this subsection, taking into consideration the greater flexibility provided by the amendments relating to the production incentive adjustment under section 122 of the Energy Conservation and Production Act, the President shall promulgate such amendments to the regulation under section 4(a) (relating to price) as shall (A) provide additional price incentives for bona fide tertiary enhanced recovery techniques and (B) provide for the adjustment of differentials in ceiling prices for crude oil that are the result of gravity differentials which are arbitrary, discriminatory, applied on a regional or local basis without reasonable justification, or fail substantially to reflect current relative market valuations of such differentials.

15 USC 753.

"Tertiary enhanced recovery techniques."

"(2) As used in this subsection, the term 'tertiary enhanced recovery techniques' means extraordinary and high cost enhancement technologies of a type associated with tertiary applications including, to the extent that such techniques would be uneconomical without additional price incentives, miscible fluid or gas injection, chemical flooding, steam flooding, microemulsion flooding, in situ combustion, cyclic steam injection, polymer flooding, and caustic flooding and variations of the same. The President shall have authority to further define the term by rule.".

Rule.

CONSTRUCTION OF REFINERIES BY SMALL AND INDEPENDENT REFINERS

15 USC 753 note.

SEC. 123. (a) It is the intent of the Congress that, for the purpose of fostering construction of new refineries by small and independent refiners in the United States, the Administrator of the Federal Energy Administration shall take such action, within his authority under other law consistent with the attainment, to the maximum extent practicable, of the objectives under section 4(b)(1)(D) of the Emergency Petroleum Allocation Act of 1973, as the Administrator determines necessary to insure that rules, regulations, or orders issued by him do not impose unreasonably, unnecessary, or discriminatory barriers to entry for small refiners and independent refiners.

15 USC 753.

Report to Congress.

(b) Not later than April 1, 1977, the Administrator shall report to the Congress with respect to actions taken to carry out the policies in subsection (a).

"Small refiner" and "independent refiner."

(c) For the purposes of this section the terms "small refiner" and "independent refiner" have the same meaning as such terms have under the Emergency Petroleum Allocation Act of 1973.

EFFECTIVE DATE OF EPAA AMENDMENTS

15 USC 757 note.

SEC. 124. The amendments made to section 8 of the Emergency Petroleum Allocation Act by section 122 of this Act shall take effect on the date of enactment of this Act. The amendments made to section 8 of such Act by section 121 of this Act shall take effect on the first day of the first full month which begins after the date of enactment of this Act.

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ENERGY POLICY AND CONSERVATION ACT

TITLE IV—PETROLEUM PRICING POLICY AND OTHER AMENDMENTS TO THE ALLOCATION ACT

PART A—PRICING POLICY

OIL PRICING POLICY

SEC. 401. (a) The Emergency Petroleum Allocation Act of 1973 is amended by adding at the end thereof the following new sections: 15 USC 751 note.

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"OIL PRICING POLICY

15 USC 757.

"SEC. 8. (a) Not later than the first day of the second full calendar month following the date of enactment of this section, the President shall promulgate and make effective an amendment to the regulation under section 4(a) of this Act which regulation, as amended, shall establish ceiling prices (or the manner of determining ceiling prices) applicable to any first sale of crude oil produced in the United States, such that the resulting actual weighted average first sale price for all such crude oil during such calendar month and each of the 39 months thereafter shall not exceed a maximum of $7.66 per barrel (hereinafter in this section referred to as the "maximum weighted average first sale price"), except as may be adjusted pursuant to this section.

15 USC 753.

"(b)(1) The regulation under section 4(a), as amended pursuant to subsection (a) of this section or by any subsequent amendment thereto, may, subject to the limitations related to the maximum weighted average first sale price and other requirements of this section, provide for different ceiling prices (or manner of determining ceiling prices) for different classifications of crude oil produced in the United States. In providing for different ceiling prices (or the manner for determining such ceiling prices) and classifications for such crude oil, the President shall determine that such ceiling prices (or the manner for determining such ceiling prices) and such classifications—

"(A) are administratively feasible; and

"(B) are justified on the basis that such prices and such classifications are consistent with obtaining optimum production of crude oil in the United States.

"(2) No amendment to the regulation under section 4(a) made after the date of enactment of this section may permit, in any month which begins after such date, an increase in the price for any volume of old crude oil production from any priorities, unless the President finds that such amendment—

"(A) will give positive incentives for (i) enhanced recovery techniques, or (ii) deep horizon development, from such properties; or

"(B) is necessary to take into account declining production from such properties; and

"(C) is likely to result in a level of production from such properties beyond that which would otherwise occur if no such amendment were made.

"Old crude oil production."

"(3) As used in paragraph (2), the term 'old crude oil production' means that volume of crude oil produced and sold from a property in a month which is equal to or less than the volume of old crude oil, as defined in section 212.72 of title 10, Code of Federal Regulations (as in effect on November 1, 1975), produced and sold from such property in the months of September, October, and November of 1975, divided by 3.

"(c)(1) Not later than 6 months after the effective date of the amendment promulgated under subsection (a), and not later than every 6 months thereafter, the President shall, on the basis of valid and reliable information (which may include information obtained by a valid and reliable sampling technique) of actual first sale prices of domestic crude oil, determine whether and the extent to which the actual weighted average first sale price for crude oil produced in the United States during any 6-month period or portion thereof for which data are available following the effective date of the amendment promulgated under subsection (a) of this section, exceeded or was less than the maximum weighted average first sale price of such

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crude oil specified in subsection (a) as may be adjusted pursuant to this section.

"(2) If the President finds, pursuant to paragraph (1) of this subsection, that the regulation under section 4(a), as amended, resulted in an actual weighted average first sale price in excess of the maximum weighted average first sale price specified in subsection (a) as adjusted pursuant to this section, he shall amend the regulation to make such compensating adjustments as are necessary to result, in a corresponding period, in an actual weighted average first sale price for domestic crude oil sufficient to offset such excess.

Amendment. 15 USC 753.

"(3) If the President finds, pursuant to paragraph (1) of this subsection, that the regulation under section 4(a), as amended, resulted in an actual weighted average first sale price less than the maximum weighted average first sale price specified in subsection (a) as adjusted pursuant to this section, he may, notwithstanding the requirements of this section pertaining to such maximum weighted average first sale price, amend the regulation to make such compensating adjustments in the regulation as are necessary to offset the deficiency in a corresponding period.

"(d)(1) The amendment promulgated pursuant to subsection (a) of this section (or any subsequent amendment to the regulation under section 4(a)) may provide for an adjustment to the maximum weighted average first sale price specified in subsection (a), such adjustment to begin no earlier than in the calendar month following the first month the amendment is in effect—

"(A) to take into account the impact of inflation as measured by the adjusted GNP deflator; and

"(B) as a production incentive;

except that any adjustment as a production incentive shall not permit an increase in the maximum weighted average first sale price in excess of 3 per centum per annum (compounded annually), unless modified pursuant to this section, and the combined effect of any such adjustments referred to in subparagraphs (A) and (B) shall not result in an increase in the maximum weighted average first sale price in excess of 10 per centum per annum (compounded annually), unless modified pursuant to this section.

"(2) As used in this subsection, the term 'adjusted GNP deflator' means the first revision of the quarterly percent change, seasonally adjusted at annual rates, of the most recent implicit price deflator for the gross national product which shall be computed and published for each calendar quarter by the Department of Commerce, subject to such additional modification as the President shall make to exclude therefrom any amount which he determines is attributable solely and directly to increases which occur after the date of enactment of this section in prices of imported crude oil, residual fuel oil, or any refined petroleum product resulting from concerted action of two or more petroleum exporting countries.

"Adjusted GNP deflator."

"(3) The adjustment as a production incentive referred to in paragraph (1)(B) may be made only on a finding by the President that such an adjustment is likely to provide positive incentive for—

"(A) the discovery or development of high cost and high risk properties (including new wildcat properties, and properties located on the Outer Continental Shelf, properties located north of the Arctic Circle, deep wells and deep horizons in onshore or offshore properties, and properties operated by independent producers);

"(B) the application of enhanced recovery techniques to producing properties to obtain a level of production higher than

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would otherwise occur from those properties but for such adjustment; or

"(C) sustaining production from marginal wells, including production from stripper wells.

Amendment, submittal to Congress.

"(e)(1) Not earlier than 90 days after the effective date of the amendment promulgated under subsection (a) and not earlier than 90 days after the date of any previous submission under this subsection, the President may submit to the Congress, in accordance with the procedures specified in section 551 of the Energy Policy and Conservation Act, an amendment to the regulation promulgated under section 4(a) which provides for (A) a production incentive adjustment to the maximum weighted average first sale price in excess of the 3 per centum limitation specified in subsection (d)(1), (B) a combined adjustment limitation in excess of the 10 per centum limitation specified in such subsection, or (C) both.

Post, p. 965.
15 USC 753.

"(2) Any such amendment shall be accompanied by a finding that an additional adjustment as a production incentive, or a combined adjustment limitation greater than permitted by subsection (d)(1), or both, is necessary to provide a more adequate incentive with respect to the matters referred to in subparagraphs (A), (B), or (C) of subsection (d)(3).

"(3) Any such amendment shall not take effect if either House of Congress disapproves such amendment in accordance with the procedures specified in section 551 of the Energy Policy and Conservation Act.

Report to Congress.

"(f)(1) On February 15, 1977, the President shall submit to the Congress a report containing an analysis of the impact of any amendment adopted pursuant to this section on the economy and on the supply of crude oil, residual fuel oil, and refined petroleum products.

"(2) The President may submit with such report to the Congress, in accordance with the procedures specified in section 551 of the Energy Policy and Conservation Act, an amendment to the regulation promulgated under section 4(a) which—

"(A) provides for the continuation or modification of the adjustment as a production incentive (referred to in subsection (d) as may have been amended pursuant to subsection (e));

"(B) provides for a modification of the combined adjustment limitation (referred to in subsection (d), as may have been amended pursuant to subsection (e)); or

"(C) provides for adjustments with respect to both subparagraphs (A) and (B).

"(3) Such amendment shall not take effect if either House of Congress disapproves such amendment in accordance with the procedures specified in section 551 of the Energy Policy and Conservation Act.

"(4) If any such amendment is disapproved by either House of Congress, the President may, not later than 30 days after the date of such disapproval, submit one additional amendment in accordance with paragraph (2), which amendment shall not take effect if either House of Congress disapproves such amendment in accordance with the procedures specified in section 551 of the Energy Policy and Conservation Act.

"(5) If no amendment to continue or modify the adjustment as a production incentive takes effect, no such adjustment to the maximum weighted average first sale price thereafter may be taken into account in computing such price for any month which begins after (A) the date on which a submission could have been made under paragraph (2) but was not, or (B) the last date on which a submission was disapproved and no further submission pursuant to paragraph (4)

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could be made, except that the President may, pursuant to the procedures under subsection (e), submit an amendment to the regulation to provide for a prospective reinstatement of such adjustment or of a modification of such adjustment.

"(g)(1) On April 15, 1977, the President shall submit to the Congress a report as to whether the regulation promulgated under section 4(a) and in effect on such date will provide positive price incentives for the development of the domestic crude oil production referred to in paragraph (2)(A) without lessening needed incentives for sustaining or enhancing crude oil production in the remainder of the United States.

Report to Congress.

"(2) If the President determines that a price required to provide positive price incentives for the development of the domestic crude oil production referred to in paragraph (2)(A) would, because of the maximum weighted average first sale price specified in subsection (a) of this section, as adjusted, have the effect of reducing or limiting ceiling prices permitted for crude oil produced in the remainder of the United States to levels which would result in less production of such crude oil than would otherwise occur, the President may, together with such report, or at any time thereafter not earlier than 90 days after any previous submission under this subsection, except as provided in paragraph (4), submit to the Congress in accordance with the procedures specified in section 551 of the Energy Policy and Conservation Act an amendment to the regulation promulgated under section 4(a) which—

Amendment, submittal to Congress.

Post, p. 965.

"(A) excludes up to 2 million barrels a day of crude oil production transported through the trans-Alaska pipeline from the computation of the maximum weighted average first sale price specified in subsection (a); and

"(B) establishes ceiling prices (or a manner of determining prices) for the first sale of crude oil production referred to in subparagraph (A) such that the actual weighted average first sale price for such production will not exceed the highest actual weighted average first sale price permitted under the regulation for significant volumes of any other classification of domestic crude oil.

"(3) Any such amendment shall be accompanied by such findings and supporting rationale as the President determines justify such ceiling prices (or manner for determining such prices). Any amendment submitted to the Congress pursuant to this subsection shall not take effect if either House of Congress disapproves such amendment in accordance with the procedures specified in section 551 of the Energy Policy and Conservation Act.

"(4) If any such amendment is disapproved by either House of Congress, the President may not later than 30 days after the date of such disapproval submit one additional amendment in accordance with paragraphs (2) and (3), which amendment shall not take effect if either House of Congress disapproves such amendment in accordance with the procedures specified in section 551 of the Energy Policy and Conservation Act.

"(5) If any amendment submitted by the President to the Congress pursuant to this subsection becomes effective, such amendment may thereafter be further amended by the President, subject to the procedures and requirements of paragraphs (2) and (3) of this subsection, except that no such further amendment shall be submitted earlier than January 1, 1978, and thereafter no earlier than 90 days after the date of any previous submission made under this paragraph.

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"(h) In any judicial review of an amendment required by this section to be submitted to the Congress in accordance with the procedures specified in section 551 of the Energy Policy and Conservation Act, the reviewing court may not hold unlawful or set aside any such amendment on the ground that any findings made by the President were not adequate to meet the requirements of this section or of subparagraph (A), (E), or (F) of section 706(2) of title 5, United States Code.

Post, p. 965.

"PASSTHROUGHS OF PRICE DECREASES

15 USC 758.

"SEC. 9. Not later than the first day of the second full calendar month following the date of enactment of this section, the regulation under section 4(a) shall provide for a dollar-for-dollar passthrough in prices at all levels of distribution from the producer through the retail level of decreases in the costs of crude oil, residual fuel oil, and refined petroleum products (including decreases in costs which result from a reduction in the price of crude oil produced in the United States because of the amendment to such regulation required under section 8(a)).".

Ante, p. 942.

Repeal.
15 USC 753.

(b)(1) Subsections (d), (e) and (g) of section 4 of the Emergency Petroleum Allocation Act of 1973 are repealed, and subsection (f) of such section 4 is redesignated as subsection "(d)" of such section 4.

(2) Section 4(a) of such Act is amended by (A) striking out "Subject to subsection (f)" and inserting in lieu thereof "Subject to subsection (d)"; and (B) striking out "Except as provided in subsection (e) such" and inserting in lieu thereof "Such".

(3) Section 4(c) of such Act is amended in paragraphs (1), (4), and (5) thereof by striking out "subsections (b) and (d)" wherever it appears and by inserting in lieu thereof in each case "subsection (b)".

Repeal.
12 USC 1904 note.

(4) Section 406 of Public Law 93-153 is repealed.

Effective date.
15 USC 753 note.

(5) The amendments made by paragraphs (1), (2), (3), and (4) of this subsection, to the Emergency Petroleum Allocation Act of 1973, shall take effect on the effective date of the amendment to the regulation under section 4(a), required by section 8(a) of such Act.

LIMITATIONS ON PRICING POLICY

15 USC 753.

SEC. 402. (a) Paragraph (2) of section 4(b) of the Emergency Petroleum Allocation Act of 1973 is amended to read as follows:

"(2) In specifying prices (or prescribing the manner for determining them), the regulation under subsection (a)—

"(A) shall provide for a dollar-for-dollar passthrough of net increases in the cost of crude oil, residual fuel oil, and refined petroleum products at all levels of distribution from the producer through the retail level;

"(B)(i) shall not permit any net crude oil cost increases—

"(I) which are incurred by a refiner during the calendar month immediately preceding the effective date of this paragraph, or in any month thereafter, and

"(II) which are not passed through in prices charged pursuant to such regulation in the 2 calendar months following the calendar month in which such crude oil cost increases were incurred,

to be passed through by such refiner in any month subsequent to the 2 calendar months following the calendar month in which such crude oil cost increases were incurred, unless the President makes the findings specified in clause (ii)(II)(aa), and such passthrough

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is consistent with the requirements specified in clause (ii)(II)(bb).

"(ii) shall not permit the passthrough in any month of—

"(I) any net crude oil cost increases incurred by a refiner not later than the last day of the calendar month which begins two months prior to the effective date of this paragraph and not passed through by the end of the last calendar month prior to the effective date of this paragraph unless such passthrough is not in excess of 10 percent of the total amount of such increased crude oil costs not passed through as of the last day of the last calendar month prior to the effective date of the amendment promulgated under section 8(a); and

Ante, p. 942.

"(II) any net crude oil cost increases incurred by a refiner after the effective date of this paragraph, which net crude oil cost increases were not passed through within the 2 calendar months following the calendar month in which such crude oil cost increases were incurred, unless—

"(aa) the President finds, and reports to the Congress with respect to such finding, that a passthrough of such crude oil cost increases is necessary to alleviate the impact on refiners, marketers, or consumers of significant increases in costs, to provide for equitable cost recovery consistent with the attainment, to the maximum extent practicable, of the objectives specified in paragraph (1), or to avoid competitive disadvantage; and

"(bb) such passthrough in any month of such crude oil cost increases is not in excess of 10 percent of the total amount of such crude oil cost increases as of the end of the calendar month in which the effective date of this paragraph occurs or any month thereafter;

"(C) shall provide for the use of the same date in the computation of markup, margin, and posted price for all marketers or distributors of crude oil, residual fuel, and refined petroleum products at all levels of marketing and distribution; and

"(D) shall not permit more than a direct proportionate distribution (by volume) to Number 2 oils (Number 2 heating oil and Number 2-D diesel fuel), aviation fuel of a kerosene or naphtha type, and propane produced from crude oil, of any increased costs of crude oil incurred by a refiner; except that the President may, by amendment to the regulation under subsection (a) or by order, permit deviation from such proportionate distribution of costs, if the President finds that refinery operations justify such deviation and further finds that to permit such deviation is consistent with the attainment of the objectives in paragraph (1) and would not result in inequitable prices for any class of users of such product.

As used in this paragraph, the term 'effective date of this paragraph' means the effective date specified in section 402(b) of the Energy Policy and Conservation Act.".

Infra.

(b) The amendment made by this section, to the Emergency Petroleum Allocation Act of 1973, shall take effect on the effective date of the amendment to the regulation under section 4(a), required by section 8(a) of such Act.

Effective date.
15 USC 753 note.

(c) The Emergency Petroleum Allocation Act of 1973, as amended by this Act, is further amended by adding at the end thereof the following new section:

15 USC 751 note.

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"LIMITATIONS ON PRICING AUTHORITY

15 USC 759. "SEC. 10. The President shall have no authority, under this Act, or under the Energy Policy and Conservation Act, to prescribe minimum prices for crude oil (or any classification thereof), residual fuel oil, or any refined petroleum product.".

ENTITLEMENTS

15 USC 753. SEC. 403. (a) Section 4 of the Emergency Petroleum Allocation Act of 1973, as amended by this Act, is further amended by adding at the end thereof the following:

"(e) Any provision of the regulation under subsection (a) of this section—

"(1) which requires the purchase of entitlements, or the payment of money through any other similar cash transfer arrangement, the purpose of which is to reduce disparities in the crude oil acquisition costs of domestic refiners, and

"(2) which is based upon the number of barrels of crude oil input, or receipts, or both, of any refiner,

shall not apply to the first 50,000 barrels per day of input, or receipts, or both, of any refiner whose total refining capacity (including the refining capacity of any person who controls, is controlled by, or is under common control with such refiner) did not exceed on January 1, 1975, and does not thereafter exceed 100,000 barrels per day. The preceding sentence shall not affect any provisions of the regulation under subsection (a) of this section with respect to the receipt by any small refiner as defined in section 3(4) of payments for entitlements or any other similar cash transfer arrangement.".

15 USC 752.

Effective date. 15 USC 753 note. (b) Subsection (a) of this section shall apply with respect to payments due on or after the last day of the month during which the date of enactment of this Act occurs.

PART B—OTHER AMENDMENTS TO THE ALLOCATION ACT

AMENDMENTS TO THE OBJECTIVES OF THE ALLOCATION ACT

SEC. 451. (a) Section 4(b)(1)(A) of the Emergency Petroleum Allocation Act of 1973 is amended to read as follows:

"(A) protection of public health (including the production of pharmaceuticals), safety and welfare (including maintenance of residential heating, such as individual homes, apartments and similar occupied dwelling units), and the national defense;".

(b) Section 4(b)(1)(G) of the Emergency Petroleum Allocation Act of 1973 is amended to read as follows:

"(G) allocation of residual fuel oil and refined petroleum products in such amounts and in such manner as may be necessary for the maintenance of, exploration for, and production or extraction of—

"(i) fuels, and

"(ii) minerals essential to the requirements of the United States,

and for required transportation related thereto;".

PENALTIES UNDER THE ALLOCATION ACT

15 USC 754. SEC. 452. Section 5 of the Emergency Petroleum Allocation Act of 1973 is amended:

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(1) by striking out "sections 205 through 211" in subsection (a)(1) of such section and inserting in lieu thereof "sections 205 through 207 and sections 209 through 211"; and

(2) by adding at the end of subsection (a) of such section the following:

Penalties.

"(3)(A) Whoever violates any provision of the regulation under section 4(a) of this Act, or any order under this Act shall be subject to a civil penalty—

"(i) with respect to activities relating to the production, distribution, or refining of crude oil, of not more than $20,000 for each violation;

"(ii) with respect to activities relating to the distribution of residual fuel oil or any refined petroleum product (other than activities entirely at the retail level), of not more than $10,000 for each violation; and

"(iii) with respect to activities—

(I) entirely relating to the distribution of residual fuel oil or any refined petroleum product at the retail level, or

(II) activities not referred to in clause (i) or (ii) of subclause (I) of this clause, of not more than $2,500 for each violation.

"(B) Whoever willfully violates any provision of such regulation, or any such order shall be imprisoned not more than 1 year, or—

"(i) with respect to activities relating to the production or refining of crude oil, shall be fined not more than $40,000 for each violation;

"(ii) with respect to activities relating to the distribution of residual fuel oil or any refined petroleum product (other than at the retail level), shall be fined not more than $20,000 for each violation;

"(iii) with respect to activities relating to the distribution of residual fuel oil or any refined petroleum product at the retail level or any other person shall be fined not more than $10,000 for each violation;

or both.

"(4) Any individual director, officer, or agent of a corporation who knowingly and willfully authorizes, orders, or performs any of the acts or practices constituting in whole or in part a violation of paragraph (3), shall be subject to penalties under this subsection without regard to any penalties to which that corporation may be subject under paragraph (3) except that no such individual director, officer, or agent shall be subject to imprisonment under paragraph (3), unless he also has knowledge, or reasonably should have known, of notice of noncompliance received by the corporation from the President.".

ANTITRUST PROVISION IN ALLOCATION ACT

SEC. 453. Section 6(c) of the Emergency Petroleum Allocation Act of 1973 is amended to read as follows:

Defense.
15 USC 755.

"(c) There shall be available as a defense to any action brought for breach of contract in any Federal or State court arising out of delay or failure to provide, sell, or offer for sale or exchange crude oil, residual fuel oil, or any refined petroleum product, that such delay or failure was caused solely by compliance with the provisions of this Act or with the regulation or any order under this Act.".

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EVALUATION OF REGULATION UNDER THE ALLOCATION ACT

15 USC 751 note.

SEC. 454. The Emergency Petroleum Allocation Act of 1973, as amended by this Act, is further amended by adding at the end thereof the following new section:

"REEVALUATION OF SECTION 4(a) REGULATION

Notice.
15 USC 760.

"SEC. 11. (a) Not later than 60 days after the date of enactment of this section, the President shall give appropriate notice and afford interested persons an opportunity to present written and oral data, views, and arguments respecting the appropriateness of, or the continuing need for, the application of any provision of the regulation promulgated under section 4(a) as such provision relates to the attainment of the objectives specified in section 4(b)(1) of section 4. A transcript shall be kept of any such oral presentations of data, views, and argument.

15 USC 753.
Transcript.

"(b) The President shall, after consideration of such written and oral presentations and such other information as may be available to him—

Report to Congress.

"(1) analyze such presentations and report thereon to the Congress within 120 days after the date of enactment of this section; and

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"(2) shall promulgate, pursuant to the limitations and authority under section 12, such amendment, or amendments, to the regulation promulgated under section 4(a) as he determines are necessary or appropriate—

"(A) to modify any provisions of such regulation in a manner which is consistent with the attainment, to the maximum extent practicable, of objectives specified in section 4(b)(1); or

"(B) to eliminate any provisions of such regulation no longer necessary to provide for the attainment of such objectives.".

CONVERSION TO STANDBY AUTHORITIES

SEC. 455. The Emergency Petroleum Allocation Act of 1973, as amended by this Act, is further amended by adding at the end thereof the following new section:

"CONVERSION MECHANISM TO STANDBY AUTHORITIES

15 USC 760a.

"SEC. 12. (a) The President may not amend the regulation under section 4(a) in any manner which—

"(1) exempts crude oil produced in the United States from any provision of such regulation required to be made a part of such regulation by section 8; or

Ante, p. 942.

"(2) results in making such regulation, as so amended, inconsistent with any limitation or other requirement specified in section 8.

"(b) Except as provided in subsection (a), the President may amend the regulation under section 4(a) if he determines that such amendment is consistent with the attainment, to the maximum extent practicable, of the objectives specified in section 4(b)(1) and that the regulation, as amended, provides for the attainment, to the maximum extent practicable, of such objectives.

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"(c)(1) Any such amendment which, with respect to a class of persons or class of transactions (including transactions with respect to any market level), exempts crude oil, residual fuel oil, or any refined petroleum product or refined product category from the provisions of the regulation under section 4(a) as such provisions pertain to either (A) the allocation of amounts of any such oil or product, or (B) the specification of price or the manner for determining the price of any such oil or product, or both of the matters described in subparagraphs (A) and (B), may take effect only pursuant to the provisions of this subsection. 15 USC 753.

"(2) The President shall submit any amendment referred to in paragraph (1) to the Congress in accordance with the procedures specified in section 551 of the Energy Policy and Conservation Act. Any such amendment shall be accompanied by a specific statement of the President's rationale for such amendment and the matter described in subsection (d) of this section. Such an amendment— Amendment, submittal to Congress. *Post*, p. 965.

"(A) may apply only to one oil or one refined product category;

"(B) may apply to the matters specified in either subparagraph (A) or (B) of paragraph (1) of this subsection, or both; and

"(C) may provide for scheduled or phased implementation.

"(3) As used in this section the term 'refined product category' means— "Refined product category."

"(A) motor gasoline;

"(B) Number 2 oils (Number 2 heating oil and Number 2-D diesel fuel);

"(C) propane; or

"(D) all or any portion of other refined petroleum products as a class (including natural gas liquids and natural gas liquid products, other than propane).

"(4) Such an amendment shall not take effect if either House of Congress disapproves such amendment in accordance with the procedures specified in section 551 of the Energy Policy and Conservation Act.

"(d)(1) The President shall support any amendment described in subsection (b) which is transmitted to the Congress under subsection (c) of this section with a finding that such amendment is consistent with the attainment of the objectives specified in subsection 4(b)(1) and in the case of—

"(A) any exemption described in subsection (c)(1)(A), with a finding that such oil or refined product category is no longer in short supply and that exempting such oil or refined product category will not have an adverse impact on the supply of any other oil or refined petroleum product subject to this Act; and

"(B) any exemption described in subsection (c)(1)(B), with a finding that competition and market forces are adequate to protect consumers and that exempting such oil or refined product category will not result in inequitable prices for any class of users of such oil or product.

"(2) Any amendment which the President submits to the Congress under subsection (c) of this section shall be accompanied— Statement.

"(A) by a statement of the President's views as to the potential economic impacts (if any) of such amendment which, where practicable, shall include his views as to—

"(i) the State and regional impacts of such amendment (including effects on governmental units);

"(ii) the effects of such amendment on the availability of consumer goods and services; the gross national product; competition; small business; and the supply and availability

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of energy resources for use as fuel or as feedstock for industry; and

"(iii) the effects on employment and consumer prices; and

"(B) in the case of an exemption described in subsection (c)(1)(B) of this section, by an analysis of the effects of such amendment on the rate of unemployment for the United States, the Consumer Price Index for the United States, and the implicit price deflator for the gross national product.

Review.

"(e) In any judicial review of an amendment required by this section to be submitted to Congress in accordance with the procedures specified in section 551 of the Energy Policy and Conservation Act, the reviewing court may not hold unlawful or set aside any such amendment on the ground that any findings made by the President were not adequate to meet the requirements of subsection (c), (d), or (g) of this section or subparagraph (A), (E), or (F), of section 706(2) of title 5, United States Code.

Post, p. 965.

"(f) With respect to any oil or refined product category which is exempted pursuant to the provisions of this section, the President shall have authority at any time thereafter to prescribe a regulation or issue an order respecting either the allocation of amounts, or the specification of price or the manner for determining the price, of any such oil or refined product category upon a determination by him that such regulation or order is necessary to attain, and is consistent with, the objectives specified in section 4(b)(1). Any such oil or refined product category for which allocation or price requirements are reimposed under authority of this subsection may subsequently be exempted without regard to the provisions of subsection (c) of this section.

15 USC 753.

"(g) Notwithstanding the provisions of subsection (e) of section 4, the President may, if he determines that the exemption from payments for certain small refiners required by such subsection—

Ante, p. 948.

"(1) results in unfair economic or competitive advantage with respect to other small refiners; or

"(2) otherwise has the effect of seriously impairing the President's ability to provide in the regulation under section 4(a) for the attainment of the objective specified in section 4(b)(1)(D) and for the attainment of those other objectives specified in section 4(b)(1);

submit, in accordance with the procedures specified in section 551 of the Energy Policy and Conservation Act, an amendment to modify the regulation under section 4(a) with respect to the provisions of such regulation as they relate to such exemption. Such amendment shall not take effect if disapproved by either House of Congress under the procedures specified in such section 551.".

TECHNICAL PURCHASE AUTHORITY

15 USC 751 note.

SEC. 456. The Emergency Petroleum Allocation Act of 1973, as amended by this Act, is further amended by adding at the end thereof the following new section:

"TECHNICAL PURCHASE AUTHORITY

15 USC 760b.

"SEC. 13. (a) The President may, by amendment to the regulation under section 4(a) of this Act, provide for and implement a procedure pursuant to which the United States may exercise the exclusive right to import and purchase all or any part of the crude oil, residual fuel

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oil, and refined petroleum products of foreign origin for resale in the United States.

"(b) The authorities granted under this section shall not be used for the purpose, or with the effect, of providing a subsidy or preference to any importer, purchaser, or user.

"(c) In exercising any authorities granted under this section, the President shall endeavor to buy and sell without profit or loss, except that the President may, in individual cases, sell, on a competitive bid basis, crude oil, residual fuel oil, or any refined petroleum product at a price above or below the cost of such oil or product if, in the judgment of the President, such sales may result in progress toward a lower price for oil sold in international commerce.

"(d) Any amendment to the regulation proposed to be implemented under this section shall be submitted to Congress for review under section 551 of the Energy Policy and Conservation Act, together with a detailed explanation of the procedure to be employed and the need therefor and shall be supported by findings by the President that the exercise of such authority is likely to reduce prices for imported oils and products. Such amendment shall not take effect if disapproved by either House of the Congress in accordance with the procedures specified in section 551 of such Act and any authority to purchase shall be subject to appropriations Acts.

Amendment, submittal to Congress.

Post, p. 965.

"(e) The President shall submit, within 90 days after the date of enactment of this section, a report which evaluates the feasibility of reducing the price of crude oil, residual fuel oil, or refined petroleum products of foreign origin for resale in the United States by providing incentives for domestic producers who also import such oils or products into the United States, to work for the reduction of the price of such oils or products. The report shall specifically discuss whether increasing aggregate old crude oil prices by an amount related to any decrease in aggregate prices for such imported oils and products would serve as an incentive for domestic producers to reduce the price of such imported oils and products.".

Price reduction, feasibility report.

DIRECT CONTROLS ON REFINERY OPERATIONS

SEC. 457. The Emergency Petroleum Allocation Act of 1973, as amended by this Act, is further amended by adding at the end thereof the following new section:

15 USC 751 note.

"DIRECT CONTROLS ON REFINERY OPERATIONS

"SEC. 14. The President may, by amendment to the regulation under section 4(a) of this Act or by order, as may be consistent with the attainment, to the maximum extent practicable, of the objectives specified in section 4(b)(1) of this Act, require adjustments in the operations of any refinery in the United States with respect to the proportions of residual fuel oil or any refined petroleum product produced through such operations if he determines such adjustments are necessary to assure the production of residual fuel oil or any refined petroleum product in such proportions as are necessary or appropriate to provide for the attainment, to the maximum extent practicable, the objectives specified in section 4(b)(1).".

15 USC 760c.
15 USC 753.

Ante, p. 948.

INVENTORY CONTROLS

SEC. 458. The Emergency Petroleum Allocation Act of 1973, as amended by this Act, is further amended by adding at the end thereof the following new section:

"INVENTORY CONTROLS

15 USC 760d.

"SEC. 15. (a) In addition to other authority provided for in this Act to alleviate shortages of crude oil, residual fuel oil, and refined petroleum products, the President may, if he finds an existing or impending regional or national supply shortage of any fuel, by amendment to the regulation under section 4(a) of this Act or by order, consistent with the attainment, to the maximum extent practicable, of the objectives specified in section 4(b)(1), require adjustments in the amounts of crude oil, residual fuel oil or any refined petroleum product which are held in inventory by persons who are engaged in the business of importing, producing, refining, marketing, or distributing such oils or products.

15 USC 753.

"(b) The authority specified in subsection (a) may be exercised to require either—

"(1) a distribution from such inventories to specified persons or classes of persons at specified rates of distribution or to specified levels of inventory accumulation; or

"(2) the accumulation of inventories at specified rates of accumulation or to specified levels,

as the President determines may be necessary or appropriate to provide for the attainment, to the maximum extent practicable, of the objectives of section 4(b)(1) or as the President determines may be necessary or appropriate to carry out the obligations of the United States under the international energy program, as defined in section 3 of the Energy Policy and Conservation Act.

Ante, p. 874.

"(c) The authority specified in subsection (a) may require the maintenance of inventories at levels greater or lesser than such person's normal business or operating requirements; except that such amounts shall not exceed the amount of oil or product, as the case may be, such person would use or distribute during any 90-day period of peak usage and in no case may the requirement to accumulate inventories be applied to any person in a manner which would necessitate such person making physical additions to storage facilities in order to comply with any such rule or order.".

HOARDING PROHIBITIONS

15 USC 751 note.

SEC. 459. The Emergency Petroleum Allocation Act of 1973, as amended by this Act, is further amended by adding at the end thereof the following new section:

"HOARDING PROHIBITIONS

15 USC 760e.

"SEC. 16. Except as may be otherwise provided with respect to persons engaged in the business of producing, refining, distributing, or marketing crude oil, residual fuel oil, or any refined petroleum product pursuant to section 15 or pursuant to requirements under section 156 of the Energy Policy and Conservation Act (relating to the Industrial Strategic Petroleum Reserve), the regulation under section 4(a) shall prohibit any person, during a severe energy supply interruption (as defined in section 3 of the Energy Policy and Conservation Act) from willfully accumulating crude oil, residual fuel oil, or any refined petroleum product in inventories, or otherwise, in amounts which are in excess of such person's reasonable needs (as such term shall be defined in such regulation).".

Supra.
Ante, p. 885.

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ASPHALT ALLOCATION AUTHORITY

SEC. 460. The Emergency Petroleum Allocation Act of 1973, as amended by this Act, is further amended by adding at the end thereof the following new section: 15 USC 751 note.

"ASPHALT ALLOCATION AUTHORITY

"SEC. 17. (a) The President may amend the regulation under section 4(a) of this Act to require, in a manner which he finds is consistent with the attainment, to the maximum extent practicable, of the objectives specified in section 4(b)(1) of this Act, the allocation of asphalt in amounts specified in (or determined in the manner prescribed by), or at prices specified in (or determined in a manner prescribed by) such amendment to the regulation, or both. 15 USC 760f. 15 USC 753. *Ante*, p. 948.

"(b) If the President exercises the authority under this section, he may thereafter amend the regulation under section 4(a) to exempt asphalt from such regulation without regard to the provisions of section 12 of this Act.". *Ante*, p. 950.

EXPIRATION OF AUTHORITIES

SEC. 461. The Emergency Petroleum Allocation Act of 1973 is amended by adding to the end of such Act, as amended by this Act, the following new section:

"EXPIRATION OF AUTHORITIES

"SEC. 18. Notwithstanding any other provision of this Act, at midnight on the conclusion of the 40th month in which the amendment under section 8(a) is in effect, the President's authority to promulgate, make effective, and amend a regulation pursuant to section 4(a) of this Act shall become discretionary rather than mandatory, and the limitations on the President's authority contained in sections 4(b)(2), 8, and 9 of this Act shall terminate. The authority to promulgate and amend any regulation or to issue any order under this Act shall expire at midnight September 30, 1981, but such expiration shall not affect any action or pending proceedings, administrative, civil, or criminal, not finally determined on such date, nor any administrative, civil, or criminal action or proceeding, whether or not pending, based upon any act committed or liability incurred prior to such expiration date.". 15 USC 760g. *Ante*, p. 942. *Ante*, pp. 946, 942, 946.

REIMBURSEMENT TO STATES

SEC. 462. The Emergency Petroleum Allocation Act of 1973, as amended by this Act, is further amended by adding at the end thereof the following new section:

"REIMBURSEMENT TO STATES

"SEC. 19. (a) The President is authorized to reimburse any State for expenses incurred by such State in carrying out any responsibilities delegated to such State by the President under the provisions of this Act. 15 USC 760h.

"(b) Such reimbursements may be paid from any funds appropriated for the purpose of carrying out responsibilities under this Act, unless any appropriation Act specifically provides to the contrary.

"(c) Not later than June 1, 1976, the President shall submit a report to the Congress analyzing and detailing the amount and nature of any Report to Congress.

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reimbursements made to any State for expenses described in subsection (a) incurred prior to such date and specifically recommending whether authorizations of additional funds for direct grants to States are necessary or appropriate for the continued operation of the reimbursement provisions authorized by this section.".

EFFECTIVE DATE OF ALLOCATION ACT AMENDMENTS

15 USC 753 note.
15 USC 751 note.

SEC. 463. Except as otherwise provided, the amendments made by this Act to the Emergency Petroleum Allocation Act of 1973 shall take effect as of midnight, December 15, 1975.

TITLE V—GENERAL PROVISIONS

PART A—ENERGY DATA BASE AND ENERGY INFORMATION

VERIFICATION EXAMINATION

42 USC 6381.

SEC. 501. (a) The Comptroller General may conduct verification examinations with respect to the books, records, papers, or other documents of—

(1) any person who is required to submit energy information to the Federal Energy Administration, the Department of the Interior, or the Federal Power Commission pursuant to any rule, regulation, order, or other legal process of such Administration, Department or Commission;

(2) any person who is engaged in the production, processing, refining, transportation by pipeline, or distribution (at other than the retail level) of energy resources—

(A) if such person has furnished, directly or indirectly, energy information (without regard to whether such information was furnished pursuant to legal requirements) to any Federal agency (other than the Internal Revenue Service), and

(B) if the Comptroller General of the United States determines that such information has been or is being used or taken into consideration, in whole or in part, by a Federal agency in carrying out responsibilities committed to such agency; or

(3) any vertically integrated petroleum company with respect to financial information of such company related to energy resource exploration, development, and production and the transportation, refining and marketing of energy resources and energy products.

Congressional request.

(b) The Comptroller General shall conduct verification examinations of any person or company described in subsection (a), if requested to do so by any duly established committee of the Congress having legislative or oversight responsibilities under the rules of the House of Representatives or of the Senate, with respect to energy matters or any of the laws administered by the Department of the Interior (or the Secretary thereof), the Federal Power Commission, or the Federal Energy Administration (or the Administrator).

Definitions.

(c) For the purposes of this title—

(1) The term "verification examination" means an examination of such books, records, papers, or other documents of a person or company as the Comptroller General determines necessary and appropriate to assess the accuracy, reliability, and adequacy of

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APPENDIX B

REPORTING REQUIREMENTS

AND THE DCOE PROGRAM

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[¶ 13,649]

§ 211.66 Reporting requirements.

[¶ 13,649.05]

(a) All matters pertaining to the allocation of crude oil and the refinery yield control program shall be addressed to the FEA in accordance with § 205.12, unless otherwise provided.

[¶ 13,649.40]

(h) *Monthly report.* On or prior to the fifth day of each month, commencing with the month of August 1978, each refiner shall file with the ERA a report certifying the following information as to the second month prior to the month in which the report is filed:

(1) The estimated volume (to the best of the knowledge of the certifying officer) of old oil included in the crude oil receipts of that refiner.

(2) The estimated volume (to the best of the knowledge of the certifying officer) of upper tier crude oil included in the crude oil receipts of that refiner.

(3) Any permitted or required adjustments to the estimated volumes of old and upper tier crude oil included in the crude oil receipts of that refiner.

(4) The volume of crude oil runs to stills of that refiner, taking into account, and specifying the amount of, the adjustments provided for in § 211.67(d).

(5) The weighted average costs for that refiner (including transportation costs to the refinery) of old oil, upper tier crude oil, ANS crude oil, stripper well crude oil (as defined in Part 212 of this chapter), incremental tertiary crude oil (as determined pursuant to § 212.78), other domestic crude oils the first sale of which is exempt from the provisions of Part 212 of this chapter, and imported crude oil included in that refiner's crude oil receipts. For refiners required to file transfer pricing report forms under § 212.84 of this chapter, the weighted average cost of imported crude oil reported under this subparagraph should be derived from the landed costs set forth in such reports.

(6) The estimated volume (to the best of the knowledge of the certifying officer) of California lower tier crude oil included in the crude oil receipts of that refiner, and the weighted average gravity (calculated as a single figure for the entire month) of such California lower tier crude oil included in such crude oil receipts.

(7) The estimated volume (to the best of the knowledge of the certifying officer) of California upper tier crude oil included in the crude oil receipts of that refiner, and the weighted average gravity

(calculated as a single figure for the entire month) of such California upper tier crude oil included in such crude oil receipts.

(8) Such other information as the ERA may request.

[¶ 13,649.45]

(i) *Monthly transaction report.* On or prior to the tenth day of each month, commencing with the month of February, 1975, each refiner and eligible firm that was required to purchase or sell entitlements for the third month prior to the month in which the report is filed shall file with the FEA a report certifying its purchases or sales of entitlements for that prior month.

[¶ 13,649.50]

(j) *Monthly report by eligible firms.* On or prior to the fifth day of each month, commencing with the month of April 1976, each eligible firm that has imported an eligible product in the second month preceding that month shall file with the ERA a report certifying the following:

(1) The identity, volumes and ports of origin and entry of any eligible products imported by the eligible firm in that preceding month.

(2) That the eligible product was imported for sale or use in the East Coast market.

(3) Such other information as the ERA may request.

[¶ 13,649.55]

(k) *Special report for Strategic Petroleum Reserve deliveries.* On or prior to the fifth day of each month immediately following a month in which the United States Government has accepted a refiner's or other firm's delivery of crude oil for storage in the Strategic Petroleum Reserve mandated by Title I, Part B, of the Energy Policy and Conservation Act (P. L. 94-163), that refiner or other firm shall file with the FEA a report that sets forth the following information:

(1) The volume of imported crude oil so accepted for delivery in the immediately preceding month by the United States Government.

(2) The volume of domestic crude oil so accepted for delivery in the immediately preceding month by the United States Government, specifying the respective portions of that volume that are old oil, upper tier crude oil, stripper well crude oil (as defined in Part 212 of this chapter), and other domestic crude oils the first sale of which is exempt from the provisions of Part 212 of this chapter.

(3) Such other information as the FEA may request.

.01 Subsections (a) and (b), 39 F. R. 35472 (October 1, 1974); subsections (d) and (e), 42 F. R. 42770 (August 24, 1977); subsection (g), 39 F. R. 35472 (October 1, 1974); subsections (h)(1)-(4), 43 F. R. 26540 (June 20, 1978); subsection (h)(5), 43 F. R. 33679 (August 1, 1978); subsections (h)(6)-(8), 43 F. R. 26540 (June 29, 1978); subsection (i), 40 F. R. 10444

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affidavit setting forth the factual basis for its claim to be classified as an eligible firm.

Subsection (k) newly originated in 42 F. R. 21761 (4/29/77), effective 4/25/77.

[¶ 13,650.05]

(a) *Issuance of entitlements.* (1) For each month, commencing with the month of June 1978, each refiner shall be issued a number of entitlements by the ERA equal to the number of barrels of crude oil included in the total volume of that refiner's crude oil runs to stills for that month multiplied by the national domestic crude oil supply ratio for that month, subject to the entitlement adjustment for small refiners set forth in paragraph (e) of this section and the entitlement adjustments in subparagraph (a)(4) of this section.

(2) Refiners to which entitlements shall be issued under this section shall include all refiners classified as refiner-buyers or refiner-sellers as of December 1, 1974 for purposes of § 211.65. Any refiner that is not so classified, or the refinery capacity of which is not certified by the FEA for purposes of § 211.65, shall apply to the FEA for certification of its refinery capacity for purposes of qualifying to receive entitlements under this section. With respect to the granting of any such application for certification, the FEA shall consider the factors set forth in § 211.65(b)(v) and (vi).

(3) For each month, commencing with the month of February 1976, each eligible firm that has imported an eligible product in that month shall be issued a number of entitlements equivalent to thirty percent (30%) of the number of entitlements that would be received by a refiner (without giving effect to the provisions of § 211.67(e)) in that month with respect to inclusion of a number of barrels of crude oil in that refiner's crude oil runs to stills equal to the number of barrels of that eligible product imported by that eligible firm, *provided* that for each month in the period July 1, 1978 through June 30, 1979, the number of entitlements issued to each eligible firm that has imported an eligible product in that month shall be equivalent to fifty percent (50%) of the number of entitlements that would be received by a refiner (without giving effect to the provisions of § 211.67(e)) in that month with respect to inclusion of a number of barrels of crude oil in that refiner's crude oil runs to stills equal to the number of barrels of that eligible product imported by that eligible firm. An eligible product is imported for purposes of this pararaph (a)(3) in the month, as specified on Customs Forms 7501 or 7505, as appropriate, in which importation takes place.

(4) For each month, commencing with the month of June 1978, the number of entitlements issued under paragraph (a)(1) of this section to each refiner shall be increased by: (i) the number of barrels of California lower tier crude oil included in its adjusted crude oil receipts in that month multiplied by a fraction, the numerator of which

is $2.38 plus or minus $.09 for each degree API gravity (or fraction thereof) by which the weighted average gravity of all California lower tier crude oil included in that refiner's adjusted crude oil receipts in that month either falls below or exceeds, respectively, 18 degrees API, and the denominator of which is the entitlement price for that month; and (ii) the number of barrels of California upper tier crude oil included in its adjusted crude oil receipts in that month multiplied by a fraction, the numerator of which is $1.45 plus or minus $.09 for each degree API gravity (or fraction thereof) by which the weighted average gravity of all California upper tier crude oil included in that refiner's adjusted crude oil receipts in that month either falls below or exceeds, respectively, 18 degrees API, and the denominator of which is the entitlement price for that month; *provided that* the dollar value of additional entitlements issued under this subparagraph (4) shall not exceed the dollar value of the obligation (as calculated under paragraph (b) of this section) for the crude oil with respect to which such additional entitlements are issued. The refiner shall calculate and report the weighted average gravity of California lower tier crude oil and California upper tier crude oil separately, and in calculating such weighted average gravities shall (A) determine the gravity of such crude oil for each receipt of such crude oil in that month on the basis of the gravity of such crude oil at the time it becomes a receipt, and (B) determine a single monthly weighted average gravity for such crude oil by weight averaging (on a volumetric basis) all of such individual receipts in that month.

(5) For each month, commencing with the month of July 1978, each firm that has been designated by the ERA as eligible to participate in the entitlements program by reason of its producing, selling or using a petroleum substitute, shall be issued a number of entitlements determined as follows:

(i) In the case of a petroleum substitute derived from oil shale, that number of entitlements that would be received by a refiner if each barrel of the petroleum substitute were a barrel of crude oil;

(ii) In the case of a petroleum substitute other than one derived from shale oil having a gross heating value of 5.7 million BTU's per barrel or more, that number of entitlements that would be received by a refiner if each barrel of the petroleum substitute were a barrel of crude oil; and

(iii) In the case of a petroleum substitute other than one derived from shale oil having a gross heating value of less than 5.7 million BTU's per barrel, that number of entitlements that would be received by a refiner if each barrel of the petroleum substitute were equal to a fraction of a barrel of crude oil, the numerator of which would be the gross heating value per barrel, in BTU's, of the petroleum substitute, and the denominator of which would be 5.7 million BTU's. Where a petroleum substitute is being used for purposes other than in a re-

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finery, ERA will designate the firm to which entitlements will be issued and the manner in which the use of the petroleum substitute by that firm shall result in entitlement issuances.

[¶ 13,650.07]

Guidelines for Evaluation of Applications for Designation as a Producer, Marketer or Consumer of Petroleum Substitutes in the Entitlements Program

[**Note:** These guidelines are proposed; however, they are being used on an interim basis. Final guidelines will be issued following receipt of public comments.]

1. *Background and Purpose*

On May 12, 1978, the Economic Regulatory Administration (ERA) issued a final rule amending the Mandatory Petroleum Allocation Regulations to include petroleum substitutes[1] in the entitlements program (43 FR 21429, May 18, 1978). The final rule provides for the automatic inclusion in the entitlements program of petroleum substitutes made from domestic oil shale and used by a refiner in a domestic refinery as feedstock or fuel. The final rule also provides that the ERA may, *on a case-by-case basis*, grant entitlement benefits for petroleum substitutes made from domestic biomass, coal, solid waste or tar sands, and for non-refinery uses of domestic shale oil. These guidelines set forth the procedures and criteria under which ERA will review each application and determine an applicant's eligibility to participate in the program.

2. *Who May Apply*

If you are currently producing a petroleum substitute, constructing a facility to produce a petroleum substitute, or planning, designing, or otherwise considering the development of a facility to produce a petroleum substitute from domestic biomass, coal, oil shale, solid waste, or tar sands, you may apply for designation as a producer of a petroleum substitute that is eligible to receive entitlements. If you are a marketer or consumer (including a refiner) of a petroleum substitute, you may apply for entitlements whenever the producer (and any other entity through which you directly or indirectly obtain the substitute) does not desire to apply. However, you must obtain and provide ERA with the written agreement of the producer and any other entity preceding you in the dis-

[1] A petroleum substitute is any synthetic liquid fuel produced from designated domestic resources and used in the United States as a substitute for petroleum as a refinery feedstock, as a fuel blendstock, or as a fuel.

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[¶ 13,650.10]

(b) *Required purchase of entitlements by refiners.* (1) For each month, commencing with the month of February 1976, each refiner that has been issued fewer entitlements for that month than the number of barrels of deemed old oil (as calculated under paragraph (b)(2) of this section) included in its adjusted crude oil receipts shall purchase a number of entitlements effective for that month equal to the difference between the number of barrels of deemed old oil (as so calculated) included in that refiner's adjusted crude oil receipts for that month and the number of entitlements issued to and retained by that refiner. Entitlement purchases required under this paragraph (b) with respect to a particular month shall be effected by the close of the second month following that month.

(2) To calculate the number of barrels of deemed old oil included in a refiner's adjusted crude oil receipts for purposes of the definition of national domestic crude oil supply ratio in § 211.62 of this subpart, paragraph (b)(1) of this section and paragraph (c) of this section, each barrel of old oil shall be equal to one barrel of deemed old oil and each barrel of upper tier crude oil shall constitute that fraction of a barrel of deemed old oil the numerator of which is equal to the reported weighted average cost per barrel to refiners of imported crude oil, stripper well crude oil (as defined in Part 212 of this chapter), incremental tertiary crude oil (as determined pursuant to § 212.78), and other domestic crude oils the first sale of which is exempt from the provisions of Part 212 of this chapter for that month, less the sum of 21 cents and such weighted average cost per barrel to refiners of upper tier crude oil, and the denominator of which is the entitlement price for that month.

[¶ 13,650.15]

(c) *Refiners and other firms with excess entitlements.* For each month, commencing with the month of February 1976, each refiner that has been issued a greater number of entitlements for that month than the number of barrels of deemed old oil (as calculated under paragraph (b)(2) of this section) included in its adjusted crude oil receipts shall sell such excess entitlements and any eligible firm (other than a refiner) that has been issued entitlements shall sell such entitlements.

[¶ 13,650.20]

(d) *Adjustments to volume of crude oil runs to stills.* (1) A refiner's volume of crude oil runs to stills shall (i) include (A) the volume of crude oil processed by another refiner for that refiner pursuant to a processing agreement and (B) the volume of crude oil processed by that refiner for a person other than a refiner pursuant to a processing agreement, and (ii) exclude the volume of crude oil processed by that refiner for another refiner pursuant to a processing agreement.

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(2) The volume of a refiner's crude oil runs to stills in a particular month for purposes of the calculations in paragraph (a)(1) of this section and the calculations for the national domestic crude oil supply ratio shall be reduced by that refiner's volume of export sales under § 212.53 of Part 212 of this chapter in that month of refined petroleum products (including aviation fuels as defined in § 211.142 of this part, but excluding refined lubricating oils) and residual fuel oil, including sales to a domestic purchaser which certifies the product is for export; *provided*, however, that the volume of a refiner's crude oil runs to stills for a month shall not be reduced by that refiner's volume of export sales of Bunker C and Navy Special fuel oils and No. 4 diesel, which are sold for use as a marine fuel on a voyage departing from a United States port.

(3) The volume of a refiner's crude oil runs to stills in a particular month for purposes of the calculations in paragraph (a)(1) of this section and the calculations for the national domestic crude oil supply ratio shall include the total number of barrels of plant condensate and the total number of barrels of synthetic crude oil made from tar sands which are imported from Canada and are utilized in that month as inputs to distillation units by a refiner, measured in accordance with the Bureau of Mines Form 6-1300-M. Neither plant condensate nor synthetic crude oil made from tar sands which are imported from Canada shall be eligible for inclusion in the volume of a refiner's crude oil runs to stills under this subparagraph (3) unless payment has been made in accordance with Presidential Proclamation No. 3279, as amended, of any import license fees applicable to crude oil as defined for purposes of this section, which is imported for refining.

(4) For purposes of the calculations in subparagraph (a)(1) of this section and the calculations for the national domestic crude oil supply ratio (but not for purposes of paragraph (e) of this section), the volume in excess of the first 5,000 barrels per day of a refiner's crude oil runs to stills for a particular month attributable to production of residual fuel oil for sale (whether directly for consumption or for resale) by that refiner in or into the East Coast market shall be reduced by fifty (50%) percent. Any export sales of residual fuel oil giving rise to a deduction under paragraph (d)(2) above shall not be considered as residual fuel oil production for purposes of this paragraph (d)(4), *provided* that for the period July 1, 1978 through June 30, 1979, this paragraph (d)(4) shall read as follows:

(4) For purposes of the calculations in subparagraph (a)(1) of this section and the calculations for the national domestic crude oil supply ratio (but not for purposes of paragraph (e) of this section), the volume of crude oil runs to stills of any domestic refinery attributable to production of residual fuel oil transported in foreign flag tankers for sale (whether directly for consumption or for resale) or use in the East Coast market shall be reduced by fifty (50%) percent.

Any export sales of residual fuel oil giving rise to a deduction under paragraph (d)(2) above shall not be considered as residual fuel oil production for purposes of this paragraph (d)(4).

(5)(i) The volume of a refiner's crude oil runs to stills in a particular month for purposes of the calculations in subparagraph (1) of paragraph (a) of this section and the calculations for the national domestic crude oil supply ratio shall include, except as provided in subdivisions (ii) and (iii) of this subparagraph, the total number of barrels of naphthas which are imported into Puerto Rico (other than imports from the U. S. Virgin Islands and other than naphthas imported into Puerto Rico which are acquired pursuant to an exchange or similar matching purchase and sale transaction for naphthas produced by a refinery located in the United States) and are utilized in that month as a petrochemical feedstock at a petrochemical plant owned or operated by that refiner in Puerto Rico.

(ii) The volume of naphthas eligible for inclusion in the volume of a refiner's crude oil runs to stills in a particular month under subdivision (i) of this subparagraph shall be reduced by the volume of export sales (under § 212.53 of Part 212 of this chapter, including sales to a purchaser which certifies it or an entity affiliated with that purchaser will export the product so purchased) for that month of products produced at the petrochemical plant that has processed the imported naphthas.

(iii) The volume of naphthas eligible for inclusion in the volume of a refiner's crude oil runs to stills for a particular month under this subparagraph (5) shall be reduced by the application of a fraction the denominator of which is equal to the entitlement value for a barrel of crude oil included in the volume of a refiner's crude oil runs to stills for that month (without giving effect to the provisions of paragraphs (e) and (d)(4) of this section), and the numerator of which is equal to the weighted average per barrel cost of all naphthas imported into Puerto Rico for that month as to which entitlement issuances are sought less the imputed per barrel cost of domestically produced naphthas for that month. For purposes of this subparagraph (5)(iii), the imputed per barrel cost of domestically produced naphthas for a particular month, commencing with November, 1977, shall be equal to one hundred eight percent (108%) of the weighted average per barrel cost of all the crude oil receipts for all domestic refiners for that month.

(iv) Notwithstanding any other provisions of this section, a firm other than a refiner that owns a petrochemical plant in Puerto Rico shall be eligible to receive entitlements with respect to naphthas processed at such a plant on the same basis as is provided for refiners in subdivisions (i) through (iii) of this subparagraph, except that such a firm shall not be eligible for any additional entitlements under the provisions of paragraph (e) of this section. Any such firm shall file reports under § 211.66 on the same basis as a refiner.

(v) The provisions of this subparagraph (5) shall be effective for imported naphthas processed in the month of May 1976: *Provided,* That, with respect to any firm that has received relief for that month under Subpart D of Part 205 of this chapter for naphthas imported into Puerto Rico and processed at a petrochemical plant, these provisions shall first become effective for imported naphthas processed in June 1976. For any firm not subject to the proviso in the preceding sentence, eligible naphtha imports processed in the month of May 1976, together with any eligible imports for June 1976, shall be reflected in the entitlement issuances for the month of June 1976.

(vi) Any firm that is eligible for entitlement issuances under this subparagraph shall obtain appropriate certifications from any other firm to which it sells products produced at a petrochemical plant located in Puerto Rico. Such certification shall set forth whether or to what extent the products so purchased will be sold (whether directly by that other firm or indirectly through any firm affiliated with that other firm) in transactions that constitute export sales under § 212.53 of Part 212 of this chapter. Any firm purchasing products produced at a petrochemical plant located in Puerto Rico shall, upon the request of the owner or operator of that facility, certify to that owner or operator as to whether or what extent the further sale of those products by that firm (or any affiliate thereof) will constitute export sales under § 212.53.

(6) The volume of a refiner's crude oil runs to stills in a particular month for purposes of the calculations in paragraph (a)(1) of this section and the calculations for the national domestic crude oil supply ratio (without giving effect to the provisions of paragraph (e) of § 211.67) shall include the total number of barrels of imported crude oil delivered to and accepted for delivery by the United States Government in the following month for storage in the Strategic Petroleum Reserve mandated by Title I, Part B, of the Energy Policy and Conservation Act (P. L. 94-163); *provided, that,* if any entitlement issuance under this subparagraph (the revenues from which were either received by that refiner or served to reduce that refiner's entitlement purchase obligations under paragraph (b) of this section) is in duplication of payments made by the United States Government pursuant to the related contract or contracts for acquisition of that imported crude oil, that refiner shall be required to purchase entitlements pursuant to one or more succeeding entitlement notices equal in value to the entitlements so issued, unless such payments made by the United States Government have been refunded or credited to the United States Government; and, *provided further, that,* in any case where the United States Government acquires crude oil for storage in the Strategic Petroleum Reserve pursuant to an exchange or matching purchase and sale transaction, the refiner from which that crude oil is acquired for storage in the Strategic Petroleum Reserve shall not be eligible for any entitlement issuances under this subparagraph (6), nor shall any domestic crude oil be deemed to have been transferred by that refiner in that exchange or transaction and such retained volumes of domestic crude oil shall be included in its crude oil receipts under the provisions of § 211.67(g)(2), but a refiner or firm other than a refiner from which the United States Government acquires imported crude oil for purposes of satisfying its obligation pursuant to that exchange or transaction shall be eligible for entitlement issuances on the same basis as refiners from which imported crude oil is acquired for storage in the Strategic Petroleum Reserve. For purposes of this subparagraph (6), a refiner shall mean any firm that owns, operates or controls the operations of a refinery located in the United States, as defined in the Emergency Petroleum Allocation Act of 1973, as amended (P. L. 93-159).

(7) Notwithstanding any other provisions of this section, any firm other than a refiner (as defined in subparagraph (6) above) shall be eligible for entitlement issuances on the same basis as a refiner under subparagraph (6) above of this paragraph (d) with respect to deliveries of imported crude oil accepted by the United States Government for storage in the Strategic Petroleum Reserve mandated by Title I, Part B, of the Energy Policy and Conservation Act (P. L. 94-163); *provided, that,* if any revenues attributable to an entitlement issuance under this subparagraph received by that firm are in duplica-

tion of payments made by the United States Government pursuant to the related contract or contracts for acquisition of that imported crude oil, that firm shall be required to purchase entitlements pursuant to one or more succeeding entitlement notices equal in value to the amount of such entitlement revenues so received, unless such payments made by the United States Government have been credited or refunded to the United States Government; and, *provided further, that,* in any case where the United States Government acquires crude oil for storage in the Strategic Petroleum Reserve pursuant to an exchange or matching purchase and sale transaction, the firm from which that crude oil is acquired for storage in the Strategic Petroleum Reserve shall not be eligible for any entitlement issuances under this subparagraph (7), nor shall any domestic crude oil be deemed to have been transferred by that firm in that exchange or transaction and such retained volumes of domestic crude oil shall be included in its crude oil receipts under the provisions of § 211.67(g)(2), but a refiner or firm other than a refiner from which the United States Government acquires imported crude oil for purposes of satisfying its obligation pursuant to that exchange or transaction shall be eligible for entitlement issuances on the same basis as refiners from which imported crude oil is acquired for storage in the Strategic Petroleum Reserve.

(8) Commencing with the month of July 1978, the volume of a refiner's crude oil runs to stills in a particular month for purposes of the calculations in subparagraph (1) of paragraph (a) of this section and the calculations for the national domestic crude oil supply ratio shall include the total number of barrels of the liquid produced from oil shale that is found in the United States and used as a refining feedstock, blending feedstock or fuel in a domestic refinery in that month by a refiner.

[¶ 13,650.25]

(e) *Small refiner bias.* (1) In addition to the number of entitlements issuable under paragraph (a) of this section, subject to the limitation set forth in paragraph (e)(2) below, each small refiner with a daily average volume of crude oil runs to stills of less than 175,000 barrels for a particular month shall be issued the following number of additional entitlements for each day of that month: (i) For each small refiner with a daily average volume of crude oil runs to stills of 100,000 to 175,000 barrels, 1,258 entitlements less the number of entitlements obtained by multiplying the difference between that small refiner's daily average volume of crude oil runs to stills (in thousands of barrels) and 100 by 16.7733; (ii) for each small refiner with a daily average volume of crude oil runs to stills of 50,000 to 100,000 barrels, 2,079 entitlements less the number of entitlements obtained by multiplying the difference between that small refiner's daily average volume of crude oil runs to stills (in thousands of barrels) and 50 by 16.42; (iii) for each small refiner with a daily

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average volume of crude oil runs to stills of 30,000 to 50,000, 3,123 entitlements less the number of entitlements obtained by multiplying the difference between that small refiner's daily average volume of crude oil runs to stills (in thousands of barrels) and 30 by 52.2; (iv) for each small refiner with a daily average volume of crude oil runs to stills of 10,000 to 30,000 barrels, 2,288 entitlements plus the number of entitlements obtained by multiplying the difference between that small refiner's daily average volume of crude oil runs to stills (in thousands of barrels) and 10 by 41.75; and (v) for each small refiner with a daily average volume of crude oil runs to stills of zero to 10,000 barrels, 228.8 entitlements for each 1,000 barrels of that small refiner's daily average volume of crude oil runs to stills.

(2) Effective for refiners' volumes of crude oil runs to stills for June 1977, no entitlements shall be issuable under paragraph (e)(1) of this section with respect to any volume of a small refiner's crude oil runs to stills attributable to a processing agreement for the account of that small refiner with another refiner.

(3) Each small refiner shall separately identify in its reports filed pursuant to § 211.66(h) of this subpart any volumes of its crude oil runs to stills not eligible (under the provisions of paragraph (e)(2) of this section) for small refiner bias entitlements.

[¶ 13,650.30]

(f) *Transactions under § 211.65.* (1) Effective for sales for the allocation quarter commencing March 1, 1976 under § 211.65 of this subpart, no sale by a refiner-seller under § 211.65 shall be deemed for purposes of this section to include any volume of domestic crude oil. If a refiner-seller sells actual volumes of domestic crude oil under § 211.65, the related volumes of old oil and upper tier crude oil shall be included in that refiner-seller's crude oil receipts in the month in which the sale is made. For purposes of the adjustments set forth in paragraph (a)(4) of this section, a refiner-buyer's receipts of imported crude oil and Alaska North Slope crude oil shall include volumes of crude oil sold under § 211.65 to that refiner-buyer.

(2) For sales for allocation quarters prior to the allocation quarter commencing March 1, 1976, each sale by a refiner-seller under § 211.65 shall be deemed to include volumes of old oil (and upper tier crude oil, if any) proportionate to the volumes thereof included in the deliveries of crude oil to that refiner-seller that determine the price at which the sale is made under § 212.94 of Part 212. Any volumes of domestic crude oil so deemed to be included in any sale under § 211.65 shall be reflected in the crude oil receipts of the refiner-buyer concerned. As to each sale for any such prior allocation quarter, each refiner-seller shall certify to the refiner-buyer the volume of old oil (and upper tier crude oil, if any) included in the volume of crude oil sold within twenty-eight (28) days following the month in which the crude oil is delivered to or for the

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account of the refiner-buyer in accordance with the provisions of § 212.131 of Part 212.

(3) In determining the weighted average landed cost of crude oil delivered to a refiner-seller in a month pursuant to § 212.94 of Part 212, the cost of any required purchases or revenues from any sales of entitlements by that refiner-seller shall not be taken into account.

[¶ 13,650.35]

(g) *Exchanges of crude oil.* (1) Subject to the provisions of paragraph (a)(3) below, in any exchange of crude oil in which only quality and location differentials are given effect in the calculation of the exchange ratio, or in any matching purchase and sale transaction which has the same effect as such an exchange, no volumes of domestic crude oil shall be deemed to have been transferred. Any volumes of domestic crude oil exchanged away or sold pursuant to any such exchange or matching purchase and sale transaction shall be considered as having been retained by the refiner or other firm that has so exchanged away or sold such volumes, regardless of the volume of crude oil received or purchased by that refiner or other firm in such exchange or transaction.

(2) Subject to the provisions of paragraph (g)(3) below, volumes of domestic crude oil deemed to be retained by a refiner under the provisions of paragraph (g)(1) above shall be (i) included in that refiner's crude oil receipts at the time the crude oil acquired pursuant to the related exchange or purchase and sale transaction constitutes a crude oil receipt under § 211.62 of this subpart to that refiner, or (ii) certified as old oil, upper tier crude oil, ANS crude oil, stripper well crude oil (as defined in Part 212 of this chapter), incremental tertiary crude oil (as determined pursuant to § 212.78), or any other domestic crude oil the first sale of which is exempt from Part 212 of this chapter, as the case may be, under the provisions of § 212.131 of Part 212 when the crude oil acquired pursuant to the related exchange or purchase and sale transaction is sold to another firm.

(3) Where a refiner exchanges away or sells volumes of domestic crude oil in an exchange or matching purchase and sale transaction of the type described in paragraph (g)(1) above and receives in exchange or purchases in the transaction foreign crude oil that is delivered and processed outside the United States, that refiner shall include any domestic crude oil so exchanged away or sold by it in its crude oil receipts as of the date that domestic crude oil is so exchanged away or sold.

(4) The provisions of paragraph (g)(1) above shall not apply to transactions involving domestic crude oil which is exchanged away by a firm other than a refiner for foreign crude oil that is not processed in a refinery located in the United States. Any firm other than a refiner

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that has exchanged away or sold domestic crude oil within the United States pursuant to an exchange transaction in which other crude oil is also transferred outside the United States shall comply with the certification requirements of § 212.131 of Part 212 as to any volumes of old oil or upper tier crude oil, as the case may be, so exchanged away or sold. Any domestic crude oil delivered to a refiner in the United States pursuant to a transaction of the type described in this paragraph (g)(4) shall be included in the crude oil receipts of the refiner that receives, directly or indirectly through further sales or exchanges, the volumes of domestic crude oil that are the subject of the transaction, as provided in § 211.62 of this subpart.

(5) For purposes of this paragraph (g), "refiner" means any firm that owns, operates or controls the operations of one or more refineries, and includes any entity that is a part of or affiliated with, or that controls or is controlled by (whether directly or indirectly), a refiner.

[¶ 13,650.40]

(h) *Averaging of crude oil receipts.* Upon application by a refiner in accordance with the procedures established under Subpart G of Part 205 of this chapter within thirty (30) days following the close of a month, the FEA may adjust the crude oil receipts of that refiner for that month to permit the portion of such crude oil receipts specified by the FEA to be included in the crude oil receipts of that refiner for one or more subsequent months, if the volume of crude oil receipts in that month is significantly disproportionate to the volume of that refiner's crude oil runs to stills for that month due to a shutdown (by reason of either a mechanical failure or normal maintenance procedures) resulting in a fifty (50%) percent or greater portion of that refiner's refinery capacity not having been operable for the duration of that month.

[¶ 13,650.45]

(i) *Issuance and transfer of entitlements.* (1) The FEA shall issue entitlements for each month (effective for the month of February 1976 and subsequent months) pursuant to a notice issued on the fifteenth day of the second month following that month.

(2) Each notice published by the FEA evidencing the issuance of entitlements under this section shall specify as to a particular month the national domestic crude oil supply ratio, the name of each refiner and other eligible firm to which entitlements have been issued, the number of barrels of deemed old oil included in each refiner's adjusted crude oil receipts, the number of entitlements issued to each such refiner or other firm, the number of entitlements required to be purchased or sold by each such refiner or other firm, and the price at which entitlements shall be purchased and sold.

(3) No transfer of an entitlement shall be effective if made to any firm that is not purchasing such entitlement to fulfill such firm's obligations under this section.

(4) The price at which entitlements shall be sold and purchased shall be fixed by the ERA for each month and shall be the exact differential between the weighted average cost per barrel to refiners of old oil and such weighted average cost of imported crude oil, ANS crude oil, stripper well crude oil (as defined in Part 212 of this chapter), incremental tertiary crude oil (as determined pursuant to § 212.78), and other domestic crude oils the first sale of which is exempt from the provisions of Part 212 of this chapter, less 21 cents, such costs to be equivalent to the delivered costs to the refinery.

[¶ 13,650.50]

(j) *Reporting errors.* (1) Refiners and eligible firms shall correct any errors contained in reports filed pursuant to § 211.66 by filing an amended report for the particular month. Based on any reporting errors so corrected, the FEA in its discretion may adjust entitlement issuances to the refiner or eligible firm in one or more months subsequent to the month in which the amended report is filed with the FEA, by issuing fewer entitlements than the number otherwise issuable, by requiring the refiner or eligible firm to purchase entitlements in order to correct for excess entitlements issued in a prior month or by issuing entitlements over and above the number otherwise issuable to compensate for too few entitlements having been issued in such prior month. All entitlement issuances or purchase requirements under this subparagraph shall give effect to any differential between the entitlement price for the month in which any correction is reflected as compared with the entitlement price for the month as to which the reporting error was made (except with respect to corrections to volumes of crude oil runs to stills where a corresponding adjustment to crude oil receipts was made as contemplated by the term "adjusted crude oil receipts" in § 211.62) and such other factors as the FEA deems appropriate.

(2) Notwithstanding the provisions of paragraph (j)(1) of this section, corrections of reporting errors for the months November 1974 through August 1975 shall be made as follows. FEA shall recalculate for those months the purchase and sale obligations (giving effect to any applicable relief under decisions and orders issued by FEA's Office of Exceptions and Appeals and to the provisions of Special Rule No. 3 for Subpart C) of all refiners and eligible firms based on inclusion in each month of each refiner's and eligible firm's corrected volume (as reported to the FEA) of crude oil runs to stills, volume of old oil included in its crude oil receipts (other than adjustments effected as contemplated by the term "adjusted crude oil receipts" in § 211.62) and eligible product imports. No entitlement price adjustment as contemplated by paragraph (j)(1) of this section shall be made in the calculations under this

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paragraph (j)(2). FEA shall then aggregate for each refiner and eligible firm its net purchase or sale amount (in dollars) for these months (giving effect to the published purchase and sale obligations for these months) and apply these amounts in substantially equal portions (translated into current entitlement values) to that refiner's or eligible firm's entitlement purchase or sale obligations for the months of July 1976 through February 1977.

(3) For purposes of this paragraph, errors required to be corrected by the filing of amended reports include (i) clerical errors, and (ii) inaccurate estimates as to the domestic crude oil pricing composition of a particular volume of crude oil where the refiner had no basis, in prior experience or otherwise, on which to make that estimate.

[¶ 13,650.55]

(k) *Failure to consummate transactions.* The FEA may direct refiners or eligible firms that have not purchased the required number of entitlements under this section for a particular month to purchase such required number of entitlements at a price specified by the FEA from any refiner or eligible firm that has entitlements for such month available for sale. The FEA may direct refiners or eligible firms that have entitlements available for sale to sell such entitlements at a price specified by the FEA to refiners or eligible firms that have not purchased their required number of entitlements under this section.

[Section 211.67 continues on page 13,549-7.]

[¶ 13,650.60]

(1) *Certification by non-refiners.* Within twenty-eight (28) days following each month, commencing with the month of January 1978, each firm other than a refiner that has delivered crude oil to a refiner for processing for the account of such firm pursuant to a processing agreement in that month shall certify to that refiner the respective volumes of and that firm's costs for old oil (separately identifying any California lower tier crude oil), upper tier crude oil (separately identifying any California upper tier crude oil), ANS crude oil, stripper well crude oil (as defined in Part 212 of this chapter), incremental tertiary crude oil (as determined pursuant to § 212.78), other domestic crude oils the first sale of which is exempt from Part 212 of this chapter, and imported crude oil contained in the crude oil so delivered to that refiner.

[¶ 13,650.65]

(m) *Adjustments to crude oil and product costs.* (1) *Refiners.* (i) *Entitlements purchased.* (A) The cost of entitlements purchased in a particular month pursuant to this section by refiners, which shall be calculated exclusive of any reduction in such costs in a particular month because of entitlements issued for the importation of eligible products, and exclusive of the cost of entitlements purchased in a particular month pursuant to adjustments to a refiner's crude oil runs to stills under paragraph (d)(4) of this section, shall be added to the cost of crude oil purchased or landed in that month (which is the period "t" (the month of measurement), for purposes of calculating the increased cost to be applied to product prices in the following month under the "A^t" factor of the general formulae of § 212.83(c)(2) of this chapter); provided, that, to the extent that the obligation of a refiner to purchase entitlements is reduced by volumes of crude oil processed by a refiner for a firm other than that refiner pursuant to a processing agreement, and that the monetary value of that reduced purchase obligation is used to reduce the processing fee otherwise payable by that firm under the processing agreement, or is otherwise passed on to that firm such monetary value may also be added by that refiner to its cost of crude oil purchased or landed in that month, but shall be subtracted from the cost of crude oil purchased or landed in that month by the firm to which the monetary value of the reduced purchase obligation is passed on pursuant to this paragraph.

(B) The reduction in the cost of entitlements purchased in a particular month because of entitlements issued for the importation of eligible products shall be subtracted from the total cost of the product concerned, purchased or landed in that month (which is the period "t" (the month of measurement), for purposes of calculating the increased costs to be applied to prices of that product under the "$B_{;t}$" factor of the appropriate formula for that product of § 212.83(c) of this chapter).

(C) The cost of entitlements purchased in a particular month pursuant to the adjustments to a refiner's crude oil runs to stills under paragraph (d)(4) of this section shall be a cost of crude oil purchased or landed in that month which shall not be applied to product prices pursuant to the "A" factor of the general formulae of § 212.83(c)(2) of this chapter, but which shall instead be applied only to prices for residual fuel oil sold in or into the East Coast market.

(ii) *Entitlements sold.* (A) The sales revenues from entitlements sold in a particular month pursuant to this section by refiners, which shall be calculated exclusive of any reduction in such sales revenues in a particular month pursuant to adjustments to a refiner's crude oil runs to stills under paragraph (d)(4) of this section, and exclusive of any sales revenues from the sale of entitlements issued for the importation of eligible products, shall be subtracted from the cost of crude oil purchased or landed in that month (which is the period "t" (the month of measurement), for purposes of calculating the increased costs to be applied to all product prices in the following month under the "A'" factor of the general formulae of § 212.83(c)(2) of this chapter); provided, that, to the extent that the sales revenues from entitlements which are issued for volumes of crude oil processed by a refiner for a firm other than that refiner pursuant to a processing agreement are used to reduce the processing fee otherwise payable by that firm under the processing agreement, or are otherwise passed on to that firm, such sales revenues shall not be subtracted by that refiner from its cost of crude oil purchased or landed in that month, but shall be subtracted from the cost of crude oil purchased or landed in that month by the firm to which the entitlement sales revenues are passed on pursuant to this paragraph.

(B) The sales revenues from entitlements issued for the importation of eligible products which are sold in a particular month shall be subtracted from the total cost of the product concerned, purchased or landed in that month (which is the period "t" (the month of measurement), for purposes of calculating the increased costs to be applied to prices of that product under the "B;t" factor of the appropriate formula for that product of § 212.83(c)(2) of this chapter).

(C) The reduction in sales revenues from entitlements sold in a particular month pursuant to the adjustments to a refiner's crude oil runs to stills under paragraph (d)(4) of this section shall be a cost of crude oil purchased or landed in that month which shall not be applied to product prices pursuant to the "A" factor of the general formulae of § 212.83(c)(2) of this chapter, but shall instead be applied only to prices for residual fuel oil sold in or into the East Coast market.

(2) *Resellers and retailers.* The sales revenues from entitlements sold pursuant to this section by resellers or retailers shall be subtracted from the cost of the product in inventory for which the entitlements

were issued, so as to reduce the weighted average unit cost of that product in inventory computed pursuant to § 212.92 of this chapter.

(3) *Sales of eligible products to eligible firms.* The total amount of any reductions in the cost of eligible products to the seller because of entitlements issued for the importation of such products, which are required by paragraphs (m)(1) and (m)(2) of this section, shall be applied exclusively to the determination of maximum lawful prices charged in sales in which the purchaser does not receive entitlements for the importation of an eligible product. Separate price calculations shall be made for sales of eligible products in which the purchaser receives entitlements for the importation of eligible products, which shall comply in all respects with the regulations of Subparts E or F of Part 212 of this chapter, except that the amount of increased product cost used to compute such prices shall not be reduced because of entitlements issued for the importation of eligible products.

(4) *Timing.* The date of purchase or sale of entitlements for purposes of determining the date on which a cost or a cost reduction is incurred under § 212.83(c) or § 212.93 of this chapter shall be the date on which the transaction is reported to have taken place on the monthly transaction report filed with the FEA under paragraph (i) of § 211.66.

(5) *Strategic petroleum reserve entitlements transactions.* Notwithstanding the other provisions of this § 211.67(m), with respect to entitlements issued by the Government to a firm associated with acquisitions from that firm for the Strategic Petroleum Reserve ("SPR") which are sold by that firm (or which diminish the entitlements purchase obligations of that firm) and entitlements which are required to be purchased by a firm because of sales by that firm for the SPR, FEA shall not:

(i) Permit or require any adjustment to that firm's cost of crude oil in § 212.83(c)(2) if it is a refiner;

(ii) Permit or require any adjustment to that firm's cost of product in inventory if it is a reseller or retailer; or

(iii) Permit or require any adjustment to that firm's prices in other first sales of crude oil if it is a producer.

.01 Subsection (a)(1), 43 F. R. 26540 (June 20, 1978); subsection (a)(2), 41 F. R. 13899 (April 1, 1976); subsection (a)(3), 40 F. R. 10444 (March 6, 1975); subsection (a)(4), 43 F. R. 26540 (June 20, 1978); subsection (a)(5), 43 F. R. 21429 (May 18, 1978); subsection (b)(1), 41 F. R. 13899 (April 1, 1976); subsection (b)(2), 43 F. R. 33679 (August 1, 1978); subsection (c) 41 F. R. 13899 (April 1, 1976); subsection (d)(1), 41 F. R. 13899 (April 1, 1976); subsection (d)(2), 41 F. R. 49476 (November 9, 1976); subsections (d)(3)-(4), 41 F. R. 13899 (April 1, 1976); subsection (d)(5), 42 F. R. 61853 (December 7, 1977); subsections (d)(6)-(7), 42 F. R. 44218 (September 2, 1977); subsection (d)(8), 43 F. R. 21429 (May 18, 1978); subsection (e)(1), 41 F. R. 20392 (May 18, 1976); subsection (e)(2), 42 F. R. 21269 (April 26, 1977); subsection (e)(3), 41 F. R. 20392 (May 18, 1976); subsection (f)(1), 42 F. R. 62897 (December 14, 1977); subsection (f)(2)—(3), 41 F. R. 16448 (April 19,

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APPENDIX C

SPECIAL BENEFITS AND STANDARDS

FOR THE DCOE PROGRAM

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SPECIAL BENEFITS AND STANDARDS FOR THE DCOE PROGRAM

To compensate for inequities in the system and to improve the economic position of certain industries, Congress and the ERA (and its predecessors) have incorporated special and standards of treatment for different types and sources of crude oil and for certain classes of participants into the DCOE Program. Presented below is a summary of these special benefits and standards.

A. SMALL REFINER BIAS

From the beginning of the DCOE Program, small refiners were issued extra entitlements to compensate them for the lack of economies of scale enjoyed by the vertically integrated and large independent oil companies. A small refiner for this purpose is currently defined as one with a refining capacity of under 175,000 bbls/day.[1] Presently additional entitlements are allocated to small refiners on a sliding scale inversely proportional to the average daily crude runs to stills of the refinery. The maximum number of Small Refiner Bias (SRB) entitlements per barrel is issued in the 0-10,000 bbls/day range of runs to stills, declining thereafter; the maximum number of SRB entitlements possible for a refiner is reached at 30,000 bbls/day.[2]

The EPCA provided an entitlement purchase exemption for the first 50,000 bbls/day for refiners with a capacity not exceeding 100,000 bbls/day.[3] However, the FEA found this benefit to be inequitable and removed it in April, 1976.[4] Effective in June, 1977, SRB entitlements were eliminated for volumes of crude oil run at another refinery under a processing agreement.[5]

The SRB is incorporated in the entitlements calculation by subtracting a number equal to the number of SRB entitlements from the numerator of the DOSR.[6] Thus, the DOSR is reduced and the SRB subsidy is spread over the whole industry.

B. RESIDUAL FUEL ENTITLEMENTS

Residual fuel entitlements are issued to improve the competitive position of the East Coast[a] residual fuel oil marketers supplied by Caribbean refiners, relative to marketers supplied by domestic refiners. Since February 1976, 30 percent of the imported residual fuel oil each month has been included in eligible importers' crude runs to stills for that month for entitlement calculation purposes.[7] During the period of July 1, 1978 through June 30, 1979, 50 percent of the imported residual fuel oil is included. The DOSR is reduced (by adding a number equal to this fraction of imports to the denominator of the DOSR) to adjust for the addition of residual fuel entitlements.[8] Additionally, the crude runs of domestic refiners in excess of the first 5000 bbls/day are reduced by fifty percent of the volume attributable to their production of residual fuel for sale or resale in, or into, the East Coast market.[9] The DOSR is increased by subtracting this figure from the denominator.[10] This reduction partially offsets the increase in the weighted average cost of all crude oil resulting from residual fuel entitlements.

C. NAPHTHA ENTITLEMENTS

Entitlements have been issued since May, 1976, for the importation of naphtha feedstock into Puerto Rico for use by the petrochemical industry.[11]

[a]See Glossary for definition.

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Naphtha entitlements are determined by computing the ratio of the difference between the average cost of naphtha imports into Puerto Rico and the imputed average cost of domestic naphtha to the entitlement price.[12] The DOSR is reduced to reflect this benefit by subtracting a number from the numerator equal to the number of naphtha entitlements issued.[13] Previously, naphtha imported into Puerto Rico was significantly more expensive than domestic naphtha processed from price-controlled crude oil, leaving the Puerto Rican petrochemical industry at a competitive disadvantage to its domestic counterpart. This program was designed to offset this disadvantage.

D. PETROLEUM SUBSTITUTE ENTITLEMENTS

The ERA issues entitlements to refiners for those volumes of synthetic fuel, denominated petroleum substitutes by the ERA, obtained from oil shale that they utilize within their domestic refineries as a feedstock or fuel.[14] In addition, the ERA grants entitlements, on a case-by-case basis, to refiners for those volumes of petroleum substitute derived from domestic biomass, coal, solid waste materials, or tar sands and used in refineries.[15] The ERA also grants entitlements on the same basis for those volumes of petroleum substitutes used as a boiler fuel outside a refinery.[16] These entitlements are reflected by a reduction in the DOSR effected by subtracting a number equal to the number of petroleum substitute entitlements issued each month from the numerator of that month's DOSR.[17]

The ERA began issuing oil shale petroleum substitute entilements in July, 1978, to encourage increased domestic production of synthetic fuels. The ERA hoped that this increased production would reduce the volume of crude oil imported by domestic refiners.[18]

E. STRATEGIC PETROLEUM RESERVE ENTITLEMENTS

The EPCA required the government to establish the Strategic Petroleum Reserve (SPR).[19] In April, 1977, the FEA adopted amendments to its regulations to allow firms selling imported crude oil to the government for storage in the SPR to receive entitlements as if the oil had been processed in a domestic refinery.[20] This program is reflected by a decrease in the DOSR (by adding a number equal to the number of SPR entitlements issued to the denominator).[21]

F. CALIFORNIA LOW-GRAVITY, HIGH-SULPHUR CRUDE OIL ENTITLEMENTS

Since 1976, producers of California low-gravity, high-sulphur crude oil have been faced with depressed prices because (1) entitlements obligations did not take into account the large and widening quality differential between California oil and other oil; (2) ANS oil was becoming more freely available, especially in the West Coast; and (3) high-sulphur oil is an unattractive fuel source in California because of the state's rigid environmental standards. Under a special program designed to boost the market attractiveness of California low-gravity crude oil, the ERA grants refiners of the product additional entitlements based on a sliding scale inversely proportional to the weighted average gravity of the refiner's receipts.[22] The ERA reduced the DOSR (by subtracting a number equal to the number of special entitlements issued under this program from the numerator) to spread the cost of this benefit nationwide.[23]

G. OTHER CATEGORIES OF OIL

Naval Petroleum Reserve (NPR), stripper well[b], tertiary[b], ANS and

[b] See Glossary for definition.

imported oil are all treated as uncontrolled oil for entitlement calculations.[24] Thus they do not affect the DOSR or a company's entitlement position, but they do affect a company's entitlement revenue via the entitlement price.

H. EXCEPTIONS AND APPEALS RELIEF

Firms can seek relief from compliance with the DCOE program regulations by petitioning the DOE's Office of Hearings and Appeals (OHA). OHA was established to provide relief to firms affected by DOE regulations which otherwise would suffer serious hardships or gross inequity.[25] About 80 percent of all successful exception applications, from the program's inception in December 4, 1974, through August 12, 1977, were submitted by small refiners. The most frequent form of relief granted by the OHA to entitlements program participants is a reduction in the applicant company's entitlement obligations.[26] This remedy is reflected by a reduction in the DOSR, effected by subtracting from the numerator a number equal to the total number of entitlement obligations excused through the exceptions and appeals process.[27]

NOTES TO APPENDIX C

1. 10 C.F.R. Section 211.62 (1978).

2. 10 C.F.R. Section 211.67(e) (1978).

3. Pub. L. No. 94-163 Section 403 (amending the EPAA by adding Section 4(e), codified at 15 U.S.C.A. Section 753(e) (1978).

4. FEA Entitlement Program Handbook, page 24. See note 6 in the report.

5. FEA Entitlement Program Handbook, page 27. See note 6 in the report.

6. 10 C.F.R. Section 211.62 (1978).

7. 10 C.F.R. Section 211.67(a)(3) (1978).

8. 10 C.F.R. Section 211.62 (1978).

9. 10 C.F.R. Section 211.67(d)(4) (1978).

10. 10 C.F.R. Sections 211.62, 211.67(d)(4) (1978).

11. FEA Entitlement Program Handbook, page 25. See note 6 in the report.

12. 10 C.F.R. Section 211.67(d)(5) (1978).

13. 10 C.F.R. Sections 211.62, 211.67(d)(5) (1978).

14. 10 C.F.R. Sections 211.62, 211.67(a)(5) (1978).

15. 10 C.F.R. Sections 211.62, 211.67(a)(5) (1978).

16. 10 C.F.R. Sections 211.62, 211.67(a)(5) (1978).

17. See 10 C.F.R. Section 211.67(d)(8); 43 Fed. Reg. 32429 (May 18, 1978).

18. 43 Fed. Reg. 21329 (May 18, 1978).

19. Pub. L. No. 94-161 Section 151, codified at 42 U.S.C.A. Section 6231 (1978).

20. 42 Fed. Reg. 21761, 21763 (April 29, 1977), codified as 10 C.F.R. Sections 211.67(d)(6), (d)(7) (1978).

21. 10 C.F.R. Sections 211.62, 211.67(d)(6), 211.67(d)(7) (1978).

22. 10 C.F.R. Section 211.67(a)(4) (1978).

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23. 10 C.F.R. Sections 211.62, 211.67(a)(4) (1978).

24. See page 1 of Form ERA 49.

25. 10 C.F.R. Section 205.50 (1978). Exception decisions may be appealed under the procedures set forth in 10 C.F.R. Sections 205.100-205.109 (1978).

26. This conclusion is based on a review of over 200 exceptions decisions issued between 1974 and 1977. See Appendix E.

27. See Domestic Crude Oil Entitlements Program, note 6 above, at page 70.

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APPENDIX D

ANALYSIS OF FORMS

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ANALYSIS OF FORMS

The analysis of forms and instructions for the DCOE system is a necessary preliminary step for validation of the data collected by the system. This analysis is complicated by the fact that since the inception of the Domestic Crude Oil Allocations Program, the forms on which companies are required to report their data have undergone several major and numerous minor changes. These changes have been necessary because of the dynamic nature of the entitlements program. Almost continual changes in the law and accompanying regulations have meant that new, different, or additional data was periodically necessary. For the purpose of our analysis, the January, 1978 version of Form ERA-49 was used. A somewhat modified version of this form is currently in use.

This appendix contains the details of our analysis, including location of possible faults and fault types, description of the discrepancy likely to follow from the fault, and recommendation as to how the fault might be corrected. In addition to the Refiners' Monthly Report Form (ERA-49), some analysis has also been given to the Naphtha Imports Monthly Report (FEA P-129-M-0), the Report of Oil Imports into the United States and Puerto Rico (FEA-P-113-M-0), and the Entitlement Transaction Report (FEA P-103-M-0).

1. Refiners' Monthly Report Form, ERA-49 (August, 1978 Version)

A. Lack of internal consistency
B. Undefined term in the instructions
C. Ambiguous or insufficiently precise reference to regulations
D. Concept or term not clearly defined
E. Lack of clarity in language
F. Omission of an instruction

(i) ITEM: Definition of "Crude Oil Runs to Stills" -- General Instructions, V. Definitions (page 4), "...in accordance with Form FEA P-320-M-0."

FAULT TYPE: D

FAULT: FEA P-320-M-0 does not use the term "runs to stills." In Section A, it uses "inputs" and in Section F it uses "charged to." These two differ in that "charged to" excludes crude oil not input to the distillation units. Thus an ambiguity is introduced.

LIKELY DISCREPANCY: Before this can be estimated, it must be determined what percentage of crude oil is not input to the distillation units. Also, the frequency of error must be estimated via field interviews.

RECOMMENDATION: There should be an equivalence of terms established between ERA-49 and P-320. The reference to P-320 should be to a specific part of that form.

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(ii) ITEM: Definition of "Crude Oil Runs to Stills" -- General Instructions, V. Definitions (page 4).

FAULT TYPE: D

FAULT: This phrase is neither precise in reference or in meaning. It could refer to physical measurement (metering), but this procedure is not in P-320. Therefore, it presumably refers to the definition of "crude oil runs to stills" (see (i) above). It may be a source of confusion since Form P-320 requires reporting to the nearest 1,000 barrels only, while ERA-49 requires reporting to the nearest barrel.

LIKELY DISCREPANCY: Rounding, where it should not be done, will lead to small percentage errors which are likely to balance out. Their frequency is to be determined.

RECOMMENDATION: There should be a reference to a specific part of P-320, and the term measured should be clarified.

NOTE ON ITEMS (1) - (ii): The reference to Form FEA P-320-M-0 is from June 1978 only. Previous referenceswas to BOM Form 6-1300-M.

(iii) ITEM: Definition of "Crude Oil Runs to Stills" -- General Instructions, V. Definitions (page 4). "...and all other inputs to the distillation units qualifying under 10 CFR Section 211.67."

FAULT TYPE: C

FAULT: This phrase does not appear in the definition in Section 211.62. The reference is to Section 211.67(d), which has eight subparagraphs. Only subparagraph (3) is rele-

vant here. Adjustments due to subparagraphs (1), (2), (4) and (5) are listed separately, on ERA-49 or on P-129-M-1. (See (v) for subparagraphs (6) and (7).) The likelihood of a mistake, however, appears small.

LIKELY DISCREPANCY: If a mistake is made, there may be double inclusion in or deduction from adjusted crude oil runs to stills. This could be a large error; it is, however, unlikely to occur.

RECOMMENDATION: The phrase should read "...qualifying under 10 CFR Section 211.67(d)(3)."

(iv) ITEM: Definition of "Crude Oil Runs to Stills" -- General Instructions, V. Definitions (page 4).

FAULT TYPE: F

FAULT: Omission of reference to Strategic Petroleum Reserve Sales. Such sales are included in adjusted runs to stills, but must be reported only on a separate form.

LIKELY DISCREPANCY: If a mistake is made, it could result in a fairly large error. The mandate for such sales is only 15 months old, and they are not made frequently.

RECOMMENDATION: The specific reference in the recommendation under (iii) above should prevent confusion.

(v) ITEM: Definitions of "New Crude Oil" and "Old Crude Oil" in General Instructions, V. Definitions (page 5).

FAULT TYPE B

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FAULT: The term "base production control level" is not defined in the form, nor is any reference given as to where it is defined.

LIKELY DISCREPANCY: Since the seller of the oil must certify its type, this is not important to the refiner filling out the form. However, a reference to an appropriate definition would be helpful.

RECOMMENDATION: Give reference to definition of BPCL in Section 212.72.

(vi) ITEM: Definition of "Crude Oil Reeeipts" in General Instructions, V. Definitions (page 3).

FAULT TYPE: D

FAULT: "Condensate recovered at the inlet side of a gas processing plant" should be specifically excluded from crude oil receipts, or the categories in which it is included should be stated. (It is excluded from "new" and "old" oil.)

LIKELY DISCREPANCY: Possible incorrect inclusion or exclusion. Magnitude and frequency may be determined by field interviews.

RECOMMENDATION: Define plant condensate and explain its status in detail.

(vii) ITEM: Definition of "Other Domestic Oil" -- General Instructions, V. Definitions (page 6). "...as explained in 10 CFR Section 212."

FAULT TYPE: C

FAULT: The reference to Section 212 is not specific.

LIKELY DISCREPANCY: Difficult to estimate or guess what an incorrect interpretation could lead to. Main effect is time wasted in searching through Section 212.

RECOMMENDATION: Give reference to specific subsection of Section 212.

(viii) ITEM: Definition of "Residual Fuel Oil" in General Instructions, V. Definitions (page 6).

FAULT TYPE: A

FAULT: There are three definitions of residual fuel oil in 10 CFR -- in Sections 211.51, 212.31 and 213.27. These are differently worded, but may be effectively the same.

Since the DCOE System uses data directly based on Section 213 (Importers' Monthly Report, Form P-113) and relies on terms defined in Section 212, a person filling in the form may become confused and use the wrong definition. There may be internal inconsistency in the information collected on residual fuel oil.

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LIKELY DISCREPANCY: Probably small.

RECOMMENDATION: Specify appropriate definition.

(ix) ITEM: Instructions for reporting of "Buy/Sell Crude" in General Instructions, VI. Special Instructions (page 7).

FAULT TYPE: C

FAULT: Dates given do not agree with regulations in Section 211.67(f). Instructions could be improved in terms of clarity and ease of reading.

LIKELY DISCREPANCY: The wrong date would lead to incorrect reporting of buy/sell transactions from July 1975 to February 1976. The rule whereby such transactions are made at the weighted average cost of imported oil is applied from two early a date in the instructions. The magnitude of error depends on the size of the price difference and the size and frequency of such transactions. This instruction, however, has just been introduced.

RECOMMENDATION: Rewrite instructions as follows: "Transactions under 10 CFR Section 211.65 ("Crude Oil Buy/Sell Program")".

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(1) Transactions occurring on or after March 1, 1976.

(a) Purchasers of crude oil under the Buy/Sell Program should include such crude oil in the "imported oil" category of "Crude Oil Receipts" on page one of ERA-49.

(b) Sellers of crude oil under the Buy/Sell program should deduct such sales from the category "imported oil" of "Crude Oil Receipts" on page one of ERA-49. If domestic crude oil was actually sold under the Buy/Sell Program, such sales will be deemed not to have occurred for reporting volume and cost on ERA-49, i.e., the related volumes of old and new oil shall be included in the seller's crude oil receipts (page one and page two or three) in the month the sale is made.

NOTE: Such transactions should be priced at the weighted average cost of all oil imported by the seller, with adjustments as stated in 10 CFR Section 212.94.

(2) Transactions occurring before March 1, 1976.

(a) Purchasers should include such volumes of crude oil in the appropriate categories of " Crude Oil Receipts" on page 1 of ERA-49, and on page 2 (for "old" oil) or page 3 (for "new" oil). Such classification should be based on certification by the seller of the oil.

(b) Sellers should reduce oil receipts by making a pro-rated reduction to all crude categories based on the receipt volumes (page 1) as a percentage of the total receipts, regardless of the actual crude delivered. Corresponding reductions

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should be made to receipts of old oil (page 2) and upper tier (new) oil (page 3).

(x) ITEM: Instructions for reporting of " Exchanges" in General Instructions, VI. Special Instructions (page 8). "The exchange...refiner concerned."

FAULT TYPE: E

FAULT: Poor sentence structure.

LIKELY DISCREPANCY: None

RECOMMENDATION: Rewrite the sentence as: "The exchange volumes...in accordance with its existing accounting procedures, if these are generally accepted, and consistently and historically applied by the refiner concerned."

(xi) ITEM: General Instructions, VIII. Specific Instructions for Item No. 1 (i): "...indicate the number of the amendment on the line provided."

FAULT TYPE: F

LIKELY DISCREPANCY: Not known.

(xii) ITEM: General Instructions, VIII. Specific Instructions for Item No. 4, Crude Oil Receipts (page 11).

FAULT TYPE: F

FAULT: The instructions do not mention corrections to volume for temperature and BS&W. This applies to all reported volumes.

LIKELY DISCREPANCY: The corrections are standard refinery practice, and mistakes should be infrequent.

RECOMMENDATION: The omission should be corrected, to avoid any possible error.

(xiii) ITEM: General Instructions, VIII. Specific Instructions for Item No. 4, Crude Oil Receipts, paragraph one (page 11).

FAULT: While it is stated on the form itself that line 10399 is the sum of lines above it on page 1 of ERA-49, <u>excluding</u> lines 10119, 10199, 10259 and 10319, this does not appear in the instructions.

LIKELY DISCREPANCY: The person filling in the form and reading only the instructions on page 11 may overlook the statement on the form. This will lead to doublecounting.

RECOMMENDATION? State the instructions for line 10399 explicitly, including the fact that summation should be done for columns (D) and (E) and <u>not</u> for column (F), which is calculated from columns (D) and (E) for each line.

(xiv) ITEM: General Instructions, VIII. Specific Instructions for Item No. 7, Runs to Stills, paragraph 2 (page 15); instructions for lines 40131 through 40138.

FAULT TYPE: A

FAULT: The source of company short names is given as the Entitlement Notice. The instructions for lines 20131 through 20138 in Item No. 5 refer to "the official list of participants."

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LIKELY DISCREPANCY:

RECOMMENDATION: Give reference to the same list throughout.

(xv) ITEM: General Instructions, VIII. Specific Instructions for Item No. 7, Runs to Stills, paragraph 9 (page 16); instructions for line 40399.

FAULT TYPE: C

FAULT: These instructions merely repeat the section heading.

LIKELY DISCREPANCY:

RECOMMENDATION: The instructions should be more explicit, referring for instance to 10 CFR Section 211.67(e).

(xvi) ITEM: Instructions referring to continuation sheets, in General Instructions, VIII. Specific Instructions, Item No. 7; instructions for lines 40139 and 40149 (pages 15 and 16).

FAULT TYPE: F

FAULT: There may be confusion as to how continuation sheets are to be filled out.

LIKELY DISCREPANCY

RECOMMENDATION: At these points, reference should be made to VII, Format Instructions, (bottom of page 9).

(xvii) ITEM: General Instructions, VIII. Specific Instructions for Item No. 9, California Old Oil Receipts.

FAULT TYPE: B

FAULT: The term "weighted average gravity" is not defined.

LIKELY DISCREPANCY: This is probably a well-understood term in the industry, and there should be few errors.

RECOMMENDATION: Correct the omission.

ADDENDUM

(xviii) ITEM: ERA-49 form, Item No. 4 (page 1).

COMMENT: The California categories of oil should be listed separately to avoid confusion in summation over categories.

(xix) ITEM: Spaces for reporting firm short names, date of report, and reporting period, on pages 2-6 of ERA-49 form.

COMMENT: There is no instruction as to filling these out.

(xx) ITEM: Instructions for line 10209.

COMMENT: The relationship of this line ("new oil receipts") to lines on page 3 of the form ("upper tier oil receipts") is not made clear.

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2. FEA P-129-M-O (Naphtha Imports Monthly Report)

COMMENTS: This form has no instructions beyond 'Purpose,' 'Who Must Submit,' 'Where' and 'When.'
Salient points of omission are:

(i) no mention of what constitutes an import and what determines its time of entry.

(ii) no definition of 'naphtha,' or specific reference to where such a definition may be found.

(iii) no definition of what constitutes 'processing' or 'petrochemical feedstock.'

(iv) no instructions on measurement of volumes of naphtha, such as temperature corrections.

(v) no instructions as to how accurately volumes or costs are to be reported, or weighted average cost to be calculated.

(vi) no allowance for adjustments

(vii) no reference, given (i) - (vi), to instructions for P-113-M-O or ERA-49.

(viii) no instructions for making amendments.

Presumably, this form has been thought to be not worth bothering about, since there are only five reporting firms.

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4. FEA P-103-M-0 (Entitlement Transaction Report)

COMMENTS: (i) Instructions, Item No. 3, paragraph 4: "The number of entitlements required...in line 0399 of FEA-P-102-M-0."

(a) The form P-102 has been replaced.

(b) The new form has no line 0399.

(c) 'old oil has been replaced by "deemed old oil."

(d) The number of entitlements required does not correspond to any single number on the ERA-49. It cannot be calculated by an individual firm. In fact, it must be obtained by firms from the Entitlement Notice. Reference should therefore be made to this.

(ii) There are no instructions for completing "Reporting Firm Short Name" and "Date of Report" on pages 2 and 3.

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3. **FEA P-113-M-O (Report of Oil Imports into the United States and Puerto Rico**

ITEM: **Instructions, V. Date of Import.**

COMMENT: **The Customs forms 7501, 7505 provide crosschecks on date, port of entry, country of origin, and volume.**

ITEM: **Instructions, VIII. General Instructions. 14.**

COMMENT: It should be highlighted that the number in Schedule T, column m, used for the entitlements program, is based on the inclusion of imports from the U.S. Virgin Islands as 'domestic'.

ITEM: **Form P-113-M-O.**

COMMENT: **There is no space on the form for the Entitlements Office to make corrections as the result of amendments (resubmissions due to internal errors). This was available on the Form FEA P-126-M-O, which was replaced by FEA P-113-M-O.**

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APPENDIX E

PRELIMINARY QUESTIONNAIRE

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E-3
PRELIMINARY QUESTIONNAIRE

A. DEFINITIONS

This section is designed to examine two major items on the Refiners' Monthly Report (Form ERA-49, formerly P-102). These items are "Crude Oil Receipts" and "Crude Oil Runs to Stills." Each of these items can be broken down in several ways. Each is adjusted in several ways on the form. The interviewer should study the form to get an idea of what it requires. The purpose of questions in this section is to examine if the refiner's definition of each of these terms corresponds with that in the regulations (10 CFR Section 211).

1. Crude Oil Receipts

a. Do you find the instructions relating to "Crude Oil Receipts" on Form ERA-49 to be clear? If not, why not? (Instructions on page 3 of General Instructions.) In particular, what do you think of the instructions relating to oil delivered to another refiner for processing on your account?

b. What do you understand by the category "other domestic oil"? (Form ERA-49, page 1, line 10239).

c. Do you include condensate recovered at the inlet side of a gas processing plant in your reported crude oil receipts on page 1 of the form? On page 2? On page 3?

d. How often do your reported figures contain estimates for crude oil receipts, and old and new oil receipts? What is the margin of error in your estimates (average and maximum, % terms)? If an estimate turns out to be wrong (for what reason can this happen?), how do you report the true volume? What length of time may elapse between the reporting of the estimate and the true volume?

e. Do you have clear guidelines on how to report transactions under the "Crude Oil Buy/Sell Program?" If not, why not? How often do such transactions occur? What volumes are involved (as a % of your total

receipts)? At what prices do these transactions take place?

f. Do you have clear instructions on the reporting of exchanges of crude oil? If not, why not? How often do you make such exchanges? What is the size of these transactions (relative to total crude oil receipts)? Do you include crude oil exchanged away in your crude oil receipts? If so, under what category of crude receipts ("old," "new," imported)?

g. How often do you request from ERA that the crude oil receipts for a given month be averaged over several months, for purposes of calculating entitlements? What procedures do you use in making such requests? What are the reasons for such requests?

h. What is the distinction between new oil as reported on page 1 of ERA-49 and upper tier oil as reported on page 3?

i. What do you understand by "plant condensate?" Can this be broken down into further categories? If so, how?

2. Crude Oil Runs to Stills

a. Do you find the instructions relating to "Crude Runs to Stills" to be clear? If not, why not?

b. Do you include crude oil input to units other than the crude distillation unit in "Crude Runs to Stills?" (Cf. line 40119, page 4 of ERA-49.)

c. Do you include crude oil used as refinery fuel in this term? (Cf. line 40119.)

d. What percentage of crude oil used in your refinery is not input to the crude distillation unit? Can you give a breakdown of what uses such oil is put to (i.e., crude not going to distillation unit)?

e. Does the figure reported as "Crude Runs to Stills" (line 40119) correspond to any figure reported on the Form FEA P-320? Is any

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figure reported on page 4 of ERA-49 the same number reported on P-320 (Section A or Section F of P-320)?

f. Does the number reported on line 40119 (page 4, ERA-49) correspond to any number on the form BOM (Bureau of Mines) 6-1300-M? If so, which number on the latter form?

g. In the reported figure for crude runs to stills (line 40119) do you include any other inputs besides crude oil? What are these?

h. Are the instructions (on page 12 of general instructions) relating to export sales of products (cf. line 40159) clear? If not, why not?

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B. RESIDUAL FUEL OIL

For convenience, questions relating to residual fuel oil are grouped together. By type, these questions fall in the category of Section 1, or in later sections.

1. Does the definition of "residual fuel oil" in the instructions (page 5 of General Instructions for ERA-49) agree with the definitions used in your company's internal record-keeping?

2. Do you include crude oil burned as fuel in "residual fuel oil"?

3. In reporting line 50199 (page 5 of ERA-49), how do you determine how much residual fuel oil produced will be sold in or into the BOM East Coast Refining District? If you make an estimate, how do you report adjustments to such estimates?

4. Is your company an importer of residual fuel oil into the BOM East Coast Refining District? I so, does the definition of residual fuel oil used in completing Form FEA P-113 agree with the definition used for Form ERA-49?

5. Does line 50119 include residual fuel oil which is not sold by you into the BOM East Coast Refining District, but which you know will eventually be sold into it? If so, how do you know it will be sold into that District?

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C. COST OF OIL

This section asks questions to see if refiners correctly report the cost of oil on ERA-49.

1. Do you include transportation costs in the cost of oil as reported on ERA-49 (page 1 of form)?

2. Are there any insurance costs included in the cost of oil as reported on ERA-49?

3. Are there any taxes included in the cost of oil as reported on ERA-49?

4. Do you ever report costs which contain estimates in column E of Item 4 (page 1 of Form ERA-49)? If so, are these estimates because volumes are estimated, or because the prices are estimates? What is the procedure for reporting an adjustment to an estimated cost?

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D. PHYSICAL MEASUREMENT (METERING, DIPSTICKING, ETC.)

1. How are your receipts of crude oil actually measured? What is the % error in this measurement (average and range)?

2. How is your inventory of crude oil measured? What is the percent error in this measurement (average and range)?

3. What is the average time crude oil stays in inventory? How much does this time fluctuate?

4. What is the ratio of crude oil in inventory to receipts for a month, on the average?

5. How are inputs to processing units measured? What are the % errors in these measurements (average and range)?

6. Are volumes processed for other refiners or for non-refiners physically measured separately?

7. What corrections are made to measured volumes for variations in temperature?

8. What corrections are made to measured volumes of crude oil for Bottom Sediment & Water? What is the magnitude (% terms) of these corrections?

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E. SOURCE DOCUMENTS AND ACCOUNTING

This section attempts to get information as to how physical measurements are aggregated and translated into written records/accounts. Furthermore, to what extend do records correspond to physical flows?

1. What are the source documents for crude oil receipts?

2. How are actual receipts checked against invoice or contract figures? How is any discrepancy resolved?

3. How are these receipts recorded in the company's books?

4. Do you ever check if the crude oil you buy has been correctly certified by the seller as "old," "new" or otherwise? If you do, why do you think such checking is necessary? What procedure do you use in making such a check?

5. How are transactions under the "Crude Oil Buy/Sell Program" recorded in the company accounts?

6. How are exchange transactions recorded in the company accounts?

7. What is the difference in timing between the agreement to make an exchange and the actual exchange?

8. What is the difference in timing between the physical completion of an exchange of crude oil and its recording in the company's accounts?

9. What is the difference in timing between a purchase or sale of crude oil and its recording in the company's books?

10. Does the company sell crude oil out of refinery inventory? How are such sales recorded?

11. How are aggregate records developed from the metering of flows to processing units? What form do these records take?

12. How do you obtain information on the volumes processed for your company by other refiners? Are there any time lags involved in this relay of information? Do you report contracted volumes or actual volumes processed under such agreements? (Can the two differ?)

13. Do you ever make adjustments in reported volumes of crude oil processed by other refiners for your account?

14. Do you have more than one refinery location? If so, how do you aggregate the data for various locations for your internal record-keeping? Do differences in accounting systems at different refineries cause difficulties in aggregating data? If so, what kinds of differences, and what kinds of resulting difficulties?

15. How do you account in your company's books for crude oil delivered to another refiner for processing on your account? Does this recording method differ from the way such volumes are reported in old and new crude oil receipts (page 2 and 3 of ERA-49)?

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F. FILLING OUT ERA-49

1. How many people are involved in directly filling out ERA-49? How many people are involved indirectly, in that they prepare worksheets? How many total man-hours does it take to fill out ERA-49?

2. How often do you consult the regulations in filling out ERA-49? How often do you consult the Entitlements Handbook issued by ERA (in DOE) in filling out ERA-49? Do you have an internal manual for guidance in filling out ERA-49? If so, may we have a copy?

3. If several lines on the form are to be added, is this done on a separate piece of paper and the whole set transcribed, or is addition done directly on the form?

4. After ERA-49 has been filled in, how much time is spent in checking the numbers filled in for clerical errors?

5. How many worksheets are prepared for filling out ERA-49? Do these come from different departments? Does the person filling out the form verify the worksheets in any way?

6. What company records are used to arrive at the reported components of crude oil receipts (pages 1, 2, 3 and 6, 9, and 10)? What data transformations are involved?

7. What company records are used to arrive at the reported components of crude oil runs to stills (page 4, Item 7)?

8. In what circumstances do ERA-49 reporting requirements require aggregation of data available at different locations?

9. Is the number reported in line 10109 the same number as reported in line 20119 <u>or</u> 20399? If not, what do they differ?

10. Is the number reported in line 10209 the same number as reported in line 30119 <u>or</u> 39399? If not, why do they differ?

G. CORRECTIONS TO PREVIOUSLY REPORTED VOLUMES

The purpose of these questions is to examine the procedures whereby companies change previously reported data. This is necessary when previous figures were estimates, or there were errors made. There are separate procedures for these two categories of corrections. These questions should indirectly identify any confusion between these among those filling in ERA-49.

1. How often do you make adjustments to reported crude oil receipts? What are the reasons for these adjustments? What is the direction of adjustments? What is their magnitude (% terms, average, and range)?

2. Do you ever report corrections to previously reported volumes of runs to stills? How often do you do so? For what reasons do you do do? What procedure do you follow? What is the magnitude and direction of these corrections?

3. Do you ever submit amendments? How often do you do so? What are the various causes for your submitting amendments? How long does it normally take to realize an error and submit an amendment? What is the magnitude and direction of these amendments? How do you number amendments on ERA-49 (page 1, Item [i])?

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H. MISCELLANEOUS

1. Capacity Measurement

a. Is your company a small refiner under the Code of Federal Regulations?

b. Has your capacity been certified by the DOE? If so, by which department and which office? How was your capacity certified?

c. If your company is a small refiner, what was the procedure followed in obtaining this status?

2. Naphtha Imports into Puerto Rico

a. Does your company fill in Form P-129? If so, do you have any comments on its format and instructions?

3. Questions about Entitlements Transactions and Their Reporting

a. How do you learn of entitlement prices each month?

b. Does it matter if you know about entitlements prices early? Late?

c. What is the procedure you follow in buying or in selling entitlements?

d. Do you have any comments on the format, instructions or requirements of Form P-103 (The Entitlements Transactions Report)?

e. Do you use the Entitlements Audit Trail? If so, how do you do so?

4. General Comments (Must be last!)

a. Do you have any other comments on the format, instructions or requirements of Form ERA-49?

b. Do you think there is any way a refiner or group of refiners might use the entitlements system for their own advantage? If so, would you like to comment further?

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c. How much knowledge do you have of what other firms in the industry are doing? What form of knowledge is this, if it relates to the entitlements system?

d. Do you have any comments on the provisions of the entitlements system for small refiners, for exceptions and relief, for residual fuel oil imports or for California oil?

e. Would you like to comment on the overall impact of the entitlements system and any changes you might like to see?

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APPENDIX F

SENSITIVITY OF THE CALCULATION PROCEDURES

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SENSITIVITY OF THE CALCULATION PROCEDURES

This appendix discusses in detail the sensitivity of the two important outputs of the DCOE System, i.e., the national Entitlement Price and the Entitlement Position of a specific company, to variations in major input data variables.

A. PRIMARY VARIABLES

Identification of the important or primary input variables serves as a valuable guide to this validation study. Input data that has a major impact on the entitlement price or total entitlement revenue need to be more carefully validated than data that does not have as significant an impact. Further, it is reasonable to believe that intentional and systematic misreporting of data, if indulged in at all, is more likely to occur when advantage is obtainable.

The primary input data whose sensitivity was studied were: 1) Crude Runs to Stills; 2) Upper Tier Receipts in Conjunction with Crude Runs; 3) Old Oil Reported as Upper Tier Receipts; 4) Exception and Appeals; and 5) Prices of Old Oil, Upper Tier Receipts, Imported Oil and Stripper Oil.

B. ANALYSIS METHOD

There are four basic formulae which affect the calculation of the entitlement price and a company's entitlement position:

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(1) The Domestic Old Oil Ratio (DOOR):

$$DOOR = \frac{\text{WAC uncontrolled oil} - \text{WAC upper tier oil} - 0.21}{EP} \quad (1)$$

(2) The Domestic Oil Supply Ratio (DOSR):

$$DOSR = \frac{OOR + (DOOR \times UTR) - SRB - EAR - NA - SFE - CALBEN}{CR + 0.3IR - 0.5DRD + SPR} \quad (2)$$

(3) The Entitlement Price (EP):

$$EP = \text{WAC uncontrolled oil} - \text{WAC old oil} - 0.21 \quad (3)$$

(4) A Company's Entitlement Position (EN_i):

$$EN_i = (CR_i + 0.3IR_i - 0.5DRD_i + SPR_i) \times DOSR + SRB_i \quad (4)$$

$$+ EAR_i + N \times NI_i + SFE_i + CALBENS_i - (OOR_i + DOOR \times UTR_i)$$

= entitlement sell requirement if positive.

where:

CALBEN = California Heavy Oil Benefit Entitlements

CR = Crude Runs to Stills (bbl)

DOOR = Domestic Old Oil Ratio

DOSR = Domestic Oil Supply Ratio

DRD = Domestic Residual Deduction

EAR = Exceptions and Appeals Relief (No. of entitlements)

EN = Entitlement (buy/sell) Obligation

EP = Entitlement Price (dollars)

IR = Imported Residual Fuel Oil Sold in East Coast Market (bbl)

N = Natha Imports (into Puerto Rico) Product Ratio

NA = Naptha Entitlements

NI = Naptha Imports into Puerto Rico (bbl)

OOR = Corrected Old Oil Receipts (bbl)

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SFE = Synthetic Fuel Entitlements

SPR = Strategic Petroleum Reserve Imports

SRB = Small Refiner Bias Entitlements

UTR = Upper Tier Receipts (bbl)

WAC = Weighted Average Cost (dollars per bbl)

The effect of each of the five primary inpput variables on the above four exogenous parameters was analyzed using partial derivatives.

C. TYPICAL DATA FOR SENSITIVITY STUDIES

In order to obtain an approximate numeric or dollar value for the net effect of a particular variation, it was necessary to assume typical or nominal values for various input data. These data were:

National Data

CR =	450,384,043	barrels
0.3IR =	0.3 x 35,024,593	"
0.5DRD =	0.5 x 16,508,246	"
SPR =	3,252,374	"
DOOR =	0.2068	(April 1978)
DOSR =	0.2184	(" ")
EP =	$8.35	(" ")

Stripper Oil constitutes 13.5% of Uncontrolled Oil (April 1978)

Imported Oil constitutes 74.6% of Uncontrolled Oil (" ")

Typical Large Refiner Data		Typical Small Refiner Data	
OOR_i = 6,282,474	barrels	OOR_j = 216	barrels
CR_i = 20,500,000	"	CR_j = 218,831	"

$0.3IR_i = 0.3 \times 325{,}700$ barrels $\quad 0.3IR_j = 0$

$0.5DRD_i = 0.5 \times 21{,}790$ " $\quad 0.5DRD_j = 0$

$SPR_i = 0 \quad\quad SPR_j = 0$

D. SENSITIVITY STUDIES

1. Crude Runs to Stills

$$DOSR = \frac{OOR + (DOOR \times UTR) - SRB - EAR - NA - SFE - CALBEN}{CR + 0.3IR - 0.5DRD + SPR}$$

$$\frac{\partial DOSR}{\partial CR} = - \frac{DOSR}{CR + 0.3IR - 0.5DRD + SPR}$$

Therefore the percent change in DOSR can be given by:

$$\frac{\Delta DOSR}{DOSR} = - \frac{\Delta CR_i}{CR + \Delta CR_i + 0.3IR - 0.5DRD + SPR}$$

$$\cong - \frac{\Delta CR_i}{CR + 0.3IR - 0.5DRD + SPR} \text{ assuming } \Delta CR_i << CR$$

And the change in the entitlement sell position of a company can be given by :

$$\Delta EN_i = \Delta DOSR(CR_i + \Delta CR_i + SPR_i + 0.3IR_i - 0.5DRD_i) + DOSR \times \Delta CR_i$$

$$\cong DOSR \times \Delta CR_i \times \left\{1 - \left(\frac{CR_i + \Delta CR_i + 0.3IR_i - 0.5DRD_i + SPR_i}{CR + \Delta CR_i + 0.3IR - 0.5DRD + SPR}\right)\right\}$$

Since the factor on the right is larger for smaller companies, we can conclude that adding one barrel of crude oil to the crude runs to stills will have slightly higher rate of return for small companies than for large companies.

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2. Upper Tier Receipts in Conjunction with Crude Runs

If both crude runs and upper tier receipts are misreported, i.e., an overreporting new oil by ΔCR_i and a corresponding of overreporting of CR by ΔCR_i, then the percent change in DOSR would be:

$$\frac{\Delta DOSR}{DOSR} = - \frac{\Delta CR_i (1 - (DOOR/DOSR)}{CR + \Delta CR_i + 0.3IR - 0.5DRD + SPR}$$

which implies a smaller rate of return than an independent change in the CR. The corresponding change in the entitlements position would be:

$$\Delta EN_i = DOSR \times \Delta CR_i \times \left\{ \left(\frac{DOOR}{DOSR} - 1 \right) \times \left(\frac{CR_i + \Delta CR_i + 0.3IR_i}{CR + \Delta CR_i + 0.3IR} \right. \right. \tag{6}$$

$$\left. \left. \frac{- 0.5DRD_i + SPR_i}{- 0.5DRD + SPR} \right) + (1 - DOOR) \right\}$$

This implies that changing crude runs report simultaneously with the new oil report has a smaller rate of return than misreporting crude runs alone.

3. Old Oil Reported as Upper Tier Receipts

Here we consider the advantages of reporting some of the OOR as UTR (i.e., old oil becomes new oil at the refinery).

$$\frac{\partial DOSR}{\partial OOR} = \frac{- 1 + DOOR}{CR + 0.3IR - 0.5DRD + SPR}$$

$$\Delta DOSR = - \frac{\Delta OOR(1 - DOOR)}{CR + 0.3IR - 0.5DRD + SPR} \text{ ; recall that } \Delta OOR < 0.$$

Decreasing the OOR decreases the DOSR and the regulation becomes ineffective at the limit.

$$\Delta EN_i = \Delta DOSR \times (CR_i + SPR_i + 0.3IR_i - 0.5DRD_i) - (\Delta OOR_i - DOOR \times \Delta UTR_i) \quad (7)$$

$$= - \Delta OOR_i \cdot (1 - DOOR) \frac{CR_i + 0.3IR_i - 0.5DRD_i + SPR_i}{CR + 0.3IR - 0.5DRD + SPR}$$

$$- \Delta OOR_i \cdot (1 - DOOR)$$

$$= - \Delta OOR_i \cdot (1 - DOOR) \cdot \left(1 - \frac{CR_i + 0.3IR_i - 0.5DRD_i + SPR_i}{CR + 0.3IR - 05.DRD + SPR}\right)$$

The rate of return for switching one barrel of old oil into one barrel of new oil is higher for smaller companies that have access to both old and new oil. This can be seen from the two factors multiplying ΔOOR. For this analysis the first factor, (1 - DOOR), may be considered to be a constant.[1] The second factor varies between 0.95 and 1.0 and is very close to 1 for small companies, increasing the rate of return. Since small companies are more likely to buy expensive oil, they have the highest rate of return, everything else being constant.

4. Changes in the Exceptions and Appeals

Suppose an exception of EAR_i is granted to company i.

$$\Delta EAR = EAR_i$$

$$\Delta DOSR = - \frac{EAR_i}{CR + 0.3IR - 0.5DRD}$$

[1]The first factor, (1 - DOOR), in fact, decreases if a company changes cheap old oil into cheap new oil, and increases if a company switches expensive old oil into expensive new oil.

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$$\Delta EN_i = EAR_i \cdot \left(1 - \frac{CR_i + 0.3IR_i - 0.5DRD_i + SPR_i}{CR + 0.3IR - 0.5DRD + SPR}\right) \quad (8)$$

The interesting thing to note is that if a big company appeals for relief, then in effect it gets less than 100% of all the exceptions granted for. However, this difference does not seem to be significant enough to be a reason for overappealing.

5. Prices of Old Oil, Upper Tier Receipts, Imported Oil and Stripper Oil

In this section, sensitivity of entitlements program to cost reporting will be analyzed. Incorrect reporting of the price of the crude oil affects the entitlements system to a lesser degree. The quantities that are directly affected are the Entitlements Price, EP, and the Deemed Old Oil Ratio, DOOR. Both of these quantities are national constants. Consequently, a refiner cannot affect its own entitlement position directly by changing its cost of oil receipts. When such a change takes place every refiner is affected proportionately. Thus, there would appear to be less incentive for such misreporting.

Let the M refiners be denoted by the index j. Let N types of oil be denoted by the index i. Let i = 1 be old oil and i = 2 be new oil. i>2 indicates different types of uncontrolled oil, imported, stripper, etc. Let V_{ij} denote the volume and P_{ij} denote the price of different tiers of oil for different companies. The formulas for the EP and for the DOOR are given below:

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$$EP = \frac{\sum_{j=1}^{m} \sum_{i=3}^{n} V_{ij} \cdot P_{ij}}{\sum_{j=1}^{m} \sum_{i=3}^{n} V_{ij}} - \frac{\sum_{j=1}^{m} V_{1j} \cdot P_{1j}}{\sum_{j=1}^{m} V_{1j}} - 0.21 \qquad (1')$$

$$DOOR = \frac{\dfrac{\sum_{j=1}^{m} \sum_{i=3}^{n} V_{ij} \cdot P_{ij}}{\sum_{j=1}^{m} \sum_{i=3}^{n} V_{ij}} - \dfrac{\sum_{j=1}^{m} V_{2j} \cdot P_{2j}}{\sum_{i=1}^{m} V_{2j}} - 0.21}{EP} \qquad (3')$$

In order to get an idea about the rate of change of these variables, we should look at the derivatives of EP and DOOR with respect to the changes in reported prices.

For all i>2, j $\quad \dfrac{\partial EP}{\partial P_{ij}} = \dfrac{V_{ij}}{\Sigma_j \Sigma_{i \geq 3} V_{ij}} \qquad (9)$

For all i>2, j $\quad \dfrac{\partial DOOR}{\partial P_{ij}} = \dfrac{V_{ij}}{\Sigma_j \Sigma_{i \geq 3} V_{ij}} \cdot \dfrac{1}{EP} (1 - DOOR) \qquad (10)$

For all j, i=1 $\quad \dfrac{\partial EP}{\partial P_{1j}} = - \dfrac{V_{1j}}{\Sigma_j V_{1j}} \qquad (11)$

For all j, i=2 $\quad \dfrac{\partial EP}{\partial P_{2j}} = 0 \qquad (12)$

For all j, i=1 $\quad \dfrac{\partial DOOR}{\partial P_{1j}} = \dfrac{DOOR}{EP} \cdot \dfrac{V_{1j}}{\Sigma_j V_{1j}} \qquad (13)$

For all j, i=2 $\quad \dfrac{\partial DOOR}{\partial P_{2j}} = - \dfrac{V_{2j}}{\Sigma_j V_{2j}} \cdot \dfrac{1}{EP} \qquad (14)$

In order to determine the end effect of the above price changes on the entitlement position of a company, we take the following partial derivatives:

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$$\frac{\partial EN_j}{\partial P_{ij}} = \frac{\partial DOSR}{\partial P_{ij}} \cdot (CR_j + 0.3IR_j - 0.5DRD_j + SPR_j) - \frac{\partial DOOR}{\partial P_{ij}} (UTR_j)$$

$$= \frac{\partial DOOR}{\partial P_{ij}} [UTR \cdot (\frac{CR_j + 0.3IR_j - 0.5DRD_j + SRP_j}{CR + 0.3IR - 0.5DRD + SRP}) - UTR_j]$$

If we assume that j is a typical company, then

$$\frac{\partial EN_j}{\partial P_{ij}} = \frac{\partial DOOR}{\partial P_{ij}} \cdot [\sim 0.0] \cong 0.0$$

The entitlement revenue for company j is the product of EN_j and EP.

Therefore,

$$\frac{\partial ER_j}{\partial P_{ij}} = \frac{\partial EN_j}{\partial P_{ij}} \cdot EP + EN_j \cdot \frac{\partial EP}{\partial P_{ij}}$$

$$\cong EN_j \cdot \frac{\partial EP}{\partial P_{ij}}$$

Therefore, for small percentage changes

$$\Delta ER_j = \Delta P_{ij} \cdot EN_j \cdot \frac{\partial EP}{\partial P_{ij}}$$

$\frac{\partial EP}{\partial P_{ij}}$ is listed for all (equations 9,11,12)

There are several things to notice in the above analysis. The variable α will always be much smaller than unity, and $\frac{\partial DOOR}{\partial P_{ij}}$ and $\frac{\partial EP}{\partial P_{ij}}$ will be of the same order of magnitude. Consequently, the significant final effect on the entitlements revenue is due to the $\frac{\partial EP}{\partial P_{ij}}$ factor since $|EN| >> |EP|$.

For April 1978, α was equal to .195. Suppose that the company we are concerned with, c, has 1% of the market share of all the oil, and is a typical company, (i.e., $V_{ic} = 0.01 \times \Sigma_j V_{ij}$ for all i)

Case I:

Suppose that c reports stripper oil cost $2.00 per barrel higher than what it actually was. The volume of total stripper oil was 13.5% of the volume of all the uncontrolled oil in April 1978.

$$\frac{\partial ER_c}{\partial P_{ic}} \cong 0.00135 \times EN_c$$

Therefore, there is no incentive for a company that buys entitlements to report inflated uncontrolled oil costs. Let $EN_c = 5000$ entitlements. Then the net gain for c is:

$$\Delta ER_c \cong \left[.00135 \times (5000) \right] \times \$2.00 \cong \$13.50.$$

Case II:

Suppose that c reports the price of old oil $1.00 higher than what it actually is.

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$$\frac{\partial ER_c}{\partial P_{1c}} \cong 5000 \times (-0.01)$$

$$\Delta ER_c \cong -\$50.00$$

Case III:

Suppose that c reports the price of new oil $1.50 higher than what it actually is. Notice that the EP would not be effected.

Therefore,

$$\frac{\partial ER_c}{\partial P_{2c}} \cong 0.0$$

$$\Delta ER_c \cong 0.0$$

Notice that since everything is linear, one can easily extend this analysis to more general cases:

(a) If a company has 10% of the market share rather than 1%, then the final effect would increase ten-fold.

(b) If five companies that have 1% of the market share, each do the same thing as company c, then the final impact on other companies is aggrevated five times.

(c) If the price is reported $20.00 higher rather than $2.00 higher, again, the final effect is ten times as large.

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Table F.1 summarizes the effect of price sensitivity for large and small buyers and sellers of entitlements. In general, the price system is not sensitive to price reporting.

Conclusions:

The main conclusion is that changing volumes has a much more significant effect that changing the prices. The individual volume and price sensitivities are discussed in detail in section II.C.

6. Caluculations Supporting Figures 13 and 14

Figures 13 and 14 are based on the following assumptions and calculations:

For Large Buyer	Small Seller
Market share = 3% = Mj	Market share = 0.01% = M_k
P_{ij} = \$6.00	P_{ik} = \$6.00
P_{2j} = \$12.00	P_{2k} = \$12.00
P_{3j} = \$15.00	P_{3k} = \$15.00
WAC uncontrolled = \$14.50	WAC uncontrolled = \$14.50
OOR_j = 3 million bbls.	OOR_k = 10,000 bbls.
UTR_j = 3 million bbls.	UTR_k = 10,000 bbls.
$UNCONT_j$ = 8 million bbls.	$UNCONT_j$ = 25,000 bbls.
Imported oil is 75% of uncontrolled	Imported oil is 75% of uncontrolled
EN_j = -500,000 entitlements	EN_k = 10,000 entitlements
DOOR = 0.2	DOOR = 0.2
EP = \$8.00	EP = \$8.00

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CALCULATIONS

Volume: Case I: Decrease OOR by 10%

$$\Delta ER_j = -\Delta OOR_j\ (1-M_j)\ .\ EP$$

$$= (0.3 \text{ million bbls})\ .\ (0.97)\ .\ 8.00$$

$$= \$2{,}328{,}000.$$

$$\Delta ER_k = (1{,}000 \text{ bbls})\ .\ (0.9999)\ .\ 8.00$$

$$= \$8{,}000$$

Case II: Decrease UTR by 10%

$$\Delta ER_j = -\Delta UTR_j . DOOR\ (1-M_j)\ .\ EP$$

$$= \$465{,}600.$$

$$\Delta ER_k = \$1{,}600.$$

Case III: Change Uncontrolled Volume by 10%

By simply taking the appropriate partial derivatives:

$$\Delta ER_j \cong 0^1$$

$$\Delta ER_k \cong 0^1$$

Price: Case I: Old Oil

a) Large buyer of entitlements. Increase the price of OOR_j by 10%. (i.e. $.60)

$$\Delta ER_j = EN_j\ .\ \left(\frac{-V_{ij}}{\sum_j V_{1j}}\right)\ .\ \Delta P_{1j}$$

$$= -500{,}000\ .\ (-M_j)\ .\ 0.60$$

$$= \$9{,}000.$$

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b) Small seller of entitlements. Decrease the price of OOR_k by 10%. (i.e. -$.60)

$$\Delta ER_k = EN_k \cdot (-M_k) \cdot -0.60$$
$$= 10{,}000 \cdot (-0.0001)\ (-0.60)$$
$$= +\ \$.60$$

Case II. New Oil

a) Large buyer of entitlements. Decrease the price of UTR_j by 10% (i.e. -$1.20)

$$\Delta ER_j = EN_j \cdot (0.) \cdot (-\$1.20)$$
$$= 0$$

b) $\Delta ER_k = 0$

Case III: Uncontrolled Oil

a) Large buyer of entitlements. Decrease the price of imported oil by 10% (i.e. -$1.50)

$$ER_j = EN_j \cdot \frac{V_{3j}}{\sum_j \sum_{i \geq 3} V_{ij}} \cdot \Delta P_{ij}$$
$$= -500{,}000 \cdot (M_j \cdot 0.75) \cdot (-1.50)$$
$$= \$17{,}000.$$

b) Small seller of entitlements. Increase price of imported oil by 10% (i.e. $1.50)

$$\Delta ER_k = EN_k \cdot (M_k \cdot 0.75) \cdot (1.50)$$
$$= \$1.12.$$

The main result is that the percentage changes in prices are less significant than the percentage changes in volumes except for the uncontrolled oil. For uncontrolled oil changing the volumes almost has no effect on the entitlements revenue, while changing

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the price has a slight effect.

TABLE F.1

SENSITIVITY OF ENTITLEMENTS REVENUE TO PRICE REPORTING[1]

	OLD OIL		NEW OIL		STRIPPER OIL[3]		IMPORTED OIL[4]	
	Large[2] Buyer	Small Seller	Large Buyer	Small Seller	Large Buyer	Small Seller	Large Buyer	Small Seller
ΔP = \$0.1	10,000.00	-0.10	~ 0.0	~ 0.0	-1,350.00	0.01	-7,460.00	0.07
ΔP = \$1.0	100,000.00	-1.00	~ 0.0	~ 0.0	-13,500.00	0.13	-74,600.00	0.75
ΔP = \$2.0	200,000.00	-2.00	~ 0.0	~ 0.0	-27,000.00	0.27	-149,200.00	1.49

[1]The entries are the change in entitlement revenue of the reporting refiner. The units of these entries are dollars.

[2]Buyer of entitlements.

[3]In April 1978 the stripper oil was 13.5% of the total uncontrolled oil.

[4]In April 1978 the imported oil was 74.6% of the total uncontrolled oil.

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APPENDIX G

DATA PROCESSING PRODUCTION DESCRIPTION

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DATA PROCESSING PRODUCTION DESCRIPTION*

The Domestic Crude Oil Cost Equalization production system was developed to facilitate the use of the system, to provide a method for uncomplicated job submission, and to keep the amount of user intervention at a minimum.

To ensure these conditions were met, all the various operations for a monthly processing cycle were categorized into discrete job steps. Once each step was defined, a series of procedures were generated containing all the job control information necessary to execute each system module and or system utility. These procedures were then stored as catalogued members in the FEA system procedure library. Although each of these stored procedures may be executed independently, they were grouped together, where appropriate, with system supplied utilities to form the executable job steps of the Entitlement production system.

The production system can be categorized into seven different procedural classes:

- Initiate Procedures
- File Maintenance Procedures
- Entitlement Procedures
- Report Procedures
- Close Procedures
- Amendment Procedures
- Operations Procedures

The Initiate Procedures are run only once at the beginning of the monthly processing cycle, when the first batch of keyed original forms (P-102-M-1, P-126-M-0 and P-129-M-0) has been received on tapes from the keypunch contractor. File Maintenance Procedures are run whenever a new batch of keyed documents is received or whenever corrections/updates are to be incorporated onto a particular master file. Entitlement Procedures are run subsequent to the completion of the final update to the master files. Report Procedures are run after the entitlement position has been finalized for the processing period or whenever a special request is made for a particular report. The Close Procedures are run only once at the completion of processing for a monthly cycle, after all reports have been microfiched. Amendment Procedures include all the steps of the Correction Audit Subsystem. Operations Procedures provide the system support personnel with simple steps for accomplishing program compilations, addition/replacement of members in the FEA.PROCLIB and various other utility job steps. These additional procedures are not illustrated within this manual; support personnel should refer to the Operations Binder for a complete description of the available support procedure utilities.

Table 1 reflects each job step of the Entitlement production system including a brief function description of what the step accomplishes. In the following section each of these job steps will be presented, detailing

* From System Sciences, Inc. sources.

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TABLE 1

DOMESTIC CRUDE OIL COST EQUALIZATION PRODUCTION SYSTEM

JOB STEPS

NAME	INITIATE PROCEDURES
START	This is the first step for the Entitlement Production System that initiates processing by coping each of the unedited original documents from tape to disk, performs editing and consistency checks on the input source documents, generates a new version of each monthly master file, and replicates all original source documents processed with annotated diagnostic messages.
ALTRNATE	Alternates two members of a partitioned data set, such that at any one time the data set contains a single copy of the Audit Trail File for the period two months prior and one month prior to the current report period.

NAME	FILE MAINTENANCE PROCEDURES
EDIT102	This step edits unprocessed keyed original P-102 documents and/or corrections to the documents on the current file and produces an updated version of the master file, in addition an edit-work list of documents inserted or corrected is produced along with other ancillary reports.
EDIT126	This step edits unprocessed keyed original P-126 documents and/or corrections to the documents on the current file and produces an updated version of the master file, in addition an edit-work list of documents inserted or corrested is produced along with other ancillary reports.
EDIT129	This step edits unprocessed keyed original P-129 documents and/or corrections to the documents on the current file and produces an updated version of the master file, in addition an edit-work list of documents inserted or corrected is produced along with other ancillary reports.
TAPECOPY	Copies any type of unedited original keyed documents from an unlabeled tape to a catalogued file for processing by one of the edit procedures; this step is used only when there is more than one batch of keyed tapes for any type of source documents.

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TABLE 1 -- (continued)

NAME	ENTITLEMENT PROCEDURES
COSTCOMP	This step executes each of the six modules of the Cost Comparison Subsystem generating four different comparison reports on both hard copy and tape media as well as the entitlement price for the current report period.
TAPCALC	Calculates the amended entitlement position (buy/sell) for each company involved in the Truth and Purity Subsystem and produces a monthly balance report for each company during the months of September 1976 through April 1977.
CALCENT	This step calculates the national entitlement position and for each participating company in the system a buy or sell entitlement condition depending on volume of runs to stills or volume of product imports.

NAME	REPORT PROCEDURES
REPORTS	This step produces either or both the Entitlement Notice and Company Audit Trail Report during the report period and if both reports are produced during a single run, a tape, used to microfiche the reports, may be produced.
LISTS	This procedure generates either an exact replica (LATEST) or a detailed HISTORY version of each P-102, P-126 and P-129 document on the monthly master files, an additional option is to produce the LATEST version in FEA region sequence.
CROSSCHK	Produces a report on the comparison and discrepencies between the amount of oil each refiner has reported as processed for other firms versus what other refiners have reported as being processed by the company in question, the Processing Agreement report is produced on both hard copy and tape media.
ADMNLOG	This step performs the administrative log-in procedure for all original source documents received during the report period and produces various reports indicating which firms have or have not submitted their monthly documents.

NAME	CLOSE PROCEDURES
ARCHIVE	This step closes out the monthly production cycle for the current report period by coping all monthly processing generation files to named disk files, which are then archived to tape using the FEA Data Set Management System.

TABLE 1 -- (continued)

NAME	AMENDMENT PROCEDURES
AMNDMNTS	This is the first step for the Correction Audit Subsystem that initiates processing by coping the unedited amendment documents from tape to a disk file, performs editing and consistency checks on the source input, generates a new version of the monthly amendments file, and replicates all amendment documents processed during the run with annotated diagnostic messages.
EDITAMND	This step edits unprocessed keyed amendment documents and/or corrections to the documents on the monthly amendment file and produces an updated version of the monthly amendment file. In addition, a work list of documents inserted or corrected is produced along with other ancillary reports.
SRTMERGE	This step sorts the current month's amendment file by form number, short name, report period, log-in-date and page and line number and then merges the sorted file with cumulative file containing all amendments received during prior months processing,
LISTAMND	Produces a report in either short name or FEA region sequence of all amendments received during the current month's processing, while also reproducing any prior amendment documents received from a company applying to the same report period for which an amendment was received this month.
ORIGINAL	Produces the LATEST version of any original document that was submitted during an earlier report period that was amended during the current months processing.
RESTORE	This job step restores by name any file that has been retired or archived by the FEA Data Set Management System.

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for each, what the job step accomplishes; the necessary substitutions (i.e., variables that vary from month to month); instructions in how to execute the job step; a sample of the job control language (JCL) that executes the job step, after substitution of positional parameters; and the output to be expected from each job step.

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APPENDIX H

STATISTICS ON AMENDMENTS

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TABLE H-1

SUMMARY OF ERRORS IN THE AMENDMENT PROCESS *
(FEBRUARY 1976 THROUGH MAY 1978)

ERROR TYPE	NUMBER OF ERRORS: Discovered & Corrected By DOE	NUMBER OF ERRORS: Not Discovered By DOE
1. Incorrect Sign for Δ	4	6
2. Incorrect DOOR used in Calculations	1	46
3. Incorrect Subtraction	-	9
4. Incorrect Entitlements Price used in Calculations	4	1
5. Possible Transcription Error	3	2
6. Amendment Calculated More Than Once	7	-
7. Incorrect Original Figure used in Calculations	2	-
8. Miscellaneous Errors	8	4

* The manual procedures associated with the calculation of amendments are carried out in three basic steps. Two of these three steps have been checked to date. The third step has yet to be verified.

Δ = The amended volume minus the original volume.

Note: This table appears as Table 1 in Section II.D of this report.

TABLE H-2

ERRORS AND CORRECTIVE ACTION

IN THE AMENDMENTS PROCESS

Δ = Amended volume - Original volume

For old oil and crude runs Converted Δ =

$$\Delta \times \frac{\text{Entitlement Price for the month of original submission}}{\text{Entitlement Price for the month of amendment}}$$

For upper tier Converted Δ =

$$\Delta \times \frac{\text{Entitlement Price for the month of original submission}}{\text{Entitlement Price for the month of amendment}} \times \frac{\text{DOOR for the month of original submission}}{\text{DOOR for the month of amendment}}$$

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Table H-2

Description of the Error	Month of Error	Month of Correction	Effects of the Error
Error Type 1 for Old Oil	75/11-76/04	76/05	Correct Δ = 140,300 Incorrect Δ = -140,300 Entitlement revenue of the company has increased $2,508,564.
Δ is found to be 28607 instead of 28067. However, the converted Δ is correct.	76/04-76/05		Correct Δ = 28067 Incorrect Δ = 28607
Error Type 1 for Old Oil	76/04-76/08	76/09	Correct Δ = -3266 Incorrect Δ = 3266 Entitlement revenue of the company decreases by $52,843.
Converted Δ error for Upper Tier	76/05-76/08		Correct converted Δ = 959 Incorrect converted Δ = 970 Entitlement revenue of the company decreases by $28.
Error Type 3 for Upper Tier. (The subtraction is done by using last 3 digits only!) 992,996 -993,005 + 991	76/06-76/08		Correct Δ = 9 Incorrect Δ = 991 Entitlement revenue of the company decreases by $2655.

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Table H-2 (continued)

Description of the Error	Month of Error	Month of Correction	Effects of the Error
July amendment to crude runs was omitted.	76/06-76/08	76/09	Correct Δ = -50642 Incorrect Δ = 0 Entitlement revenue of the company decreases by $127,669.
July amendment to Old Oil was omitted. Instead, June amendment to upper tier was given as Old Oil. (See the next error.)	76/07-76/08	76/09	Correct Δ = -117304 Incorrect Δ = - 71208 Entitlement revenue of the company decreases by $359,548.
76/06 amendment for upper tier which should have been input in 76/08, was omitted by giving it as Old Oil.	76/06-76/08	76/09	Correct Δ = -71208 Incorrect Δ = 0 Entitlement revenue of the company increases by $102,497.
76/07 amendments for upper tier was omitted.	76/07-76/08	76/09	Correct Δ = 104588 Incorrect Δ = 0 Entitlements revenue of the company increases by $260,001.
The nature of the error was not discovered. A note in 76/09 indicates that this error has been corrected.	75/09-76/08	76/09	Correct Δ = unknown Incorrect Δ = unknown Entitlements revenue of the company increases by $1,080.

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Table H-2 (continued)

Description of the Error	Month of Error	Month of Correction	Effects of the Error
Error Type 6 for crude runs (The amendment was given in 76.06.)	76/05-78/09	76/10	Entitlements revenue of the company increases by $18,394.
Error Type 6.	76/10	76/11	Entitlements revenue of the company increases by $67,744.
Error Type 6 for Crude Runs	76/12-77/01	77/02	Correct Δ = 0 Incorrect Δ = -94341 Entitlements revenue of the company decreases by $198,011.
Error Type 1 for Old Oil.	76/11-77/02	77/03	Correct Δ = -31456 Incorrect Δ = 31456 Entitlements revenue of the company decreases by $497,004.
Error Type 3 for Old Oil.	76/05-77/02		Correct Δ = 15376 Incorrect Δ = 15373 Entitlements revenue of the company increases by $23.

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Table H-2 (continued)

Description of the Error		Month of Error	Month of Corrections	Effects of the Error
Error Type 1 for Old Oil		76/08-77/02		Correct Δ = -111 Incorrect Δ = 111 Entitlements revenue of the company decreases by $1780.
Error Type 3 for Upper Tier		76/11-77/03		Correct Δ = -67430 Incorrect Δ = -68430 Entitlements revenue of the company increases by $2579.
Error Type 3 for Old Oil	10330651 -10309843 -20208 8	76/12-77/03		Correct Δ = -20808 Incorrect Δ = -20208 Entitlements revenue of the company decreases by $4782.
Error Type 3 for Old Oil	10312935 -10043164 -269711 7	77/02-77/03		Correct Δ = -269711 Incorrect Δ = -269771 Entitlements revenue of the company increases by $511.
Converted Δ for Crude Runs has the wrong sign!		76/12-77/03		Correct Δ = 1661 Incorrect Δ = -1661 Entitlements revenue of the company decreases by $296.

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Table H-2 (continued)

Description of the Error	Month of Error	Month of Corrections	Effects of the Error
Error Type 1 for Old Oil	76/03-77/03		Correct Δ = -5 Incorrect Δ = 5 Entitlements revenue of the company decreases by $78.
Erase Type 1 for Upper Tier	76/09-77/04		Correct Δ = -130 Incorrect Δ = 130 Entitlements revenue of the company increases by $315.
Error Type 6 for Crude Runs	77/05-77/06		Correct Δ = 135487 Incorrect Δ = 136911 Entitlements revenue of the company increases by $29,076.
Error Type 5. (Incorrect figures are used for the amended and the original figures for 77/05 Crude Runs) Original / Amended Correct figures: 315534 / 318534 Incorrect figures: 317930 / 315534	77/05-77/06	77/07	Correct Δ = 3031 Incorrect Δ = -2396 Entitlements revenue of the company decreases by $392.
Error Type 3 for Old Oil 1064661 -1084515 -19851	75/08-77/08		Correct = -19854 Incorrect = -19851 Entitlements revenue of the company decreases by $23.

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Table H-2 (continued)

Description of the Error	Month of Error	Month of Corrections	Effects of the Error
Error Type 2. (The Upper Tier Δ is divided by an incorrect DOOR.)	76/03-77/08		Correct converted Δ = 27174 Incorrect converted Δ = 27176 Entitlements revenue of the company decreases by $6.
Error Type 2	76/09-77/08		Correct converted Δ = -33713 Incorrect converted Δ = -33715 Entitlements revenue of the company increases by $6.
Error Type 2	76/04-77/08		Correct converted Δ = 37036 Incorrect converted Δ = 37038 Entitlements revenue of the company decreases by $6.
Error Type 2	77/07-77/08		Correct converted Δ = -32480 Incorrect converted Δ = -32483 Entitlements revenue of the company increases by $6.
Error Type 4 for Crude Runs	77/07-77/08		Correct converted Δ = -103078 Incorrect converted Δ = -103559 Entitlements revenue of the company increases by $268.

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Table H-2 (continued)

Description of the Error	Month of Error	Month of Corrections	Effects of the Error
Error Type 2	77/07-77/08		Correct converted Δ = -27044 Incorrect converted Δ = -27046 Entitlements revenue of the company increases by $6.
Error Type 2	77/07-77/08		Correct converted Δ = 41248 Incorrect converted Δ = 41251 Entitlements revenue of the company increases by $9.
Error Type 2	76/09-77/08		Correct converted Δ = -240350 Incorrect converted Δ = -240366 Entitlements revenue of the company increases by $48.
Error Type 2	76/10-77/08		Correct converted Δ = -203236 Incorrect converted Δ = -203251 Entitlements revenue of the company increases by $45.
Error Type 2	76/11-77/08		Correct converted Δ = -123479 Incorrect converted Δ = -123487 Entitlements revenue of the company increases by $24.

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Table H-2 (continued)

Description of the Error	Month of Error	Month of Corrections	Effects of the Error
Error Type 2	77/12-77/08		Correct converted Δ = -244024 Incorrect converted Δ = -244040 Entitlements revenue of the company increases by $48.
Error Type 2	77/01-77/08		Correct converted Δ = -345196 Incorrect converted Δ = -345219 Entitlements revenue of the company increases by $69.
Error Type 2	77/02-77/08		Correct converted Δ = -353210 Incorrect converted Δ = -353233 Entitlements revenue of the company increases by $69.
Error Type 2	77/03-77/08		Correct converted Δ = -264074 Incorrect converted Δ = -264091 Entitlements revenue of the company increases by $51.
Error Type 2	77/05-77/08		Correct converted Δ = -273896 Incorrect converted Δ = -273914 Entitlements revenue of the company increases by $54.

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Table H-2 (continued)

Description	Month of Error	Month of Corrections	Effects of the Error
Error Type 2	77/05-77/08		Correct converted Δ = -275333 Incorrect converted Δ = -275351 Entitlements revenue of the company increases by $54.
Error Type 2	77/06-77/08		Correct converted Δ = -187912 Incorrect converted Δ = -187924 Entitlements revenue of the company increases by $36.
Error Type 7 for Old Oil. Correct Original Figure: 1620340 Incorrect Original Figure: 1642490	76/12-77/08	77/11	Correct converted Δ = 5759 Incorrect converted Δ = -16391 Entitlements revenue of the company increases by $84,737.
Error Type 7 for Upper Tier. Correct Original Figure: 1,175,666 Incorrect Original Figure: 1,175,105	76/12-77/08	77/11	Correct converted Δ = 457 Incorrect converted Δ = 14 Entitlements revenue of the company decreases by $687.
Error Type 6 for Crude Runs	76/11-77/08	77/11	Correct converted Δ = 0 Incorrect converted Δ = 218654 Entitlements revenue of the company decreases by $471,571.

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Table H-2 (continued)

Description	Month of Error	Month of Corrections	Effects of the Error
Error Type 6 for Crude Runs	76/12-77/08	77/11	Correct converted Δ = 0 Incorrect converted Δ = -136242 Entitlements revenue of the company decreases by $285,578.
Error Type 6 for Crude Runs	77/01-77/08	77/11	Correct converted Δ = 0 Incorrect converted Δ = -97458 Entitlements revenue of the company decreases by $215,167
Error Type 6 for Crude Runs	77/02-77/08	77/11	Correct converted Δ = 0 Incorrect converted Δ = 15054 Entitlements revenue of the company increases by $34,286.
Error Type 2	77/08-77/09		Correct converted Δ = -12197 Incorrect converted Δ = -12285 Entitlements revenue of the company increases by $237.
Error Type 5 for Old Oil. The converted Δ is calculated incorrectly.	76/08-77/09		Correct converted Δ = -18787 Incorrect converted Δ = -17787 Entitlements revenue of the company decreases by $8,750.

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Table H-2 (continued)

Description	Month of Error	Month of Corrections	Effects of the Error
Error Type 2	77/08-77/09		Correct converted Δ = -27960 Incorrect converted Δ = -28161 Entitlements revenue of the company increases by $541.
Error Type 2	77/08-77/09		Correct converted Δ = -10968 Incorrect converted Δ = -11047 Entitlements revenue of the company increases by $212.
Error Type 1 for Upper Tier	77/08-77/09		Correct converted Δ = 195 Incorrect converted Δ = -195 Entitlements revenue of the company increases by $1,173.
Error Type 3 for Old Oil 5747 -(-28555 -22808	77/07-77/09		Correct converted Δ = 34302 Incorrect converted Δ =-22808 Entitlements revenue of the company increases by $495,714.
The nature of the error was not discovered. A note in 77/09 indicates that this error has been corrected by DOE		77/09	Correct converted Δ = unknown Incorrect converted Δ = unknown Entitlements revenue of the company decreases by $788.

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Table H-2 (continued)

Description		Month of Error	Month of Corrections	Effects of the Errors
Error Type 3 for Upper Tier	-17792 -29610 47402	77/07-77/10		Correct converted Δ = -47402 Incorrect converted Δ = -11818 Entitlements revenue of the company decreases by $101,617.
Error Type 1		77/08-77/10		Correct converted Δ = 1863 Incorrect converted Δ = -1863 Entitlements revenue of the company increases by $32,602.
Error Type 2		77/08-77/10		Correct converted Δ = -13790 Incorrect converted Δ = -13889 Entitlements revenue of the company increases by $247.
Error Type 1 for Old Oil		75/05-77/10		Correct converted Δ = -200 Incorrect converted Δ = 200 Entitlements revenue of the company increases by $2,956.
Error Type 1 for Upper Tier		77/02-77/10		Correct converted Δ = -8848 Incorrect converted Δ = 8848 Entitlements revenue of the company decreases by $44,280.

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Table H-2 (continued)

Description	Month of Error	Month of Corrections	Effects of the Errors
Error Type 5 for Crude Runs. (Original and the amended figures are transposed on the worksheet.)	77/09-77/10	77/11	Correct Δ = -9516 Incorrect Δ = 9516 Entitlements revenue of the company increases by $46,632.
Error Type 2	77/09-77/11		Correct converted Δ = -22735 Incorrect converted Δ = -22723 Entitlements revenue of the company decreases by $26.
Error Type 2	77/10-77/11		Correct converted Δ = 104791 Incorrect converted Δ = 104736 Entitlements revenue of the company increases by $121.
Error Type 2	77/09-77/11		Correct converted Δ = -725803 Incorrect converted Δ = -725419 Entitlements revenue of the company decreases by $849.
Error Type 2	77/10-77/11		Correct converted Δ = -24733 Incorrect converted Δ = -22723 Entitlements revenue of the company decreases by $28.

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Table H-2 (continued)

Description	Month of Error	Month of Corrections	Effects of the Errors
Error Type 2	77/10-77/11		Correct converted Δ = 18930 Incorrect converted Δ = 18920 Entitlements revenue of the company increases by $22.
Error Type 2	76/02-77/11		Correct converted Δ = 24866 Incorrect converted Δ = 24853 Entitlements revenue of the company increases by $28.
Error Type 2 and Error Type 5	76/03-77/11		Correct converted Δ = 41587 Incorrect converted Δ = 41565 Entitlements revenue of the company increases by $22.
Error Type 2	76/04-77/11		Correct converted Δ = 37521 Incorrect converted Δ = 37501 Entitlements revenue of the company increases by $44.
Error Type 2	76/05-77/11		Correct converted Δ = 36705 Incorrect converted Δ = 36685 Entitlements revenue of the company increases by $44.

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Table H-2 (continued)

Description	Month of Error	Month of Corrections	Effects of the Errors
Error Type 2	76/06-77/11		Correct converted Δ = 36475 Incorrect converted Δ = 36456 Entitlements revenue of the company increases by $42.
Error Type 2	76/07-77/11		Correct converted Δ = 37273 Incorrect converted Δ = 37253 Entitlements revenue of the company increases by $42.
Error Type 2	76/08-77/11		Correct converted Δ = 43110 Incorrect converted Δ = 43087 Entitlements revenue of the company increases by $23.
Error Type 2	76/09-77/11		Correct converted Δ = 47739 Incorrect converted Δ = 47714 Entitlements revenue of the company increases by $55.
Error Type 2	76/10-77/11		Correct converted Δ = 41098 Incorrect converted Δ = 41077 Entitlements revenue of the company increases by $48.

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Table H-2 (continued)

Description	Month of Error	Month of Corrections	Effects of the Errors
Error Type 2	76/11-77/11		Correct converted Δ = 48767 Incorrect converted Δ = 48741 Entitlements revenue of the company increases by $57.
Error Type 2	76/12-77/11		Correct converted Δ = 58278 Incorrect converted Δ = 58248 Entitlements revenue of the company increases by $66.
Error Type 2	77/01-77/11		Correct converted Δ = 81033 Incorrect converted Δ = 80988 Entitlements revenue of the company increases by $100.
Error Type 2	77/02-77/11		Correct converted Δ = 55570 Incorrect converted Δ = 55590 Entitlements revenue of the company increases by $66.
Error Type 2	77/03-77/11		Correct converted Δ = 75815 Incorrect converted Δ = 75775 Entitlements revenue of the company increases by $88.

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Table H-2 (continued)

Description	Month of Error	Month of Corrections	Effects of the Errors
Error Type 2	77/04-77/11		Correct converted Δ = 74729 Incorrect converted Δ = 74689 Entitlements revenue of the company increases by $88.
Error Type 2	77/05-77/11		Correct converted Δ = 93005 Incorrect converted Δ = 92956 Entitlements revenue of the company increases $117.
Error Type 2	77/06-77/11		Correct converted Δ = 76143 Incorrect converted Δ = 76102 Entitlements revenue of the company increases by $90.
Error Type 2 and Type 4	77/07-77/11		Correct converted Δ = 80623 Incorrect converted Δ = 80581 Entitlements revenue of the company increases by $92.
Error Type 3 for Old Oil	77/11-77/12		Correct converted Δ = 342 Incorrect converted Δ = -332 Entitlements revenue of the company increases by $5,803.

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Table H-2 (continued)

Description	Month of Error	Month of Corrections	Effects of the Errors
Error Type 2	77/08-77/12		Correct converted Δ = 45038 Incorrect converted Δ = 45361 Entitlements revenue of the company decreases by $706.
Error Type 2	77/08-77/12		Correct converted Δ = 27062 Incorrect converted Δ = 27256 Entitlements revenue of the company increases by $424.
The calculation of the Δ was forgotten for Crude Runs	77/11-77/12	78/01	Correct converted Δ = -316 Incorrect converted Δ = 0 Entitlements revenue of the company decreases by $2,720.
Division by the DOOR for the amendment month was omitted.	78/01-78/02		Correct converted Δ = -2389 Incorrect converted Δ = -538 Entitlements revenue of the company decreases by $3,531.
Converted Δ for Crude Runs was subtracted twice	78/03-78/04	78/05	Correct converted Δ = -232 Incorrect converted Δ = -494 Entitlements revenue of the company increases by $436

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Table H-2 (continued)

Description	Month of Error	Month of Corrections	Effects of the Errors
Error Type 4	78/03	78/04	Entitlements revenue of the company increases by $316.
Error Type 2	77/12-78/04	78/05	Correct $ amount = -8996 Incorrect $ amount = -7931 Entitlements revenue of the company decreases by $1065.
Error Type 5 for Crude Runs	78/03-78/04	78/05	Correct converted Δ = -1,085,000 Incorrect converted Δ = 1,085,000 Entitlements revenue of the company increases by $4,135,478.
Error Type 4 for Crude Runs in correcting the above error	78/03-78/05	78/06	Entitlements revenue of the company increases by $58,590.
Error Type 1	76/07-76/10	76/11	Correct Δ = 39405 Incorrect Δ = -39405 Entitlements revenue of the company increases by $180,054.

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TABLE H-3

RANKING OF AMENDERS FOR OLD OIL

RANK	COMPANY ID. NUMBER	NUMBER OF AMENDMENTS	STRATA	CUMULATIVE PERCENTAGE
1	116	61.	L INT	10
2	135	57.	L INT	19
3	28	52.	L INT	28
4	32	36.	L INT	34
5	163	29.	L INT	39
6	74	22.	SMALL	42
7	161	21.	L IND	46
8	151	20.	L INT	49
9	58	19.	L INT	52
10	91	18.	L INT	55
11	139	16.	L IND	57
12	120	16.	SMALL	60
13	25	14.	L IND	63
14	55	13.	SMALL	65
15	11	12.	SMALL	67
16	29	11.	SMALL	69
17	170	11.	SMALL	70
18	144	10.	SMALL	72
19	52	9.	L INT	73.5
20	26	8.	SMALL	
21	98	8.	SMALL	
22	143	8.	SMALL	77.5
23	79	7.	SMALL	
24	14	6.	SMALL	
25	47	6.	SMALL	80.6
26	66	5.	SMALL	
27	160	5.	SMALL	
28	68	5.	L INT	83.1
29	46	4.	SMALL	
30	57	4.	SMALL	
31	71	4.	SMALL	
32	130	4.	SMALL	
33	95	4.	L INT	86.4
34	16	3.	SMALL	
35	69	3.	SMALL	
36	73	3.	SMALL	
37	164	3.	SMALL	
38	172	3.	SMALL	
39	10	3.	L INT	89.3

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40	27	2.	L INT	
41	2	2.	SMALL	
42	35	2.	SMALL	
43	3	2.	SMALL	
44	149	2.	L IND	
45	42	2.	SMALL	
46	65	2.	SMALL	
47	82	2.	SMALL	
48	87	2.	SMALL	
49	94	2.	SMALL	
50	107	2.	SMALL	
51	119	2.	SMALL	
52	132	2.	SMALL	
53	146	2.	SMALL	
54	150	2.	SMALL	
55	156	2.	SMALL	
56	165	2.	SMALL	
57	181	2.	SMALL	
58	183	2.	SMALL	
59	124	2.	SMALL	95.9
60	31	1.	L IND	
61	49	1.	L IND	
62	83	1.	L IND	
63	102	1.	L IND	
64	9	1.	SMALL	
65	12	1.	SMALL	
66	40	1.	SMALL	
67	43	1.	SMALL	
68	44	1.	SMALL	
69	97	1.	SMALL	
70	105	1.	SMALL	
71	108	1.	SMALL	
72	111	1.	SMALL	
73	114	1.	SMALL	
74	117	1.	SMALL	
75	123	1.	SMALL	
76	133	1.	SMALL	
77	152	1.	SMALL	
78	155	1.	SMALL	
79	167	1.	SMALL	
80	168	1.	SMALL	
81	171	1.	SMALL	
82	176	1.	SMALL	
83	7	1.	L INT	
84	147	1.	L INT	100

The number of Small Refiners that do not have an amendment	92
The number of Large Independents that do not have an amendment	7
The number of Large Integrateds that do not have an amendment	0

TABLE H-3 (continued)

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TABLE H-4

RANKING OF AMENDERS FOR UPPER TIER OIL

RANK	COMPANY ID NUMBER	NUMBER OF AMENDMENTS	STRATA	CUMULATIVE PERCENTAGE
1	116	59	L INT	10
2	135	55	L INT	19
3	28	48	L INT	27
4	163	28	L INT	31
5	74	27	SMALL	36
6	161	19	L IND	42
7	151	19	L INT	45
8	91	18	L INT	48
9	55	17	SMALL	51
10	120	16	SMALL	53
11	32	16	L INT	56
12	58	15	L INT	58
13	139	12	L IND	60
14	29	12	SMALL	62
15	170	12	SMALL	63
16	144	11	SMALL	65
17	10	11	L INT	
18	11	10	SMALL	
19	98	8	SMALL	
20	143	8	SMALL	70.8
21	52	8	L INT	
22	25	7	L IND	
23	14	7	SMALL	
24	24	7	SMALL	75.4
25	26	7	SMALL	
26	57	6	SMALL	
27	160	6	SMALL	
28	51	5	SMALL	
29	65	5	SMALL	
30	66	5	SMALL	80.7
31	79	5	SMALL	
32	168	5	SMALL	
33	46	4	SMALL	
34	71	4	SMALL	
35	119	4	SMALL	
36	132	4	SMALL	
37	183	4	SMALL	85.3
38	16	3	SMALL	
39	40	3	SMALL	
40	80	3	SMALL	
41	156	3	SMALL	
42	181	3	SMALL	
43	27	3	L INT	
44	95	3	L INT	
45	149	2	L IND	
46	3	2	SMALL	
47	35	2	SMALL	
48	44	2	SMALL	
49	47	2	SMALL	90.3

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50	73		2	SMALL	
51	87	H-27	2	SMALL	
52	93		2	SMALL	
53	107		2	SMALL	
54	117		2	SMALL	
55	124		2	SMALL	
56	127		2	SMALL	
57	138		2	SMALL	
58	146		2	SMALL	
59	150		2	SMALL	
60	152		2	SMALL	
61	157		2	SMALL	
62	165		2	SMALL	
63	7		2	L INT	
64	147		2	L INT	
65	4		1	L IND	
66	30		1	L IND	95.2
67	33		1	L IND	
68	49		1	L IND	
69	83		1	L IND	95.7
70	102		1	L IND	
71	12		1	SMALL	
72	20		1	SMALL	
73	42		1	SMALL	
74	53		1	SMALL	
75	63		1	SMALL	96.7
76	82		1	SMALL	
77	85		1	SMALL	
78	92		1	SMALL	
79	94		1	SMALL	97.4
80	105		1	SMALL	
81	106		1	SMALL	
82	108		1	SMALL	
83	111		1	SMALL	
84	114		1	SMALL	98.2
85	121		1	SMALL	
86	122		1	SMALL	
87	123		1	SMALL	
88	130		1	SMALL	
89	133		1	SMALL	99.0
90	141		1	SMALL	
91	167		1	SMALL	
92	176		1	SMALL	99.5
93	177		1	SMALL	
94	178		1	SMALL	
95	179		1	SMALL	100.0

The number of Small Refiners that do not have an amendment 112
The number of Large Independents that do not have an amendment 5
The number of Large Integrateds that do not have an amendment 1

TABLE H-4 (continued)

DRAFT

TABLE H-5

RANKING OF AMENDERS FOR CRUDE RUNS

RANK	COMPANY ID NUMBER	NUMBER OF AMENDMENTS	STRATA	CUMULATIVE PERCENTAGE
1	135	43	L INT	9
2	93	42	SMALL	17
3	151	34	L INT	24
4	161	17	L IND	27
5	121	17	SMALL	30
6	116	17	L INT	34
7	74	16	SMALL	37
8	58	16	L INT	40
9	52	15	L INT	43
10	27	14	L INT	46
11	29	13	SMALL	48
12	39	13	SMALL	51
13	32	13	L INT	
14	144	11	SMALL	55.5
15	10	11	L INT	
16	49	10	L IND	
17	44	9	SMALL	61.5
18	170	9	SMALL	
19	25	8	L IND	
20	11	7	SMALL	66.2
21	40	7	SMALL	
22	55	7	SMALL	
23	182	7	SMALL	70.4
24	68	7	L INT	
25	119	6	SMALL	
26	28	6	L INT	
27	95	6	L INT	75.3
28	31	5	L IND	
29	14	5	SMALL	
30	26	5	SMALL	
31	66	4	SMALL	
32	67	4	SMALL	
33	97	4	SMALL	80.6
34	33	3	L IND	
35	16	3	SMALL	
36	46	3	SMALL	
37	69	3	SMALL	
38	80	3	SMALL	
39	82	3	SMALL	
40	142	3	SMALL	
41	143	3	SMALL	85.4
42	155	3	SMALL	
43	168	3	SMALL	
44	171	3	SMALL	

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45	83	2	L IND	
46	3	2	SMALL	
47	12	2	SMALL	
48	23	2	SMALL	
49	63	2	SMALL	
50	64	2	SMALL	
51	85	2	SMALL	
52	90	2	SMALL	90.3
53	111	2	SMALL	
54	114	2	SMALL	
55	118	2	SMALL	
56	120	2	SMALL	
57	122	2	SMALL	
58	126	2	SMALL	
59	132	2	SMALL	
60	137	2	SMALL	
61	4	2	L IND	
62	36	1	L IND	
63	13	1	SMALL	
64	15	1	SMALL	
65	21	1	SMALL	
66	22	1	SMALL	
67	35	1	SMALL	
68	43	1	SMALL	
69	51	1	SMALL	
70	59	1	SMALL	95.7
71	78	1	SMALL	
72	79	1	SMALL	
73	86	1	SMALL	
74	105	1	SMALL	
75	106	1	SMALL	96.7
76	107	1	SMALL	
77	109	1	SMALL	
78	123	1	SMALL	
79	124	1	SMALL	97.4
80	129	1	SMALL	
81	133	1	SMALL	
82	146	1	SMALL	
83	152	1	SMALL	98.2
84	153	1	SMALL	
85	157	1	SMALL	
86	160	1	SMALL	99.0
87	164	1	SMALL	
88	174	1	SMALL	
89	176	1	SMALL	99.4
90	178	1	SMALL	99.6
91	179	1	SMALL	99.8
92	163	1	L INT	100.0

The number of Small Refiners that do not have any amendments 81
The number of Large Independents that do not have any amendments 7
The number of Large Integrateds that do not have any amendment 3

TABLE H-5 (continued)

7602 TO 7605
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-15427.054	STD ERR	4424.109	STD DEV	109088.153
VARIANCE	.1190E+11	KURTOSIS	33.405	SKEWNESS	-3.830
MINIMUM	-.1092E+07	MAXIMUM	389843.000	SUM	-.9379E+07
C.V. PCT	707.122	.95 C.I.	-24115.472	TO	-6738.636

VALID CASES 608 MISSING CASES 0

7602
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-23959.333	STD ERR	11589.033	STD DEV	72373.486
VARIANCE	.5237E+10	KURTOSIS	6.619	SKEWNESS	-1.010
MINIMUM	-313860.000	MAXIMUM	197766.000	SUM	-934414.000
C.V. PCT	302.068	.95 C.I.	-47420.104	TO	-498.563

VALID CASES 39 MISSING CASES 0

7603
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-15644.900	STD ERR	29768.518	STD DEV	188272.641
VARIANCE	.3544E+11	KURTOSIS	25.318	SKEWNESS	-4.706
MINIMUM	-.1092E+07	MAXIMUM	282786.000	SUM	-625796.000
C.V. PCT	1203.412	.95 C.I.	-75857.412	TO	44567.612

VALID CASES 40 MISSING CASES 0

7604
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-43093.824	STD ERR	27178.025	STD DEV	158473.759
VARIANCE	.2511E+11	KURTOSIS	9.607	SKEWNESS	-3.191
MINIMUM	-646015.000	MAXIMUM	156579.000	SUM	-.1465E+07
C.V. PCT	367.741	.95 C.I.	-98387.932	TO	12200.285

VALID CASES 34 MISSING CASES 0

7605
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-17585.200	STD ERR	10807.314	STD DEV	63956.931
VARIANCE	.4087E+10	KURTOSIS	5.225	SKEWNESS	-2.138
MINIMUM	-263316.000	MAXIMUM	72760.000	SUM	-615482.000
C.V. PCT	363.584	.95 C.I.	-39548.305	TO	4377.905

VALID CASES 35 MISSING CASES 0

7606
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-23645.406	STD ERR	16544.619	STD DEV	93590.501
VARIANCE	.8759E+10	KURTOSIS	8.256	SKEWNESS	-2.439
MINIMUM	-419171.000	MAXIMUM	126045.000	SUM	-756653.000
C.V. PCT	395.808	.95 C.I.	-57388.380	TO	10097.568

VALID CASES 32 MISSING CASES 0

7607
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	8153.933	STD ERR	14889.139	STD DEV	81551.172
VARIANCE	.6650E+10	KURTOSIS	4.758	SKEWNESS	1.670
MINIMUM	-128974.000	MAXIMUM	305760.000	SUM	244618.000
C.V. PCT	1000.145	.95 C.I.	-22297.775	TO	38605.642

VALID CASES 30 MISSING CASES 0

7608
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-17595.172	STD ERR	15342.725	STD DEV	82623.102
VARIANCE	.6826E+10	KURTOSIS	2.597	SKEWNESS	.565
MINIMUM	-202812.000	MAXIMUM	234385.000	SUM	-510260.000
C.V. PCT	469.578	.95 C.I.	-49023.[illegible]	TO	13832.97[illegible]

VALID CASES 29 MISSING CASES 0

Delta = Amended Volume - Original Volume

TABLE H-6

MONTHLY STATISTICS ON OLD OIL DELTAS

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7609
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-1274,893	STD ERR	11585,258	STD DEV	61303,426
VARIANCE	,3758E+10	KURTOSIS	-,109	SKEWNESS	-,081
MINIMUM	-122284,000	MAXIMUM	109226,000	SUM	-35697,000
C.V. PCT	4808,516	,95 C.I.	-25045,880	TO	22496,094

VALID CASES 28 MISSING CASES 0

7610
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-25288,143	STD ERR	9473,567	STD DEV	56046,377
VARIANCE	,3141E+10	KURTOSIS	1,561	SKEWNESS	-1,360
MINIMUM	-202177,000	MAXIMUM	48896,000	SUM	-885085,000
C.V. PCT	221,631	,95 C.I.	-44540,747	TO	-6035,539

VALID CASES 35 MISSING CASES 0

7611
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-5603,300	STD ERR	10642,036	STD DEV	58288,830
VARIANCE	,3397E+10	KURTOSIS	8,221	SKEWNESS	2,129
MINIMUM	-112623,000	MAXIMUM	235657,000	SUM	-168099,000
C.V. PCT	1040,259	,95 C.I.	-27368,707	TO	16162,107

VALID CASES 30 MISSING CASES 0

7612
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	19342,871	STD ERR	19470,036	STD DEV	108404,571
VARIANCE	,1175E+11	KURTOSIS	3,093	SKEWNESS	1,769
MINIMUM	-154178,000	MAXIMUM	351237,000	SUM	599629,000
C.V. PCT	560,437	,95 C.I.	-20420,247	TO	59105,989

VALID CASES 31 MISSING CASES 0

7701
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-16026,923	STD ERR	15766,416	STD DEV	80393,265
VARIANCE	,6463E+10	KURTOSIS	2,010	SKEWNESS	,400
MINIMUM	-210833,000	MAXIMUM	228848,000	SUM	-416700,000
C.V. PCT	501,614	,95 C.I.	-48498,466	TO	16444,620

VALID CASES 26 MISSING CASES 0

7702
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-31080,346	STD ERR	14677,001	STD DEV	74838,317
VARIANCE	,5600E+10	KURTOSIS	2,683	SKEWNESS	-1,647
MINIMUM	-269771,000	MAXIMUM	64287,000	SUM	-808089,000
C.V. PCT	240,790	,95 C.I.	-61308,197	TO	-852,496

VALID CASES 26 MISSING CASES 0

7703
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-7097,850	STD ERR	18263,562	STD DEV	81677,132
VARIANCE	,6671E+10	KURTOSIS	4,131	SKEWNESS	,361
MINIMUM	-219041,000	MAXIMUM	237049,000	SUM	-141957,000
C.V. PCT	1150,731	,95 C.I.	-45323,924	TO	31128,224

VALID CASES 20 MISSING CASES 0

7704
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-67387,368	STD ERR	56205,869	STD DEV	244995,702
VARIANCE	,6002E+11	KURTOSIS	10,551	SKEWNESS	-3,304
MINIMUM	-,1021E+07	MAXIMUM	145159,000	SUM	-,1280E+07
C.V. PCT	-363,563	,95 C.I.	-185471,[illegible]	TO	50696,780

VALID CASES 19 MISSING CASES 0

TABLE H-6 (continued)

DRAFT

7705
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-39802.958	STD ERR	17285.758	STD DEV	84682.575
VARIANCE	.7171E+10	KURTOSIS	5.815	SKEWNESS	-2.371
MINIMUM	-350000.000	MAXIMUM	46692.000	SUM	-955271.000
C.V. PCT	212.754	.95 C.I.	-75561.274	TO	-4044.643

VALID CASES 24 MISSING CASES 0

7706
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-9886.350	STD ERR	13133.211	STD DEV	58733.504
VARIANCE	.3449E+10	KURTOSIS	1.367	SKEWNESS	-.920
MINIMUM	-152879.000	MAXIMUM	103939.000	SUM	-197727.000
C.V. PCT	594.087	.95 C.I.	-37374.476	TO	17601.776

VALID CASES 20 MISSING CASES 0

7707
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-39462.158	STD ERR	27597.276	STD DEV	120293.737
VARIANCE	.1447E+11	KURTOSIS	6.037	SKEWNESS	-2.509
MINIMUM	-457663.000	MAXIMUM	81337.000	SUM	-749781.000
C.V. PCT	304.833	.95 C.I.	-97441.883	TO	18517.567

VALID CASES 19 MISSING CASES 0

7708
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	15350.000	STD ERR	23427.246	STD DEV	87656.727
VARIANCE	.7683E+10	KURTOSIS	7.657	SKEWNESS	2.939
MINIMUM	-69184.000	MAXIMUM	310000.000	SUM	214900.000
C.V. PCT	571.054	.95 C.I.	-35261.485	TO	65961.485

VALID CASES 14 MISSING CASES 0

7709
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-22960.364	STD ERR	31307.547	STD DEV	103835.553
VARIANCE	.1078E+11	KURTOSIS	5.460	SKEWNESS	-2.639
MINIMUM	-330000.000	MAXIMUM	58973.000	SUM	-252564.000
C.V. PCT	452.238	.95 C.I.	-92718.018	TO	46797.291

VALID CASES 11 MISSING CASES 0

7710
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	9036.700	STD ERR	27945.891	STD DEV	88372.666
VARIANCE	.7809E+10	KURTOSIS	-.444	SKEWNESS	.453
MINIMUM	-120579.000	MAXIMUM	155000.000	SUM	90367.000
C.V. PCT	977.931	.95 C.I.	-54181.264	TO	72254.664

VALID CASES 10 MISSING CASES 0

7711
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	19649.111	STD ERR	22104.183	STD DEV	66312.549
VARIANCE	.4397E+10	KURTOSIS	-.080	SKEWNESS	1.047
MINIMUM	-62295.000	MAXIMUM	150000.000	SUM	176842.000
C.V. PCT	337.484	.95 C.I.	-31323.174	TO	70621.396

VALID CASES 9 MISSING CASES 0

7712
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	69701.778	STD ERR	46186.813	STD DEV	138560.438
VARIANCE	.1919E+11	KURTOSIS	1.207	SKEWNESS	1.473
MINIMUM	-63851.000	MAXIMUM	389843.000	SUM	627316.000
C.V. PCT	198.790	.95 C.I.	-36805.09[illegible]	TO	176206.650

VALID CASES 9 MISSING CASES 0

TABLE H-6 (continued)

DRAFT

7801
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-82077,250	STD ERR	86704,291	STD DEV	245236,768
VARIANCE	,6014E+11	KURTOSIS	3,097	SKEWNESS	-2,249
MINIMUM	-687778,000	MAXIMUM	37700,000	SUM	-656618,000
C.V. PCT	298,788	.95 C.I.	-287099,863	TO	122945,363

VALID CASES 8 MISSING CASES 0

7802
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-4635,250	STD ERR	12842,142	STD DEV	36323,063
VARIANCE	,1319E+10	KURTOSIS	-,471	SKEWNESS	-,304
MINIMUM	-68355,000	MAXIMUM	49548,000	SUM	-37090,000
C.V. PCT	783,458	.95 C.I.	-35003,023	TO	25730,523

VALID CASES 8 MISSING CASES 0

7803
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	34528,250	STD ERR	38622,340	STD DEV	109240,475
VARIANCE	,1193E+11	KURTOSIS	-,189	SKEWNESS	-,116
MINIMUM	-158678,000	MAXIMUM	212257,000	SUM	276226,000
C.V. PCT	316,380	.95 C.I.	-56798,870	TO	125855,370

VALID CASES 8 MISSING CASES 0

7804
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-20630,143	STD ERR	21573,982	STD DEV	57079,392
VARIANCE	,3258E+10	KURTOSIS	,320	SKEWNESS	-1,212
MINIMUM	-134238,000	MAXIMUM	38489,000	SUM	-144411,000
C.V. PCT	276,680	.95 C.I.	-73419,492	TO	32159,206

VALID CASES 7 MISSING CASES 0

VARIABLE DELTA

MEAN	3956,714	STD ERR	22797,945	STD DEV	60317,694
VARIANCE	,3638E+10	KURTOSIS	,466	SKEWNESS	-,387
MINIMUM	-106862,000	MAXIMUM	100000,000	SUM	27697,000
C.V. PCT	1524,439	.95 C.I.	-51627,547	TO	59740,975

VALID CASES 7 MISSING CASES 0

7712 TO 7805
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	1981,277	STD ERR	19462,711	STD DEV	133429,626
VARIANCE	,1780E+11	KURTOSIS	14,750	SKEWNESS	-2,409
MINIMUM	-687778,000	MAXIMUM	389843,000	SUM	93120,000
C.V. PCT	6734,528	.95 C.I.	-37195,129	TO	41157,683

VALID CASES 47 MISSING CASES 0

7612 TO 7705
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-20566,767	STD ERR	10038,163	STD DEV	121291,567
VARIANCE	,1471E+11	KURTOSIS	31,475	SKEWNESS	-3,649
MINIMUM	-,1021E+07	MAXIMUM	351237,000	SUM	-,3002E+07
C.V. PCT	589,746	.95 C.I.	-40406,791	TO	-726,743

VALID CASES 146 MISSING CASES 0

7602 TO 7701
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-14316,527	STD ERR	5226,307	STD DEV	103078,878
VARIANCE	,1062E+11	KURTOSIS	37,681	SKEWNESS	-3,863
MINIMUM	-,1092E+07	MAXIMUM	351237,000	SUM	-,5569E+07
C.V. PCT	719,999	.95 C.I.	-24591,952	TO	-4041,102

VALID CASES 389 MISSING CASES 0

7702 TO 7801
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-20809,217	STD ERR	9091,669	STD DEV	124989,785
VARIANCE	,1562E+11	KURTOSIS	25,936	SKEWNESS	-3,675
MINIMUM	-,1021E+07	MAXIMUM	389843,000	SUM	-,3932E+07
C.V. PCT	600,646	.95 C.I.	-38744,013	TO	-2874,420

VALID CASES 189 MISSING CASES 0

TABLE H-6 (continued)

DRAFT

7602 TO 7605
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-7248.762	STD ERR	4851.996	STD DEV	119441.909
VARIANCE	.1426E+11	KURTOSIS	14.351	SKEWNESS	-1.956
MINIMUM	-833995.000	MAXIMUM	641967.000	SUM	-.4392E+07
C.V. PCT	1647.756	.95 C.I.	-16777.562	TO	2280.038

VALID CASES 606 MISSING CASES 0

7602
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	7165.758	STD ERR	27319.838	STD DEV	156940.518
VARIANCE	.2463E+11	KURTOSIS	6.930	SKEWNESS	1.730
MINIMUM	-305337.000	MAXIMUM	641967.000	SUM	236470.000
C.V. PCT	2190.146	.95 C.I.	-48482.931	TO	62814.446

VALID CASES 33 MISSING CASES 0

7603
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	13077.118	STD ERR	19511.131	STD DEV	113768.464
VARIANCE	.1294E+11	KURTOSIS	3.753	SKEWNESS	-1.122
MINIMUM	-368654.000	MAXIMUM	228451.000	SUM	444622.000
C.V. PCT	869.981	.95 C.I.	-26618.576	TO	52772.812

VALID CASES 34 MISSING CASES 0

7604
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-442.206	STD ERR	29868.805	STD DEV	174163.565
VARIANCE	.3033E+11	KURTOSIS	15.323	SKEWNESS	-2.062
MINIMUM	-833995.000	MAXIMUM	485879.000	SUM	-15035.000
C.V. PCT	39385.176	.95 C.I.	-61210.747	TO	60326.335

VALID CASES 34 MISSING CASES 0

7605
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	13223.176	STD ERR	16072.446	STD DEV	93717.659
VARIANCE	.8782E+10	KURTOSIS	4.920	SKEWNESS	-.646
MINIMUM	-330000.000	MAXIMUM	249371.000	SUM	449568.000
C.V. PCT	708.738	.95 C.I.	-19476.461	TO	45922.814

VALID CASES 34 MISSING CASES 0

7606
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	10338.138	STD ERR	24718.278	STD DEV	133111.998
VARIANCE	.1771E+11	KURTOSIS	2.668	SKEWNESS	.176
MINIMUM	-331389.000	MAXIMUM	400964.000	SUM	299668.000
C.V. PCT	1287.582	.95 C.I.	-40294.959	TO	60971.234

VALID CASES 29 MISSING CASES 0

7607
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-5664.069	STD ERR	16569.285	STD DEV	89228.329
VARIANCE	.7961E+10	KURTOSIS	4.568	SKEWNESS	-1.601
MINIMUM	-322869.000	MAXIMUM	160749.000	SUM	-164258.000
C.V. PCT	1575.340	.95 C.I.	-39604.710	TO	28276.572

VALID CASES 29 MISSING CASES 0

7608
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-1857.267	STD ERR	21804.7[illegible]	STD DEV	119429.596
VARIANCE	.1426E+11	KURTOSIS	4.[illegible]	SKEWNESS	-2.[illegible]
MINIMUM	-441697.000	MAXIMUM	202350.000	SUM	-55871[illegible].000
C.V. PCT	643.573	.95 C.I.	-63153.011	TO	26038.478

VALID CASES 30 MISSING CASES 0

TABLE H-7

MONTHLY STATISTICS ON UPPER TIER DELTAS

DRAFT

7609
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-40185.000	STD ERR	27569.118	STD DEV	158372.525
VARIANCE	.2508E+11	KURTOSIS	7.531	SKEWNESS	-2.874
MINIMUM	-611354.000	MAXIMUM	111774.000	SUM	-.1326E+07
C.V. PCT	394.109	.95 C.I.	-96341.456	TO	15971.456

VALID CASES 33 MISSING CASES 0

7610
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	2719.618	STD ERR	17338.494	STD DEV	101099.922
VARIANCE	.1022E+11	KURTOSIS	12.451	SKEWNESS	-2.548
MINIMUM	-465020.000	MAXIMUM	243200.000	SUM	92467.000
C.V. PCT	3717.431	.95 C.I.	-32555.813	TO	37995.048

VALID CASES 34 MISSING CASES 0

7611
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-6634.393	STD ERR	14323.689	STD DEV	75793.838
VARIANCE	.5744E+10	KURTOSIS	3.902	SKEWNESS	-1.319
MINIMUM	-264805.000	MAXIMUM	158650.000	SUM	-185763.000
C.V. PCT	1142.438	.95 C.I.	-36024.175	TO	22755.390

VALID CASES 28 MISSING CASES 0

7612
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-41576.793	STD ERR	30917.827	STD DEV	166497.595
VARIANCE	.2772E+11	KURTOSIS	4.870	SKEWNESS	-2.337
MINIMUM	-611730.000	MAXIMUM	159037.000	SUM	-.1205E+07
C.V. PCT	400.458	.95 C.I.	-104909.092	TO	21755.505

VALID CASES 29 MISSING CASES 0

7701
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-25768.160	STD ERR	22734.998	STD DEV	113674.968
VARIANCE	.1292E+11	KURTOSIS	12.597	SKEWNESS	-3.371
MINIMUM	-519405.000	MAXIMUM	107427.000	SUM	-644204.000
C.V. PCT	441.145	.95 C.I.	-72690.889	TO	21154.569

VALID CASES 25 MISSING CASES 0

7702
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-26259.524	STD ERR	29557.934	STD DEV	135451.472
VARIANCE	.1834E+11	KURTOSIS	4.115	SKEWNESS	-1.372
MINIMUM	-458581.000	MAXIMUM	269860.000	SUM	-551450.000
C.V. PCT	515.818	.95 C.I.	-87916.295	TO	35397.247

VALID CASES 21 MISSING CASES 0

7703
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	940.381	STD ERR	15270.479	STD DEV	69978.125
VARIANCE	.4896E+10	KURTOSIS	10.664	SKEWNESS	-3.104
MINIMUM	-279127.000	MAXIMUM	82976.000	SUM	19748.000
C.V. PCT	7441.466	.95 C.I.	-30913.280	TO	32794.042

VALID CASES 21 MISSING CASES 0

7704
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-4661.421	STD ERR	17179.[illegible]	STD DEV	74883.686
VARIANCE	.5607E+10	KURTOSIS	9.1[illegible]7	SKEWNESS	-2.967
MINIMUM	-287881.000	MAXIMUM	75112.000	SUM	-88567.000
C.V. PCT	1606.456	.95 C.I.	-40754.202	TO	31431.360

VALID CASES 19 MISSING CASES 0

TABLE H-7 (continued)

DRAFT

7705
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-12759.261	STD ERR	14812.543	STD DEV	71038.459
VARIANCE	.5046E+10	KURTOSIS	6.914	SKEWNESS	-2.430
MINIMUM	-279761.000	MAXIMUM	69625.000	SUM	-293463.000
C.V. PCT	556.760	.95 C.I.	-43478.594	TO	17960.072

VALID CASES 23 MISSING CASES 0

7706
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-2496.778	STD ERR	17036.447	STD DEV	72279.523
VARIANCE	.5224E+10	KURTOSIS	1.632	SKEWNESS	-.857
MINIMUM	-201282.000	MAXIMUM	121209.000	SUM	-44942.000
C.V. PCT	2894.912	.95 C.I.	-38440.539	TO	33446.983

VALID CASES 18 MISSING CASES 0

7707
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-4597.043	STD ERR	10046.679	STD DEV	48182.179
VARIANCE	.2321E+10	KURTOSIS	4.975	SKEWNESS	-1.637
MINIMUM	-174045.000	MAXIMUM	75978.000	SUM	-105732.000
C.V. PCT	1048.112	.95 C.I.	-25432.580	TO	16238.493

VALID CASES 23 MISSING CASES 0

7708
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	1665.294	STD ERR	14296.144	STD DEV	58944.512
VARIANCE	.3474E+10	KURTOSIS	4.825	SKEWNESS	1.390
MINIMUM	-122741.000	MAXIMUM	186884.000	SUM	28310.000
C.V. PCT	3539.586	.95 C.I.	-28641.177	TO	31971.765

VALID CASES 17 MISSING CASES 0

7709
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-30420.154	STD ERR	49344.505	STD DEV	177914.142
VARIANCE	.3165E+11	KURTOSIS	6.465	SKEWNESS	-2.638
MINIMUM	-596801.000	MAXIMUM	184043.000	SUM	-395462.000
C.V. PCT	584.856	.95 C.I.	-137932.584	TO	77092.277

VALID CASES 13 MISSING CASES 0

7710
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-53218.214	STD ERR	56921.651	STD DEV	212981.316
VARIANCE	.4536E+11	KURTOSIS	8.328	SKEWNESS	-3.142
MINIMUM	-781128.000	MAXIMUM	92840.000	SUM	-745055.000
C.V. PCT	400.204	.95 C.I.	-176169.959	TO	69753.530

VALID CASES 14 MISSING CASES 0

7711
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	175.923	STD ERR	20235.236	STD DEV	72959.166
VARIANCE	.5323E+10	KURTOSIS	2.719	SKEWNESS	-.763
MINIMUM	-188841.000	MAXIMUM	150346.000	SUM	2287.000
C.V. PCT	41472.209	.95 C.I.	-43912.868	TO	44264.714

VALID CASES 13 MISSING CASES 0

7712
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-25867.000	STD ERR	27214.982	STD DEV	90261.883
VARIANCE	.8147E+10	KURTOSIS	5.907	SKEWNESS	-2.768
MINIMUM	-296502.000	MAXIMUM	17602.000	SUM	-284537.000
C.V. PCT	348.946	.95 C.I.	-86505.742	TO	34771.742

VALID CASES 11 MISSING CASES 0

TABLE H-7 (continued)

DRAFT

7801
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	28295.455	STD ERR	33812.690	STD DEV	112144.005
VARIANCE	.1257E+11	KURTOSIS	5.965	SKEWNESS	2.804
MINIMUM	-32432.000	MAXIMUM	365098.000	SUM	311250.000
C.V. PCT	396.332	.95 C.I.	-47043.892	TO	103634.801

VALID CASES 11 MISSING CASES 0

7802
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-3207.600	STD ERR	12867.535	STD DEV	28772.684
VARIANCE	.8278E+09	KURTOSIS	-.503	SKEWNESS	-.212
MINIMUM	-45594.000	MAXIMUM	35518.000	SUM	-16038.000
C.V. PCT	897.016	.95 C.I.	-38933.025	TO	32517.825

VALID CASES 5 MISSING CASES 0

7803
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	17327.000	STD ERR	21963.470	STD DEV	58109.879
VARIANCE	.3376E+10	KURTOSIS	2.062	SKEWNESS	1.993
MINIMUM	-12997.000	MAXIMUM	148360.000	SUM	121289.000
C.V. PCT	335.372	.95 C.I.	-36415.385	TO	71069.385

VALID CASES 7 MISSING CASES 0

7804
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	31895.727	STD ERR	47466.663	STD DEV	157429.113
VARIANCE	.2478E+11	KURTOSIS	5.685	SKEWNESS	2.715
MINIMUM	-68515.000	MAXIMUM	500749.000	SUM	350853.000
C.V. PCT	493.574	.95 C.I.	-73866.561	TO	137658.015

VALID CASES 11 MISSING CASES 0

7 NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-18054.857	STD ERR	12293.718	STD DEV	32526.122
VARIANCE	.1057E+10	KURTOSIS	.352	SKEWNESS	-1.109
MINIMUM	-32[illegible]	MAXIMUM	17707.[illegible]	SUM	-126384.000
C.V. PCT	180.152	.95 C.I.	-48136.340	TO	12026.626

VALID CASES 7 MISSING CASES 0

7712 TO 7805
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	6854.481	STD ERR	13926.430	STD DEV	100424.912
VARIANCE	.1008E+11	KURTOSIS	13.702	SKEWNESS	2.730
MINIMUM	-296502.000	MAXIMUM	500749.000	SUM	356433.000
C.V. PCT	1465.099	.95 C.I.	-21103.993	TO	34612.955

VALID CASES 52 MISSING CASES 0

7612 TO 7705
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-20026.543	STD ERR	9739.026	STD DEV	114407.646
VARIANCE	.1308E+11	KURTOSIS	10.571	SKEWNESS	-2.887
MINIMUM	-611730.000	MAXIMUM	269860.000	SUM	-.2763E+07
C.V. PCT	571.280	.95 C.I.	-39284.797	TO	-768.290

VALID CASES 138 MISSING CASES 0

7602 TO 7701
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-6921.659	STD ERR	6676.337	STD DEV	128768.531
VARIANCE	.1658E+11	KURTOSIS	11.599	SKEWNESS	-1.733
MINIMUM	-833995.000	MAXIMUM	641967.000	SUM	-.2574E+07
C.V. PCT	1860.371	.95 C.I.	-20049.867	TO	6206.550

VALID CASES 372 MISSING CASES 0

7702 TO 7801
FILE NONAME (CREATION DATE = 13 OCT [illegible]

VARIABLE DELTA

MEAN	-10527.515	STD ERR	7251.310	STD DEV	103569.418
VARIANCE	.1072E+11	KURTOSIS	21.622	SKEWNESS	-3.392
MINIMUM	-781128.000	MAXIMUM	365098.000	SUM	-.2147E+07
C.V. PCT	983.797	.95 C.I.	-24825.059	TO	3770.029

VALID CASES 204 MISSING CASES 0

TABLE H-7 (continued)

DRAFT

7602 TO 7605
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-14192.870	STD ERR	12443.528	STD DEV	280186.702
VARIANCE	.7850E+11	KURTOSIS	110.881	SKEWNESS	6.815
MINIMUM	-.1648E+07	MAXIMUM	4134966.000	SUM	-.7195E+07
C.V. PCT	1974.137	.95 C.I.	-38640.214	TO	10254.474

VALID CASES 507 MISSING CASES 0

7602
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-8771.200	STD ERR	13705.375	STD DEV	68526.877
VARIANCE	.4695E+10	KURTOSIS	2.976	SKEWNESS	-1.308
MINIMUM	-234480.000	MAXIMUM	100527.000	SUM	-219380.000
C.V. PCT	780.915	.95 C.I.	-37061.705	TO	19511.305

VALID CASES 25 MISSING CASES 0

7603
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-10558.950	STD ERR	29434.153	STD DEV	131633.532
VARIANCE	.1732E+11	KURTOSIS	6.697	SKEWNESS	1.860
MINIMUM	-243969.000	MAXIMUM	456000.000	SUM	-211179.000
C.V. PCT	1246.654	.95 C.I.	-72165.339	TO	51047.439

VALID CASES 20 MISSING CASES 0

7604
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-74482.095	STD ERR	80124.070	STD DEV	367174.615
VARIANCE	.1348E+12	KURTOSIS	14.737	SKEWNESS	-4.006
MINIMUM	-.1648E+07	MAXIMUM	151000.000	SUM	-.1564E+07
C.V. PCT	492.970	.95 C.I.	-241617.977	TO	92653.786

VALID CASES 21 MISSING CASES 0

7605
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-106505.900	STD ERR	60975.716	STD DEV	272691.693
VARIANCE	.7436E+11	KURTOSIS	6.975	SKEWNESS	-2.796
MINIMUM	-.1090E+07	MAXIMUM	41953.000	SUM	-.2130E+07
C.V. PCT	256.034	.95 C.I.	-234129.541	TO	21117.741

VALID CASES 20 MISSING CASES 0

7606
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	10202.810	STD ERR	25206.156	STD DEV	115509.118
VARIANCE	.1334E+11	KURTOSIS	5.007	SKEWNESS	1.590
MINIMUM	-242475.000	MAXIMUM	390790.000	SUM	214259.000
C.V. PCT	1132.130	.95 C.I.	-42376.311	TO	62781.930

VALID CASES 21 MISSING CASES 0

7607
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	142034.760	STD ERR	166861.508	STD DEV	834307.540
VARIANCE	.6960E+12	KURTOSIS	19.775	SKEWNESS	4.649
MINIMUM	-255322.000	MAXIMUM	4134966.000	SUM	3550869.000
C.V. PCT	587.397	.95 C.I.	-202350.468	TO	486419.968

VALID CASES 25 MISSING CASES 0

7608
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-35451.652	STD ERR	23442.043	STD DEV	112424.086
VARIANCE	.1263E+11	KURTOSIS	2.273	SKEWNESS	-1.394
MINIMUM	-346134.000	MAXIMUM	188000.000	SUM	-815388.000
C.V. PCT	317.119	.95 C.I.	-84067.473	TO	13164.169

VALID CASES 23 MISSING CASES 0

TABLE H-8

MONTHLY STATISTICS ON CRUDE RUNS DELTAS

DRAFT

7609
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-86099,407	STD ERR	27792,379	STD DEV	144413,437
VARIANCE	,2085E+11	KURTOSIS	7,233	SKEWNESS	-2,476
MINIMUM	-613886,000	MAXIMUM	182500,000	SUM	-,1244E+07
C.V. PCT	313,265	,95 C.I.	-103227,461	TO	11028,646
VALID CASES	27	MISSING CASES	0		

7610
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-38072,731	STD ERR	21260,304	STD DEV	108406,706
VARIANCE	,1175E+11	KURTOSIS	7,792	SKEWNESS	-2,996
MINIMUM	-446325,000	MAXIMUM	20953,000	SUM	-989891,000
C.V. PCT	284,736	,95 C.I.	-81859,147	TO	5713,686
VALID CASES	26	MISSING CASES	0		

7611
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-784,690	STD ERR	19012,568	STD DEV	102385,814
VARIANCE	,1048E+11	KURTOSIS	2,821	SKEWNESS	-,575
MINIMUM	-312211,000	MAXIMUM	218654,000	SUM	-22756,000
C.V. PCT	13047,937	,95 C.I.	-39730,171	TO	38160,791
VALID CASES	29	MISSING CASES	0		

7612
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-689,273	STD ERR	26152,515	STD DEV	122666,171
VARIANCE	,1504E+11	KURTOSIS	2,423	SKEWNESS	,213
MINIMUM	-321298,000	MAXIMUM	306700,000	SUM	-15164,000
C.V. PCT	17796,464	,95 C.I.	-55076,406	TO	53697,861
VALID CASES	22	MISSING CASES	0		

7701
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-33615,278	STD ERR	34746,941	STD DEV	147418,787
VARIANCE	,2173E+11	KURTOSIS	4,846	SKEWNESS	1,595
MINIMUM	-283324,000	MAXIMUM	447000,000	SUM	-605075,000
C.V. PCT	438,547	,95 C.I.	-106924,915	TO	39694,360
VALID CASES	18	MISSING CASES	0		

7702
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-9092,409	STD ERR	23941,652	STD DEV	112296,300
VARIANCE	,1261E+11	KURTOSIS	4,405	SKEWNESS	,249
MINIMUM	-315571,000	MAXIMUM	334798,000	SUM	-200033,000
C.V. PCT	1235,056	,95 C.I.	-58881,800	TO	40696,981
VALID CASES	22	MISSING CASES	0		

7703
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-24396,667	STD ERR	25678,637	STD DEV	88953,407
VARIANCE	,7912E+10	KURTOSIS	5,464	SKEWNESS	-2,478
MINIMUM	-293438,000	MAXIMUM	76031,000	SUM	-292760,000
C.V. PCT	364,613	,95 C.I.	-80914,956	TO	32121,623
VALID CASES	12	MISSING CASES	0		

7704
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-26212,923	STD ERR	52113,740	STD DEV	265728,977
VARIANCE	,7061E+11	KURTOSIS	8,577	SKEWNESS	1,780
MINIMUM	-[illegible]	MAXIMUM	[illegible]	SUM	-681536,000
C.V. PCT	1013,733	,95 C.I.	-13543,180	TO	81117,334
VALID CASES	26	MISSING CASES	0		

TABLE H-8 (continued)

DRAFT

7705
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-30246,667	STD ERR	45500,028	STD DEV	208507,321
VARIANCE	,4347E+11	KURTOSIS	3,973	SKEWNESS	,196
MINIMUM	-587640,000	MAXIMUM	587640,000	SUM	-635160,000
C.V. PCT	689,356	.95 C.I.	-125158,061	TO	64664,728

VALID CASES 21 MISSING CASES 0

7706
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-28944,000	STD ERR	17926,292	STD DEV	67074,042
VARIANCE	,4498E+10	KURTOSIS	1,887	SKEWNESS	-1,838
MINIMUM	-203318,000	MAXIMUM	20807,000	SUM	-405216,000
C.V. PCT	231,737	.95 C.I.	-67671,397	TO	9783,397

VALID CASES 14 MISSING CASES 0

7707
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-47138,647	STD ERR	27688,083	STD DEV	114160,889
VARIANCE	,1303E+11	KURTOSIS	6,833	SKEWNESS	-2,747
MINIMUM	-483930,000	MAXIMUM	9060,000	SUM	-801357,000
C.V. PCT	242,181	.95 C.I.	-105834,759	TO	11557,465

VALID CASES 17 MISSING CASES 0

7708
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-11685,385	STD ERR	12800,269	STD DEV	46152,027
VARIANCE	,2130E+10	KURTOSIS	6,184	SKEWNESS	-2,657
MINIMUM	-157897,000	MAXIMUM	32829,000	SUM	-151910,000
C.V. PCT	394,955	.95 C.I.	-39574,773	TO	16204,004

VALID CASES 13 MISSING CASES 0

7709
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-124921,500	STD ERR	78686,265	STD DEV	369071,298
VARIANCE	,1362E+12	KURTOSIS	11,018	SKEWNESS	-3,384
MINIMUM	-,1631E+07	MAXIMUM	102261,000	SUM	-,2748E+07
C.V. PCT	295,443	.95 C.I.	-288558,547	TO	38715,547

VALID CASES 22 MISSING CASES 0

7710
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	21380,867	STD ERR	20392,198	STD DEV	78978,644
VARIANCE	,6237E+10	KURTOSIS	,165	SKEWNESS	,330
MINIMUM	-131853,000	MAXIMUM	179232,000	SUM	320713,000
C.V. PCT	369,389	.95 C.I.	-22356,047	TO	65117,781

VALID CASES 15 MISSING CASES 0

7711
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	22756,944	STD ERR	15648,537	STD DEV	66391,120
VARIANCE	,4407E+10	KURTOSIS	2,513	SKEWNESS	1,679
MINIMUM	-63000,000	MAXIMUM	214740,000	SUM	409625,000
C.V. PCT	291,740	.95 C.I.	-10258,582	TO	55772,471

VALID CASES 18 MISSING CASES 0

7712
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	46420,556	STD ERR	17193,440	STD DEV	51580,319
VARIANCE	,2660E+10	KURTOSIS	-1,156	SKEWNESS	,500
MINIMUM	-7253,000	MAXIMUM	,24000,000	SUM	417785,000
C.V. PCT	111,115	.95 C.I.	6772,453	TO	86068,658

VALID CASES 9 MISSING CASES 0

TABLE H-8 (continued)

DRAFT

7801
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-88581.000	STD ERR	196809.055	STD DEV	393618.110
VARIANCE	.1549E+12	KURTOSIS	-.791	SKEWNESS	-.979
MINIMUM	-663770.000	MAXIMUM	216802.000	SUM	-354324.000
C.V. PCT	444.360	.95 C.I.	-714906.136	TO	537744.136

VALID CASES 4 MISSING CASES 0

7802
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-59298.875	STD ERR	53463.949	STD DEV	151218.883
VARIANCE	.2286E+11	KURTOSIS	-.744	SKEWNESS	-.916
MINIMUM	-327317.000	MAXIMUM	69965.000	SUM	-474391.000
C.V. PCT	255.011	.95 C.I.	-185720.743	TO	67122.993

VALID CASES 8 MISSING CASES 0

7803
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	129588.923	STD ERR	214605.280	STD DEV	773770.340
VARIANCE	.5987E+12	KURTOSIS	5.268	SKEWNESS	2.099
MINIMUM	-.1085E+07	MAXIMUM	2482531.000	SUM	1684656.000
C.V. PCT	597.096	.95 C.I.	-337995.771	TO	597173.617

VALID CASES 13 MISSING CASES 0

7804
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	64087.571	STD ERR	66099.902	STD DEV	174883.903
VARIANCE	.3058E+11	KURTOSIS	1.692	SKEWNESS	1.818
MINIMUM	-69647.000	MAXIMUM	450000.000	SUM	448613.000
C.V. PCT	272.863	.95 C.I.	-97652.191	TO	225827.333

VALID CASES 7 MISSING CASES 0

7805
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	35603.778	STD ERR	37246.163	STD DEV	111738.488
VARIANCE	.1248E+11	KURTOSIS	1.468	SKEWNESS	1.368
MINIMUM	-105016.000	MAXIMUM	295030.000	SUM	320434.000
C.V. PCT	313.839	.95 C.I.	-50285.940	TO	121493.495

VALID CASES 9 MISSING CASES 0

7712 TO 7805
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	40855.460	STD ERR	58442.790	STD DEV	413252.928
VARIANCE	.1707E+12	KURTOSIS	23.745	SKEWNESS	3.737
MINIMUM	-.1085E+07	MAXIMUM	2482531.000	SUM	2042773.000
C.V. PCT	1011.500	.95 C.I.	-76569.724	TO	158300.044

VALID CASES 50 MISSING CASES 0

7612 TO 7705
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-20080.562	STD ERR	15940.869	STD DEV	175349.564
VARIANCE	.3074E+11	KURTOSIS	12.368	SKEWNESS	1.377
MINIMUM	-650789.000	MAXIMUM	1021301.000	SUM	-.2429E+07
C.V. PCT	873.230	.95 C.I.	-51642.374	TO	11461.250

VALID CASES 121 MISSING CASES 0

7602 TO 7701
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-14630.437	STD ERR	17921.836	STD DEV	298278.804
VARIANCE	.8897E+11	KURTOSIS	137.329	SKEWNESS	0.948
MINIMUM	-.1640E+07	MAXIMUM	2134966.000	SUM	-.4052E+07
C.V. PCT	2038.755	.95 C.I.	-49911.299	TO	20650.425

VALID CASES 277 MISSING CASES 0

7702 TO 7801
FILE NONAME (CREATION DATE = 13 OCT 78)

VARIABLE DELTA

MEAN	-26541.275	STD ERR	13900.112	STD DEV	193106.523
VARIANCE	.3729E+11	KURTOSIS	29.508	SKEWNESS	-2.747
MINIMUM	-.1631E+07	MAXIMUM	1021301.000	SUM	-.5122E+07
C.V. PCT	727.571	.95 C.I.	-53957.806	TO	875.257

VALID CASES 193 MISSING CASES 0

TABLE H-8 (continued)

DRAFT

7602 TO 7805
VARIABLE NORMDEL

MEAN	-.051	STD ERR	.034	STD DEV	.849		
VARIANCE	.721	KURTOSIS	308.806	SKEWNESS	-14.956		
MINIMUM	-17.730	MAXIMUM	2.000	SUM	-30.900		
C.V. PCT	1670.395	.95 C.I.	-.118	TO	.017		

VALID CASES 608 MISSING CASES 0

7602
VARIABLE NORMDEL

MEAN	-.095	STD ERR	.061	STD DEV	.380		
VARIANCE	.145	KURTOSIS	14.844	SKEWNESS	-3.301		
MINIMUM	-2.000	MAXIMUM	.671	SUM	-3.691		
C.V. PCT	401.831	.95 C.I.	-.218	TO	.029		

VALID CASES 39 MISSING CASES 0

7603
VARIABLE NORMDEL

MEAN	.046	STD ERR	.052	STD DEV	.327		
VARIANCE	.107	KURTOSIS	9.039	SKEWNESS	.828		
MINIMUM	-1.139	MAXIMUM	1.317	SUM	1.850		
C.V. PCT	707.357	.95 C.I.	-.058	TO	.151		

VALID CASES 40 MISSING CASES 0

7604
VARIABLE NORMDEL

MEAN	-.090	STD ERR	.073	STD DEV	.423		
VARIANCE	.179	KURTOSIS	11.806	SKEWNESS	-2.830		
MINIMUM	-2.000	MAXIMUM	.896	SUM	-3.044		
C.V. PCT	472.715	.95 C.I.	-.237	TO	.058		

VALID CASES 34 MISSING CASES 0

7605
VARIABLE NORMDEL

MEAN	-.030	STD ERR	.038	STD DEV	.222		
VARIANCE	.049	KURTOSIS	21.326	SKEWNESS	-4.184		
MINIMUM	-1.205	MAXIMUM	.427	SUM	-1.049		
C.V. PCT	741.244	.95 C.I.	-.106	TO	.046		

VALID CASES 35 MISSING CASES 0

7606
VARIABLE NORMDEL

MEAN	-.027	STD ERR	.043	STD DEV	.242		
VARIANCE	.059	KURTOSIS	18.426	SKEWNESS	-3.721		
MINIMUM	-1.236	MAXIMUM	.594	SUM	-.865		
C.V. PCT	895.954	.95 C.I.	-.114	TO	.060		

VALID CASES 32 MISSING CASES 0

7607
VARIABLE NORMDEL

MEAN	.079	STD ERR	.094	STD DEV	.516		
VARIANCE	.266	KURTOSIS	7.664	SKEWNESS	2.376		
MINIMUM	-1.064	MAXIMUM	2.000	SUM	2.374		
C.V. PCT	652.366	.95 C.I.	-.114	TO	.272		

VALID CASES 30 MISSING CASES 0

7608
VARIABLE NORMDEL

MEAN	-.033	STD ERR	.034	STD DEV	.181		
VARIANCE	.033	KURTOSIS	15.778	SKEWNESS	-3.629		
MINIMUM	-.886	MAXIMUM	.286	SUM	-.966		
C.V. PCT	542.538	.95 C.I.	-.102	TO	.035		

VALID CASES 29 MISSING CASES 0

7609
VARIABLE NORMDEL

MEAN	.030	STD ERR	.076	STD DEV	.403		
VARIANCE	.162	KURTOSIS	19.128	SKEWNESS	4.294		
MINIMUM	-.522	MAXIMUM	2.000	SUM	.850		
C.V. PCT	1326.078	.95 C.I.	-.126	TO	.167		

VALID CASES 28 MISSING CASES 0

7610
VARIABLE NORMDEL

MEAN	.025	STD ERR	.094	STD DEV	.558		
VARIANCE	.312	KURTOSIS	7.[illegible]	SKEWNESS	2.117		
MINIMUM	-1.296	MAXIMUM	2.000	SUM	.891		
C.V. PCT	2194.463	.95 C.I.	-.166	TO	.217		

VALID CASES 35 MISSING CASES 0

TABLE H-9

MONTHLY STATISTICS ON OLD OIL NORMALIZED DELTAS

DRAFT

7611
VARIABLE NORMDEL

MEAN	-.159	STD ERR	.102	STD DEV	.557
VARIANCE	.310	KURTOSIS	5.923	SKEWNESS	-2.427
MINIMUM	-2.000	MAXIMUM	.787	SUM	-4.767
C.V. PCT	350.675	.95 C.I.	-.367	TO	.049

VALID CASES 30 MISSING CASES 0

7612
VARIABLE NORMDEL

MEAN	-.050	STD ERR	.067	STD DEV	.371
VARIANCE	.137	KURTOSIS	23.388	SKEWNESS	-4.893
MINIMUM	-2.000	MAXIMUM	.261	SUM	-1.559
C.V. PCT	737.267	.95 C.I.	-.186	TO	.086

VALID CASES 31 MISSING CASES 0

7701
VARIABLE NORMDEL

MEAN	-.663	STD ERR	.683	STD DEV	3.482
VARIANCE	12.125	KURTOSIS	21.010	SKEWNESS	-4.795
MINIMUM	-17.730	MAXIMUM	.331	SUM	-17.244
C.V. PCT	525.022	.95 C.I.	-2.070	TO	.743

VALID CASES 26 MISSING CASES 0

7702
VARIABLE NORMDEL

MEAN	.009	STD ERR	.023	STD DEV	.117
VARIANCE	.014	KURTOSIS	14.242	SKEWNESS	3.620
MINIMUM	-.115	MAXIMUM	.535	SUM	.245
C.V. PCT	1239.678	.95 C.I.	-.038	TO	.057

VALID CASES 26 MISSING CASES 0

7703
VARIABLE NORMDEL

MEAN	-.018	STD ERR	.020	STD DEV	.090
VARIANCE	.008	KURTOSIS	5.302	SKEWNESS	-2.158
MINIMUM	-.325	MAXIMUM	.111	SUM	-.358
C.V. PCT	505.036	.95 C.I.	-.060	TO	.024

VALID CASES 20 MISSING CASES 0

7704
VARIABLE NORMDEL

MEAN	-.017	STD ERR	.018	STD DEV	.076
VARIANCE	.006	KURTOSIS	3.009	SKEWNESS	-1.702
MINIMUM	-.243	MAXIMUM	.092	SUM	-.331
C.V. PCT	439.460	.95 C.I.	-.054	TO	.019

VALID CASES 19 MISSING CASES 0

7705
VARIABLE NORMDEL

MEAN	.078	STD ERR	.089	STD DEV	.435
VARIANCE	.189	KURTOSIS	14.492	SKEWNESS	3.637
MINIMUM	-.375	MAXIMUM	2.000	SUM	1.867
C.V. PCT	558.497	.95 C.I.	-.106	TO	.261

VALID CASES 24 MISSING CASES 0

7706
VARIABLE NORMDEL

MEAN	.067	STD ERR	.171	STD DEV	.766
VARIANCE	.586	KURTOSIS	2.561	SKEWNESS	1.156
MINIMUM	-1.401	MAXIMUM	2.000	SUM	1.350
C.V. PCT	1134.271	.95 C.I.	-.291	TO	.426

VALID CASES 20 MISSING CASES 0

7707
VARIABLE NORMDEL

MEAN	-.160	STD ERR	.161	STD DEV	.703
VARIANCE	.494	KURTOSIS	12.836	SKEWNESS	-3.743
MINIMUM	-3.008	MAXIMUM	.473	SUM	-3.034
C.V. PCT	440.345	.95 C.I.	-.499	TO	.179

VALID CASES 19 MISSING CASES 0

7708
VARIABLE NORMDEL

MEAN	.101	STD ERR	.126	STD DEV	.473
VARIANCE	.224	KURTOSIS	8.277	SKEWNESS	3.099
MINIMUM	-.331	MAXIMUM	1.7[illegible]	SUM	1.411
C.V. PCT	469.231	.95 C.I.	-.172	TO	.374

VALID CASES 14 MISSING CASES 0

TABLE H-9 (continued)

DRAFT

7709
VARIABLE NORMDEL

MEAN	.288	STD ERR	.196	STD DEV	.649
VARIANCE	.421	KURTOSIS	2.571	SKEWNESS	2.018
MINIMUM	-.036	MAXIMUM	2.000	SUM	3.167
C.V. PCT	225.413	.95 C.I.	-.148	TO	.724

VALID CASES 11 MISSING CASES 0

7710
VARIABLE NORMDEL

MEAN	.018	STD ERR	.143	STD DEV	.452
VARIANCE	.204	KURTOSIS	2.210	SKEWNESS	1.015
MINIMUM	-.761	MAXIMUM	1.103	SUM	.176
C.V. PCT	2569.547	.95 C.I.	-.306	TO	.341

VALID CASES 10 MISSING CASES 0

7711
VARIABLE NORMDEL

MEAN	-.115	STD ERR	.428	STD DEV	1.284
VARIANCE	1.649	KURTOSIS	-.484	SKEWNESS	-.192
MINIMUM	-2.060	MAXIMUM	2.000	SUM	-1.038
C.V. PCT	1113.217	.95 C.I.	-1.103	TO	.872

VALID CASES 9 MISSING CASES 0

7712
VARIABLE NORMDEL

MEAN	-.127	STD ERR	.265	STD DEV	.796
VARIANCE	.634	KURTOSIS	1.666	SKEWNESS	-1.470
MINIMUM	-2.000	MAXIMUM	.859	SUM	-1.141
C.V. PCT	628.128	.95 C.I.	-.739	TO	.485

VALID CASES 9 MISSING CASES 0

7801
VARIABLE NORMDEL

MEAN	-.253	STD ERR	.250	STD DEV	.708
VARIANCE	.502	KURTOSIS	3.067	SKEWNESS	-2.239
MINIMUM	-2.000	MAXIMUM	.055	SUM	-2.021
C.V. PCT	280.429	.95 C.I.	-.845	TO	.340

VALID CASES 8 MISSING CASES 0

7802
VARIABLE NORMDEL

MEAN	-.211	STD ERR	.261	STD DEV	.738
VARIANCE	.544	KURTOSIS	2.726	SKEWNESS	-2.072
MINIMUM	-2.000	MAXIMUM	.399	SUM	-1.692
C.V. PCT	348.799	.95 C.I.	-.826	TO	.405

VALID CASES 8 MISSING CASES 0

7803
VARIABLE NORMDEL

MEAN	-.005	STD ERR	.025	STD DEV	.070
VARIANCE	.005	KURTOSIS	1.497	SKEWNESS	-1.603
MINIMUM	-.165	MAXIMUM	.054	SUM	-.043
C.V. PCT	1302.996	.95 C.I.	-.064	TO	.053

VALID CASES 8 MISSING CASES 0

7804
VARIABLE NORMDEL

MEAN	-.293	STD ERR	.282	STD DEV	.746
VARIANCE	.557	KURTOSIS	2.136	SKEWNESS	-2.027
MINIMUM	-1.983	MAXIMUM	.224	SUM	-2.054
C.V. PCT	254.261	.95 C.I.	-.933	TO	.397

VALID CASES 7 MISSING CASES 0

7805
VARIABLE NORMDEL

MEAN	-.027	STD ERR	.089	STD DEV	.236
VARIANCE	.056	KURTOSIS	1.182	SKEWNESS	-1.404
MINIMUM	-.524	MAXIMUM	.244	SUM	-.187
C.V. PCT	884.734	.95 C.I.	-.245	TO	.192

VALID CASES 7 MISSING CASES 0

7712 TO 7805
VARIABLE NORMDEL

MEAN	-.152	STD ERR	.088	STD DEV	.601
VARIANCE	.362	KURTOSIS	5.067	SKEWNESS	-2.391
MINIMUM	-2.000	MAXIMUM	.859	SUM	-7.138
C.V. PCT	396.055	.95 C.I.	-.328	TO	.025

VALID CASES 47 MISSING CASES 0

TABLE H-9 (continued)

DRAFT

7612 To 7705

VARIABLE NORMDEL

MEAN	-.119	STD ERR	.123	STD DEV	1.490
VARIANCE	2.219	KURTOSIS	132.672	SKEWNESS	-11.425
MINIMUM	-17.730	MAXIMUM	2.000	SUM	-17.380
C.V. PCT	1251.496	.95 C.I.	-.363	TO	.125

VALID CASES 146 MISSING CASES 0

7602 To 7701

VARIABLE NORMDEL

MEAN	-.070	STD ERR	.050	STD DEV	.977
VARIANCE	.955	KURTOSIS	273.363	SKEWNESS	-15.241
MINIMUM	-17.730	MAXIMUM	2.000	SUM	-27.219
C.V. PCT	1396.297	.95 C.I.	-.167	TO	.027

VALID CASES 389 MISSING CASES 0

7702 To 7801

VARIABLE NORMDEL

MEAN	.002	STD ERR	.041	STD DEV	.557
VARIANCE	.310	KURTOSIS	10.748	SKEWNESS	-.477
MINIMUM	-3.068	MAXIMUM	2.000	SUM	.294
C.V. PCT	35776.359	.95 C.I.	-.078	TO	.081

VALID CASES 189 MISSING CASES 0

TABLE H-9 (continued)

DRAFT

7602 To 7805
VARIABLE NORMDEL

MEAN	-.050	STD ERR	.023	STD DEV	.575
VARIANCE	.331	KURTOSIS	64.347	SKEWNESS	-4.634
MINIMUM	-8.022	MAXIMUM	2.000	SUM	-30.366
C.V. PCT	1147.791	.95 C.I.	-.096	TO	-.004

VALID CASES 606 MISSING CASES 0

7602
VARIABLE NORMDEL

MEAN	.009	STD ERR	.034	STD DEV	.198
VARIANCE	.039	KURTOSIS	10.466	SKEWNESS	-.595
MINIMUM	-.779	MAXIMUM	.714	SUM	.301
C.V. PCT	2164.882	.95 C.I.	-.061	TO	.079

VALID CASES 33 MISSING CASES 0

7603
VARIABLE NORMDEL

MEAN	.073	STD ERR	.037	STD DEV	.214
VARIANCE	.046	KURTOSIS	6.404	SKEWNESS	1.784
MINIMUM	-.451	MAXIMUM	.919	SUM	2.485
C.V. PCT	293.055	.95 C.I.	-.002	TO	.148

VALID CASES 34 MISSING CASES 0

7604
VARIABLE NORMDEL

MEAN	-.006	STD ERR	.053	STD DEV	.309
VARIANCE	.095	KURTOSIS	22.698	SKEWNESS	-4.558
MINIMUM	-1.656	MAXIMUM	.436	SUM	-.200
C.V. PCT	5246.153	.95 C.I.	-.114	TO	.102

VALID CASES 34 MISSING CASES 0

7605
VARIABLE NORMDEL

MEAN	.015	STD ERR	.023	STD DEV	.133
VARIANCE	.018	KURTOSIS	7.287	SKEWNESS	-1.215
MINIMUM	-.525	MAXIMUM	.312	SUM	.498
C.V. PCT	911.070	.95 C.I.	-.032	TO	.061

VALID CASES 34 MISSING CASES 0

7606
VARIABLE NORMDEL

MEAN	-.025	STD ERR	.075	STD DEV	.404
VARIANCE	.163	KURTOSIS	12.137	SKEWNESS	-2.562
MINIMUM	-1.800	MAXIMUM	.952	SUM	-.728
C.V. PCT	1608.052	.95 C.I.	-.179	TO	.129

VALID CASES 29 MISSING CASES 0

7607
VARIABLE NORMDEL

MEAN	.003	STD ERR	.106	STD DEV	.571
VARIANCE	.326	KURTOSIS	5.996	SKEWNESS	.393
MINIMUM	-1.715	MAXIMUM	2.000	SUM	.081
C.V. PCT	20495.949	.95 C.I.	-.214	TO	.220

VALID CASES 29 MISSING CASES 0

7608
VARIABLE NORMDEL

MEAN	-.045	STD ERR	.057	STD DEV	.311
VARIANCE	.097	KURTOSIS	19.[illegible]	SKEWNESS	-4.200
MINIMUM	-1.597	MAXIMUM	.416	SUM	-1.361
C.V. PCT	685.943	.95 C.I.	-.162	TO	.071

VALID CASES 30 MISSING CASES 0

7609
VARIABLE NORMDEL

MEAN	.029	STD ERR	.074	STD DEV	.423
VARIANCE	.179	KURTOSIS	12.738	SKEWNESS	3.131
MINIMUM	-.608	MAXIMUM	2.000	SUM	.955
C.V. PCT	1461.011	.95 C.I.	-.121	TO	.179

VALID CASES 33 MISSING CASES 0

7610
VARIABLE NORMDEL

MEAN	-.019	STD ERR	.124	STD DEV	.7[illegible]
VARIANCE	.521	KURTOSIS	4.4[illegible]	SKEWNESS	.016
MINIMUM	-2.000	MAXIMUM	2.000	SUM	-.643
C.V. PCT	3814.749	.95 C.I.	-.271	TO	.233

VALID CASES 34 MISSING CASES 0

TABLE H-10

MONTHLY STATISTICS ON UPPER TIER NORMALIZED DELTAS

DRAFT

7611
VARIABLE NORMDEL

MEAN	-.076	STD ERR	.078	STD DEV	.413
VARIANCE	.170	KURTOSIS	15.410	SKEWNESS	-3.661
MINIMUM	-2.000	MAXIMUM	.561	SUM	-2.136
C.V. PCT	540.876	.95 C.I.	-.236	TU	.084

VALID CASES 28 MISSING CASES 0

7612
VARIABLE NORMDEL

MEAN	-.086	STD ERR	.062	STD DEV	.332
VARIANCE	.111	KURTOSIS	19.338	SKEWNESS	-4.389
MINIMUM	-1.733	MAXIMUM	.225	SUM	-2.496
C.V. PCT	386.292	.95 C.I.	-.213	TU	.040

VALID CASES 29 MISSING CASES 0

7701
VARIABLE NORMDEL

MEAN	-.040	STD ERR	.021	STD DEV	.107
VARIANCE	.011	KURTOSIS	1.013	SKEWNESS	-1.461
MINIMUM	-.314	MAXIMUM	.099	SUM	-1.000
C.V. PCT	267.401	.95 C.I.	-.084	TU	.004

VALID CASES 25 MISSING CASES 0

7702
VARIABLE NORMDEL

MEAN	-.158	STD ERR	.082	STD DEV	.374
VARIANCE	.140	KURTOSIS	2.868	SKEWNESS	-2.100
MINIMUM	-1.223	MAXIMUM	.091	SUM	-3.318
C.V. PCT	236.987	.95 C.I.	-.328	TU	.012

VALID CASES 21 MISSING CASES 0

7703
VARIABLE NORMDEL

MEAN	-.012	STD ERR	.034	STD DEV	.156
VARIANCE	.024	KURTOSIS	3.830	SKEWNESS	-.286
MINIMUM	-.443	MAXIMUM	.424	SUM	-.254
C.V. PCT	1292.256	.95 C.I.	-.083	TU	.059

VALID CASES 21 MISSING CASES 0

7704
VARIABLE NORMDEL

MEAN	-.026	STD ERR	.029	STD DEV	.126
VARIANCE	.016	KURTOSIS	11.099	SKEWNESS	-3.476
MINIMUM	-.523	MAXIMUM	[illegible]	SUM	-.498
C.V. PCT	482.426	.95 C.I.	-.087	TU	.035

VALID CASES 19 MISSING CASES 0

7705
VARIABLE NORMDEL

MEAN	-.010	STD ERR	.165	STD DEV	.791
VARIANCE	.625	KURTOSIS	2.745	SKEWNESS	.036
MINIMUM	-2.000	MAXIMUM	2.000	SUM	-.220
C.V. PCT	8278.712	.95 C.I.	-.352	TU	.332

VALID CASES 23 MISSING CASES 0

7706
VARIABLE NORMDEL

MEAN	.071	STD ERR	.135	STD DEV	.574
VARIANCE	.330	KURTOSIS	6.475	SKEWNESS	1.632
MINIMUM	-1.210	MAXIMUM	2.000	SUM	1.264
C.V. PCT	805.000	.95 C.I.	-.214	TU	.357

VALID CASES 18 MISSING CASES 0

7707
VARIABLE NORMDEL

MEAN	-.365	STD ERR	.371	STD DEV	1.778
VARIANCE	3.161	KURTOSIS	13.537	SKEWNESS	-3.632
MINIMUM	-8.022	MAXIMUM	2.000	SUM	-8.396
C.V. PCT	487.023	.95 C.I.	-1.134	TU	.404

VALID CASES 23 MISSING CASES 0

7708
VARIABLE NORMDEL

MEAN	-.134	STD ERR	.114	STD DEV	.470
VARIANCE	.221	KURTOSIS	10.049	SKEWNESS	-3.332
MINIMUM	-1.893	MAXIMUM	.236	SUM	-2.275
C.V. PCT	351.431	.95 C.I.	-.376	TU	.108

VALID CASES 17 MISSING CASES 0

TABLE H-10 (continued)

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7709
VARIABLE NORMDEL

MEAN	-.231	STD ERR	.170	STD DEV	.613
VARIANCE	.376	KURTOSIS	3.605	SKEWNESS	-2.202
MINIMUM	-2.000	MAXIMUM	.290	SUM	-3.005
C.V. PCT	265.249	.95 C.I.	-.602	TO	.139

VALID CASES 13 MISSING CASES 0

7710
VARIABLE NORMDEL

MEAN	-.002	STD ERR	.208	STD DEV	.777
VARIANCE	.604	KURTOSIS	3.582	SKEWNESS	.198
MINIMUM	-1.897	MAXIMUM	2.000	SUM	-.029
C.V. PCT	38012.695	.95 C.I.	-.451	TO	.447

VALID CASES 14 MISSING CASES 0

7711
VARIABLE NORMDEL

MEAN	-.066	STD ERR	.238	STD DEV	.860
VARIANCE	.739	KURTOSIS	2.104	SKEWNESS	.232
MINIMUM	-1.928	MAXIMUM	2.000	SUM	-.864
C.V. PCT	1294.004	.95 C.I.	-.586	TO	.453

VALID CASES 13 MISSING CASES 0

7712
VARIABLE NORMDEL

MEAN	-.273	STD ERR	.227	STD DEV	.753
VARIANCE	.567	KURTOSIS	.765	SKEWNESS	-1.190
MINIMUM	-2.000	MAXIMUM	.755	SUM	-3.008
C.V. PCT	275.414	.95 C.I.	-.779	TO	.232

VALID CASES 11 MISSING CASES 0

7801
VARIABLE NORMDEL

MEAN	-.370	STD ERR	.217	STD DEV	.720
VARIANCE	.518	KURTOSIS	.317	SKEWNESS	-1.343
MINIMUM	-2.000	MAXIMUM	.171	SUM	-4.065
C.V. PCT	194.733	.95 C.I.	-.853	TO	.114

VALID CASES 11 MISSING CASES 0

7802
VARIABLE NORMDEL

MEAN	.371	STD ERR	.404	STD DEV	.904
VARIANCE	.817	KURTOSIS	.233	SKEWNESS	1.487
MINIMUM	-.[illegible]	MAXIMUM	1.[illegible]	SUM	1.857
C.V. PCT	243.345	.95 C.I.	-.751	TO	1.494

VALID CASES 5 MISSING CASES 0

7803
VARIABLE NORMDEL

MEAN	-.008	STD ERR	.013	STD DEV	.034
VARIANCE	.001	KURTOSIS	-.250	SKEWNESS	-.604
MINIMUM	-.070	MAXIMUM	.028	SUM	-.054
C.V. PCT	433.703	.95 C.I.	-.039	TO	.023

VALID CASES 7 MISSING CASES 0

7804
VARIABLE NORMDEL

MEAN	-.011	STD ERR	.179	STD DEV	.594
VARIANCE	.353	KURTOSIS	1.829	SKEWNESS	.747
MINIMUM	-1.091	MAXIMUM	1.406	SUM	-.117
C.V. PCT	5586.429	.95 C.I.	-.410	TO	.388

VALID CASES 11 MISSING CASES 0

7805
VARIABLE NORMDEL

MEAN	-.452	STD ERR	.264	STD DEV	.699
VARIANCE	.489	KURTOSIS	-.582	SKEWNESS	-.811
MINIMUM	-1.716	MAXIMUM	.264	SUM	-3.162
C.V. PCT	154.813	.95 C.I.	-1.099	TO	.195

VALID CASES 7 MISSING CASES 0

7712 To 7805
VARIABLE NORMDEL

MEAN	-.164	STD ERR	.094	STD DEV	.681
VARIANCE	.463	KURTOSIS	2.716	SKEWNESS	-.368
MINIMUM	-2.000	MAXIMUM	1.985	SUM	-8.548
C.V. PCT	414.020	.95 C.I.	-.354	TO	.025

VALID CASES 52 MISSING CASES 0

TABLE H-10 (continued)

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7612 TO 7705

VARIABLE NORMDEL

MEAN	-.056	STD ERR	.033	STD DEV	.392
VARIANCE	.154	KURTOSIS	15.297	SKEWNESS	-.668
MINIMUM	-2.000	MAXIMUM	2.000	SUM	-7.785
C.V. PCT	695.078	.95 C.I.	-.122	TO	.010

VALID CASES 138 MISSING CASES 0

7602 TO 7701

VARIABLE NORMDEL

MEAN	-.011	STD ERR	.020	STD DEV	.384
VARIANCE	.147	KURTOSIS	16.831	SKEWNESS	-.707
MINIMUM	-2.000	MAXIMUM	2.000	SUM	-4.245
C.V. PCT	3361.436	.95 C.I.	-.051	TO	.028

VALID CASES 372 MISSING CASES 0

7702 TO 7801

VARIABLE NORMDEL

MEAN	-.121	STD ERR	.057	STD DEV	.807
VARIANCE	.651	KURTOSIS	45.061	SKEWNESS	-4.710
MINIMUM	-8.022	MAXIMUM	2.000	SUM	-24.646
C.V. PCT	667.962	.95 C.I.	-.232	TO	-.009

VALID CASES 204 MISSING CASES 0

TABLE H-10 (continued)

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7602 TO 7805
VARIABLE NORMDEL

MEAN	.028	STD ERR	.014	STD DEV	.324
VARIANCE	.105	KURTOSIS	25.554	SKEWNESS	3.143
MINIMUM	-2.000	MAXIMUM	2.000	SUM	14.393
C.V. PCT	1140.316	.95 C.I.	.000	TO	.057

VALID CASES 507 MISSING CASES 0

7602
VARIABLE NORMDEL

MEAN	.051	STD ERR	.067	STD DEV	.333
VARIANCE	.111	KURTOSIS	19.203	SKEWNESS	4.546
MINIMUM	-.188	MAXIMUM	1.635	SUM	1.286
C.V. PCT	647.609	.95 C.I.	-.086	TO	.189

VALID CASES 25 MISSING CASES 0

7603
VARIABLE NORMDEL

MEAN	.032	STD ERR	.059	STD DEV	.264
VARIANCE	.070	KURTOSIS	13.168	SKEWNESS	3.703
MINIMUM	-.269	MAXIMUM	1.120	SUM	.636
C.V. PCT	828.661	.95 C.I.	-.092	TO	.155

VALID CASES 20 MISSING CASES 0

7604
VARIABLE NORMDEL

MEAN	-.111	STD ERR	.082	STD DEV	.378
VARIANCE	.143	KURTOSIS	13.293	SKEWNESS	-3.802
MINIMUM	-1.694	MAXIMUM	.018	SUM	-2.321
C.V. PCT	341.746	.95 C.I.	-.282	TO	.061

VALID CASES 21 MISSING CASES 0

7605
VARIABLE NORMDEL

MEAN	-.019	STD ERR	.008	STD DEV	.036
VARIANCE	.001	KURTOSIS	5.825	SKEWNESS	-2.398
MINIMUM	-.144	MAXIMUM	.019	SUM	-.374
C.V. PCT	191.241	.95 C.I.	-.035	TO	-.002

VALID CASES 20 MISSING CASES 0

7606
VARIABLE NORMDEL

MEAN	-.036	STD ERR	.037	STD DEV	.168
VARIANCE	.028	KURTOSIS	13.849	SKEWNESS	-3.767
MINIMUM	-.747	MAXIMUM	.127	SUM	-.749
C.V. PCT	471.726	.95 C.I.	-.112	TO	.041

VALID CASES 21 MISSING CASES 0

7607
VARIABLE NORMDEL

MEAN	.129	STD ERR	.116	STD DEV	.581
VARIANCE	.337	KURTOSIS	6.546	SKEWNESS	2.703
MINIMUM	-.714	MAXIMUM	2.000	SUM	3.252
C.V. PCT	449.208	.95 C.I.	-.110	TO	.369

VALID CASES 25 MISSING CASES 0

7608
VARIABLE NORMDEL

MEAN	-.039	STD ERR	.037	STD DEV	.175
VARIANCE	.031	KURTOSIS	16.0[illegible]	SKEWNESS	-4.112
MINIMUM	-.823	MAXIMUM	.17[illegible]	SUM	-.[illegible]95
C.V. PCT	450.248	.95 C.I.	-.115	TO	.037

VALID CASES 23 MISSING CASES 0

7609
VARIABLE NORMDEL

MEAN	.063	STD ERR	.075	STD DEV	.392
VARIANCE	.154	KURTOSIS	20.901	SKEWNESS	4.704
MINIMUM	-.288	MAXIMUM	2.000	SUM	1.694
C.V. PCT	624.617	.95 C.I.	-.092	TO	.218

VALID CASES 27 MISSING CASES 0

7610
VARIABLE NORMDEL

MEAN	.223	STD ERR	.129	STD DEV	.555
VARIANCE	.439	KURTOSIS	3.764	SKEWNESS	2.395
MINIMUM	-.103	MAXIMUM	2.000	SUM	5.796
C.V. PCT	293.990	.95 C.I.	-.042	TO	.488

VALID CASES 26 MISSING CASES 0

TABLE H-11

MONTHLY STATISTICS ON CRUDE RUNS NORMALIZED DELTAS

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7611
VARIABLE NORMDEL

MEAN	.003	STD ERR	.091	STD DEV	.491
VARIANCE	.241	KURTOSIS	11.368	SKEWNESS	-1.190
MINIMUM	-2.000	MAXIMUM	1.600	SUM	.078
C.V. PCT	18233.400	.95 C.I.	-.184	TO	.190

VALID CASES 29 MISSING CASES 0

7612
VARIABLE NORMDEL

MEAN	.000	STD ERR	.006	STD DEV	.027
VARIANCE	.001	KURTOSIS	4.428	SKEWNESS	1.606
MINIMUM	-.045	MAXIMUM	.093	SUM	.010
C.V. PCT	5986.897	.95 C.I.	-.012	TO	.013

VALID CASES 22 MISSING CASES 0

7701
VARIABLE NORMDEL

MEAN	.052	STD ERR	.060	STD DEV	.256
VARIANCE	.066	KURTOSIS	12.241	SKEWNESS	3.710
MINIMUM	-.125	MAXIMUM	1.065	SUM	.933
C.V. PCT	494.351	.95 C.I.	-.076	TO	.179

VALID CASES 18 MISSING CASES 0

7702
VARIABLE NORMDEL

MEAN	.062	STD ERR	.104	STD DEV	.490
VARIANCE	.240	KURTOSIS	10.248	SKEWNESS	2.559
MINIMUM	-.977	MAXIMUM	2.000	SUM	1.373
C.V. PCT	784.853	.95 C.I.	-.155	TO	.280

VALID CASES 22 MISSING CASES 0

7703
VARIABLE NORMDEL

MEAN	-.011	STD ERR	.006	STD DEV	.019
VARIANCE	.000	KURTOSIS	1.412	SKEWNESS	-1.566
MINIMUM	-.060	MAXIMUM	.002	SUM	-.136
C.V. PCT	168.871	.95 C.I.	-.023	TO	.001

VALID CASES 12 MISSING CASES 0

7704
VARIABLE NORMDEL

MEAN	-.001	STD ERR	.019	STD DEV	.096
VARIANCE	.009	KURTOSIS	5.316	SKEWNESS	2.079
MINIMUM	-.155	MAXIMUM	.335	SUM	-.035
C.V. PCT	16247.037	.95 C.I.	-.039	TO	.038

VALID CASES 26 MISSING CASES 0

7705
VARIABLE NORMDEL

MEAN	.001	STD ERR	.009	STD DEV	.043
VARIANCE	.002	KURTOSIS	3.293	SKEWNESS	1.025
MINIMUM	-.101	MAXIMUM	.122	SUM	.022
C.V. PCT	4063.948	.95 C.I.	-.019	TO	.021

VALID CASES 21 MISSING CASES 0

7706
VARIABLE NORMDEL

MEAN	-.002	STD ERR	.006	STD DEV	.024
VARIANCE	.001	KURTOSIS	1.761	SKEWNESS	.229
MINIMUM	-.054	MAXIMUM	.054	SUM	-.030
C.V. PCT	1096.507	.95 C.I.	-.016	TO	.012

VALID CASES 14 MISSING CASES 0

7707
VARIABLE NORMDEL

MEAN	-.028	STD ERR	.014	STD DEV	.057
VARIANCE	.003	KURTOSIS	2.979	SKEWNESS	-2.042
MINIMUM	-.198	MAXIMUM	.002	SUM	-.481
C.V. PCT	200.274	.95 C.I.	-.057	TO	.001

VALID CASES 17 MISSING CASES 0

7708
VARIABLE NORMDEL

MEAN	-.008	STD ERR	.011	STD DEV	.039
VARIANCE	.002	KURTOSIS	6.[illegible]	SKEWNESS	-2.66[illegible]
MINIMUM	-.134	MAXIMUM	.035	SUM	-.108
C.V. PCT	494.162	.95 C.I.	-.032	TO	.016

VALID CASES 13 MISSING CASES 0

TABLE H-11 (continued)

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7709
VARIABLE NORMDEL

MEAN	-.047	STD ERR	.034	STD DEV	.158
VARIANCE	.025	KURTOSIS	5.604	SKEWNESS	-2.679
MINIMUM	-.539	MAXIMUM	.097	SUM	-1.028
C.V. PCT	337.398	.95 C.I.	-.117	TO	.023
VALID CASES	22	MISSING CASES	0		

7710
VARIABLE NORMDEL

MEAN	.089	STD ERR	.066	STD DEV	.256
VARIANCE	.066	KURTOSIS	7.593	SKEWNESS	2.950
MINIMUM	-.049	MAXIMUM	.966	SUM	1.333
C.V. PCT	288.036	.95 C.I.	-.053	TO	.231
VALID CASES	15	MISSING CASES	0		

7711
VARIABLE NORMDEL

MEAN	.068	STD ERR	.046	STD DEV	.197
VARIANCE	.039	KURTOSIS	9.847	SKEWNESS	3.273
MINIMUM	-.063	MAXIMUM	.812	SUM	1.230
C.V. PCT	287.577	.95 C.I.	-.029	TO	.166
VALID CASES	18	MISSING CASES	0		

7712
VARIABLE NORMDEL

MEAN	.030	STD ERR	.014	STD DEV	.042
VARIANCE	.002	KURTOSIS	-1.413	SKEWNESS	.304
MINIMUM	-.025	MAXIMUM	.089	SUM	.273
C.V. PCT	139.035	.95 C.I.	-.002	TO	.063
VALID CASES	9	MISSING CASES	0		

7801
VARIABLE NORMDEL

MEAN	.061	STD ERR	.049	STD DEV	.098
VARIANCE	.010	KURTOSIS	-1.161	SKEWNESS	.651
MINIMUM	-.024	MAXIMUM	.194	SUM	.243
C.V. PCT	161.115	.95 C.I.	-.095	TO	.216
VALID CASES	4	MISSING CASES	0		

7802
VARIABLE NORMDEL

MEAN	-.073	STD ERR	.100	STD DEV	.283
VARIANCE	.080	KURTOSIS	-.626	SKEWNESS	-.314
MINIMUM	-.484	MAXIMUM	.348	SUM	-.584
C.V. PCT	388.506	.95 C.I.	-.310	TO	.164
VALID CASES	8	MISSING CASES	0		

7803
VARIABLE NORMDEL

MEAN	.121	STD ERR	.127	STD DEV	.459
VARIANCE	.210	KURTOSIS	7.785	SKEWNESS	3.093
MINIMUM	-.164	MAXIMUM	1.636	SUM	1.573
C.V. PCT	379.029	.95 C.I.	-.156	TO	.398
VALID CASES	13	MISSING CASES	0		

7804
VARIABLE NORMDEL

MEAN	.146	STD ERR	.145	STD DEV	.385
VARIANCE	.148	KURTOSIS	2.165	SKEWNESS	2.040
MINIMUM	-.005	MAXIMUM	1.019	SUM	1.024
C.V. PCT	263.244	.95 C.I.	-.216	TO	.502
VALID CASES	7	MISSING CASES	0		

7805
VARIABLE NORMDEL

MEAN	.042	STD ERR	.031	STD DEV	.094
VARIANCE	.009	KURTOSIS	.181	SKEWNESS	1.406
MINIMUM	-.026	MAXIMUM	.235	SUM	.377
C.V. PCT	223.443	.95 C.I.	-.030	TO	.114
VALID CASES	9	MISSING CASES	0		

7712 TO 7805
VARIABLE NORMDEL

MEAN	.058	STD ERR	.042	STD DEV	.298
VARIANCE	.089	KURTOSIS	16.214	SKEWNESS	3.538
MINIMUM	-.464	MAXIMUM	1.636	SUM	2.906
C.V. PCT	512.132	.95 C.I.	-.026	TO	.143
VALID CASES	50	MISSING CASES	0		

TABLE H-11 (continued)

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7612 TO 7705
VARIABLE NORMDEL

MEAN	.018	STD ERR	.021	STD DEV	.233
VARIANCE	.054	KURTOSIS	46.946	SKEWNESS	5.274
MINIMUM	-.977	MAXIMUM	2.000	SUM	2.168
C.V. PCT	1291.010	.95 C.I.	-.024	TO	.060

VALID CASES 121 MISSING CASES 0

7602 TO 7701
VARIABLE NORMDEL

MEAN	.038	STD ERR	.023	STD DEV	.384
VARIANCE	.148	KURTOSIS	19.020	SKEWNESS	2.599
MINIMUM	-2.000	MAXIMUM	2.000	SUM	9.327
C.V. PCT	1141.571	.95 C.I.	-.012	TO	.079

VALID CASES 277 MISSING CASES 0

7702 TO 7801
VARIABLE NORMDEL

MEAN	.014	STD ERR	.015	STD DEV	.202
VARIANCE	.041	KURTOSIS	53.076	SKEWNESS	5.049
MINIMUM	-.977	MAXIMUM	2.000	SUM	2.677
C.V. PCT	1459.141	.95 C.I.	-.015	TO	.043

VALID CASES 193 MISSING CASES 0

TABLE H-11 (continued)

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TABLE H-12

STATISTICS FOR NORMALIZED DELTA

FEBRUARY 1976 THROUGH MAY 1978

OLD OIL	STRATUM LARGE INTEGRATEDS	STRATUM LARGE INDEPENDENTS	STRATUM SMALLS	UNIVERSE
Mean	-.007	-.036	-.114	-.051
Standard Dev.	.043	.275	1.360	.849
No. of Cases	317	57	234	608
UPPER TIER				
Mean	-.001	-.017	.114	-.050
Standard Dev.	.057	.112	.850	.575
No. of Cases	287	46	273	606
CRUDE RUNS				
Mean	-.005	.026	.067	.028
Standard Dev.	.027	.300	.486	.324
No. of Cases	183	48	275	506

Normalized Delta = Delta/½ (Amended Volume + Original Volume)

0 0 0 0 5 2 0 4 0 6 4

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TABLE H-13

EXTREME POINTS FOR THE DELTA DISTRIBUTIONS

AND THE NORMALIZED DELTA DISTRIBUTIONS

	LARGE INTEGRATED REFINERS	LARGE INDEPENDENT REFINERS	SMALL REFINERS	TOTAL
Old Oil	11	0	0	11
Upper Tier	14	1	3	18
Crude Runs	5	2	0	7
Universe	30	3	3	36

Extreme Points for the Delta Distributions

	LARGE INTEGRATED REFINERS	LARGE INDEPENDENT REFINERS	SMALL REFINERS	TOTAL
Old Oil	0	0	2	2
Upper Tier	0	0	23	23
Crude Runs	0	1	15	16
Universe	0	1	40	41

Extreme Points for the

Normalized Delta Distributions

Normalized Delta = Delta/½ (Amended Volume + Original Volume)

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TABLE H-14

STATISTICS FOR DELDATE (k - i)*

FEBRUARY 1976 THROUGH MAY 1978

Old Oil	Stratum Large Integrateds	Stratum Large Independents	Stratum Smalls	Universe
Mean	10.032	5.737	5.158	7.753
Standard Deviation	7.023	4.842	5.313	6.661
Upper Tier				
Mean	10.237	4.957	4.527	7.264
Standard Deviation	7.148	4.536	4.797	6.634
Crude Runs				
Mean	7.071	6.083	5.455	6.099
Standard Deviation	5.545	4.811	5.734	5.625

*k: amendment date
i: original date

Deldate is the difference between the month of amendments and the month of original submission:

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TABLE H-15

AN EXAMPLE OF THE NORMAL CALCULATION

OF A TYPICAL AMENDMENT CORRECTION

Mo	OLD-OIL	UPPER TIER	CRUDE RUNS
FEB 78 ORIG		x.225118339	
AMEND	x $8.48	x $8.48	x $8.48
Δ	= $	= $	= $
MAR 78 ORIG		x.2243681022	
AMEND	x $8.47	x $8.47	x $8.47
Δ	= $	= $	= $
Apr 78 Orig		x.2067529201	
Amend	x $8.35	x $8.35	x $8.35
Δ	= $	= $	= $
May 78 Orig	94792	99624 x.1981351547	252388
Amend	94486 x $8.26	100571 x. $8.26	252388 x $8.26
Δ	-306 = $-2527.56	+947 = $ 1549.86	= $
Total Adj.	$-2527.56	$+1549.86	$
June Ent. $			
June DOOR			
June Orig	85234	130357	227069
± Diff	-309	+1020	
June Compute	84925	131377	

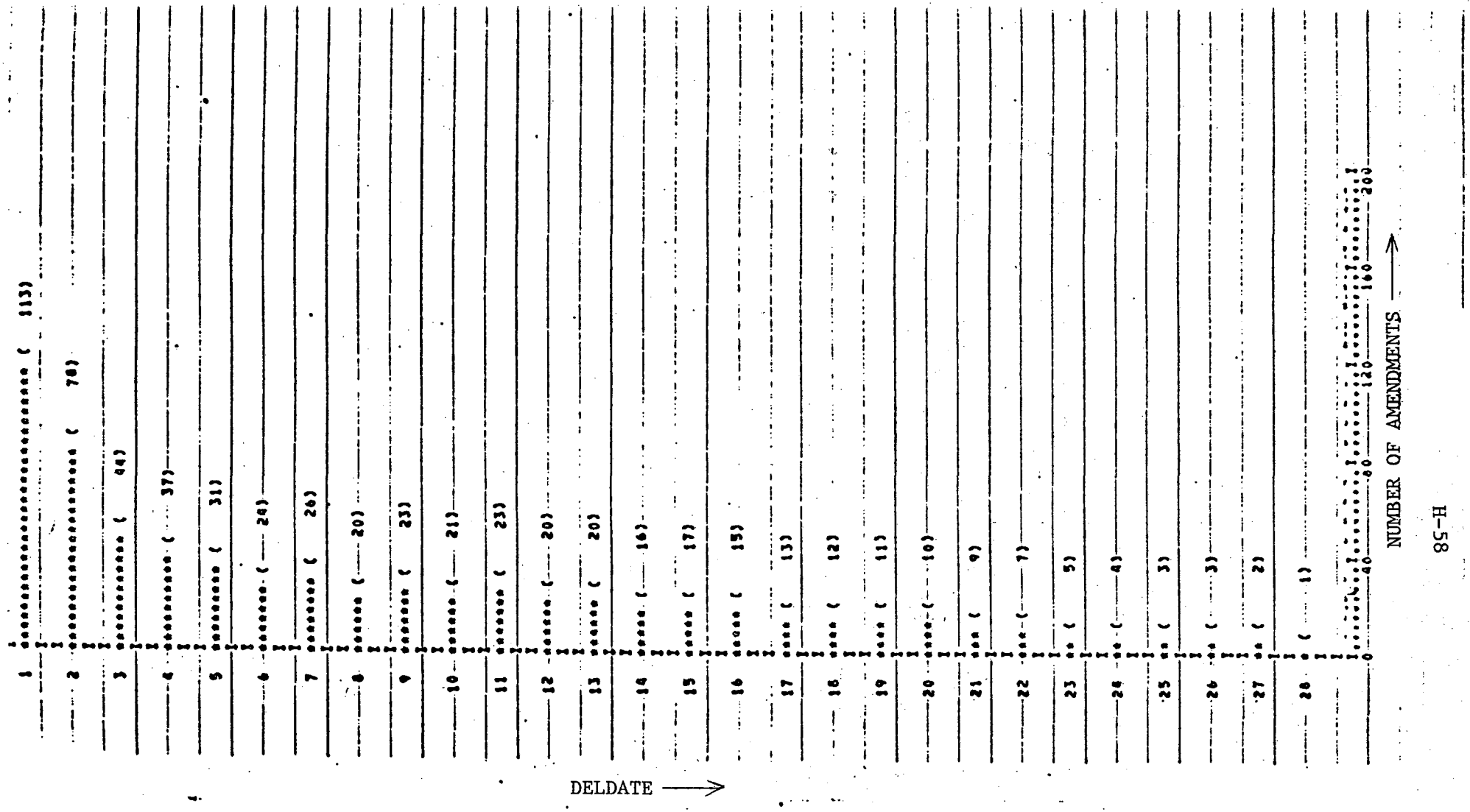

FIGURE H-1 DISTRIBUTION OF THE OLD OIL DELDATES*

Figure layout will be adjusted for Interim Report

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*Deldate is the difference between the month of amendment and the month of original submission.

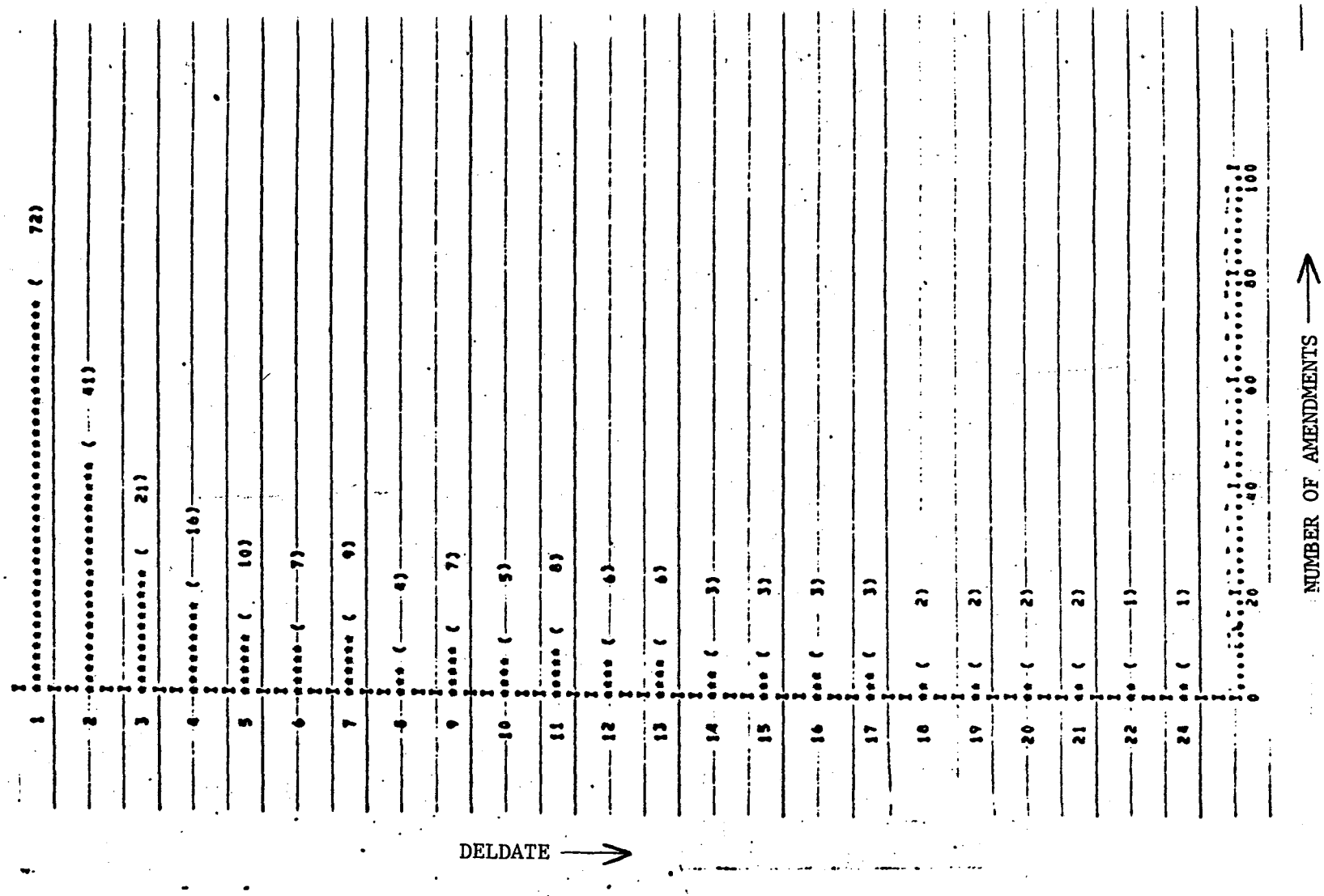

FIG.H-1(cont'd) DISTRIBUTION OF THE OLD OIL DELDATES

FOR THE SMALL REFINERS

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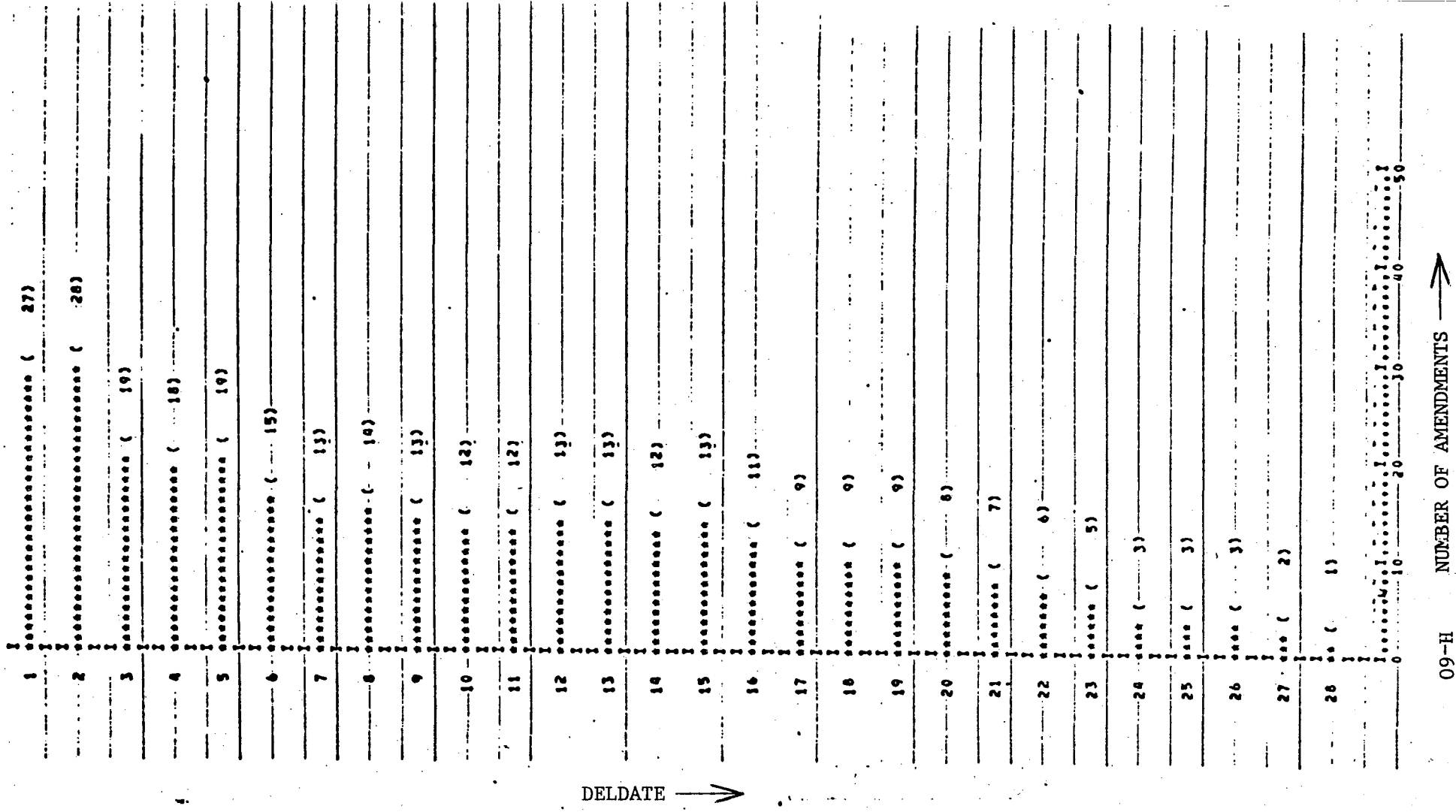

FIG.H-1 (cont'd) DISTRIBUTION OF THE OLD OIL DELDATES

FOR THE LARGE INTEGRATEDS

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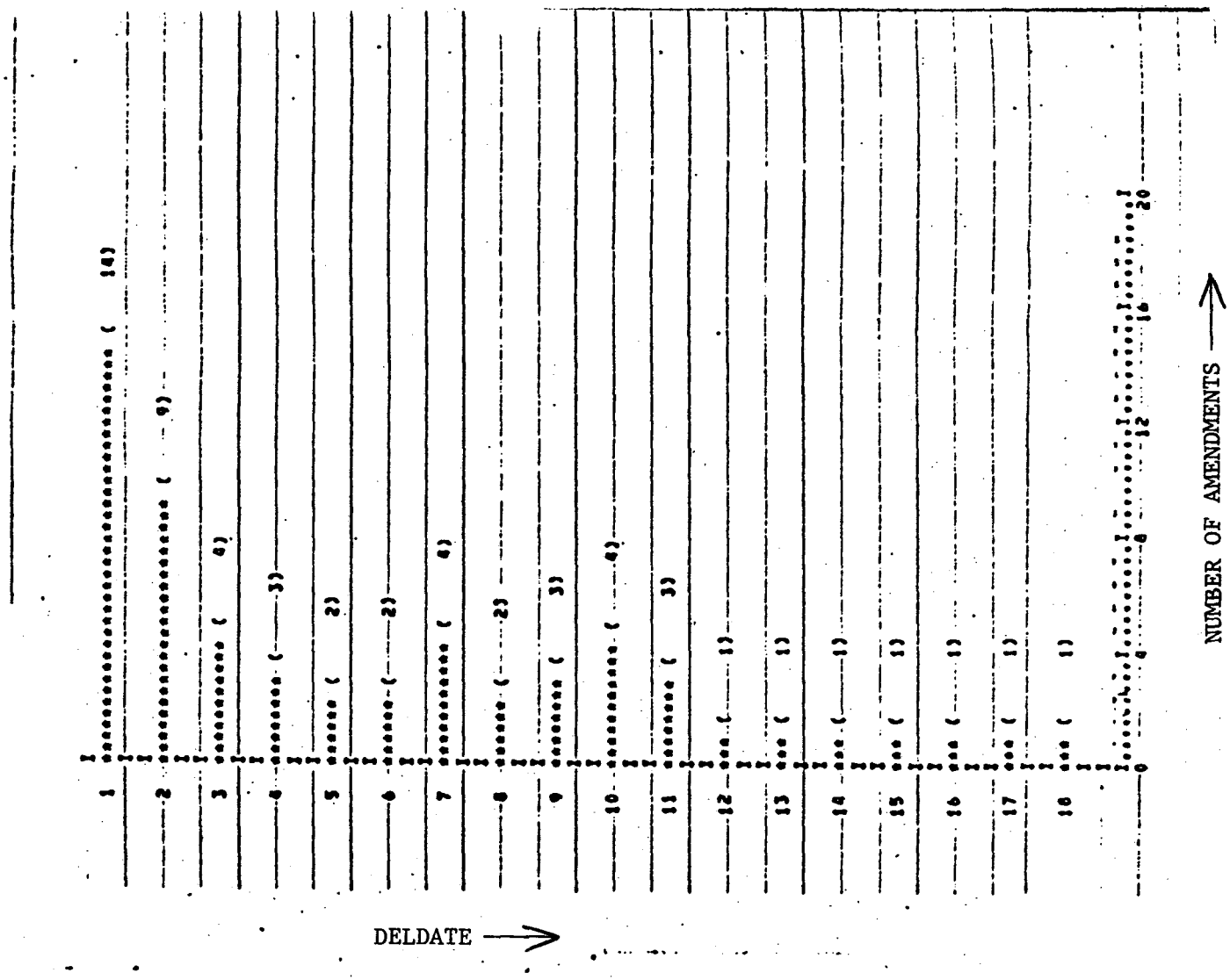

FIG.H-1(cont'd) DISTRIBUTION OF THE OLD OIL DELDATES

FOR THE LARGE INDEPENDENTS

0 0 0 0 5 2 0 4 0 6 7

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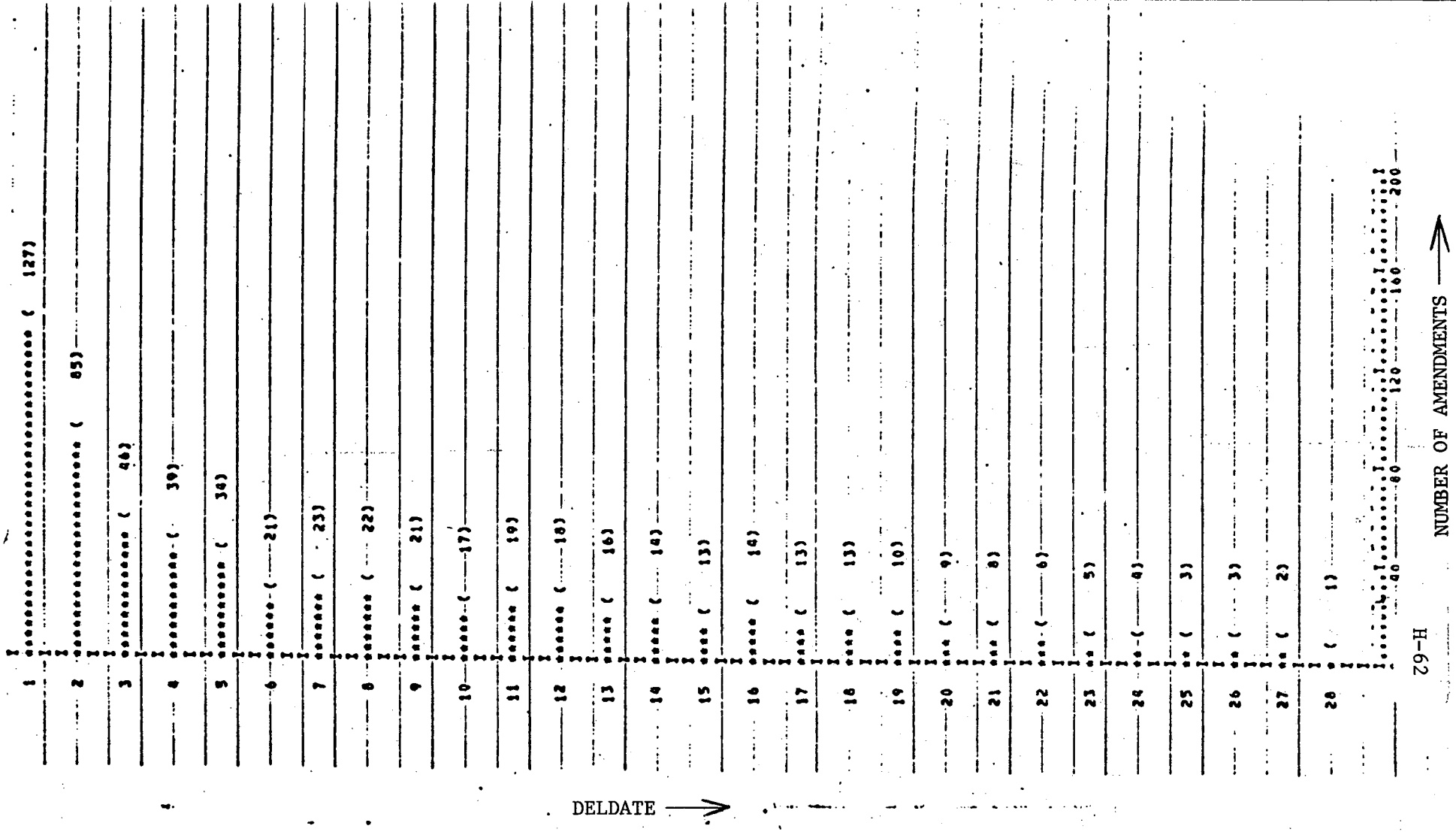

FIGURE H-2 DISTRIBUTION OF THE UPPER TIER DELDATES

FOR THE LARGE INTEGRATEDS

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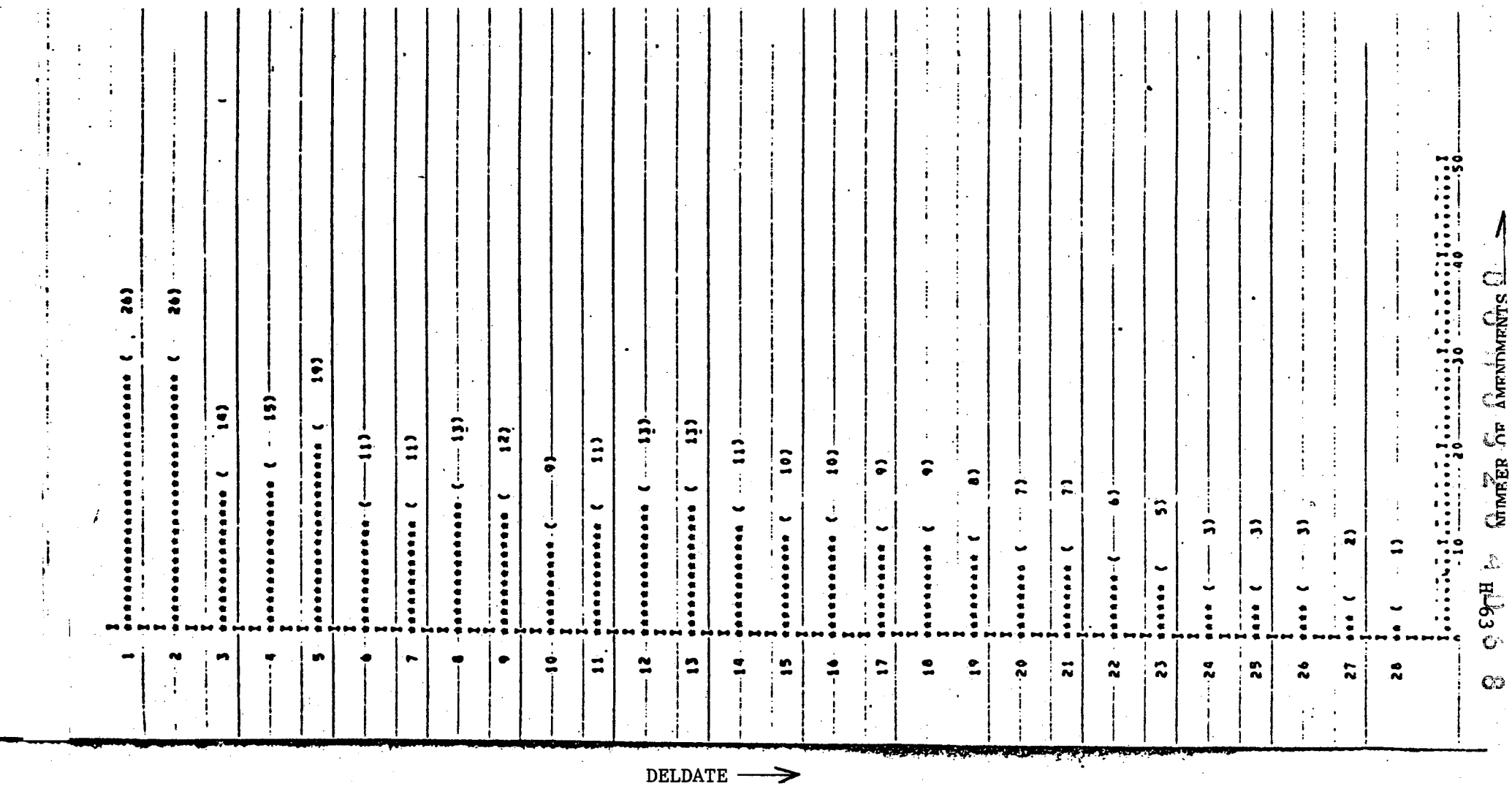

FIG. H-2 (cont'd) DISTRIBUTION OF THE UPPER TIER DELDATES

FOR THE LARGE INTEGRATEDS

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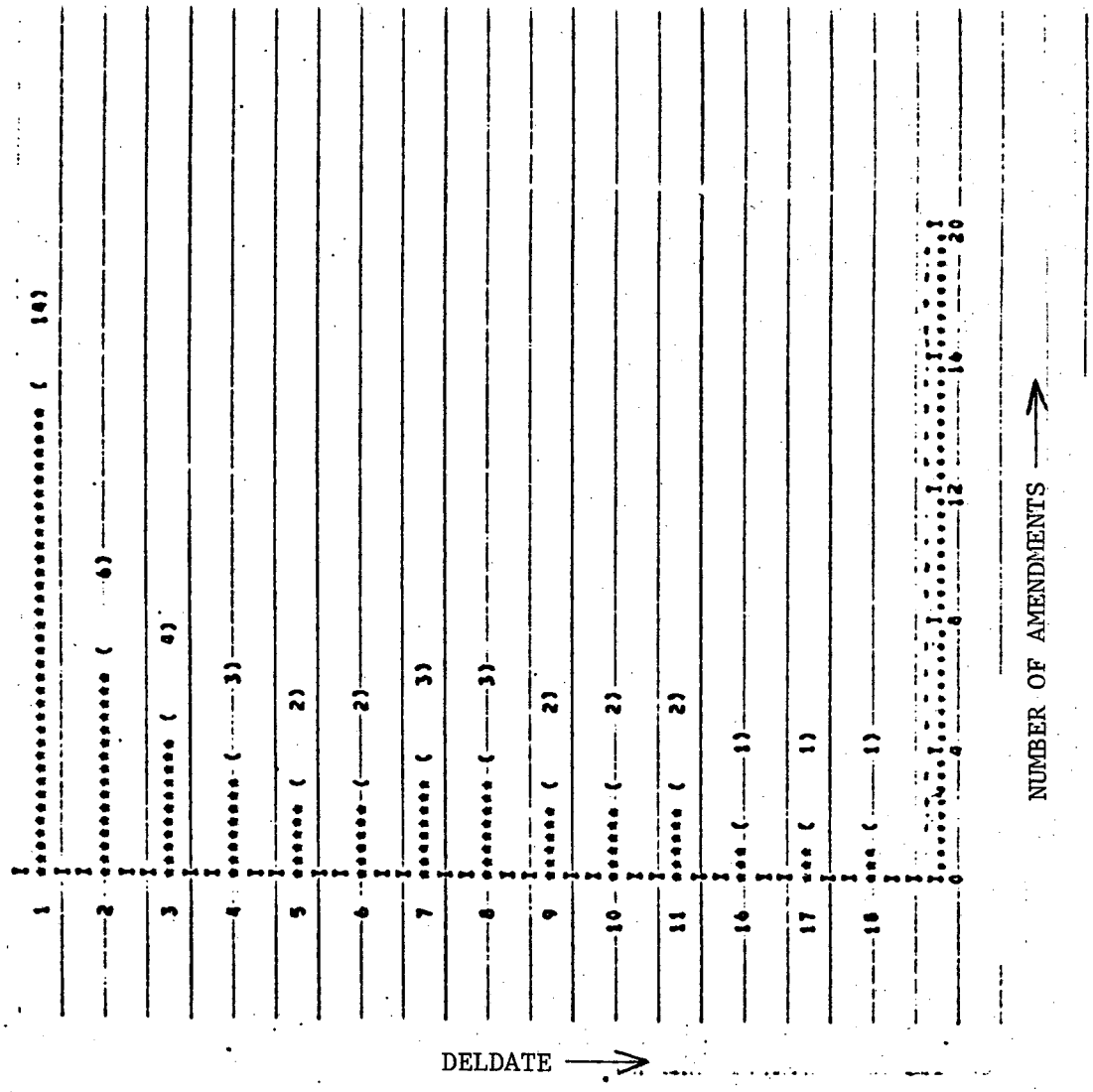

FIG.H-2 (cont'd) DISTRIBUTION OF THE UPPER TIER DELDATES

FOR THE LARGE INDEPENDENTS

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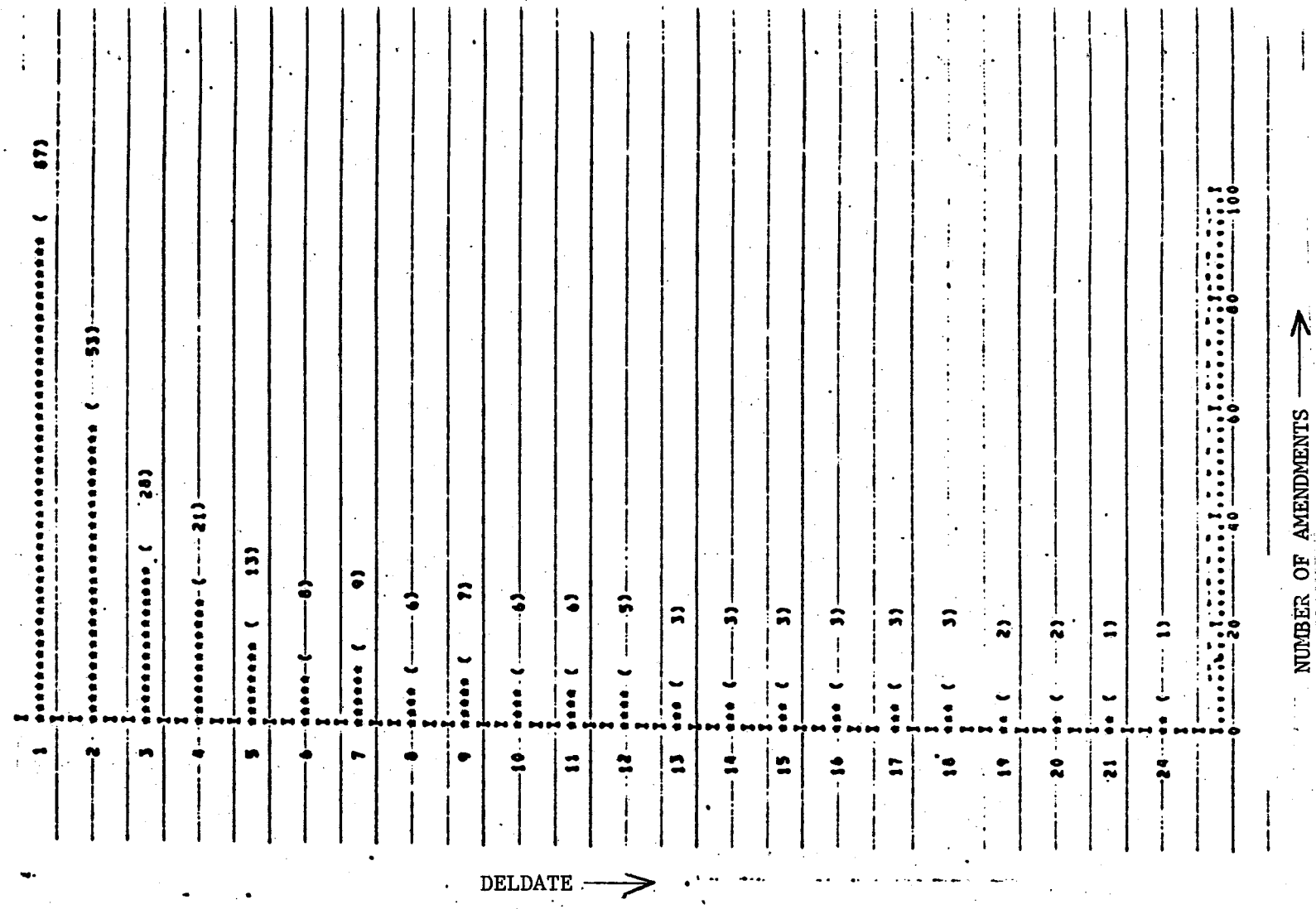

FIG. H-2 (cont'd) DISTRIBUTION OF THE UPPER TIER DELDATES

FOR THE SMALL REFINERS

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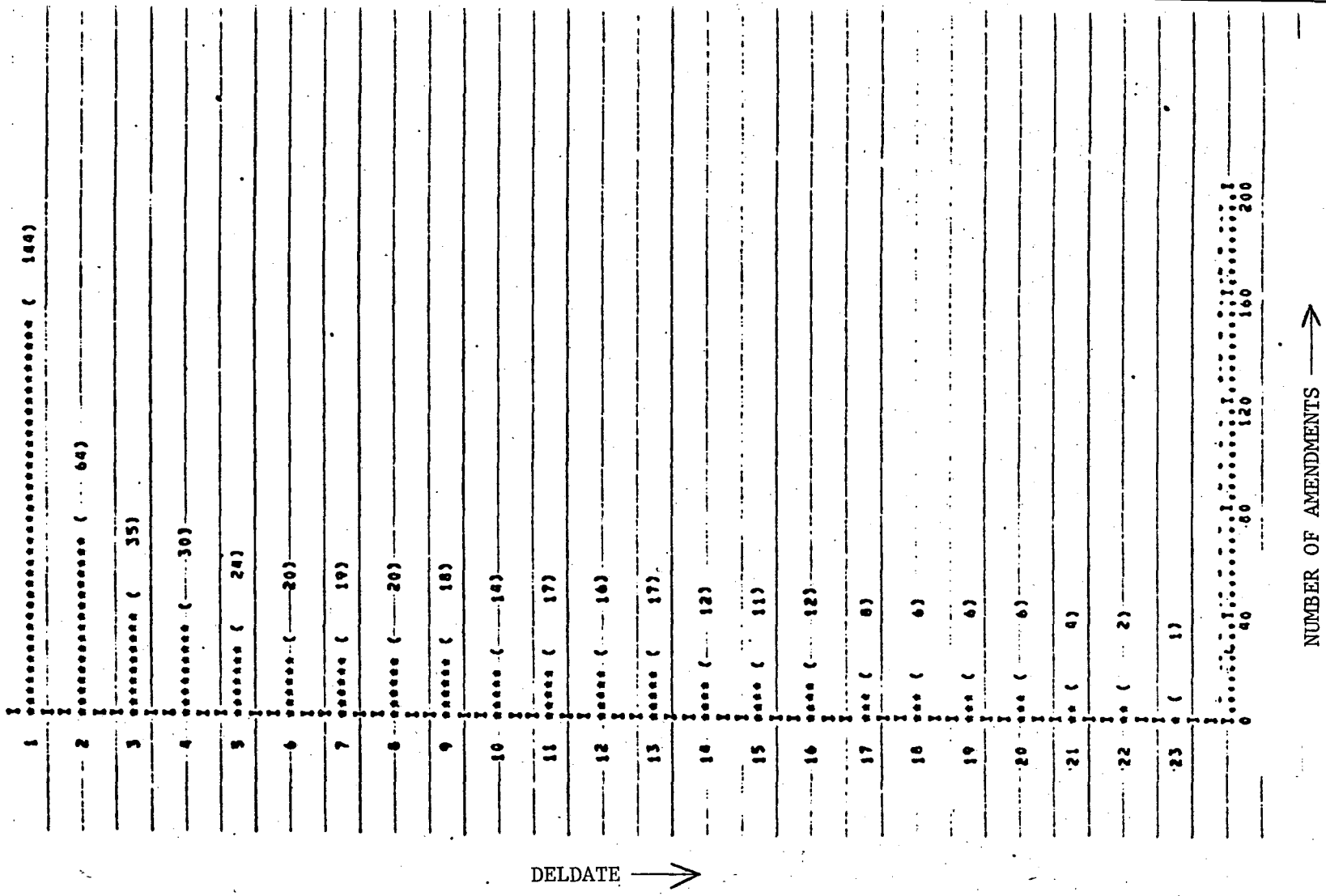

FIGURE H-3 DISTRIBUTION OF THE CRUDE RUNS DELDATES

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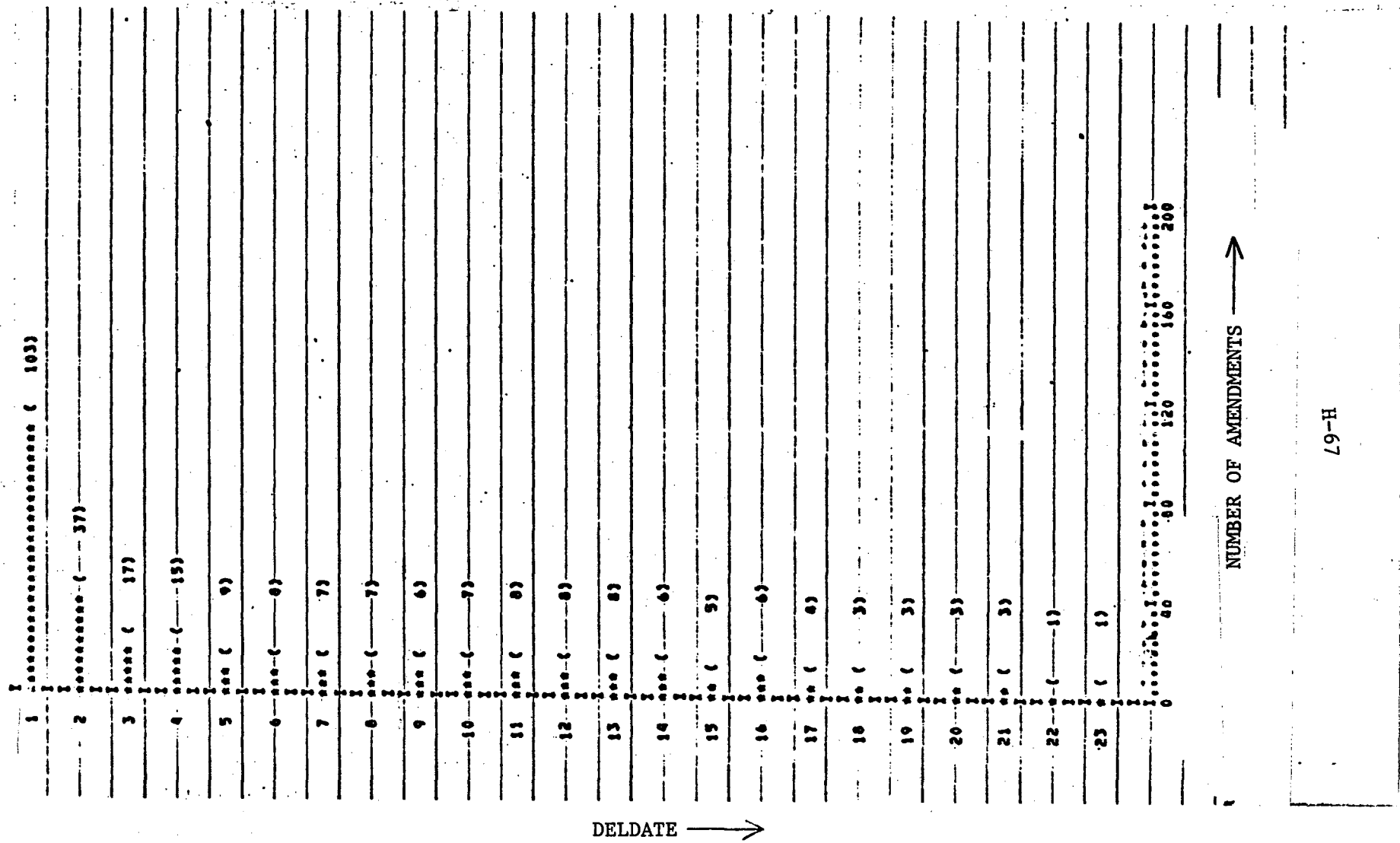

FIG H-3 (cont'd) DISTRIBUTION OF CRUDE RUNS DELDATES FOR SMALL REFINERS

0 0 0 0 5 2 0 4 0 7 0

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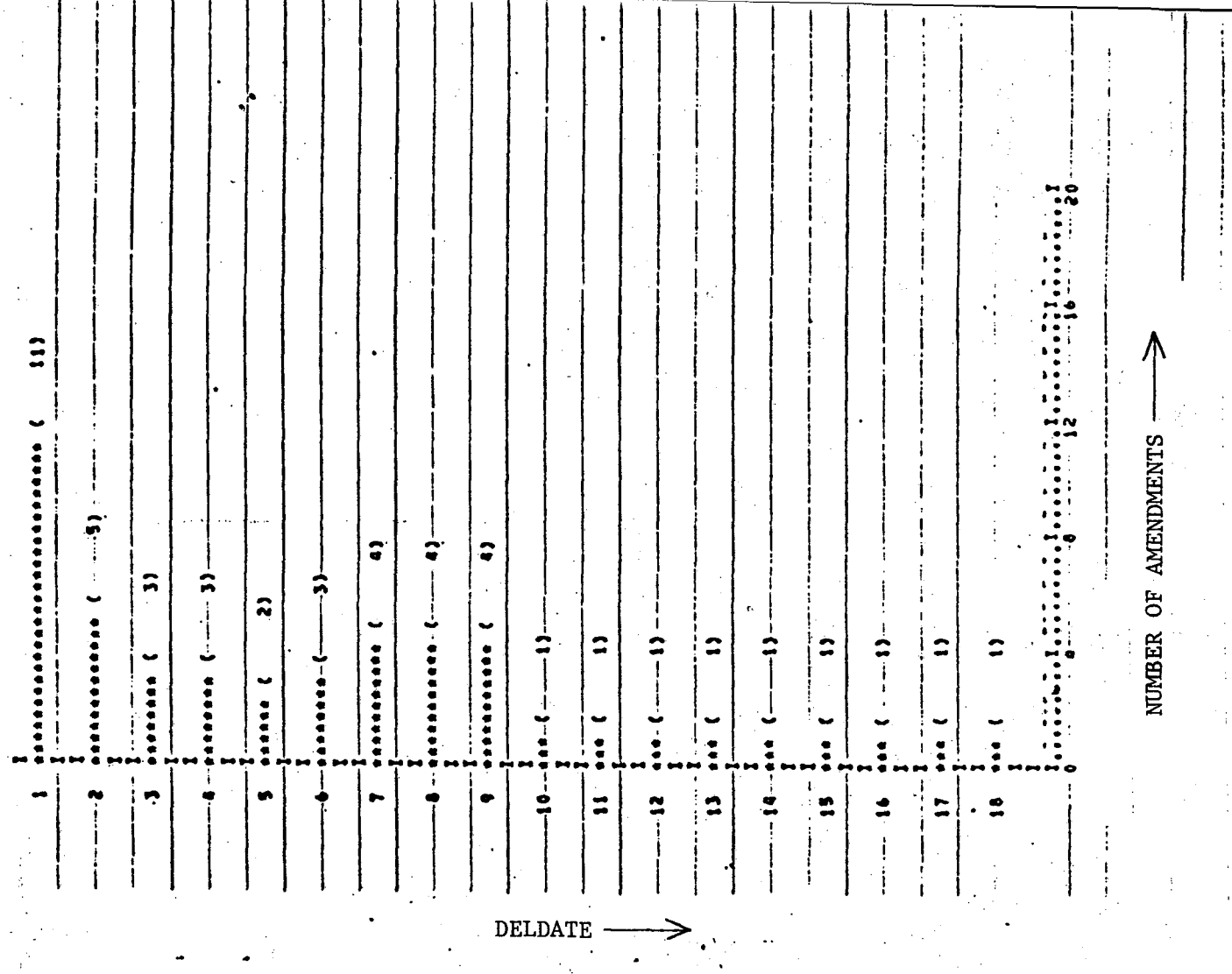

FIG. II-3 (cont'd) DISTRIBUTION OF CRUDE RUNS DELDATES

FOR LARGE INDEPENDENTS

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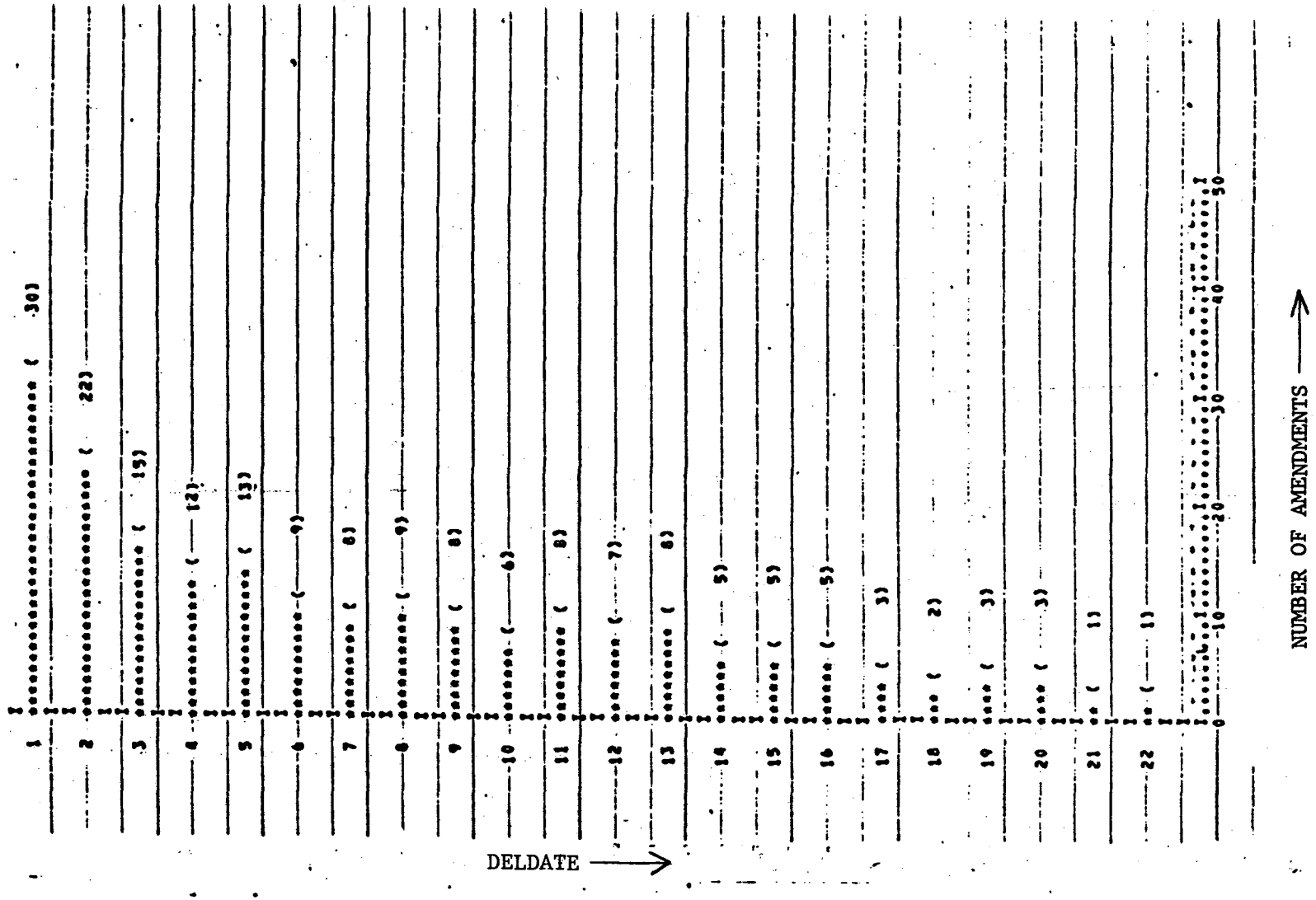

FIG H-3 (cont'd) DISTRIBUTION OF CRUDE RUNS DELDATES

FOR LARGE INTEGRATEDS

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FIGURE H-4

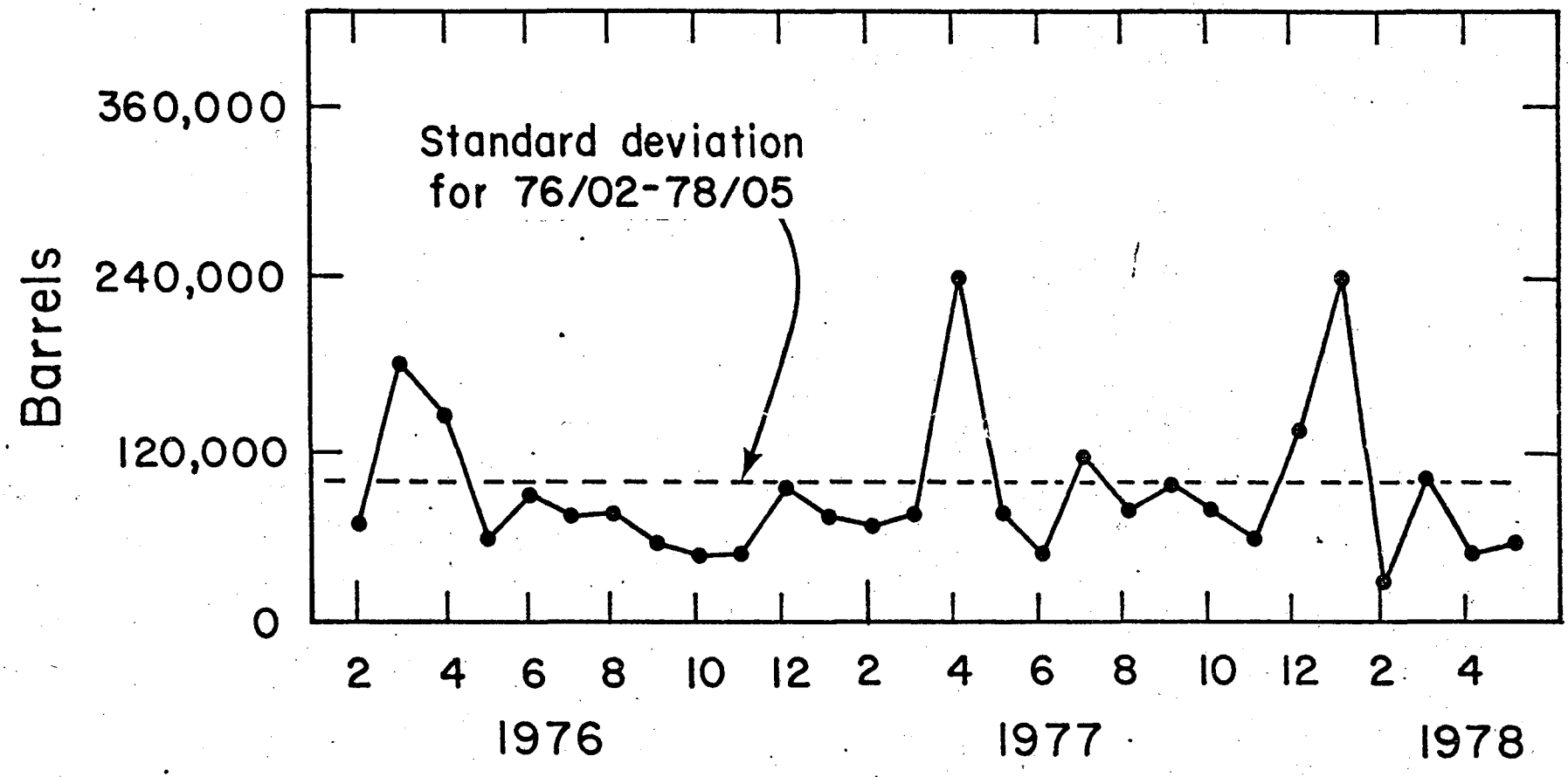

FIGURE H-4 Old oil delta standard deviation by month 76/02-78/05

Delta = Amended Volume - Original Volume

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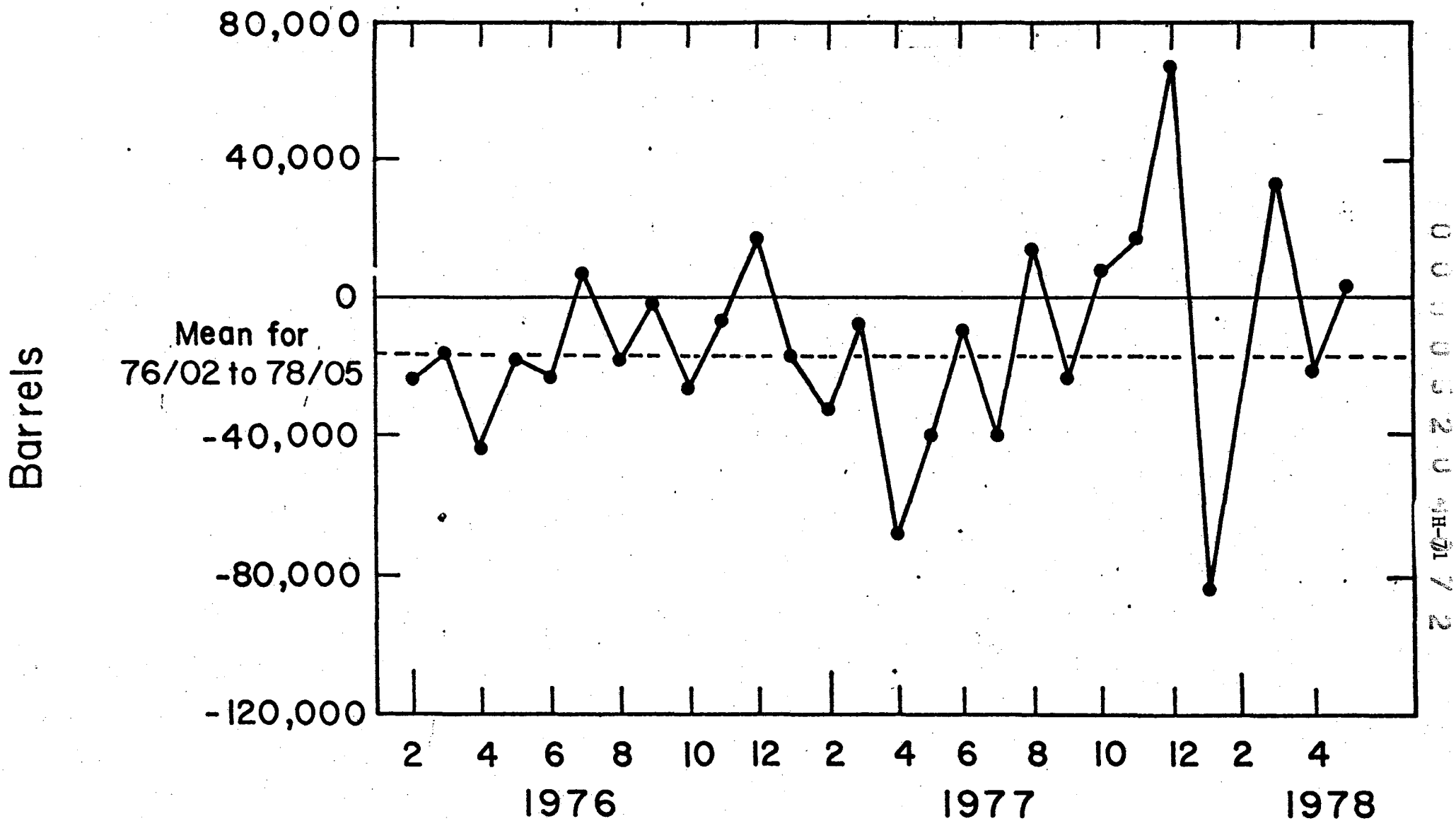

FIG. H-4 (cont'd) Old oil delta means by month 76/02-78/05

Delta = Amended Volume - Original Volume

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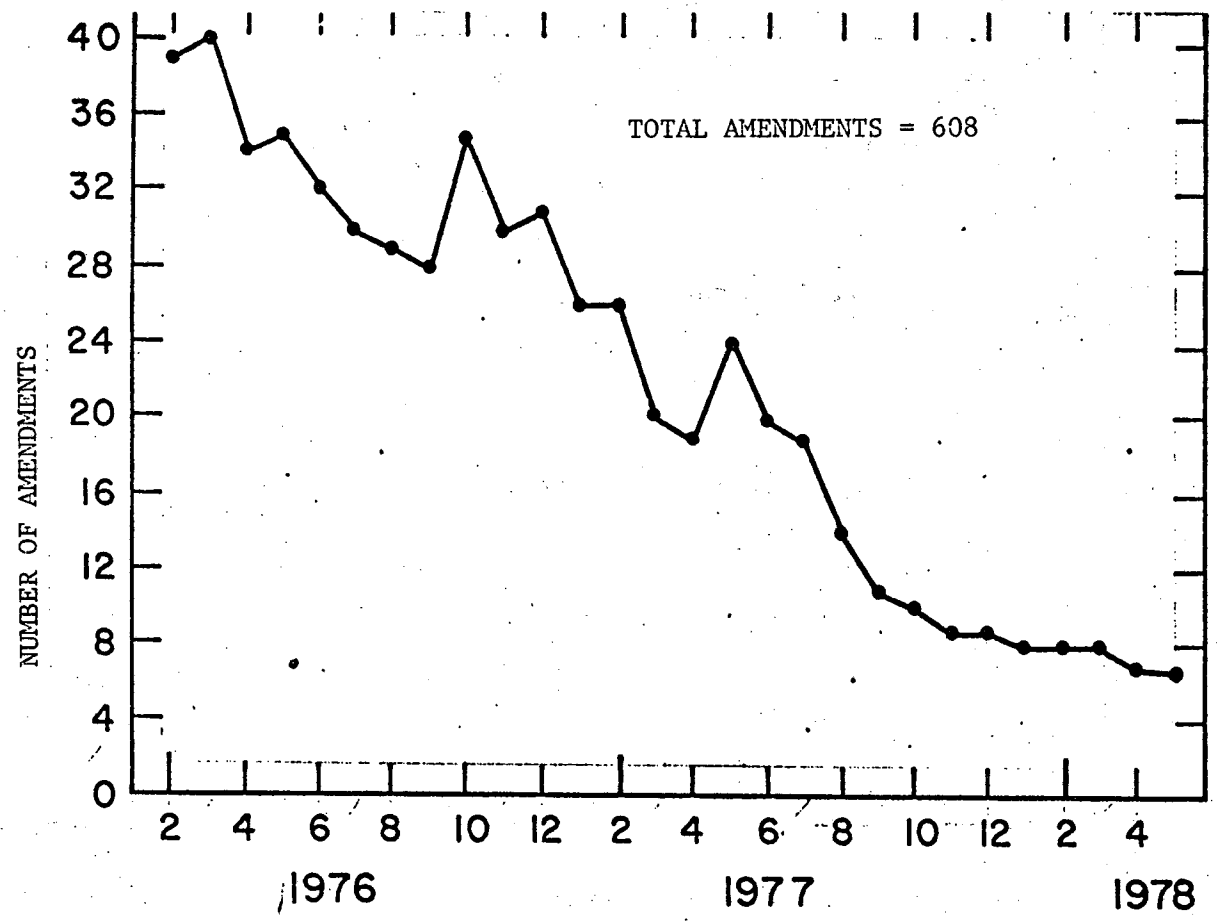

FIG. H-4 (Cont'd) OLD OIL DELTA

NUMBER OF AMENDMENTS

BY MONTH

Delta = Amended volume - Original volume 76/02-78/05

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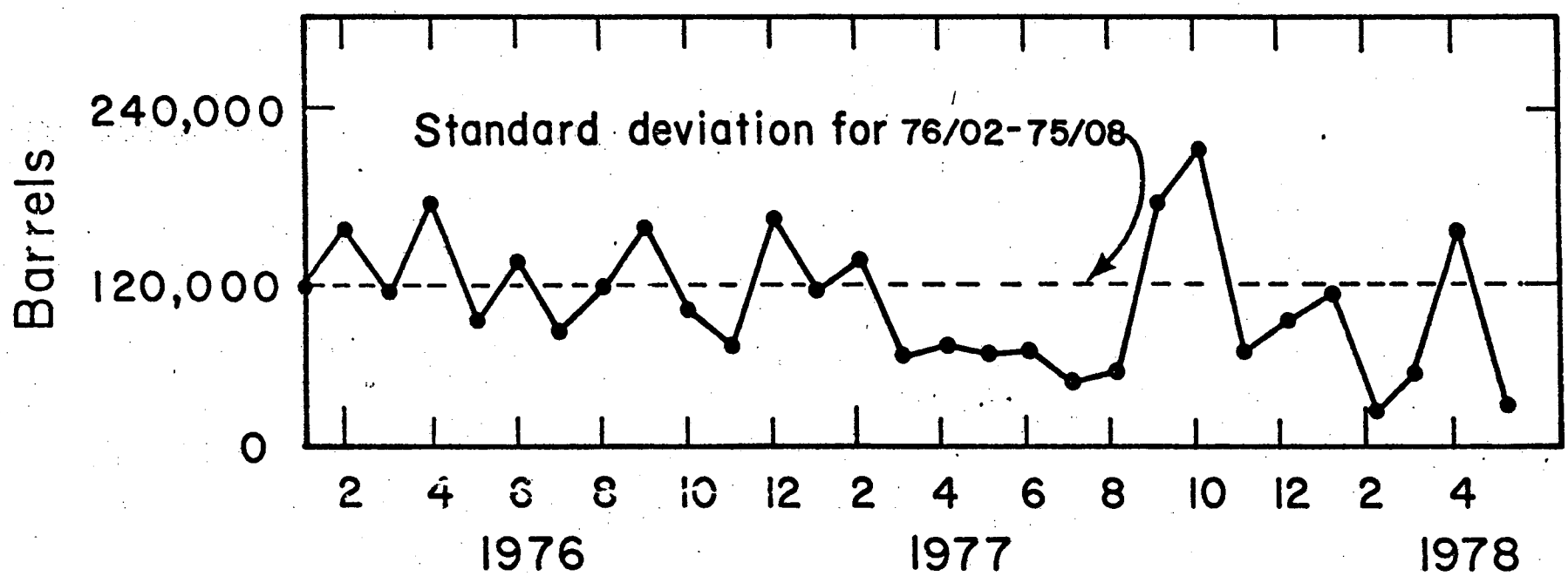

FIG. H-5 Upper tier delta standard deviations by month 76/02-75/08

Delta = Amended Volume - Original Volume

XBL7811-12673

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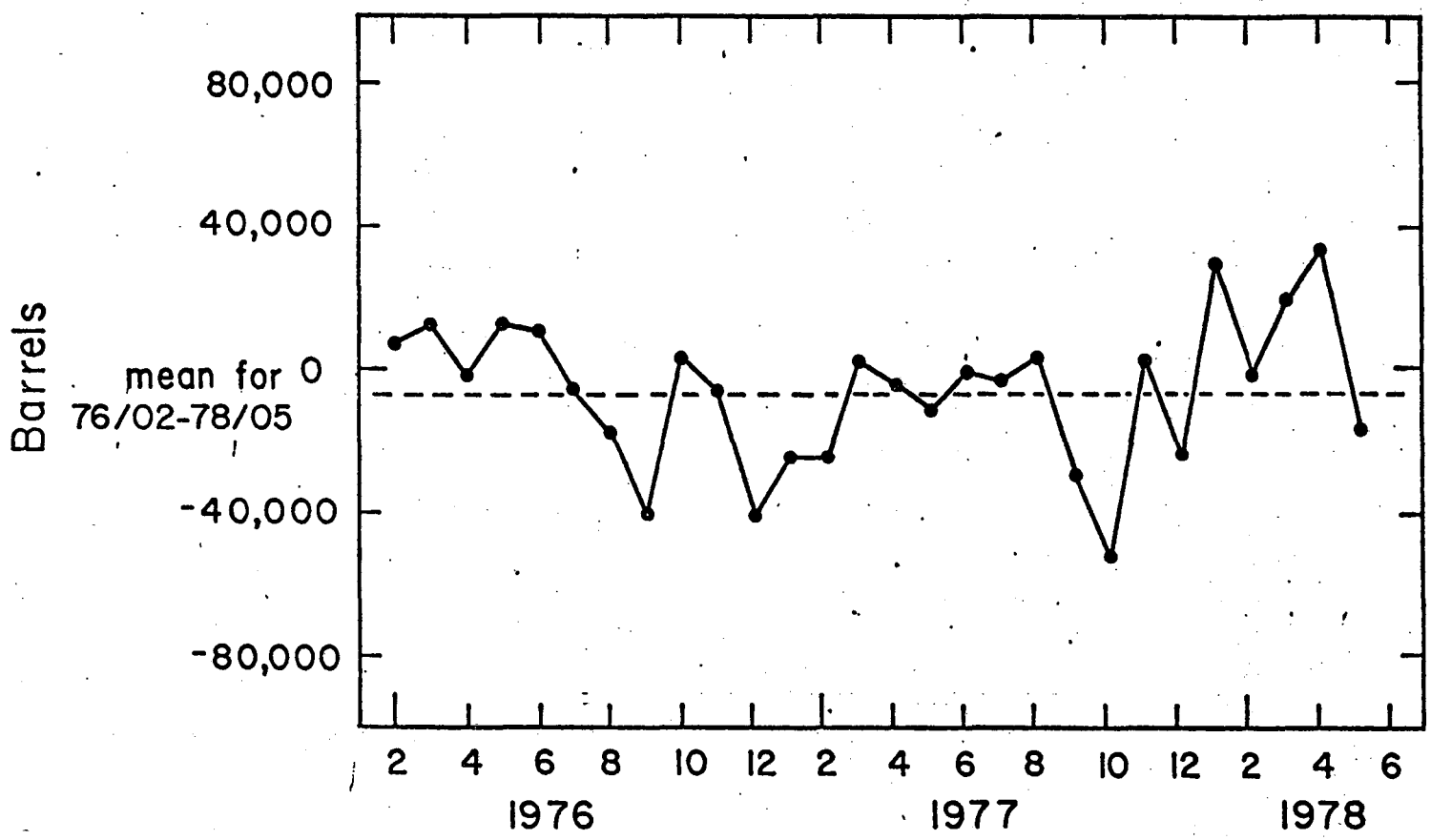

FIG. H-5 (cont'd) Upper tier delta means by month 76/02-78/05

Delta = Amended Volume - Original Volume

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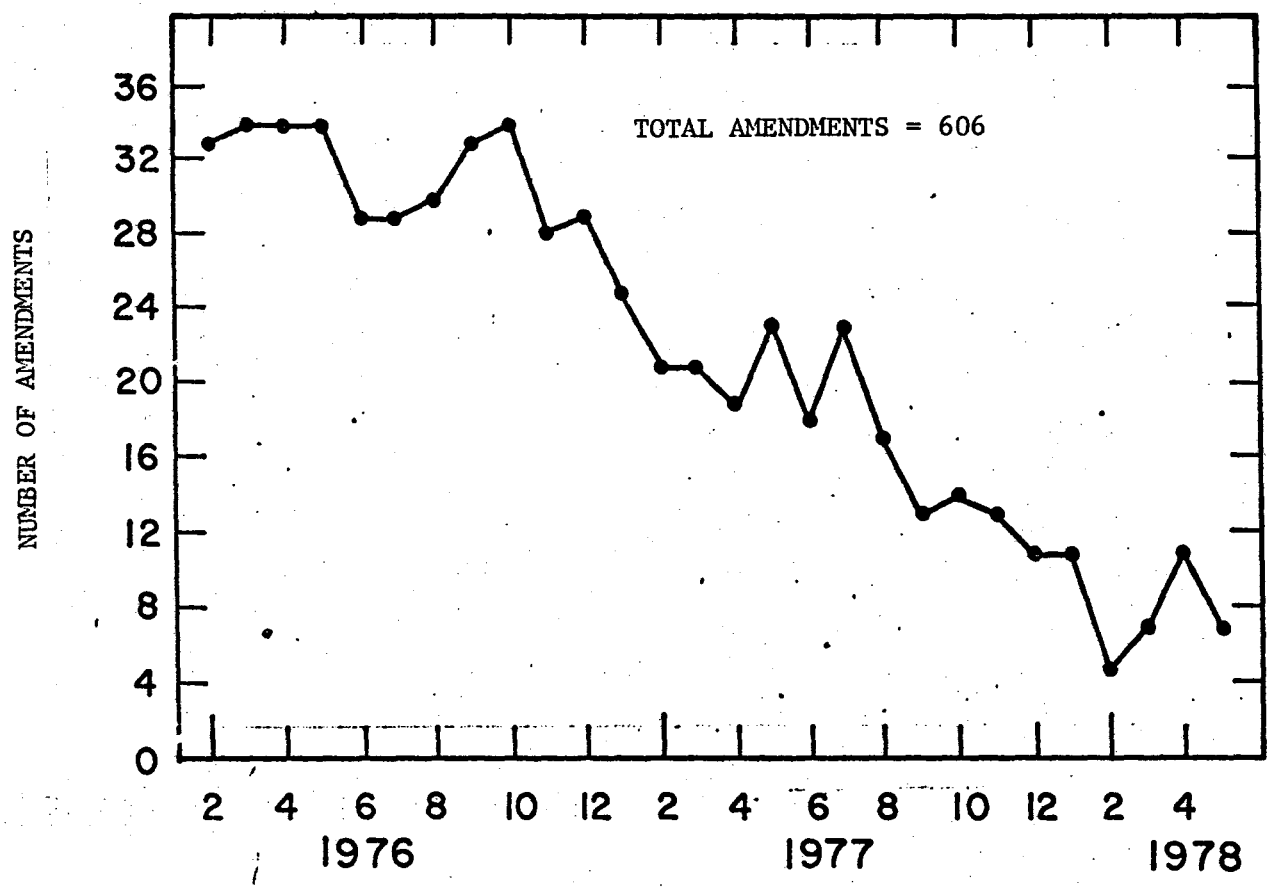

FIG H-5 (cont'd) UPPER TIER DELTA

NUMBER OF AMENDMENTS

BY MONTH

76/02-78/05

Delta = Amended Volume - Original Volume

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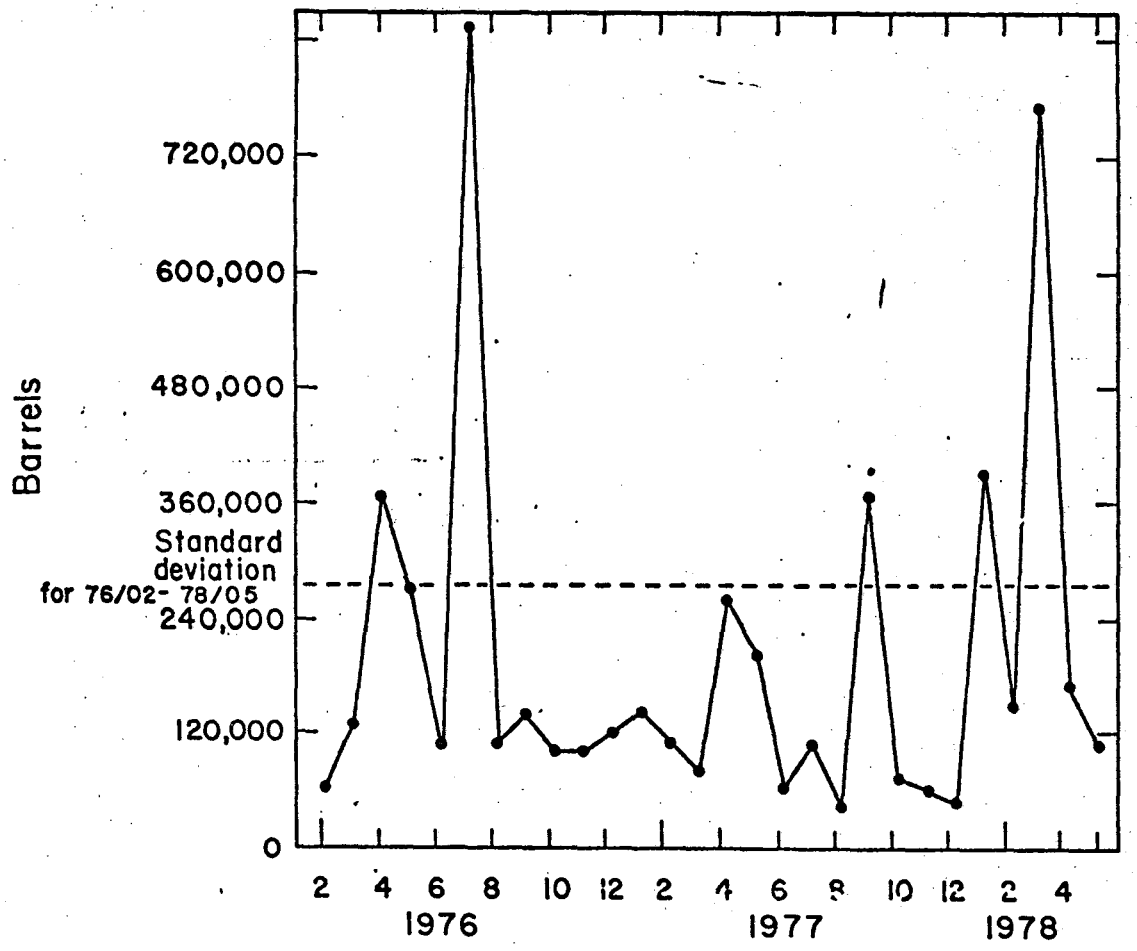

FIG. H-6 Crude runs delta standard deviation by month 76/02-78/05

Delta = Amended Volume - Original Volume

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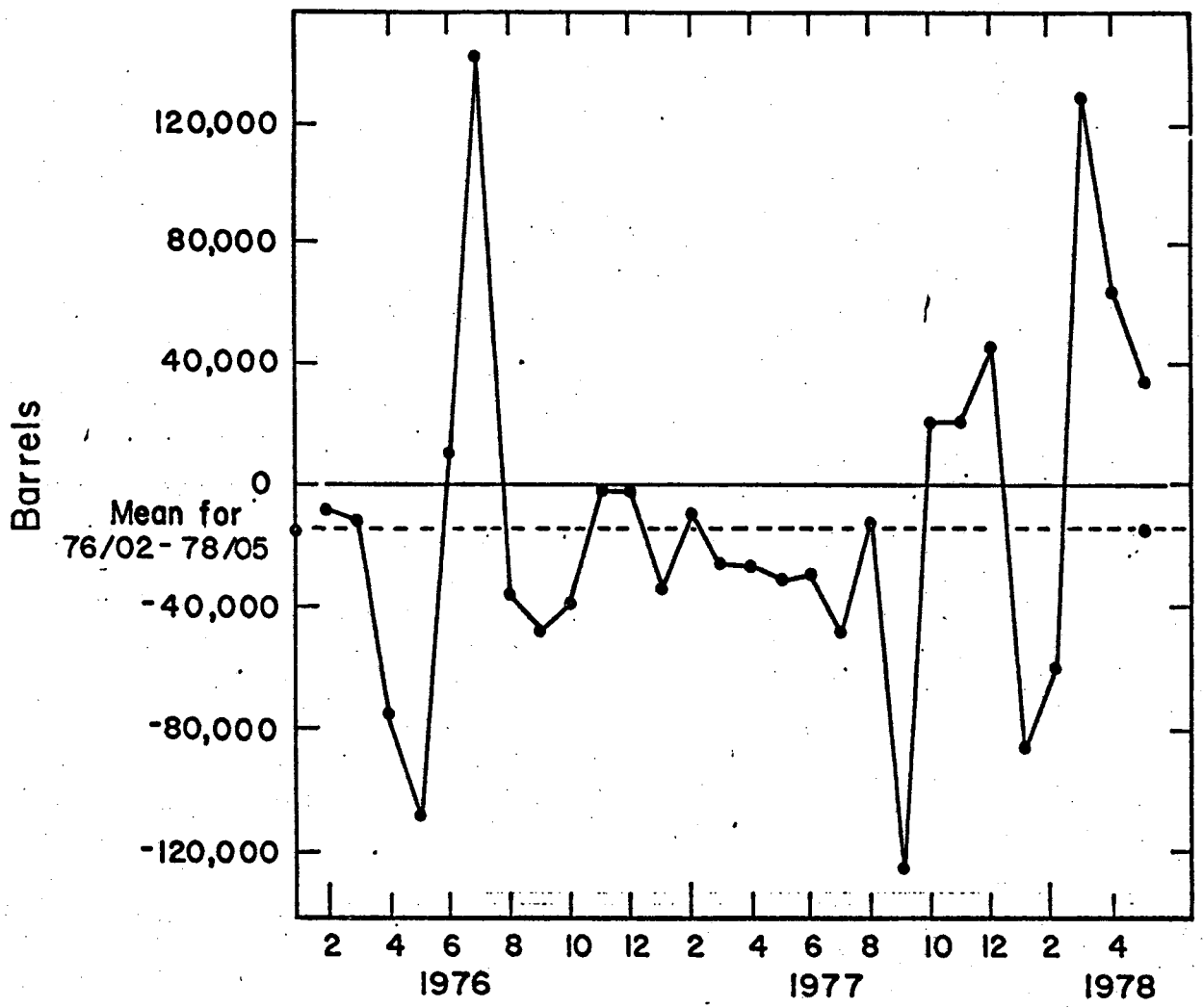

FIG. H-6(cont'd) Crude runs delta means by month 76/02-78/05

Delta = Amended Volume - Original Volume

0 0 0 5 2 0 1 0 7 5

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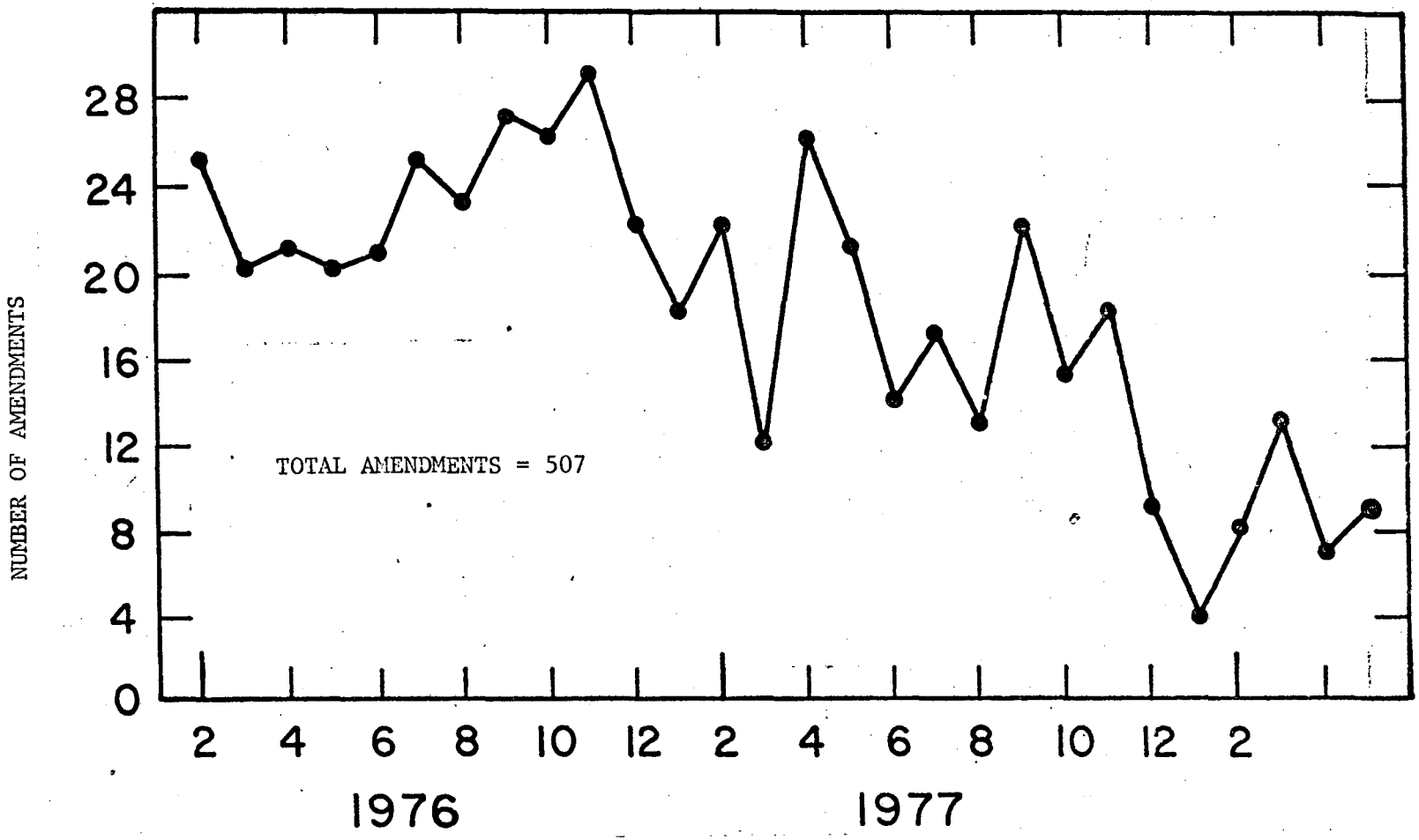

FIG. H-6 (cont'd)

CRUDE RUNS DELTA

NUMBER OF AMENDMENTS

BY MONTH

Delta = Amended Volume - Original Volume

76/02-78/05

XBL7811-12670

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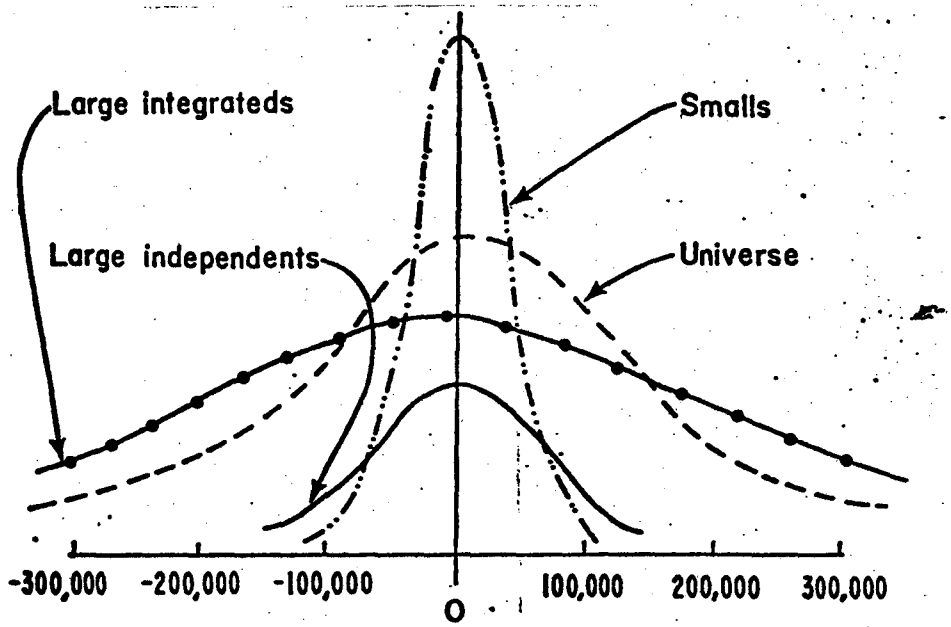

Distribution of the deltas*
(Old oil)

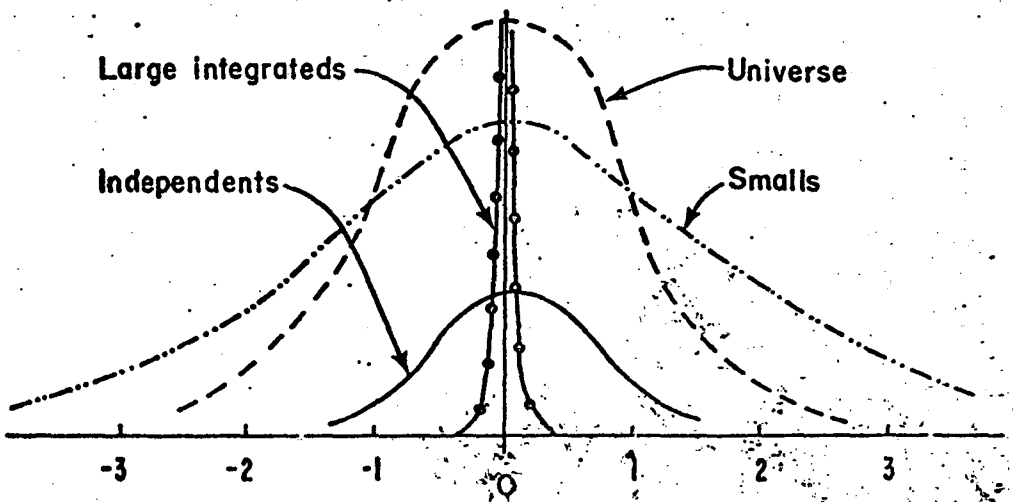

FIG. H-7

Distribution of the normalized deltas*
(Old oil)

*Means are assumed to be equal to zero.
76/02 ≤ Ordate ≤ 78/05

Delta = Amended Volume - Original Volume

Normalized Delta = Delta/((Amended Volume + Original Volume)/2)

Ordate = Month of original submission

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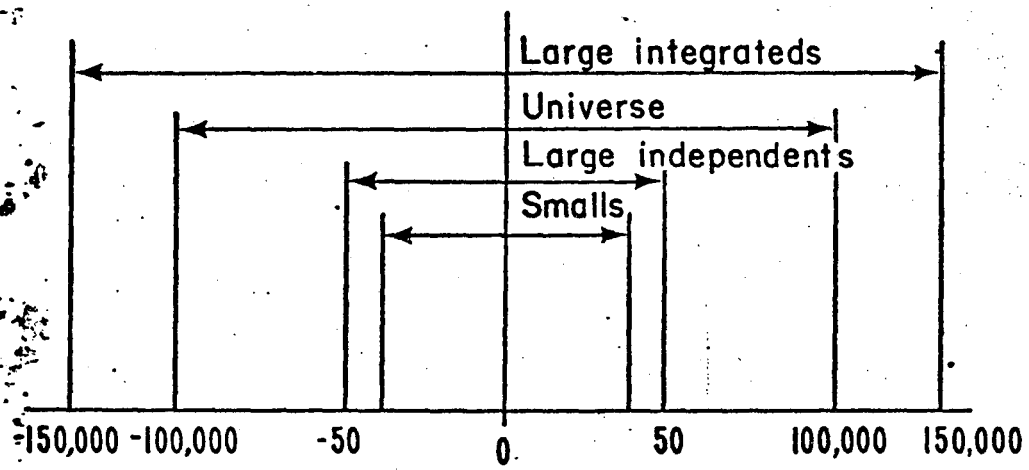

$\pm 1\sigma$ Intervals for deltas for the strata*
(Old oil)

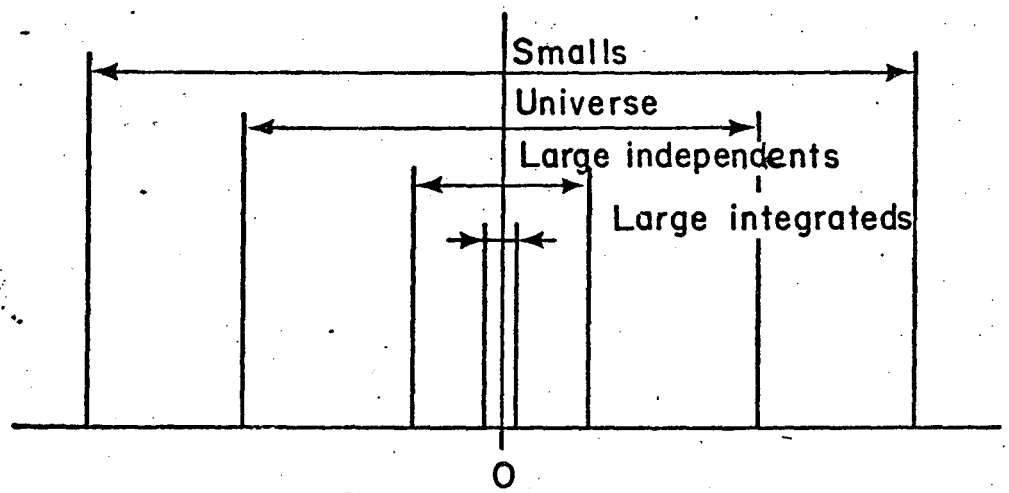

FIG. H-8

$\pm 1\sigma$ Intervals for normalized deltas for the strata
(Old oil)

*Means are assumed to be equal to zero.
$76/02 \leq$ Ordate $\leq 78/05$

Delta = Amended Volume - Original Volume
Normalized Delta = Delta/((Amended Volume + Original Volume)/2)
Ordate = Month of original submission

XBL7811-12676

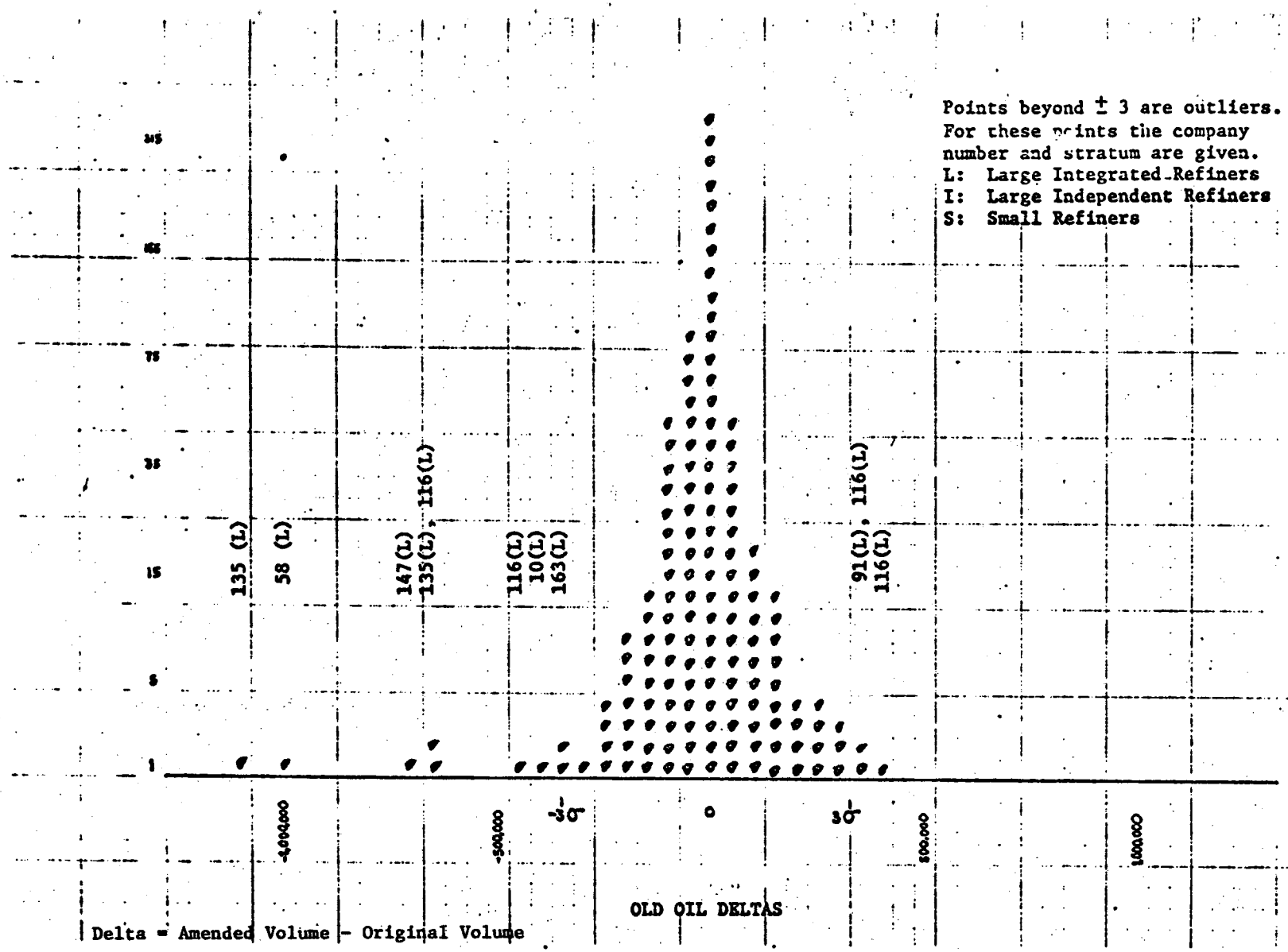

Figure H-9

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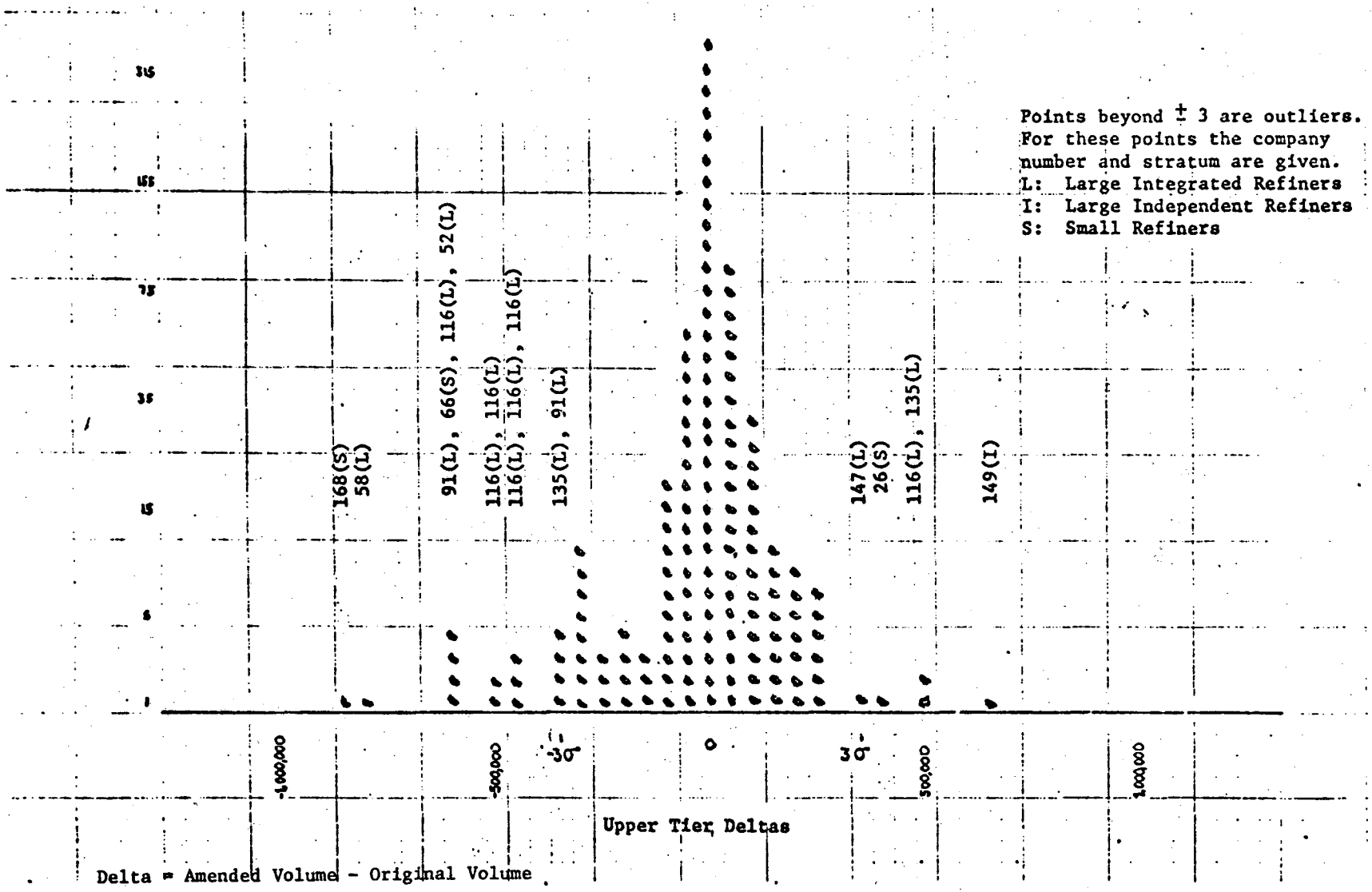

Figure H-9 (cont'd)

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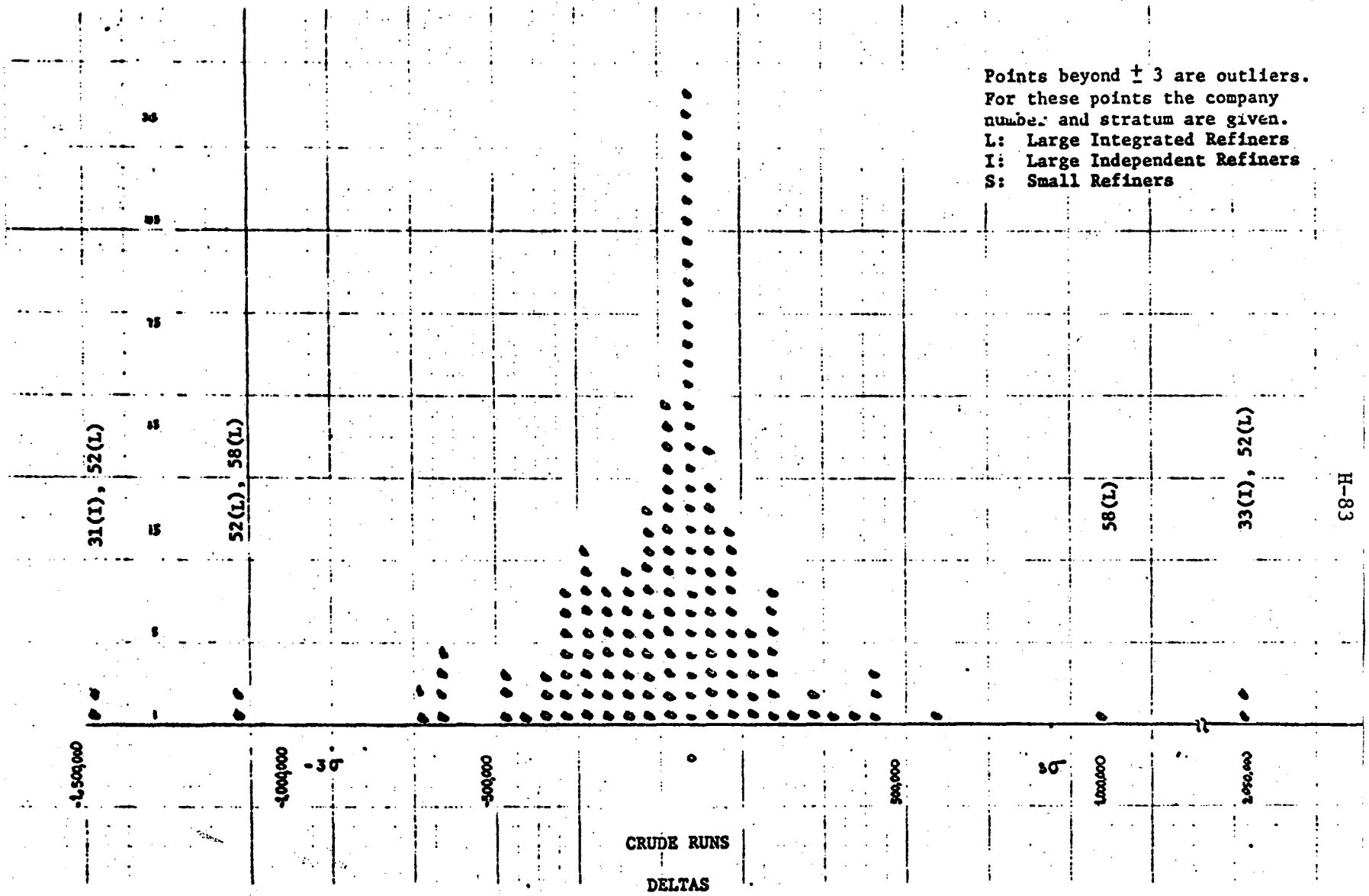

Figure H-9 (cont'd)

Delta = Amended Volume - Original Volume

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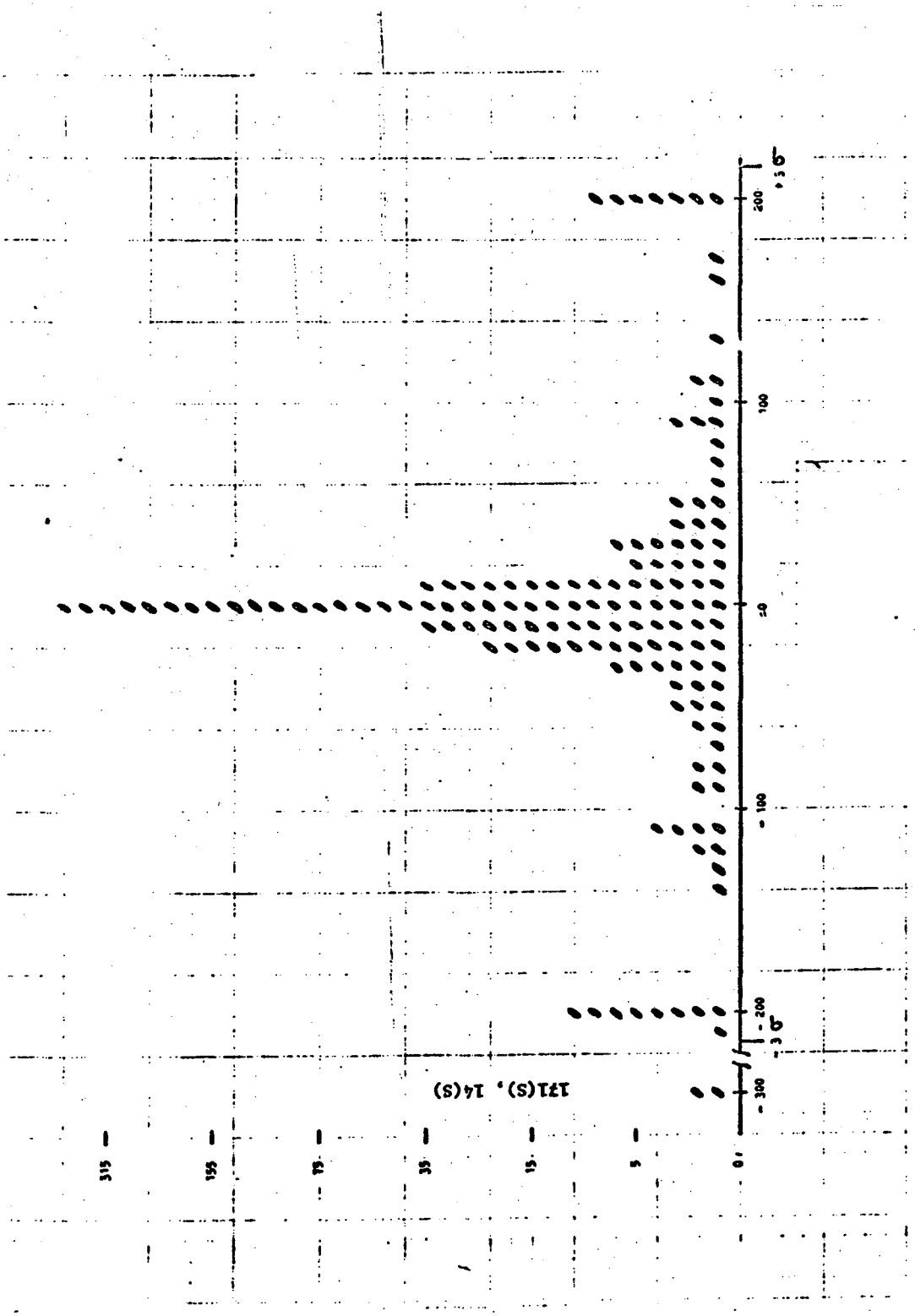
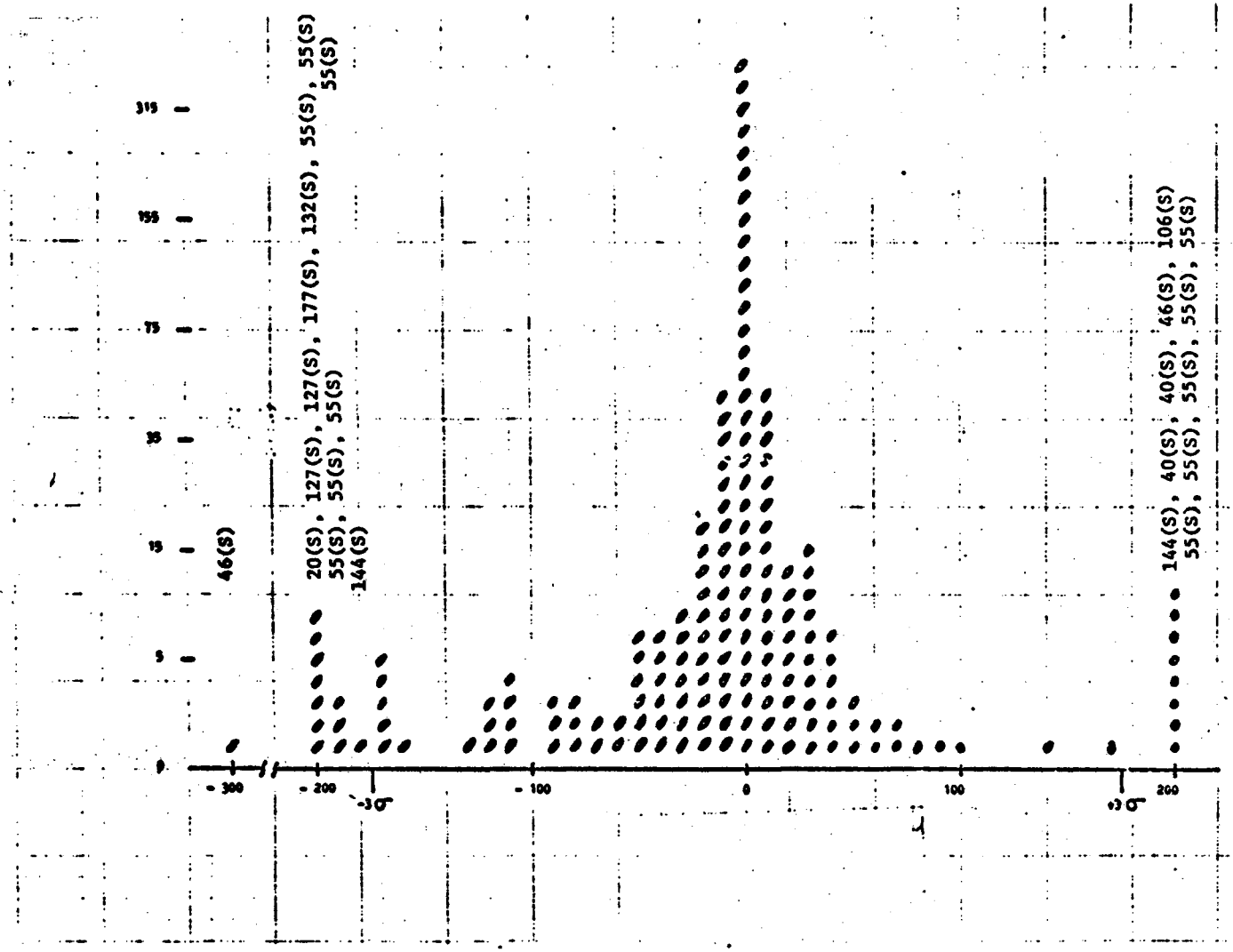


OLD OIL NORMALIZED DELTAS

Figure H-10

Normalized Delta = Delta/((Amended Volume + Original Volume)/2)



UPPER TIER

NORMALIZED DELTAS

Normalized Delta = Delta/((Amended Volume + Original Volume)/2)

Figure H-10 (cont'd)

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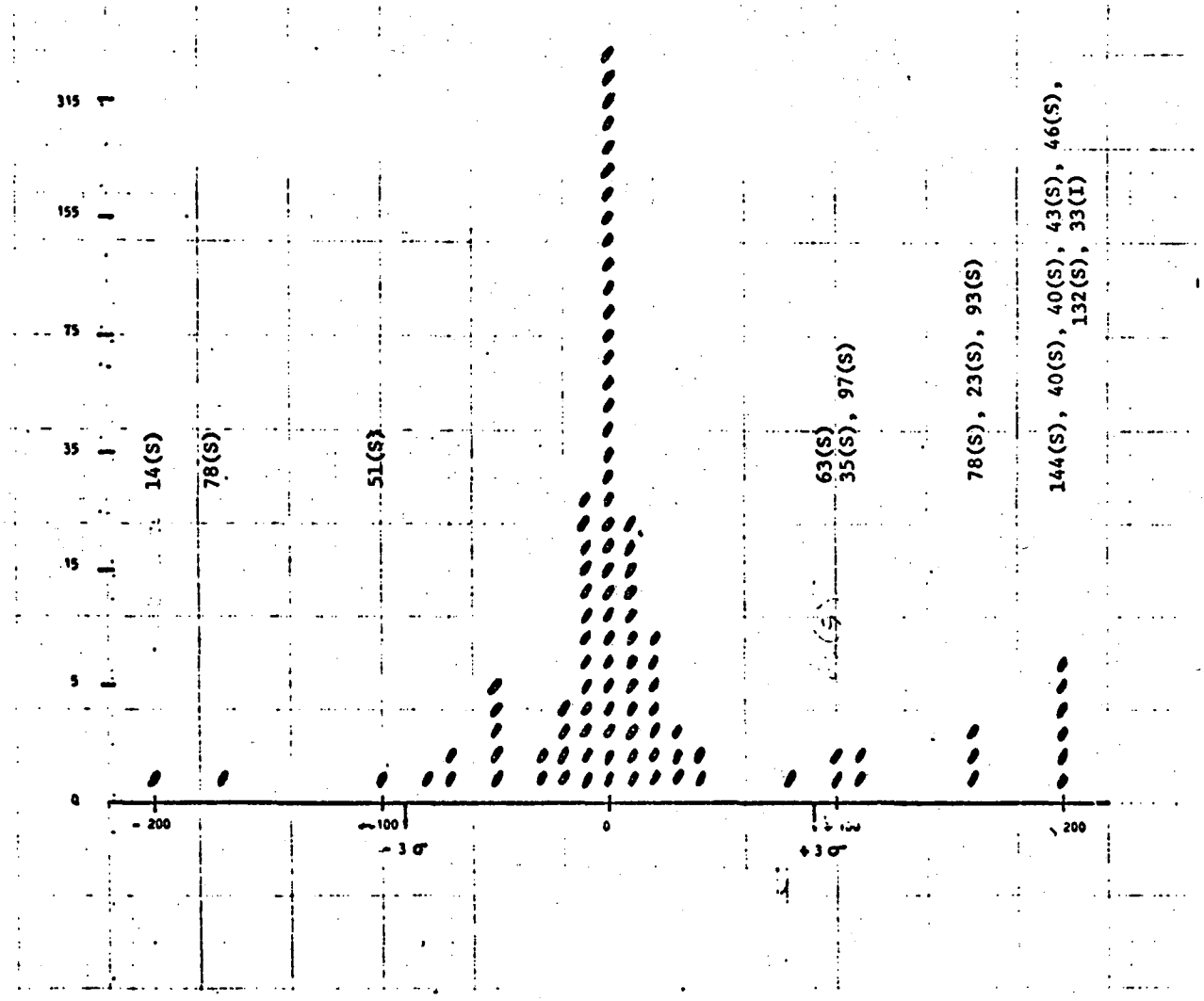
0 0 0 5 2 0 4 0 7 9



CRUDE RUNS

NORMALIZED DELTAS

Normalized Delta = Delta/((Amended Volume + Original Volume)/2)

Figure H-10 (cont'd)

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0 0 1 0 5 2 0 4 0 8 0

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APPENDIX I

SAMPLE PLAN

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SAMPLE PLAN AND SAMPLE SELECTION: ENTITLEMENTS SYSTEM

A. MAIN SAMPLE

There are presently 180 refiners in the Entitlements System. Of these, 15 can be classified as large-integrated, 15 as large-independent, and 150 as small. (Note that the latter two categories are not based on ERA classification.) The first 30 account for a very large percentage (80%) of all oil refined. Therefore they are most important in assessing the overall validity of the data. Whenever possible, it is planned to investigate all 30 of these companies. There are many provisions of the Entitlements System, however, which affect only the smaller refiners. Therefore they must be adequately sampled too. A random sample of 15 has been chosen from this set of 150.

For sample selection, an alphabetical list of the 180 companies was used. This list is current as of August 18, 1978. The companies were numbered sequentially. Random numbers were generated by a programmable TI-58 calculator. The process was continued till 15 numbers which did not correspond to any previously chosen companies (including the 30 large companies) had been generated. See Table I.1 for the names of the companies in this sample.

B. SUBSAMPLE

It was found out that accessing the data for the large main sample may sometimes require extensive time and resources. Furthermore, doing some of the contemplated detailed analysis (on all members

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of the main sample) would not be always feasible due to limited resources. Consequently, a smaller sample of 15 companies was drawn from the main sample. Five companies from each of the first two strata were randomly sampled, giving proportional weight to the company's capacity. A simple random sample of five companies was drawn from the third stratum, equally weighing the fifteen companies. The fifteen companies in the subsample are identified by an asterisk on Table I.1.

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TABLE I.1

SAMPLE OF COMPANIES

Large Integrateds	Large Independents	Small Refiners
Exxon*	Amerada - Hess*	Cross
Shell*	Sohio*	Canal
Amoco*	Ashland*	Sage - Creek*
Texaco	Coastal	Bayou
Chevron	Tosco	Claiborne
Mobil	Kerr-McGee	US - Oil*
Gulf*	Champlin*	MacMillan
Arco*	Amer - Petrofina*	US & So. - Amer
Union	Corco	Caribou
Sun	Murphy	Mountaineer*
Marathon	Koch	Edgington - Oil*
Conoco	Energy - Coop	Bruin*
Phillips	Clark	Goldking
Citgo	Crown	Hiri
Getty (and Skelly)	Tenneco	Shepherd

0 0 0 0 5 2 0 4 0 8 3

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APPENDIX J

OIL INDUSTRY PRACTICES

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OIL INDUSTRY PRACTICES[1]

A. THE FLOW OF CRUDE OIL

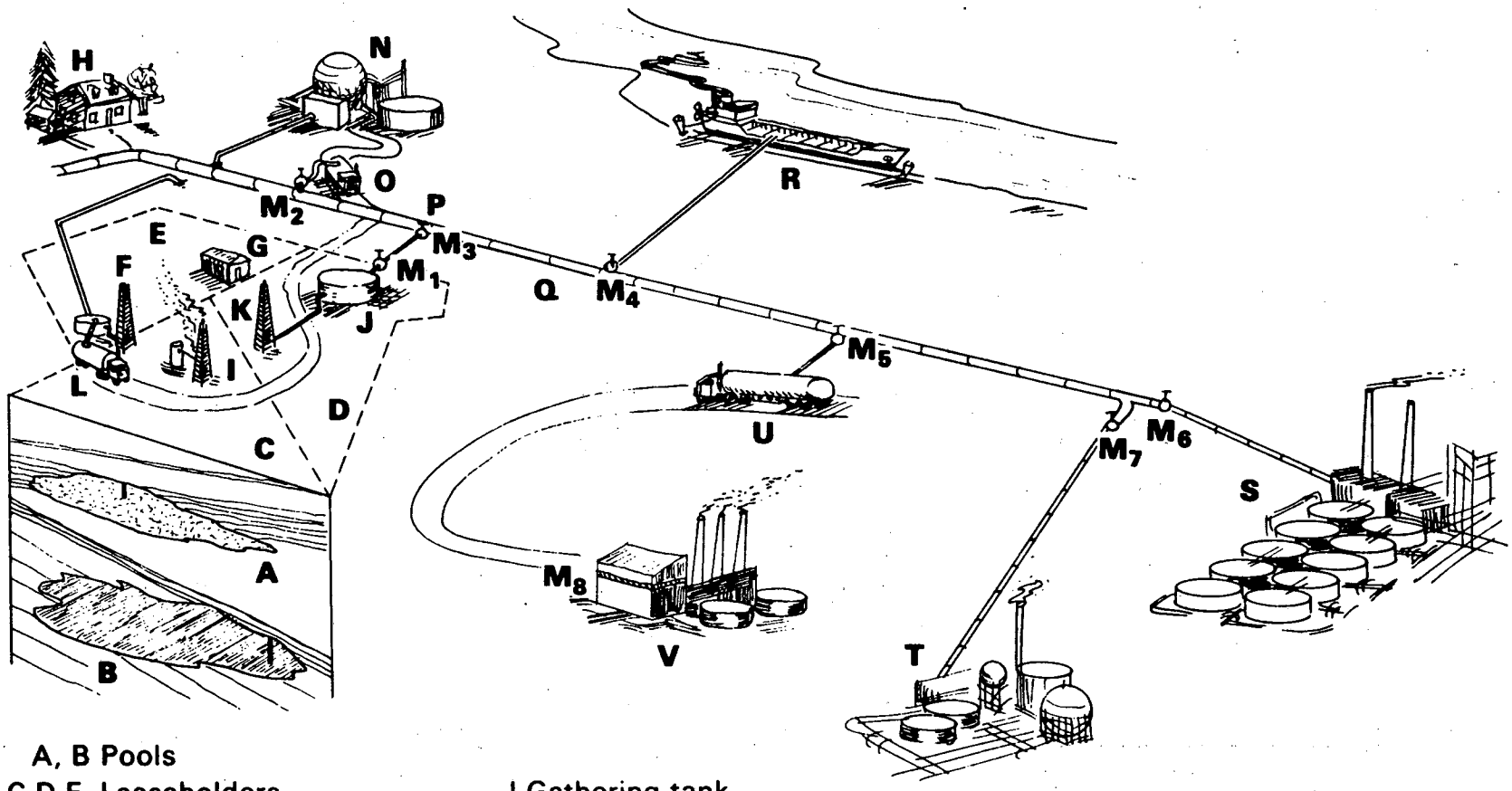
1. Introduction

In order to understand the Domestic Crude Oil Entitlements System, one must understand oil industry practices. Especially important are industry measurement practices, since the quantities of oil produced can directly effect the entitlement position.

Virtually all crude oil is produced, gathered in storage tanks, then entered into pipelines or other transportation systems for delivery to refineries. The typical flow of crude oil is shown in Figure J-1. From the refinery, the crude oil is distilled into its components, and then marketed for sale to users. Some small quantities may be burned as fuel for lease or transportation purposes, or injected back into the ground. A small amount of crude is used as petrochemical feedstock. In addition, some crude oil may be lost through evaporation, spillage, or leakage. At each stage of the flow of crude from production through final use, the entity which has custody of the oil will attempt to record it as accurately as required for taxation, ownership, and accounting purposes.

2. Measurement Problems

There are several problems involved in the measurement and recording of crude oil. The first is that of defining the quality of the crude. Problems arise here because crude oil is a mixture of varying proportions of many chemical compounds. The value of the



A, B Pools
C,D,E Leaseholders
F Gas well
G Operator
H Property owner
I Steam injection well
J Gathering tank
K Oil well
L Lease condensate
M_1-M_8 Measurements
N Gas plant
O Plant condensate
P Pumping station
Q Truck pipe line
R Barge tanker
S, T Refineries
U Tank truck
V Blender (non-refinery)

Fig. J-1. The typical flow of crude oil.

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crude oil differs for different combinations of chemical components. These chemical characteristics of crude oil, such as sulfur content, gravity and viscosity, must also be measured because the wellhead price differs depending on these factors. In cases where the crude is produced from a field where the chemical composition is known, subsequent production is not normally retested for chemical composition. However, in new fields, it is necessary to conduct such tests before the oil can be used downstream.

The second problem involves the technical difficulties of precisely measuring the quantity of crude. Crude oil is measured in volumetric terms; however, the primary objective of volumetric measurement is to determine the mass of crude oil. The relationship between volume and mass changes with temperature; therefore, adjustment must be made for temperature differences. The quantities of other substances (e.g., water and sediment) must also be measured, and in some cases netted out. Measurement of physical quantities is usually done with flow meters and other devices. Problems arise both from human errors in recording metered data and from meter inaccuracies. The metering process and sources or error is discussed in detail below, under the heading "Metering, Ganging and Testing."

Crude oil also has a third set of attributed which are not qualitative or quantitative, but rather are defined by its legal and regulatory status. Domestic crude oil may be classified as old, new, stripper, Alaskan North Slope (ANS), Naval Petroleum Reserve or

tertiary. This classification may depend solely on its place of extraction from the ground, or additionally on historical levels of production from that lease, and possibly also on the method of recovery. While current ownership of a given volume of oil may be fairly easy to determine, identifying its past owners (and the consistency of its legal classification) is more difficult, precisely because that information is historical information and of less interest to the entities involved in recording the current flow of oil. Further, the original regulatory classification becomes more difficult to identify as oil flows through successive owners. Hence verifying this attribute of crude oil may be extremely difficult, as compared to verifying its physical composition, volume or present ownership.

In summary, crude oil has both physical and regulatory attributes. As it flows through the system to its final destination, it may acquire new regulatory attributes. At various stages in the flow, some of these physical and regulatory attributes will be observed and recorded. At each stage in the flow, the party recording the attributes will be most likely to record only those attributes present at that party's particular stage of the process. Attributes from past stages may be lost or ignored. However, some attributes observed at one stage give direct information as to past attributes. A description of the measurement and recording of physical and regulatory attributes of crude oil as it flows from source to destination follows. Knowledge these flows indicates the sources of information about the crude oil at all stages in the system, as well as the

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places where errors are likely, and how such errors can be detected and corrected.

3. Definition of Crude Oil

There is some discrepancy in the definition of crude oil which may serve to confuse measurement efforts. In Section 211.51, Title 10 of the Code of Federal Regulations (1977), crude oil is "a mixture of liquid hydrocarbons including lease condensate that exists in natural underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities." However, in 10 C.F.R. Section 212.31 (1978) crude oil is defined as "a mixture hydrocarbons that existed in liquid phase in underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities...includes condensate recovered in associated or non-associated production by mechanical separators, whether located on the lease, at central field facilities or at the inlet side of a gas processing plant."

We therefore have a discrepancy between the definitions of crude oil in Sections 211 and 212, arising primarily from the difference between lease condensate and condensate arising at the field or plant. Since a large portion of the condensate is recovered in field facilities, lack of a clear and consistent understanding and application of a definition can lead to obvious misinterpretation or favorable interpretation situations. Still, the discrepancy is small in relative magnitude (less than 0.5 percent of domestic production),

and definitions of lease, field, and plant condensates can be found in 10 C.F.R. Section 214.21 (1978) and 10 C.F.R. Section 211.62 (1978).

Having noted this slight inconsistency, it will be ignored for the remainder of this chapter, except where it infringes on the description of the measurement and recording procedures.

4. Metering, Gauging, and Testing

In the previous two sections we have dealt with the physical and regulatory attributes of crude oil and possible problems arising from these attributes in accounting for crude oil. Since the accounting methods are designed to capture stocks and flows arising from physical stocks and flows, the physical measurement system dictates the structure of the accounting data. This section details the flow of crude oil and the measurement practices that capture these flows for the accounting system.

The first stage at which the flow of crude oil can be measured is when the oil is brought up from the ground. Production may be metered at this point either on a periodic or continuous basis. Metering at the individual well lease is normally carried out for production control purposes and only on a periodic basis. Well metering is not required for stripper properties (average of less than 10 barrels per day per well) and often will be absent.

The next measurement stage is at the lease separator. This device separates the crude oil from associated or dissolved gas and

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any bottom sediment and water (BS&W). In the case where a separator serves several wells, a flow meter at the header of the system can be used to measure production from one well at a time. Measurement at the separator is normally done periodically. Such measurements are accurate to approximately 0.1 percent.

After gas has been separated from the oil and the oil has been treated to remove any BS&W, the oil goes to stock tanks which are commonly grouped in a tank battery. The tanks in a tank battery will vary in number and in size, depending upon the daily production of the lease and the frequency of pipeline runs. A battery may serve up to 60 wells or more. Often, but not always, these batteries will serve only one lease. The total storage capacity of a tank battery is usually three to seven days' production. In volume terms, this may be up to 75 million barrels. Individual tank capacities can vary from 90 to 10,000 barrels. The tank batteries are arranged so that as oil is being run from one tank, the other tank can be filling with current production.

Stock tanks usually have a bottom drain outlet for draining off BS&W. The inlet is at the top of the tank and the outlet about one foot above the bottom of the tank. This set up means that the tanks cannot be completely drained at any time.

The most important measurements are those made after the oil reaches the lease storage tanks. Every volume measurement is normally accompanied by a measurement of temperature. The tank

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battery system may either be automatic or manual. The measurement process under each system is described in turn.

Where oil storage is controlled manually the tank is fitted with a thief or guage hatch in the tank roof so the amount of oil in the tank can be determined with a steel measuring line. The thief hatch allows a device called a "thief" to be lowered into the tank: samples of oil are obtained to determine the BS&W content of the oil, its API gravity and temperature.

Volumes gauged as above are measured in linear feet (usually to the nearest 1/4 inch).[2] A pre-prepared table is used to convert height of liquid in the tank to a measure in barrels. This table is computed from measurements of the dimensions of the tank, made before that tank battery is put into service. This measurement and preparation of the "tank table" is usually done by a third party (i.e., neither the producer nor the pipeline or other purchaser).

Measurement of the volume of oil in each tank is usually made once every 24 hours and these measurements are entered in an oil-production report. Production is determined from beginning and end-period stock measurements and measurement of pipeline runs. The tank volume record is made primarily for production-control purposes.

In addition to this daily measurement, when a tank of oil on a lease is delivered on "run" to a pipeline, tank car, or tank truck, the oil delivered is measured by gauging the height of oil in

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the tank before and after the delivery is completed. At that time, the oil is tested to determine its gravity, BS&W and temperature. This measurement is made by a gauger associated with a pipeline or other purchaser, and the lease operator will usually also be present.

Lease tank batteries are fairly well standardized with respect to type, layout, and size of equipment and fittings employed. Even in older tank batteries, valves to regulate the flow of oil may be automatic. Newer type lease tank batteries will have a fully automatic unit called lease automatic custody transfer or LACT. A LACT system provides for the unattended transfer of oil or gas from the lease to the pipeline. The unit takes samples, records temperatures, determines quality and net volume, eliminates any dissolved gas, recirculates improperly processed oil for re-treating, keeps a record for producing and accounting purposes, and shuts-down when something goes wrong. Surge tanks are used for protection against irregular flow. The LACT unit delivers directly to the pipeline as soon as fluids have been separated rather than waiting until a tank is filled. The advantages of LACT include a reduction in lease storage, increased operating efficiency and control and fewer opportunities for human error.

For each sale or transfer to a pipeline or other transportation company all information regarding measurements, along with the terms of the lease, producer, and transporter, the number of the tank, the date, and other necessary data are recorded on the "run ticket",

which is then signed by both parties. The run ticket is the most important record on the lease, because it becomes the basis for all payments to the producer, royalty owners and to others with interests in the oil produced and delivered from the lease.

It normally takes approximately 24 hours to empty a tank into the pipeline or other transportation facility. The transaction date is recorded as the date at which flow begins from the tank. If the tank flow extends over more than one month, the flow in the first month is recorded as one transaction and the flow in the second month is treated as a new transaction with a new run ticket. This procedure allows an end-of-month cut-off for accounting purposes.

Crude oil is transported from the lease by pipeline, tanker, barge, truck and tank car. Of domestic crude oil which arrives at refineries, about 85% comes by pipeline, 12% by tanker and barge and the remainder by truck or railroad. We shall therefore concentrate on measurement of crude oil flows through pipelines.

A tank battery will empty into a field pipeline. These have typical flow capacities of 10,000 to 20,000 barrels per day. They usually end at a terminal where a destination pipeline, going to refineries or ports, begins. About 65% of destination pipelines are regulated by the Interstate Commerce Commission as common carriers; the remaining 35% are company-owned and not regulated by the ICC. Company-owned pipelines may be intrastate and available to other companies, in which case the state sets a transport rate. If they are

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"dedicated" only to the company that owns them, there is no regulation. Destination pipelines have typical capacities of 75,000 to as many as 1,500,000 barrels/day.

The flow of crude oil through a pipeline is measured by a flow meter. While flow meters on the lease are "proved" (checked for accuracy) only periodically pipeline meter installations will typically have continuous proving equipment. This need for greater accuracy may be justified by the greater quantities flowing through the pipeline.

The volume of oil is metered each time it enters or leaves a pipeline system. It is measured at various points within the system for control, inventory and other purposes. There is no direct information on the details of measurement within these pipeline systems. In fact, the tracking of oil after it leaves the lease, up to the time it reaches the refinery needs further investigation. The description which follows is general and covers only one system.

Integrated companies typically produce their own oil, or purchase it at the wellhead from other producers. The oil is then simply sent directly to their own refineries. In this case, records are easily centralized, and problems of tracking the oil do not arise. For example, Chevron's Western Division uses only a dedicated pipeline, and does not need to separate batches of oil ownership. However, if oil were moving through a common carrier pipeline, different owners' oil might be separated by using "plugs" (mechanical dividers) or radioactive tracers. The flow of oil on the pipeline will typically

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be sampled to detect different batches. This detection may be based on dyes introduced into the oil, or changes in viscosity and gravity. When a change in type of oil is detected, the interfacing oil is stored in a holding tank until its ownership is decided.

Among large companies, exchanges or sales and purchases of crude oil in transit in a pipeline are relatively infrequent. Typically, exchanges only take place with foreign oil transported by tanker for which problems of certification do not arise. Measurement of imported volumes may be less accurate than technically feasible because unloading must be rapid to avoid tying up the tanker. The accuracy of such measurements is therefore only to $\pm$ 2.5%.[3]

In an integrated oil company, oil going from pipeline to refinery may only be metered by the pipeline department; the refinery may not independently measure the flow of incoming oil. The most important measurements undertaken by the refinery are measurements of stock in tanks. Each tank is gauged daily for refinery accounting purposed. Oil may also be metered for process control purposes as it leaves the refinery stock tanks.

In summary, the physical measurement of crude oil stocks and flows takes place at several stages in the system. Volumes and/or physical and chemical characteristics of the oil maybe measured at any of these stages. The actual process of metering or gauging is unlikely to be a source of substantial error. However, maintaining regulatory characteristics of the crude oil through the various stages is somewhat

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more difficult to monitor. For this reason it is necessary to examine the recordkeeping system and the related accounting and control processes designed to capture this information.

5. Recording and Accounting

As crude oil leaves the production stage and enters the transportation system, the document which records relevant data is the run ticket. The run ticket contains physical information on the batch of oil in that transaction. In addition, the seller's and purchaser's names are recorded. If the oil is subject to a multi-party contract transaction shares of each party will be noted on the run ticket.

Typically, four copies of the run ticket will be made. These will go to (1) the purchaser's office, (2) the pipeline company or other transporter, (3) the pumper in the field and (4) the seller or property operator. Each time an actual exchange transaction is made, a new run ticket is prepared. All physical measurements recorded on the run ticket, are certified by representatives of both parties at the time the ticket is prepared.

Once the crude oil is in the transportation network, the movement of crude oil is recorded by means of a tender of shipment, which is the counterpart of the bill of lading for railroads. The tender is addressed by the shipper to the originating carrier. Among other things, it specifies the quantity and quality of crude as well as the point of origin, destination and route. When accepted by the carrier the tender document becomes a contract. In practice, the

tender of shipment cover a total quantity of crude which is to be moved in batches over an extended period of time. When this practice occurs, it is necessary for the carrier to maintain a memorandum record of the individual and cumulative quantities received and delivered for each batch transported under a specific tender.

Actual deliveries from the transportation system are reported on delivery or transit receipts. The recording procedure for these documents is the same as for pipeline run tickets. Oil consumed within the system for fuel or other purposes is measured in the same fashion.

Pipeline companies typically keep detailed internal records of all crude oil moved by them. Flow measurements and inventory measurements are made at several points in the transportation system to generate these records. Dispatchers may be in contact with the pipeline stations through an intra-company communication system. Through this system, they can determine where each batch of oil is at all times. Stations and delivery points are kept informed of arrival times of specific batches of crude. There are, of course, problems with measuring quantities of crude oil in the lines at any given time because gathering lines may not be full or temperature corrections may be difficult to determine accurately, or for other similar reasons. Various estimation methods are used to overcome these difficulties so that reasonably accurate approximations of the quantities of each specific batch of crude moving are obtained.

Characteristics such as ownership may be fairly easy to

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establish as well since it is noted on the run ticket. However, oil tier classification presents more problems. The classifications of crude oil as "old", "new", etc., typically depends on historical information about the field from which the oil is produced. The producer has 60 days to certify to the buyer the tier classification of the oil he sells. Large first purchasers will often do this for producers when the purchases is familiar with the history of the field. Computerized records of field history are maintained to facilitate this certification. Even if a large company is not a first purchaser, it may estimate the "tier-composition" of a particular batch of oil based on historical information about the oil received from a particular contract and lease. An alternative practice by some companies is to record all unclassified oil as old oil until certification of the tier classification is received from the seller.

When the oil has not been certified, the book entry for recording unclassified oil as old oil is made on an estimated basis. When the invoice arrives, with the certification of the oil on it, the estimate entry is reversed and the transaction is recorded at its actual classification. In some cases, though, even this entry may need later adjustment because invoices from a carrier may not have an official producers certification. In cases where the invoice certification differs from the producers, invoice information must be revised and an adjustment recorded. Indeed, in some cases producers' certifications may be in error. When revisions or corrections are received by the purchaser, adjustments to the accounting records must be made.

as a result, final figures on all purchased crude may not be known for several months.

While companies attempt to estimate refinery requirements and enter into crude oil purchase contracts ahead of time, sometimes spot purchases have to be made. Oil intended for one company may be diverted through a purchase or exchange agreement. Or crude oil may be purchased from resellers which exist specifically to meet such spot needs. Determining the ERA classification of oil in unanticipated transactions is more difficult since the ownership of the oil may need to be traced back through several exchange transactions. Estimates will often be made, with subsequent adjustments as the correct classification of the oil becomes known.

Tier classification information required by the DOE is normally centralized in the accounting department of larger companies rather than recorded on each run ticket or other document which accounts for the flow of oil. There is thus a divergence between the amount of information which is used for monitoring the movement of a particular batch of oil and that which is required for tier classification. For example, a large integrated company's pipeline division, having physical custody, can determine the physical and chemical characteristics of a given batch of oil, determine who is the owner, perhaps which field it came from, but generally will know nothing of the ERA classification of that batch. This latter information is usually maintained somewhere else, based on initial run ticket data and historical information maintained in the comptroller's office.

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Volumes and other characteristics are verified by a company which is the final recipient of any crude oil and compared with refinery and pipeline records. Verifying ERA classification is more difficult since the physical flow records must be related back to an historical record on the field or to a seller's certification. While physical flow data is necessary for production control purposes, tier classification data are required only for regulatory purposes. For this reason and because of the difficulties in gathering and maintaining tier classification data, it is likely that companies perceive this recordkeeping as burdensome.

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B. MEASUREMENT STANDARDS

1. Introduction

This section discusses the development of standards for the metering of crude oil in the production and transportation stages. The API Manual of Petroleum Measurement Standards and other API standards manuals form the basis for meter accuracy standards and the limitations that may be expected to arise in actual metering applications. This section deals with the standard metering procedures recommended to the petroleum companies and may not be representative of the actual practices employed throughout the industry.

In 1943 the API and ASME became interested in meter measurement of liquid hydrocarbons. These organizations monitored the design, research, testing and operation of positive displacement meters.[a] As concern grew about meter standards, it was agreed (by the API and ASME) that uniform metering procedures should be developed for the industry.

The API standards (first edition, 1960) define the acceptable approaches for achieving accuracy in meter measurement. Standard procedures are based on the theoretically attainable levels of accuracy; in practice, these procedures are often unrealistic and cannot be implemented. Most companies may not believe that the marginal payoff required to attain additional accuracy is a practice worth the extra effort and expense that would be required. Existing legislation does not mandate close monitoring

[a]See the Glossary.

of metering procedures. The Federal Energy Guidelines establish rather broad guidelines for measurement, and the only direct references to the measurement process are that adjustments are to be made for base sediment and water, and that measurements are to be adjusted to a standard 60° F. temperature. Rulings by the National Bureau of Standards are more specific, and some of these rulings are listed in the API standards.[a] (One of them is included here as an example in Appendix J.)

2. Need for Accuracy

DOE and the petroleum industry share a need for accurately measured data on petroleum production, transportation, refining, and consumption. While DOE's needs pertain to informational, regulatory, and policy-making purposes at a national level, industry's needs pertain to accurate transfer of property and money, and management decision-making and control purposes at a micro or company level. In the large integrated companies, the need for accurately measuring and recording oil transfers between divisions is necessary to fix responsibility for costs and for product as well as to provide management with necessary information to plan efficient operations and to match quantities on hand with market demands.

In industry transactions, the degree of measurement accuracy is usually set by mutual agreement between contracting parties. In intracompany transfers, accuracy requirements are set by company policy. Often individual companies prepare their own manuals of practice to produce metered measurements that can meet the company's tolerance limits. Other times, the approach

[a]See the Glossary.

to accuracy is specified by reference to common practice or established industry standards. Exchange agreements often clearly state that all gauging, sampling, and testing should be done in accordance with API codes. Industry self-interest would provide reason to believe that the industry sets and follows standards that are as accurate as can be justified for the metering costs incurred. Evidence supporting this suggestion in the form of a set of quotations from industry manuals and personnel on the need for and the level of accuracy maintained is presented in Section C, Standards of Accuracy and Measurement.

3. Limitations to Accuracy

All measurement systems consist of parts that are subject to error. The variances of different measurements are potentially cumulative, so that the variance of the measurement system could be greater than any of its individual components. Accumulated errors could be larger than expected.

Differences between metered quantities and actual quantities may arise from three sources: (1) instrumentation errors, (2) human factors and (3) when metering is not continuous, sampling error.

Instrumentation error occurs when the meter misreads the quantity measured. Initially, meter accuracy is limited by the design specifications of the meter itself. Manufacturer specifications include details of meter accuracy. However, operating conditions tend to wear moving parts in the meter; thus, after some period of operation, accuracy decreases. The most obvious sources of meter instrumentation error are the initial meter design

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and the condition of the meter.

Meters are tested at various intervals and adjusted to correct readings if necessary. The testing process is referred to as meter proving. For any given metering operation, the more frequent the proving, the more accurate meter readings that may be expected. Of course, this relationship between frequency of proving and meter accuracy will only hold if the system for proving is itself accurate. In addition, if the meter is proved under conditions different from those under which meter operations occur, the proving process may be improper.

If practical, and necessary after proving, a meter will be adjusted so that readings will be accurate within acceptable tolerances. However, if due to condition of the meter or other causes, the meter cannot be adjusted, then a mathematical relationship is computed for the difference between quantities measured on the meter and actual quantities. The resulting "meter factor" is used to translate incorrect meter readings to correct actual quantities.

Industry standards recommend that an ongoing quality control chart is kept for every meter,[4] for each grade of crude oil read by the meter and over a range of flow rates encountered in meter operations. The two major influences on meter accuracy derived from the proving system are the precision and systematic error (if any) of the proving system. A quality control chart can be used to monitor changes in meter accuracy over different proving systems or over proving intervals.

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Another limitation to accuracy arises because not all meterings of crude oil are conducted continuously. Sampling is used to estimate gravity and BS & W, for the required adjustments for these items. Reference to sampling theory forms the basis for analysis of the effects of sampling error. For example, samples should represent as closely as possible the oil being tested. Systematic differences between the sample and the population will generate improper extrapolation to the population.

The most common sampling equipment is what's called a thief, which has the capability of "stealing" oil from any desired segment of the tank. Sampling from one level in the tank will not indicate tank contents at another level. In addition, the user of sampling procedures also implies the existence of sampling variances which may be another source of error.

After data are gathered in a metering system, they are usually adjusted to correct for

(a) variances in operating flow rates

(b) meter case operating pressure

(c) meter case operating temperatures

(d) type of liquid or liquids being measured

(e) meter accuracy factors.

Erroneous calculations by meter readers or analysts may occur during this process. In addition, the data are recorded to a maximum accuracy of five significant figures. When two figures are combined, the resulting figure inherits inaccuracy from both figures.

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figures is sampled rather than measured continuously, then statistical variance is introduced.

Human error may arise in translating meter readings to actual quantities. For example, temperatures usually are not read more accurately than to the nearest 0.1° F. [5] The small effect of finer temperature measurement is not captured in this measurement. In addition, if analog fast flow meters are used to measure the crude, data collection must make interpolations and approximations to translate meter readings. Human error may be significant in such a reading process. If, however, digital meters are used, the human error factor is related to the adjustment process alone, rather than to the approximation of analog readings.

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C. STANDARDS OF ACCURACY AND MEASUREMENT

This section lists examples of specific standard for accurate measurement, and quotations from independent sources on the meter accuracy of the reported data. In all references the importance of temperature and basic sediment and water corrections of every reading is emphasized.

Standards:

> "Capacity of the volumetric prover shall not be less than the volume delivered in one minute through the meter to be proved."[6]
>
> "The calibration is repeated until two successive readings agree within 0.02% of the proven volume. The average of two volumes is used."[7]
>
> "Temperatures of the metered liquid are read to the nearest 0.1°F and API gravities to the nearest 0.1 degree; pressures are determined with sufficient accuracy to minimize errors resulting from liquid compressibility."[8]
>
> "The meter accuracy or meter factor for each single proof and for the average of two or more proofs should be calculated to the nearest ten-thousandth part."[9]

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"When proving turbine meters, total count for a proving run should not be less than 10,000 discrete pulses and preferably more so that the counter error of plus or minus one will become ± 0.01%."[10]

"Thermometer should be suspended in the middle of the tank for at least five minutes, and should be read to the nearest ± 1/2 degree F."[11]

"If the tank is larger than 5,000 bbls capacity, then three temperature readings should be taken at different depths and the average should be used."[12]

"Depth of oil in tank should be measured to the nearest 1/8th of an inch."[13]

"The accuracy of the tape should be at least equal to 1/8th of an inch per 100 feet at 60F, although no tape corrections will be made for tank temperature."[14]

"The maximum level of nonmerchantable oil and water at the bottom of a tank should be a least four inches below the bottom of the outlet of the lowest measurement from which oil may be run from the tank by gravity."[15]

Independent sources:

"Fast metering of tankers is accurate to ± 2.5%."[16]

"Custody metering is expensive and time consuming, but is accurate to ± 0.05%."[17]

"I would guess the error due to metering is not more than 0.1%."[18]

"Storage tanks can be measured accurately by checking the level of tanks. This measurement is accurate to 1/8 inch (i.e., 100-150 bbls)."[19]

"Small storage tanks can be measured to the nearest 0.01 foot (i.e., 25-50 bbls)."[20]

"The six large companies we have interviewed all use the API/ASTM standards, and the measurement error is not more than 0.5%."[21]

"Large errors (up to 0.5%) are introduced if the API gravity at the observed temperature (rather than adjusted temperature) is used to determine the API gravity group of the oil, because this error may place the oil in the wrong group."[22]

"It is industry practice to read the tape to the nearest 1/4 inch."[23]

There are also some points worthy of note in the run ticket. 1.) The readings are taken to the nearest 1/10 of a bbl. 2.) The readings are corrected for meter accuracy, API gravity, and temperature and BS & W measurements. 3.) Meter correction factor is accurate to four significant figures.

One can note that different people have different ideas about the final accuracy of the data, since this final accuracy depends mainly on the complex setup and the characteristics of the different measuring systems. However all figures quoted here are very small.

NATIONAL BUREAU OF STANDARDS
CALIBRATION OF
LIQUID CAPACITY FIELD STANDARDS
Graduated Neck Type

To be acceptable for test and certification by the National Bureau of Standards, liquid capacity field standards of the graduated neck type should be so designed and constructed that they are suitable for their intended use. The Bureau reserves the right to decline to test any field standard of this type which is deemed to be unsatisfactory in design, construction, or condition.

Liquid capacity field standards of this type normally are associated with liquid petroleum products and are used ''to deliver.'' In order that the results of calibrations made at the National Bureau of Standards may be, as nearly as possible, directly applicable to this normal method of use, unless otherwise requested, capacity field standards of this type are calibrated ''to deliver.'' Calibrations are made at 60°F., with a drainage period, after the main flow ceases, of 10 seconds for field standards of 10 gallons and less, and 30 seconds for field standards above 10 gallons, and for meter provers.

The API, ASME, ASTM, and other national groups have adopted 60°F. as the reference temperature for the measurement of petroleum and petroleum products.

If, for a particular service, a different basis of calibration is required, a full description of the special requirements should be given in writing at the time the standard is submitted.

A National Bureau of Standards Certificate is issued to document the results of calibration of each liquid capacity field standard if the gage-scale can be so adjusted that the correction to the indicated capacity is not greater than one part in 2000 (0.05%). A National Bureau of Standards Report is issued when the correction is in excess of one part in 2000, but not greater than one part in 1000 (0.10%). If the gage-scale cannot be so adjusted that the correction is within one part in 1000, the results of calibration are reported in letter form only.

Attention is directed to National Bureau of Standards Handbook 45, Testing of Measuring Equipment, wherein testing procedures with liquid capacity field standards are described in full.

H. S. Bean, Chief,
Capacity, Density and
Fluid Meters Section,
Mechanics Division

Effective March 2, 1953

FIG. 30.

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NOTES TO APPENDIX J

1. Appendix J is based on several interviews with ERA auditors at two large integrated companies, and company officials at one of these. These interviews are chronicled below. Details are contained in the interview notes. Further valuable information was obtained from the references.

Interviews (conducted by LBL Personnel)

Date	Persons Interviewed	Place
July 12, 1978	Robert Boldt, Office of Special Counsel, ERA	San Francisco
July 19, 1978	Robert Boldt, Office of Special Counsel, ERA.	San Francisco
July 21, 1978	Virgil Pettimato, Al Terada, Valerie Hashemoto, Office of Special Counsel, ERA.	Los Angeles
Aug. 2, 1978	Jim Detlefs, Craig Blaylock, Frank Navarro, Office of Special Counsel, ERA.	Los Angeles
Aug. 8, 1978	Fred Howell, ARCO	Dallas (by telephone)
Aug. 24, 1978	Earl Stubbs, Chevrol; Al Terada, OSC, ERA	Concord
Sept. 5, 1978	John Lopez, Chevron; Al Terada, Jack McConnell, OSC, ERA	Concord
Sept. 15, 1978	Wes Baker, Chevron; Al Terada, OSC, ERA	Concord
Sept. 15, 1978	John Lopez, Chevron	Concord

References

1) Primer of Oil and Gas Production, Production Department, API, 300 Corrigan Tower, Dallas, Texas 75201, 6th printing, 1978 (3rd Edition 1971).

2) Petroleum Accounting Practices by Stanley P. Porter, McGraw-Hill, 1965.

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3) A Data-Base for Crude Oil Contract Accounting by Donald F. Cooper, unpublished graduate research paper, USC GSBA, January, 1978.

2. Primer of Oil and Gas Production.

3. Larry Burnley, retired Chevron Refinery Engineer.

4. API Std. 2534, Measurement of Liquid Hydrocarbons by Turbine Meter Systems.

5. API Std. 1101 Measurement of Petroleum Liquid Hydrocarbons by Positive Displacement Meter.

6. API Std. 1101, Measurement of Petroleum Liquid Hydrocarbons by Positive Displacement Meter.

7. Ibid.

8. Ibid.

9. API Std. 2534, Measurement of Liquid Hydrocarbons by Turbine Meter Systems.

10. Ibid.

11. API Std. 2500, Measuring, Sampling, and Testing Crude Oil.

12. Ibid.

13. Ibid.

14. API Std. 2500.

15. Ibid.

16. Larry Burnley, retired Chevron Refinery Engineer.

17. Ibid.

18. John Murry of ERA.

19. Larry Burnley.

20. Kindle Report.

21. Leon Hunt of the Kindle Corporation.

22. Sample run ticket and an Exchange Agreement between two oil companies.

23. Primer of Oil and Gas Production, Chapter 9, "Gaging and Switching."

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APPENDIX K

COMPARISON OF PRODUCTION, FIRST PURCHASER, AND ENTITLEMENT SYSTEMS DATA FOR THE PERIOD OCTOBER 1976 TO MAY 1978

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COMPARISON OF PRODUCTION, FIRST PURCHASER
AND ENTITLEMENT SYSTEMS DATA FOR THE PERIOD
OCTOBER 1976 TO MAY 1978

The LBL Validation team made a significant attempt to reconcile differences between nationwise Production, First Purchaser, and Entitlements data. The purpose of this section of the report is to give a brief summary of these efforts, showing the estimated magnitude of the errors, in which tiers they occur, and (possibly) how they can be corrected.

There are three more or less independent sources for the data used in this analysis. The monthly production figures were provided by EIA/OED (formerly Bureau of Mines') monthly Energy Data Reports from October 1976 to May 1978. The monthly first purchase totals were obtained from Report 1 which is based on the P124 Schedule B from october 1976 to May 1978. The Entitlements Data came from the adjusted monthly P-102 national totals released by the EIA for this time period. The 20-month period which we have chosen to examine is the longest simultaneous period for which we had data for all three systems as of November 1, 1978.

Straightforward comparison of the data is not readily accomplished for several reasons. One of these is that the First Purchaser and Entitlements System report oil in tiers (Old, New, Stripper, Naval Petroleum Reserve (NPR), and Alaska North Slope oil (ANS)), whereas the Production System just reports the total amount of oil produced nationwide, with no tier-by-tier breakdown. Naval Petroleum Reserve oil was

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always reported as such by the Entitlements System, but prior to July 1978, it is not clear where it was reported in the First Purchaser System. Since Alaska North Slope oil appears to have been reported completely erroneously in both the First Purchaser and Entitlements System, it has been left out of this comparison. Production figures are adjusted (to make them comparable with the other two systems) by subtracting the amount of oil producedon the Alaska North Slope as reported by the State of Alaska. The results (in 1000 barrels/day) are shown for each month and system in Table K-1 of this report.

At first glance, COFP is below Production by 113,000 barrels per day and above Entitlements by 85,000 barrels per day. This 85,000 consists of an excess of 173,000 barrels of old oil and 19,000 barrels of stripper, and a shortage of 58,000 barrels of Naval Petroleum Reserve oil and 49,000 barrels of new oil.

1. 160 small first purchasers report annually, thus never report volumes purchased (volumes are not required on annual schedules in COFP). This results in an estimated incompleteness of 24,000 bbls/day.[1]

2. 33,000 barrels per day of new oil are doublecounted in Florida by the First Purchaser System.[2]

3. About 515,000,000 barrels of oil (36% Old, 44% New, 20% Stripper) were doublecounted during the period from October 1976 to December 1977 by one large first Purchaser. Over the 20-month

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period this averages out to respective double-counts of 31,000 barrels/day of Old oil, 37,000 barrels/day of New oil, and 17,000 barrels/day of Stripper oil.[3]

4. 13,000 barrels/day of crude oil is used directly as residual, and 1,000 barrels/day as "distillate." The 14,000 barrels/day are included in COFP but not COE. This oil is estimated to be composed of about 7,000 barrels/day of Old oil, 5,000 barrels/day of New oil, and 2,000 barrels/day of Stripper oil.[4]

5. From December 1977 to May 1978 about 4,845,000 barrels of Old oil was exported as Bunker Fuel, and thus reported in COFP but not COE. This amounts to an average of about 8,000 barrels/day over the 20-month period.[5]

6. Over the 20-month period, about 25,938,000 barrels of oil was exported from Northern first purchasers to Canada, and thus was reported by COFP but not COE. This works out to an average of about 43,000 barrels/day, estimated to be about 8,000 barrels/day of Old oil, 22,000 barrels/day of New oil, and 13,000 barrels/day of Stripper oil.[6]

7. In Texas, about 23,000 barrels/day of Plant Condensate are counted as Production, but not in the COFP or COE systems.[7]

8. 21,000 barrels of Naval Petroleum Reserve oil has gone unreported throughout this period because of a misunderstanding.

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9. Approximately 55,000 barrels/day of crude oil are used in the field for raising steam and thus escape COFP and COE.

The systems are compared in tabular form (in 1,000 barrels/day) on the following page. To simplify the problem of comparison, we have selected Entitlements as the standard of measure. Therefore, production and First Purchase are adjusted in the table below to exclude oil not reported in the Entitlements System.

Upon close inspection, it now appears that First Purchase is below production by 108,000 barrels/day and below Entitlements by 53,000 barrels/day when all known errors are corrected. This 53,000 barrels/day consists of an excess of 130,000 barrels of Old oil and a shortage of 8,000 barrels of Stripper oil, 37,000 barrels of Naval Petroleum Reserve oil and 138,000 barrels of New oil.

To better understand the relationships between the systems, please refer to Figure K-1 of this report. Initially, X (K bbls/day) of oil were produced nationwide (not counting ANS oil): an amount (e) of it was never reported as produced, but the rest (X-e) was reported by the COPS. Most of this oil (X-a) was then purchased by a first purchaser and reported, but some of it (a) was either never purchased or purchased and not reported. All of the (X-a) made its way onto the P124 form, but an extra amount (b) was also added to this number because of double-counting by purchasers. Now, after having been purchased, most oil (X-c) goes to a refinery, but some (c) is used for non-refining users at a refinery or elsewhere upstream. All of the (X-c) should be reported on

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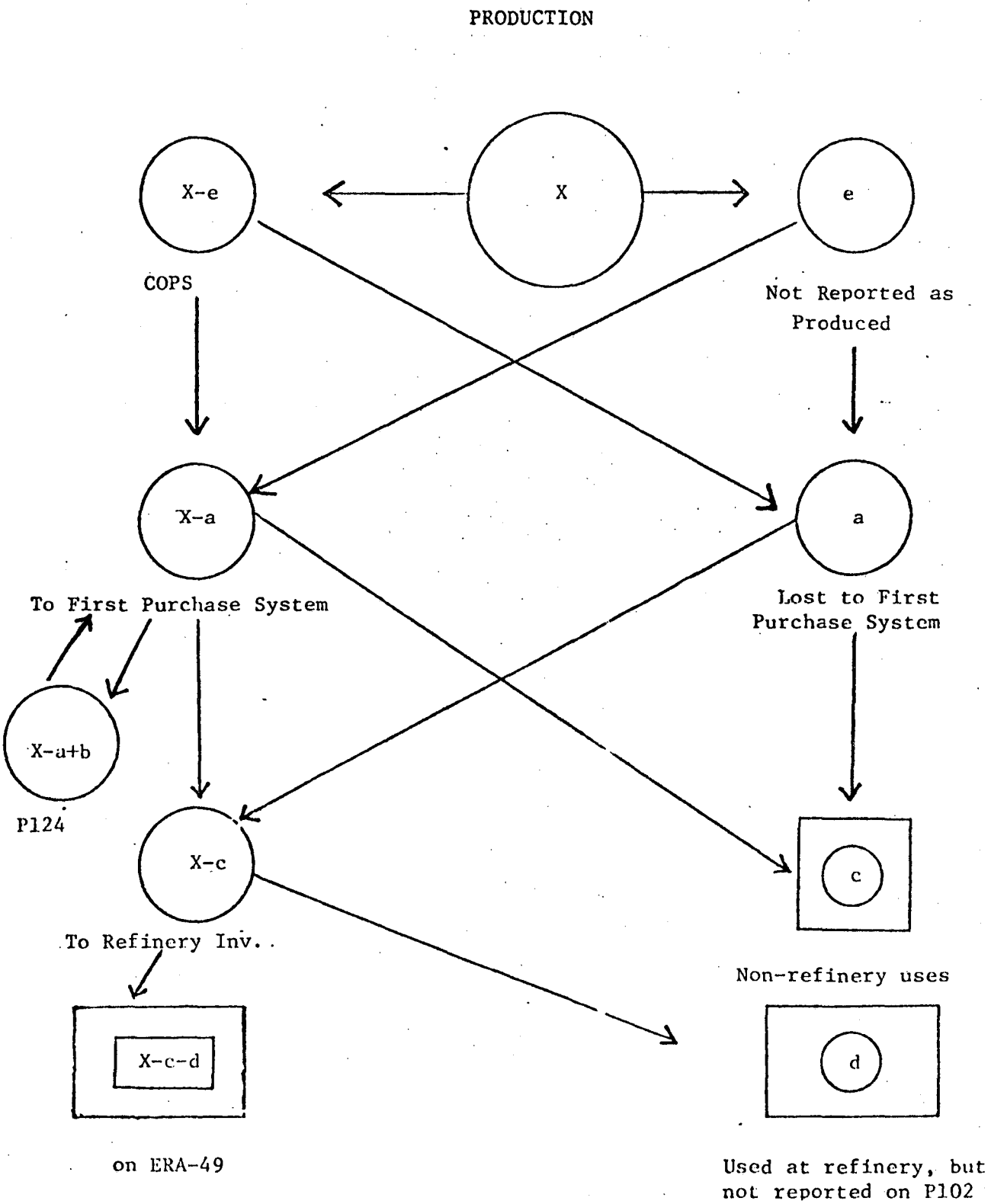

Fig. K-1

RELATIONSHIP BETWEEN COPS, COPP AND COE

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TABLE K-1

UNITED STATES DOMESTICE CRUDE OIL MONTHLY REPORTS (EXCLUDING ANS) AS REPORTED BY 3 SYSTEMS

In 1000 barrels/day

Sources:

PRODUCTION: NPR from Department of Navy Data
TOTAL = COPS total - State of Alaska ANS
O,N,S = Old, New, Stripper = TOTAL - NPR

FIRST PURCHASES: All data from Report 1 based on P-124 schedule B

ENTITLEMENTS: All data from summary of adjusted nationwide P-102 totals.

DATE	PRODUCTION			FIRST PURCHASES					ENTITLEMENTS				
(Month).	O,N,S	NPR	TOTAL	OLD	NEW	STR	NPR	TOTAL	OLD	NEW	STR	NPR	TOTAL
OCT 76	7978	85	8063	4136	2741	1018	0	7895	4031	2761	1003	55	7850
NOV	7988	92	8080	4016	2945	1081	0	8042	3873	3095	1016	72	8056
DEC	7960	101	8061	4005	2910	1084	0	7999	3846	3068	1061	86	8061
JAN 77	7691	99	7790	3915	2838	982	0	7735	3696	2913	1005	86	7700
FEB	7958	109	8067	3935	2958	1053	0	7946	3907	3047	1051	89	8094
MAR	7895	127	8022	3924	2968	1087	0	7979	3593	3068	1075	104	7840
APR	7954	125	8079	3925	2933	1076	0	7934	3716	2982	1010	101	7809
MAY	7891	118	8009	3825	2967	1104	0	7896	3704	2992	1043	97	7836
JUNE	7802	112	7914	3854	2920	1117	0	7891	3686	2940	1066	88	7780
JULY	7729	97	7828	3720	2912	1058	60	7750	3504	3009	1032	77	7622
AUG	7662	96	7758	3598	3044	1106	76	7824	3511	2927	1127	105	7670
SEPT	7602	102	7704	3646	2903	1120	78	7747	3527	2901	1122	183	7728
OCT	7697	120	7817	3628	2970	1110	99	7807	3356	3064	1107	250	7777
NOV	7682	121	7803	3604	3018	1131	92	7845	3301	3033	1123	101	7558
DEC	7786	104	7890	3477	2977	1118	89	7661	3283	3061	1100	99	7543
JAN 78	7351	112	7463	3417	2799	1039	98	7353	3300	2942	1065	95	7402
FEB	7410	114	7524	3366	2834	1129	102	7431	3259	2855	1095	94	7303
MAR	7718	123	7841	3356	2913	1196	80	7545	3207	2890	1157	109	7363
APR	7862	123	7985	3262	2927	1180	88	7457	3152	2930	1164	108	7354
MAY	7749	122	7871	3314	2956	1196	84	7550	3012	2942	1202	95	7251
AVG	7768	110	7878	3696	2922	1100	47	7765	3523	2971	1081	105	7680

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the P-102 (Entitlements) form, but some amount (d) goes unreported, leaving only (X-c-d) reported on the P-102.

So, the reasons for the discrepancies are contained in the letters a, b, c, d, and e. Each of these variable can be subdivided into a "known" error and an unknown error using the adjustments from above.

Thus let:

$a = 24 + 23 + 55 + \alpha = 123 + \alpha$

Where: 24 is the average

24 is the avg. (K bbls/day) of oil purchased by 160 small first purchasers who do not report monthly and thus do not report their volumes.

23 is avg. (K bbls/day) of Texas Plant Condensate.

21 is avg. (K bbls/day) non-reporting of NPR nationwide.

α is unknown avg. (K bbls/day) of other oil not reported in p;eriod.

55 is avg (K bbls/day) of Lease Oil.

$b = 33 + 85 + \beta = 118 + \beta$

Where:

33 is avg. (K bbls/day) known to have been doublecounted in Florida.

85 is avg. (K bbls/day) of other doublecounting by a large company.

β is unknown avg. (K bbls/day) of ther doublecounting.

$c = 43 + 14 + 8 + 23 + \gamma = 88 + \gamma$

Where:

43 is avg. (K bbls/day) Canadian Export.

14 is avg. (K bbls/day) Residual and Fuel Oil nationwide.

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TABLE K-2

COMPARISON OF PRODUCTION, FIRST PURCHASER, AND ENTITLEMENTS SYSTEM

	PRODUCTION			FIRST PURCHASER					ENTITLEMENTS				
	O,N,S	NPR	TOTAL	O	N	S	NPR	TOTAL	O	N	S	NPR	TOTAL
AVG.	7768	110	7878	3696	2922	1100	47	7765	3523	2971	1081	105	7680
Adjusted for:													
1) Incompleteness of frame				11	8			24					
2) Florida double-counting					-33			-33					
3) Other double-counting				-31	-37	-17		-85					
4) Residual and distillate	-14		-14	-7	-5	-2		-14					
5) Bunker fuel export	-8		-8	-8				-8					
6) Canadian exports	-43		-43	-8	-22	-13		-43					
7) Texas Plant Condensate	-23		-23										
8) NPR non-reporting							21						
9) Lease Oil													
Correction[55]	-143	0	-143	-47	-89	-27	+21	-138	0	0	0	0	0
	7625	110	7735	3653	2833	1073	68	7627	3523	2971	1081	105	7680

The numbers are now in an easily comparable form. Various comparisons which one might be interested in are:

Total Oil: Prod-7735; COFPS-7627; COE-7680

O,N,S combined: Prod-7625; COFPS-7559; COE-7575

NPR Oil: Prod-110; COFPS-68; COE-105

Old Oil: ----; COFPS-3653; COE-3523

New Oil: ----; COFPS-2833; COE-2971

Stripper Oil: ----; COFPS-1073; COE-1081

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8 is avg. (K bbls/day) Bunker Fuel Exports nationwide.

23 is avg. (K bbls/day) of Texas Plant Condensate.

γ is unknown avg. (K bbls/day) of other non-refining users.

$d = \delta$

Where

δ is unknown avg. (K bbls/day) refined but not reported.

$e = \varepsilon$

Where:

ε is unknown avg. (K bbls/day) of other oil not reported to COPS.

Now we know that (Production) COPS = X-e; (COFP) P124 = X-a+b and and (COE) P-102 = X-c-d, so we have the following three equations:

1) $7878 = X-\varepsilon$

2) $7765 = X-a+b = X-5-\alpha+\beta$

3) $7680 = X-c-d - X-143-\gamma-\delta$

which becomes

1) $7878 = X-\varepsilon$

2) $7770 = X+\beta-\alpha$

3) $7825 = X-\gamma-\delta$

Combining equations (2) and (3) yields: $\beta+\gamma+\delta-\alpha= 55$

Combining equations (1) and (2) yields: $\beta+\varepsilon-\alpha= -108$

Of course, as anyone can see, we have 2 equations in 5 unknowns which cannot possibly be solved uniquely. However, to the best of our knowledge, both γ and ε can be reasonably assumed to be close to 0, leaving:

$\beta - \alpha \cong -108$

$\delta \cong 53$

What the first equation implies is that even if there is no unaccounted for double-counting (β), the COFP system misses about 108 K bbls/day* from non-reporting. The system is correspondingly worse if double-counting does exist.

The second equation implies that on the average 53 K bbls/day of oil brought to the refineries is not reported in the COE unless there is some other use we have not heard of.

Overall, then, this means that even after accounting for known errors, the COFP is low by about 108/7878 or about 1.4% and the COE is low by about 53.7878, or about 0.7% over the 20-month period. Further investigation into the causes of these discrepancies is warranted.

There is a shortfall between COFP and COE of 53,000 bbls/day consisting of an excess of 135,000 bbls/day of old oil and a shortfall of 8,000 bbls/day of stripper, 37,000 bbls/day of Naval Petroleum Reserve, and 133,000 bbls day of new oil. Leaving aside the discrepancies in stripper and NPR oil, there appears to be a recertification of at least 133,000 bbls/day of old to new oil between COFP and COE--more than 1% of the total national volume. However, results are inconclusive because the

*The main report concludes that there is an "unexplained difference" of 153,000 bbls/day. This discrepancy occurs because in the text of the report, incompleteness of the frame (24,000 bbls/day) and NPR non-reporting (20,000 bbls/day) are regarded as possible sources of incompleteness rather than as known errors. Here, for the sake of simplicity, the distinction has not been made. Thus, the main report finds a shortfall of 1.7% in COFP while here the shortfall becomes 1.4% due to unknown causes.

discrepancies may be small enough to be drowned by background noise in the data series.

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NOTES:

[1] John Murray, ERA/OFR/DCOSA

[2] See Appendix I, Part 1, Crude Oil First Purchaser Draft Interim Report.

[3] Charles Little, ERA/OFR/DCOSA Table 2 of the Energy Data Reports, Petroleum Statement Monthly.

[4] Sources are Forms FEA-P113, 320, 321, 322, 323; Bureau of Mines Forms 6-1305-M, 6-1309-M; Bureau of Census publications IM 145, EM 522 and FT 900.

[5] Table 22 of the Energy Data Reports, Petroleum Statement Monthly. Sources are Bureau of Census publications EM 522 and FT 900.

[6] Same as 5.

[7] Jim Diehl, EIA/OED/DGO.

[8] Same as 3.

[9] Average of several estimates from John Murray, ERA/OFR/DCOSA, Jim Latta of Chevron, James Woods of the California Independent Producers Association and Donald Lindros of Union Oil of California.

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APPENDIX L

DCOE'S PROGRAM REFINERS MONTHLY REPORT

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DEPARTMENT OF ENERGY

DOMESTIC CRUDE OIL ENTITLEMENTS PROGRAM
REFINERS MONTHLY REPORT ERA-49

GENERAL INSTRUCTIONS

I. PURPOSE

- Form ERA-49 provides the means by which refiners report pursuant to 10 CFR 211.66(h).
- Form ERA-49 is designed to collect necessary data for each reporting refiner under the provisions of the Domestic Crude Oil Entitlements Program (10 CFR 211.67).

II. WHO MUST SUBMIT

- Form ERA-49 must be completed by all refiners of crude oil (domestic and imported) in compliance with the Mandatory Petroleum Allocation Program (Code of Federal Regulations, Title X, Chapter II, Part 211, Subpart (c) paragraphs 211,66(h), (i) and (j)).

III. TO WHOM

- Participants must submit Form ERA-49 and any attachments which may be required, in triplicate (original plus two copies), to:

  Domestic Crude Oil Entitlements Program
  20th Street Postal Station
  Post Office Box 19326
  Washington, D. C. 20036

IV. WHEN

- Form ERA-49 must be in receipt of DOE by the fifth (5) day of the second month following the month for which the report is filed. For example: June reporting data must be in receipt of DOE by August 5th.

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V. DEFINITIONS

- Adjusted crude oil receipts means, the crude oil receipts of a refiner for a particular month, which are adjusted to reflect any invoice received in that month for domestic crude oil (including crude oil sold under buy-sell program (10 CFR 211.65)) delivered to that refiner in any previous month (excluding months prior to November 1974). These adjustments to a month's reported crude oil receipts must have the effect of increasing or decreasing the previous month's volume of old or upper tier crude oil reported by that refiner under 10 CFR 211.66(h).

  However, these invoice adjustments may be made only in cases where previously reported volume was based on either a prior invoice, or a good faith estimate based on the refiner's past experience as to the old and upper tier crude oil content of the domestic crude oil delivery to which the adjustment is to be made.

- Adjustment means, the receipt of an invoice of recertified crude oil previously booked into your account which results in a change to the volume and/or category as previously reported on the P102 or the ERA-49 and a subsequent invoice to a reported volume based on either a prior invoice or a good faith estimate. A good faith estimate is a volume based on that refiner's past experience as to its composition for pricing purposes of domestic crude oil of the same origin. For the Form ERA-49 filing purposes, exclude adjustments prior to November 1974.

- Alaskan North Slope Crude Oil (ANS) means, crude oil transported through te Trans-Alaska Pipeline System.

- Amendment means, a resubmission of a previously filed report resulting from an internal company error. Do not file amended reports to adjust for subsequent invoices (see adjustment).

- Bureau of Mines East Coast Refining District means, the District of Columbia and the States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina,

Georgia, Florida, and the following countries of the State of New York: Cayuga, Tompkins, Chemung, the following counties in the State Of Pennsylvania: Bradford, Sullivan, Columbia, Montour, Northumberland, Dauphin, York, and all counties east thereof.

- California ANS Oil Receipts, (Item 10, page 6), means, crude oil transported through the Trans-Alaska pipeline and included in the crude oil receipts of that refiner that are physically attributable to refineries located in the State of California.

- California Heavy Old Oil means, crude oil produced in California with a gravity of 25.9 degrees API or below that is subject to (1) the highest posted price at 6 A. M., local time, May 15, 1973; plus (2) $1.35 per barrel; plus (3) 2 cents for each degree API gravity between 34 and 40 degrees API gravity; and plus (4) 3 cents for each degree API gravity below 34 degree API gravity, as fully explained in section 212.73. Note that California heavy lower tier receipts, (Item 9, page 6), include all California heavy old oil in a refiner's crude oil receipts, regardless of the location of the refinery that actually processess the oil.

- California Receipts Imported Oil, (Item 11, page 6), means, crude oil imported into California and included in the crude oil receipts of that refiner that are physically attributable to refineries located in the State of California. Crude oil imported into California by a refiner that is subsequently exchanged on a barrel-for-barrel basis for other crude oil (which is then processed by that refiner) shall not be included in this reporting entry by the importing refiner, but shall be so included by the refiner that processes the imported crude in a refinery located in California.

- Crude Oil Receipts means, as to a particular refiner, the volume of crude oil (a) booked into its refineries in accordance with accounting procedures generally accepted and consistently and historically applied by the refiner concerned, for tis own account or for the account of a firm other than a refiner, or (b) if not previously so booked into its refineries, delivered by that

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refiner for its account to another refiner pursuant to a processing agreement with that other refiner. Crude oil receipts shall not include crude oil received by a refiner for the purpose of processing at its refineries for the account of another refiner. A particular crude oil receipt shall be deemed to have occurred when the related cost is booked into refinery inventory in accordance with accounting procedures generally accepted and consistently and historically applied by the

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refiner concerned, whether or not such crude oil has been actually received by that refiner, except that crude oil delivered by one refiner to another refiner pursuant to a processing agreement will be deemed to have been delivered by the delivering refiner to the other refiner when the risk of loss passes to the other refiner under the particular processing agreement, or when the crude oil is received at the refinery of the other refiner, whichever occurs first. Crude oil which has been added by a refiner to its inventory and which is thereafter sold or otherwise disposed of without processing for the account of that refiner shall be deducted from its crude oil receipts at the time when the related cost is deducted from refinery inventory in accordance with accounting procedures generally accepted and consistently and historically applied by the refiner concerned. The volume of domestic crude oil included in a refiner's crude oil receipts shall be evidenced by and consistent with invoices received with respect to such crude oil receipts.

- Crude Oil Runs to Stills means, in the case of a refiner other than a petrochemical producer, the total number of barrels of crude oil input to distillation units processed by a refiner and measured in accordance with Bureau of Mines Form 6-1300-M and, in the case of a petrochemical producer, the total number of barrels of crude oil input to processing units for conversion into petrochemicals, and all other inputs to the distillation units qualifying under 10 CFR 211.67.

- Entitlement means, for a particular month, the right of the refiner owning the entitlement to include one barrel of deemed old crude oil (as provided in 10 CFR 211.67(b)), in its adjusted crude oil receipts in that month. The issuance and transfer of entitlements shall be evidenced on records maintained by the DOE.

- Navy Petroleum Reserves (NPR) means, that oil produced on any of four Navy reserve sites established by law.

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- New Crude Oil means, with respect to a specific property, (1) prior to February 1, 1976, the total number of barrels of domestic crude oil produced and sold in a specific month, less (a) the base production control level for that month, and less (b) the current cumulative deficiency; (2) effective February 1, 1976, the total number of barrels of domestic crude oil produced and sold in a specific month less (a) the property's base production control level for that month and less (b) the current cumulative deficiency since February 1, 1967; and (3) that the total number of barrels of domestic crude oil shall not in either period include any number of barrels not certified as new crude oil pursuant to the provisions of 10 CFR 212.131(a)(1) within the consecutive 2-month period immediately succeeding the month in which the crude oil is produced and sold except where such recertification is explicitly required or permitted by DOE order, interpretation, or ruling.

- Synthetic Crude Oil means, the liquid hydrocarbons produced from deposits or sources which are located within the United States of oil shale, tar sands, coal, organic matter, or such other sources as may be designated by the Administrator of ERA through future rulemaking proceedings. For the purposes of this definition, the term "oil shale" means a fine-grained sedimentary rock containing insoluble organic matter that yields substantial amounts of oil when heated.

- Old Crude Oil, means (1) prior to February 1, 1976, the total number of barrels of crude oil produced and sold from a property in a specific month, less the total number of barrels of new crude oil for that property in that month, and less the total number of barrels of released crude oil for that property in that month; (2) effective February 1, 1976, the total number of barrels of crude oil produced and sold from a property in a specific month, less the total number of barrels of new crude oil for that property in that month.

- Old Oil, means old crude oil as defined in 10 CFR 212.72, except that old oil included in a refiner's adjusted crude oil receipts shall not include condensate recovered at the inlet side of a gas processing plant.

- Other Domestic Oil means, crude oil that is not covered in the crude oil definitions as explained in 10 CFR 212.

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- Refined Petroleum Product means, for the purposes of this form, gasoline, kerosene, middle distillate (including No. 2 fuel oil), LPG, lubricating oils, or diesel fuel.

- Reporting Period means, for the purposes of this form, a calendar month.

- Residual Fuel Oil means the fuel oil commonly known as (a) No. 4, No. 5, and No. 6 fuel oils; (b) Bunker C; (c) Navy Special Fuel Oil; and (d) other fuel oils which have a 50 percent boiling point over 700 degress F in the ASTM D-86 standard distillation test.

- Stripper Well oil means, for the purpose of this form, crude oil certified as having been produced on a stripper well lease (a lease whose average daily production per well did not exceed 10 barrels per day during any calendar year beginning after December 31, 1972).

- Tertiary Oil means that oil which is produced under a qualified tertiary enhanced recovery project.

- Upper Tier Crude Oil means, effective February 1, 1976, new crude oil except that upper tier crude oil included in a refiner's adjusted crude oil receipts shall not include plant condensate, as covered in Section 212.72.

VI. SPECIAL INSTRUCTIONS

- Buy/Sell Crude

  Purchasers of Crude Oil under the Buy/Sell Program should include in their receipts on page one of the ERA-49 (1) the cost of the buy/sell crude in

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the reported volume, cost, and weighted average cost of imported crude oil if the crude is purchased on or after July 7, 1975, and (2) the cost by category of crude as certified by the seller, if the purchase is before July 7, 1975, and should include the receipts in oil oil (Page 2) and upper tier (Page 3).

Sellers of crude oil under the Buy/Sell Program should include in their receipts on page one of the ERA-49 any reduction of crude oil receipts for crude oil sold under the Buy/Sell Program where (1) the reduction should be to imported oil at the weighted average cost of that refiners imported oil, even if domestic crude oil is delivered, where the date of sale is on or after July 7, 1975 and the domestic oil is deemed to be retained by the seller and should be reported as receipts (page 1), old oil (page 2) and upper tier (page 3); or (2) the reduction should be pro-rated to all crude categories based on the receipt volumes (page 1) as a percentage of the total receipts, regardless of the actual crude delivered, where the date of sale is before July 7, 1975, and the receipts of Old Oil (Page 2) and Upper Tier (Page 3) should be reduced by the same amounts as Page one receipts.

o EXCHANGES

Volumes of crude oil exchanged away or sold pursuant to a matching purchase/sale transaction should be retained as a receipt for purposes of the ERA-49 by the refiner exchanging away or selling such volumes.

Example: Refiner A exchanges or sells 100 barrels of old oil to Refiner B and receives, in return, 100 barrels of imported oil. Refiner A reports the 100 barrels of old oil for purposes of the ERA-49 and refiner B reports the 100 barrels of imported oil.

The exchange volumes become a receipt for purposes of the ERA-49 where the refiner books the cost relative to those volumes into its refinery inventory in accordance with its existing accounting procedures

if generally accepted, consistently and historically applied by the refiner concerned. When a refiner receives the exchange delivery prior to giving up its reciprocal exchange volume, provide an estimate of the volume and cost of the crude oil to be given up in the month of the delivery receipt and adjust volumes, if necessary, in the appropriate reporting period.

Where a refiner exchanges away or sells domestic crude oil in a matching purchase/sale transaction and receives in exchange or purchases foreign crude oil that is delivered for sale or processing outside the United States, that refiner must include the domestic crude oil exchanged away or sold by it in its crude oil receipts as of the date that the domestic crude oil was exchanged away or sold.

These handling procedures also apply to firms other than refiners under the certification requirements of 10 CFR 212.131. It should be noted that the exchange situation described above is not provided as an all-encompassing explanation. Please refer to 10 CFR 211.67(g).

Imported or Alaskan North Slope crude oil that is processed in refineries located in California will not be treated as described above for purpose of reporting such receipts on page 6 of the ERA-49. The receipt of such physical oil will be reported on page 6 and the refiner actually processing such oil in a California refinery will be subject to the entitlements penalty for such oil even though it may be deemed to be another category of crude oil under the exchange provisions above and is reported as the other category on page 1. This treatment does not apply to receipts of California heavy lower tier crude oil reported on page 6.

VII. FORMAT INSTRUCTIONS

All volumes are to be reported in actual barrels. Volumes should be entered so that any unused

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blocks are to the left of the number entered. Negative numbers should be entered with the minus sign in the block furthermost to the left, filling any extra blocks with zeros. Zero filling should not be done for positive numbers.

A volume of negative 283,124 barrels should be entered as:

/-/0/0/2/8/3/1/2/4/

A volume of positive 283,124 barrels should be entered as:

/ / / /2/8/3/1/2/4/

All weighted average costs should be rounded to the nearest cent.

A weighted average cost of $8.51 per barrel should be entered as:

/ /8/./5/1/

All total costs can be rounded to the nearest dollar.

A total cost of $8,436,024.57 should be entered as:

/ / / /8/4/3/6/0/2/5/./0/0/

All company short names should be entered one letter to a block, beginning with the block furthermost to the left. Use hyphens, not periods, to fill blocks between words. For example:

/S/T/A/R/-/R/E/F/I/N/I/N/G/ / / /

Consult the Entitlement Notice for the proper company short name to be used.

If more spaces are needed for any item than are available on the Form ERA-49, enter "See Continuation Sheet" under that item on the form. Prepare the item in its entirety on a separate page or pages. Number additional pages with the item number from the form. For example, continuation pages for Item 3 would be numbered "3-1,"

"3-2" and so forth. Be careful to include all entries on continuation sheets in the subtotals and/or totals requested on the form itself.

Complete the blocks for Reporting Firm Short Name, Date of Report, and Report Period on the top of each page.

VIII. SPECIFIC INSTRUCTIONS

The refiner must complete each item of Form ERA-49 as specified below.

Item No. 1. REPORTING FIRM IDENTIFICATION INFORMATION

(a) In Item 1(a), enter the name of the reporting firm.

(b,c,d,e) In Items 1(b) through (e), enter the complete address, including ZIP Code, of the reporting firm.

(f,g) In Items 1(f) and 1(g), respectively, enter the name and telephone number, including area code, of an official of the reporting firm who can answer inquiries regarding this report and who may be contacted by DOE or other parties with respect to entitlement transactions.

(h) In Item 1(h), enter the reporting firm short name. The short name is the name as it appears in the official list of participants. If the reporting firm has not been assigned a short name, Item 1(h) should be left blank. The DOE will assign a short name after the receipt of the first report.

If there has been any changes in identification data since the last submission of this form, check the box provided in the upper right corner.

(i) In Item 1(i) check the block if the report filed is an amendment and indicate the number of the amendment on the line provided.

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Item No. 2. REPORTING DATES

(a) In Item 2(a), enter the date on which this report is completed by year, month and day. For example, April 2, 1978, would be entered as "Year /7/8/, Month /0/4/, Day /0/2/."

(b) In Item 2(b), enter the year and month for which this report is submitted.

Item No. 3, CERTIFICATION

o Enter the name and title of the individual designated by the company to sign the certification and the date of signing in the spaces provided on the form.

Item No. 4, CRUDE OIL RECEIPTS

o In lines 10109, 10119, 10209, 10219, 10229, 10239, 10259, 10269, 10279, 10289, 10299, 10309, 10319, and 19399, enter in Column (D) in the appropriate category and line number, the actual barrels of crude oil receipts received for your account and received for processing for your account by other refiners for the reporting period. Enter the receipts processed at your account for non-refiners if an estimate of cost can be provided.

o In lines 10109, 10119, 10209, 10219, 10229, 10239, 10259, 10269, 10279, 10289, 10299, 10309, 10319 and 10399, enter in column (E), in the appropriate category and line number, the total cost of the volume received and listed in column (D). Cost includes any cost assciated with the delivery of crude oil to the refinery, including transportation. Do not include prior month cost adjustments or the entitlement dollar effect.

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- In lines 10109, 10119, 10219, 10229, 10239, 10259, 10269, 10279, 10289, 10299, 10309, 10319, and 10399, enter in Column (F) in the appropriate category and line number, the weighted average cost per barrel. This amount should be calculated by dividing the total cost in Column (E) by the total volume in Column (D). When dividing, round out to the nearest dollar and/or cent.

- In line 10109, report the volume, cost, and weighted average cost all old oil including the California Heavy Old Oil.

- In line 10119, report the volume, cost, and weighted average cost of only California Heavy Old Oil which should be included in Old Oil (line 10109) and on page 6 (Item 9) of the ERA-49.

- In line 10259, report the volume, cost, and wieghted average cost of California ANS Oil (i.e., physical ANS Oil received into refineries located in California) which should also be reported on page 6 (Item 10) of the ERA-49.

- In line 10309, Column (D), enter the total volume in actual barrels, of imported crude oil received during the reporting period. For refiners required to file transfer pricing report froms under 10 CFR 212.84, costs of imported crude oil shall be as reported on that form.

- In line 10309, Column (E), enter the total cost of the imported crude oil received and listed in Column (D).

- In line 10309, Column (F), enter the weighted average cost per barrel of the imported crude oil received and listed in Column (D). This amount may be calculated by dividing the total cost in line 10309 Column (E) by the total volume in line 10309, Column (D).

- In line 10319, report the volume, cost and wieghted average cost of California Imported Oil (i.e., physical Imported Oil received into refineries located in California) which should also be reported on page 6 (Item 11) of the ERA-49.

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Item No. 5, OLD CRUDE OIL RECEIPTS

- In Line 20119, Column (C), enter the total volume of old crude oil, in actual barrels, received for your account at own refineries for the reporting period.

- In line 20129, Column (C), enter the total volume of old crude oil, in actual barrels, received for processing at own refineries for non-refiners for the reporting period.

- In lines 20131 through 20138, Column (A), enter the company short name of other refiners who received old oil for processing for your account during the reporting period. Use the name of the refiner that appears in the official list of participants. Enter in Column (B) the volume of old oil, in actual barrels, received for your account by each refiner listed.

- In line 20139, Column (C), enter the total volume of old oil, in actual barrels, received for processing for your account by other refiners. This number is the total of lines 20131(B) through 20138(B) and any attached continuation sheets.

- In lines 20199, Column (D), enter the total receipts of old oil for the reporting period. Calculate this volume by adding the volumes in Column (C) for lines 20119, 29129, and 20139.

Adjustments

- In line 20219, Column (C), enter the volume of total adjustments, in actual barrels, to receipts of old oil for your own account at your own refineries during the reporting period. If the adjustment is negative, indicate with a minus sign in the left most position of the field and zero fill. Do not include corrections resulting from internal errors.

- In lines 20229, Column (C), enter the volume of total adjustments, in actual barrels, to receipts of old oil for non-refiners at your refineries. If the adjustment is negative, indicate with a minus sign. Do not include corrections resulting from internal errors.

- In line 20239, Column(C), enter the volume of total adjustments, in actual barrels, to receipts of old oil for your account at other refineries. If the adjustment is negative, indicate with a minus sign. Do not include corrections resulting from internal errors.

- In line 20299, Column (D), enter the volume, in actual barrels, of the total adjustments in lines 20219 through 20239. If the total adjustment is negative, indicate with a minus sign.

- In line 20399, Column (D), enter the volume, in actual barrels, of the total adjusted monthly receipts for the reporting period. Calculate this volume by adding line 20199, Column (D) to the volume in line 20299, Column (D). If the total adjusted monthly receipts are negative, indicate with a minus sign.

Item No. 6, UPPER TIER OIL RECEIPTS

- Those instructions detailed under Item No. 5, OLD CRUDE OIL RECEIPTS, also apply to Upper Tier Oil Receipts with the exception to the change in crude oil category and the first digit of line number. Please refer to Item No. 5 instructions when completing this Item.

Item No. 7, RUNS TO STILLS

- For Own Account at Own Refineries

  In line 40119, Column (C), enter, in actual barrels, the total volume of crude oil processed for your account at your own refineries during the reporting period.

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- For Own Account at Other Refineries

  In lines 40131 through 40138, Column (A), enter the company short name of other refiners whose refineries processed crude oil for your account during the reporting period. Use the company short name of the refiner that appears in the Entitlement Notice. In Column (B), enter for each refiner named the volume of crude oil processed, in actual barrels, during the reporting period.

- In line 40139, Column (C) enter the total volume of crude oil processed at other refineries. This figure will be the total of lines 40131, Column (B) through 40138, Column (B), and any attached continuation sheets.

- In line 40189, Column (D), enter the total volume of crude oil processed, in actual barrels, for the reporting firm's own account. Calculate the total by adding the volume in line 40119, Column (C) to the volume in line 49139, Column (C).

- For Non-refiners at Own Refineries

  In line 40129, Column (C), enter the total volume, in actual barrels, of crude oil processed for all non-refiners during the reporting period.

- Exports of Refined Petroleum Products and Residual Fuel Oil

  In line 40159, Column (C), enter the total volume in barrels of refined petroleum products (excluding refined lubricating oils and bunker C and Navy special fuel oils, which are sold for use as a marine fuel on a voyage departing from a U. S. port, but including residual fuel oil) refined and exported by you, or sold by you to a domestic purchaser certifying the product for export. The effective inclusion date of residual fuel oil in this item was April 1, 1976. Do not make corrections to reported volumes of residual fuel oil in this item if errors occurred prior to April 1, 1976.

- Total Runs to Stills

  In line 49199, Column (D), enter the total volume of crude runs to stills, in actual barrels, during the reporting period. Calculate this volume by adding the volume in line 40119, Column (C) to the volume in line 40139, Column (C) to the volume in line 40129, Column (C) and subtracting any exports of refined petroleum products (excluding refined lubricating oils but including residual fuel oil), line 40159, Column (C).

- Volumes (excluding processing agreements) not qualifying for the Small Refiner Bias.

  In line 40399 Column (C), enter the total volume of crude oil not qualifying for the Small Refiner Bias. Do not include processing agreement volumes.

- For Other Refiners at Own Refineries

  In lines 40141 through 40148 Column (A), list the company short names of other refiners for whom the reporting firm processed crude oil during the reporting period. Use the company short name of the refiner that appears in the Entitlement Notice. In Column (B), enter the volume of crude oil processed, in actual barrels, for each other refiner listed.

- In line 40149, Column (C), enter the total volume of crude oil processed, in actual barrels, for other refiners. This entry will be the total of lines 40141, Column (B) through line 40148, Column (B) and any attached continuation sheets.

- Total for Others

  In line 40179, Column (D), enter the total volume of crude oil processed, in actual barrels, for others by the reproting firm. This volume may be calculated by adding the volume in line 40129, Column (C) to the volume in line 40149, Column (C).

Item No. 8, RESIDUAL FUEL OIL (OPTIONAL)

- This item is to be completed only by those reporting firms producing residual fuel oil for sale in the

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BOM East Coast Refining District. The provisions of 10 CFR 211.67(d)(4) do not apply to the first 5000 barrels per day of residual fuel oil production for sale in the BOM East Coast Refining District. However, reporting of volumes of less than 5000 barrels per day is required.

A. For domestic refiners that sell residual fuel oil in the Bureau of Mines East Coast Refining District, enter on Line 50199 the total volume of residual fuel oil sales in or into the Bureau of Mines East Coast Refining District during the reporting period. Do not include any production of residual fuel oil that was entered as an export in Part 7, Line 40159.

B. Enter on Line 50399 the average volume of residual fuel oil per day for sale in or into the Bureau of Mines East Coast Refining District. This volume may be calcualted by dividing the number of barrels on Line 50199 by the number of calendar days in the reporting period.

ITEM NO. 9, CALIFORNIA HEAVY OLD OIL RECEIPTS

- In line 60119, Column (C), enter the total volume of California heavy old crude oil, in actual barrels, received for your account at own refineries for the reporting period.

- In line 60129, Column (C), enter the total volume of California heavy old crude oil, in actual barrels, received for processing at own refineries for non-refiners for the reporting period.

- In line 60139, Column (C), enter the total volume of California heavy old oil, in actual barrels, received for processing for your account by other refiners.

Adjustments

- In line 60219, Column (C), enter the volume of California heavy old adjustments, in actual barrels, to receipts of oil for your own account at your own refineries

during the reporting period. If the adjustments is negative, indicate with a minus sign in the left most position of the field and zero fill. Do not include corrections resulting form internal errors.

- In line 60399, Column (D), enter the volume, in actual barrels, of the total adjusted monthly receipts for the reporting period.

ITEM NO. 10, CALIFORNIA ANS OIL RECEIPTS

- In line 61119, Column (C), enter the total volume of California ANS crude oil, in actual barrels, received for your account at own refineries for the reporting period.

- In line 61129, Column (C), enter the total volume of California ANS crude oil, in actual barrels, received for processing at own refineries for non-refiners for the reporting period.

- In line 61139, Column (C), enter the total volume of old oil, in actual barrels, received for processing for your account by other refiners.

Adjustments

- In line 61219, Column (C), enter the volume of total adjustments, in actual barrels, to receipts of California ANS crude oil for your own account at your own refineries during the reporting period. If the adjustment is negative, indicate with a minus sign in the left most position of the field and zero fill. Do not include corrections resulting from internal errors.

- In line 61399, Column (D), enter the volume, in actual barrels, of the total adjusted monthly receipts for the reporting period.

ITEM NO. 11, CALIFORNIA IMPORTED OIL RECEIPTS

- In line 62119, Column (C), enter the total volume of California imported crude oil, in actual barrels, received for your account at own refineries for the reporting period.

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- In line 62129, Column (C), enter the total volume of California imported crude oil, in actual barrels, received for processing at own refineries for non-refiners for the reporting period.

- In line 62139, Column (C), enter the total volume of Calfornia imported oil, in actual barrels, received for processing for your account by other refiners.

- In line 62219, Column (C), enter the volume of total adjustments, in actual barrels, to receipts of California imported oil for your own account at your own refineries during the reporting period. If adjustment is negative, indicate with a minus sign in the left most position of the field and zero fill. Do not include corrections resulting from internal errors.

- In line 62399, Column (D), enter the volume, in actual barrels, of the total adjusted monthly receipts for the reporting period. If the total adjusted monthly receipts are negative, indicate with a minus sign.

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