DOCUMENTATION FOR THE HUNGARY REFINED PRODUCT PRICING MODEL

Emergency Energy Program
for Eastern and Central Europe

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In December 1990 the U.S. Agency for International Development organized an Emergency Energy Program to assist the countries of eastern Europe in improving the energy efficiency of their industrial plants and refineries, in rationalizing and reforming their energy price systems, and in improving their oil purchasing techniques. Assistance programs for Poland, Czechoslovakia, Hungary, Romania, Bulgaria, and Yugoslavia were established.

One of the objectives of the Emergency Energy Program is to support energy price reform. By helping the eastern European democracies rationalize and reform their energy price systems the United States can help them make a transition from centrally planned economies to market economies. The purpose of the energy price reform component in these countries is to support country efforts to rationalize and reform their energy price systems, with particular focus on petroleum prices.

The emergency energy program was established at the end of 1990, following the oil price spike associated with the loss of Iraqi and Kuwaiti oil supplies, and following the Soviet Union's announcement that eastern European countries would have to pay for soviet oil and gas supplies with hard currency, beginning January 1, 1991. At this time it was clear that Soviet oil production was declining and therefore Soviet oil exports were expected to decline. In this context the energy price reform component was given a particular focus on petroleum prices.

Activities under the Energy Price Reform component of the Emergency Energy Program in Hungary were managed by RCG/Hagler, Bailly, inc., a management and technical consulting firm. To provide MOL Ltd, the state-owned oil company, with an analytical tool for understanding the relationships between petroleum prices, customer demand for refined products, and refinery utilization, the project team in Hungary transferred a refined product pricing model to MOL. Once the usefulness of the model had been discussed with oil company staff and the likely users of the model had been identified, the task of adapting the model to Hungary's needs and transferring it to MOL was conducted by Donald Hertzmark, under a subcontract to RCG/Hagler, Bailly. The users of the refined product model are senior MOL staff involved in management of refining operations, corporate planning, and economic analysis.

The project team conducted its initial mission to Hungary in March 1991. At that time the Hungarian oil and gas industry was controlled by OKGT, a "trust" which was managed by the Ministry of Industry and Trade and acted as a holding company for various state-owned enterprises. Although petroleum product prices were decontrolled on January 1, 1991 and foreign oil companies were given an opportunity to market petroleum products in competition with OKGT, in the first few months of 1991 OKGT had no experience with marketing

products in a competitive setting. Analytical techniques for assessing the impact of changes in product prices on domestic demand and on crude oil netback values were unfamiliar to OKGT staff. The refined product pricing model provided an analytical tool to help OKGT staff address these issues.

On July 1, 1991 the gas distribution companies of OKGT were spun off and on October 1, 1991 the assets of the remaining nine subsidiaries were transferred to a new corporation called MOL Ltd. Transfer of the model was completed in October 1991.

This report provides documentation for the model, in two parts:

- "the Refined Product Pricing Model: Description and Outline" explains the potential uses of the model and the types of forecasting and planning issues it can be used to address.

- "the Hungary Refined Product Pricing Model: User Guide and Introduction" describes the menus available to the user and the steps required to do a set of calculations.

A copy of the model has been provided to AID's Bureau for Europe, Office of Development Resources, Energy and Infrastructure Division.

The Refined Product Pricing Model: Description and Outline

Oil company executives and energy policymakers will often wish to know how various oil pricing systems will affect the financial health of the refinery companies and the fiscal health of the government. A simple tool exists to assist in calculating these impacts as well as short-to-medium term forecasts of refined oil product demand.

The model that is used in this instance was developed by the author in cooperation with the Harvard Institute for International Development in 1988-89. This model contains modules to estimate refined oil product demand, taxes, and refining costs that are specific to a particular country. However, the model can be modified to reflect the particulars of any particular refining and fiscal setup. Once the model is adapted to a particular country, it can be used easily and quickly to project a number of key oil sector pricing impacts. These impacts may include:

- Refined oil product demand for the short-to-medium terms;
- Crude oil input costs and netback values;
- Net tax revenues from oil product sales;
- Effectiveness of various oil pricing and taxation schemes for demand stabilization or stimulation;
- Refining costs;
- Demand for crude oil imports;
- Demand for refined product imports;
- Availability of refined products for export.

The refined product pricing model uses commercial computer software to model the impacts of changes in key economic and financial parameters on the economy of Hungary and on the financial health of the nation's oil refiners. The model was developed to quickly and accurately provide energy analysts with key indicators of the economic and financial implications of alternative price and tax policies.

The model has four main components. These are:

1. An econometric model of refined oil product demand;

2. A refinery cost model;
3. A fiscal impacts model; and
4. A price and tax composition model.

Each of these components has a role in helping energy analysts define and understand the important elements of refined product pricing.

An Econometric Approach to Estimating the Demand for Refined Oil Products

A simple system of demand equations is used to project future demands for refined oil products. In keeping with microeconomic theory, this model uses a series of equations for each of the major fractions of the demand barrel to model the interaction of prices, economic growth, and the price and availability of substitutes. For example, the demand equation for gasoline will determine the quantity of gasoline demanded in the domestic and foreign (export) markets as a function of the following elements:

- gasoline prices (own price elasticity);
- diesel prices (cross-price elasticity);
- rates of change in crude and refined product prices;
- changes in national income (income elasticity of demand).

If other fuels compete with gasoline, say LPG or compressed natural gas (CNG), then the cross-price elasticities of these fuels would need to be estimated as well. For some other fuels, including industrial and utility boiler fuel, both natural gas and coal prices will influence the demand for heavy fuel oil.

Changes in oil prices, domestic oil product pricing régimes, national product growth rates, and prices of competing fuels will combine to give a projection of the demand for a given fuel in the future. **These estimated demands are not fuel requirements. Rather, they represent the quantities of each fuel that will clear the market at a given set of prices.** In other words, they represent market equilibrium quantities.

Refinery Cost Model

The costs of crude oil and the refining system must be covered if the oil refining company is to remain solvent. If the economic and financial costs of refining oil products are known, then the costs of refining the amount of oil demanded by the market can be calculated in a straightforward manner using an electronic spreadsheet.[1]

The volumes of refined oil products that are used in the cost calculation come directly from the demand estimation model. By comparing the value of the refined products that can be made from each barrel of crude oil, the model calculates the **crude oil netback value**, a key measure of refinery efficiency and pricing sufficiency.

A crude oil netback value that is less than the cost of the input crude indicates that the prices received by the refinery are not sufficient to permit the refinery to remain in operation. Conversely, a crude oil netback value that is greater than the cost of the input crude indicates that the pricing system permits the refiners to make a net operating margin.

Fiscal Impacts Model

Once the pricing régime has been chosen, the fiscal impacts model calculates the net inflow of funds to the government from taxes on or subsidies to refined oil products. As with the refinery cost model, this accounting can be a rather simple spreadsheet approach.

A variety of tax and subsidy instruments can be included in the model's accounting framework. There are several alternatives including:

- road user taxes for motor fuels;
- excise taxes on all fuels or on crude oil;
- price stabilization taxes to cushion the impacts of changes in crude oil or refined products prices on international markets.

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[1] These costs can be estimated from an audit of the refinery operations or from an optimization analysis of the refining system operation. Using the former set of prices gives an estimate of the *financial* impact while using the "shadow prices" from an optimization model will give *economic* impacts.

Pricing and Taxation Modal

A simple system of menus is used to allow the modeler to choose a variety of wholesale and retail oil product prices. These choices are simply transferred to the demand and fiscal impacts models and used in the subsequent calculations.

The Hungary Refined Product Pricing Model: User Guide and Introduction

Donald I. Hertzmark, October, 1991

(Note: this work has been funded by USAID as a part of its Emergency Energy Program for Eastern Europe under a contract to RCG/Hagler-Bailly.)

The Hungary Refined Product Pricing Model (HREF), uses commercial software tools to show the impacts of different refined product pricing policies on product demand, tax receipts, and refinery operations. HREF is currently available on three different software platforms, Quattro Pro©/Lotus 123© (any version), and Microsoft Excel© 3.0.[1] This user guide will focus on the Quattro/Lotus implementation of the model.

The model starts with the year 1990, displayed from historical data. Data on Hungary's economy, national income, inflation, exchange rates, are used as the basis of the economic growth and inflation scenarios that determine future income levels and exchange rates.

Data on the first two quarters of 1991 are treated as given with regard to prices and demand for refined products. The simulation part of the model starts with the third quarter of 1991 and extends by quarter through the end of 1996. At the present time, the uncertain nature of macroeconomic data in the country makes econometric projections of more than 4-5 years unsupportable in terms both of data and model structure. Once the Hungarian economy settles down a bit, the HREF structure can be used to project over periods as long as 7-8 years.[2]

Another limitation of the model is its use of quarterly reporting. Given better data on seasonal patterns of oil product demand and GDP, it will be desirable to shorten the calculation interval to a monthly basis.[3] Other items in the model's data will require some significant additional efforts before the model is fully operational. These include:

- Econometric estimates of demand for both major and minor refined oil products;
- Econometric demand estimation of the substitution between fuel oil, natural gas, and coal;

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1 The Excel version of the model works exactly like the Lotus version but is more easily expanded and modified.

2 It is suggested that any such expansion be undertaken on the Excel version of the model since the Lotus version may become intractable and unjustifiably slow to operate in Lotus with such a degreee of expansion. In addition, it is far simpler to effect the requisite modification of the program in Excel than in Lotus.

3 Such a quadrupling of the number of entries would approximately double the amount of computer memory required to run HREF.

- Demand curve estimates for minor products including LPG and petrochemical naphthas;
- Fuller characterization of the national refinery and refined product transport and distribution system;
- Fuller characterization of import and excise taxes on gasoline and other refined products.

Operating the Model

The model opens with a menu for the main user-selected options. This menu and those that follow are shown on pages 5-11 as they appear on the computer screen in Lotus 123 and are explained in the Table below.[4] The choices in the initial menu are:

HREF: Initial Menu

Command	Action	Notes
Parameters	Goes to set of menus to modify model parameters or data inputs	Use this menu for most data entry
Product Sales	View net surplus or deficit on product sales account	Shows whether refined product sales are profitable for OKGT and for government
Netback	View crude oil netback value associated with chosen parameters	Gives a basic measure of price sufficiency and refinery/marketing operational efficiency
Recalc	Recalculates model with new parameters	Default setting is manual recalculation to speed up model use
Move	Exits from menu system	Useful for modifying user code or basic data
Print	Exits from menu system	Future versions of HREF will make use of this menu
Save	Saves a particular version of the model to disk	Menu prompts the user for a version name different from main model name
Quit	Exits model and 123 to DOS	

Note: Throughout the menuing system, the *Return* command will always put the user back to the main *Parameters* menu.

Once the user is familiar with navigating the initial menu, he or she can activate the next set of menus by pressing <Enter> when the highlight is on the *Parameters* key.[5] Choosing the Parameters menu item activates the parameter

[4] In both Quattro Pro and Excel, the menu choices will appear vertically in boxes rather than horizontally across the top of the screen. The sample menus are from Lotus only.

menus, the main menuing system of the model.[6] The parameter menu will also show the status of the key parameters of the model so that the user can decide which parameters, if any, require new input.

The key parameters of the model are:

- The price of crude oil and its evolution over the period of the simulation;
- The pattern of refined oil product prices;
- The growth of the economy, and inflation, exchange rates and taxes on refined products;
- The pattern of output from the nation's refineries; and
- The level and structure of refined product taxation.

HREF: Parameter Menu Choices

Command	Action	Notes
Oil Prices	User chooses oil price for start of simulation period in III91	User can choose from pre-set menu or can input any other figure (in $/barrel)
Oil Price Growth	User chooses path of oil price evolution from menu	Choices include real growth, inflation adjustment and "shock" and subsequent decline scenario
Economic Growth	User sets growth rates for economy and sets tax parameters	Tax menu is distinct from economic growth parameters
Dom Oil Price	User sets refined product pricing rules	Allows the user to choose from a number of domestic product pricing options that range from a fully controlled price environment to one that depnds entirely on market prices in the main refining centers of Europe
Return	Returns user to initial menu	

The first parameter menu allows the user to set the price of crude oil at the beginning of the simulation period. A number of fixed choices are given along with the option to pick some other value for the 1991 crude oil price. The second menu in this group allows the user to set the type and path of crude oil price growth over the period that the model simulates. A number of options are given, including adjustment for domestic inflation, adjustment for world inflation, real price growth, nominal price stability, and a price spike with a subsequent decline. The latter scenario is used largely to test the im-

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[5] Experienced users of 123 or Quattro will know that items can be selected simply by pressing the first letter of that selection. In a number of menus, though, there is more than one choice that begins with the same letter so caution is advised.

[6] From outside the menu system, this menu can be invoked at any time by pressing Alt-M.

pacts of sudden crude price runups on the profitability of the refinery and on the change in net tax receipts from refined product sales.

The economic growth menu allows the user to pick the key economic growth rate and inflation parameters for the simulation period. Given the instability of the Hungarian economy at present the user can enter inflation and economic growth information for two periods, 1991-1992 and 1993-1996. The tax manu is a submenu of the economic growth menu and allows the user to set key tax parameters on refined oil products.

The other menu of note is the Domestic Pricing menu which allows the user to specify the formula which is used to set domestic refined rpoduct prices.

HREF: Economic Growth Menu

Command	Action	Notes
1992-1993	Pick real economic growth rate for 1992-1993	Model to quarterly growth rate and adjusts for inflation
1994-1996	Pick real economic growth rate for 1994-1996	
Taxes	Go to taxation menu	
Inflation	Go to inflation menu	
Return	Return to main menu	

Note that negative numbers can be used for real economic growth rates or for inflation rates. Enter economic growth rates in ***annual*** 0.xxx format.

Once the user has attained a degree of familiarity with the model, choosing key parameters will become essentially automatic. the taxation menu allows the user to establish the basic tax rates for the key refined oil products. It is a a relatively simple matter to add new tax rates in the future for such additional products as industrial and utility fuel oils.

HREF: Tax Menu Choices		
Command	**Action**	**Notes**
VAT	Currently Inactive in HREF	Can be used to specify Value Added Tax
ROAD TAX - Mogas	User sets road tax for gasoline in Ft/tonne	Assumes same level of road tax for all gasolines
EXCISE - Mogas	User sets excise tax levels for gasolines	
ROAD TAX - Diesel	User sets road tax for diesel in Ft/tonne	applies only to automotive diesel (ADO)
EXCISE - Diesel	User sets excise tax levels for gasolines	
Inflation	User decides whether to adjust taxes for inflation	Adjusting taxes for inflation keeps real value of taxes constant. Otherwise, real value of tax receipts will fall leading to loss of revenues and falling real price of the refined product subject ot such taxation.
No Inflation	Keeps taxes at constant nominal level	
Return	Returns user to initial menu	
Note that a marketing margin is also used in the model and can be adjusted by the user for all of the refined products.		

The Tax menu can be expanded once there are additional categories of excise and other taxes. One type of tax to consider is one which fills the coffers of an oil price stabilization fund, a fund to buffer the wholesale market from price spikes in the very short term. Such a buffer fund tax would need to be variable and rules worked out concerning its deployment. However, the concept has been used in the past in a number of countries and can be made workable at a relatively low cost.

The next submenu in the economic growth menu doncerns the rate of inflation in the economy as a whole. the user is permitted to choose inflation rates for two periods, 1991-1992, and 1993-1996. The demarcation between the periods is somewhat arbitrary but the purpose is to allow the user to distinguish between the near term when high inflation is expected to result from macroeconomic instabilty and the medium term when the stabilization of the inflation rate is expected to accompany and even to lead renewed economic growth.

HREF: Inflation Menu Choices

Command	Action	Notes
1991-1992	Set annual inflation rate for period	
1993-1996	Set annual inflation rate for period	
Return	Returns user to initial menu	

Note that inflation rates should be entered on an ***annual*** basis in the 0.xxx format. The program converts these values to quarterly rates.

HREF: Domestic Pricing Menu Choices

Command	Action	Notes
Flexible	Adjusts **current** system of domestic prices to changes in real price of world oil	Relies on previously existing set of prices for relative price structure
Inflation Adjusted	Adjusts **current** system of domestic prices for domestic inflation only	
No Change	No adjustments to current domestic system for either inflation or real oil price changes	Tests financial and product demand impacts of current pricing system
Ex Rotterdam	Bases domestic *ex refinery* prices on crude oil plus refining margins for each major product	Tests the impacts of fully decontrolled or formula set prices
Part Decontrol	Similar to *ex Rotterdam* scenario except one product can remain controlled	
MoF	User sets refined product prices according to whatever rules the user wants	Tests the impacts of creating another pricing regulation system relying on government decisions rather than market forces
Return	Returns user to initial menu	

The final menuing system that is used in the HREF model allows the user to modify the refinery output slate and to test the effects of improved yields of gasolines and middle distillates on fuel netbacks, net foreign trade in refined products and in tax receipts. This menu is invoked by pressing Alt-R.

HREF: Refining Menu Choices		
Command	**Action**	**Notes**
Current	Keeps refinery output at current levels	
Low	Choose small changes in patterns of product yields	Reflects minimal debottlenecking of refineries to increase light end ouput and reduce losses. No new process units.
High	Choose larger changes in patterns of refined product yields	Additions of new process units at refineries to increase conversion of HFO and HGO to gasolines and middle distillates. Implemented over one year period.
Return	Returns user to initial menu	

Other menus in the model are not developed for use in the current version of the simulation. However, there are several additional capabilities that should be added to the model in the near future. These include: customized reporting, graphical displays of major results, and interfacing with demand optimization models.

```
J81: (F2) 'C/WWCTITLE                                                    MENU
ARAMETERS  PRODUCT SALES BALANCE  NETBACK  RECALC  MOVE  PRINT  SAVE  QUIT
ODIFY PARAMETERS OF THE MODEL
      AJ        AK        AL        AM        AN        AO        AP
1  C/WWCTITLE
2
3
4
5
6
7                              OKGT
8
9                    REFINED PRODUCT PRICING MODEL
0
1
2
3
4
5
6
7
8
9
0
7-Oct-9  03:51 PM                    CMD       CALC      NUM
```

AJ105:
OIL PRICES OIL PRICE GROWTH ECON. GROWTH DOM. OIL PRICE RETURN MENU

	AJ	AK	AL	AM	AN	AO	AP
105							
106			CURRENT SCENARIO USES:				
107							
108	CRUDE PRICE IN 1991 =				$20.00		
109	1992-1993 REAL ECONOMIC GROWTH RATE =				-2.5% P.A.		
110	1994-1996 REAL ECONOMIC GROWTH RATE =				6.5% P.A.		
111	RATE OF CRUDE OIL PRICE INFLATION =				WORLD INFLATION		
112	(HARD CURRENCY BASIS)						
113	VAT RATE =				10.0%		
114	DOMESTIC PRICING SCENARIO =				EX ROTTERDAM		
115	GASOLINE ROAD TAXES (FT/TONNE)				15000		
116	GASOLINE EXCISE TAXES (FT/TONNE) =				5000		
117	DIESEL ROAD TAXES (FT/TONNE)				12500		
118	DIESEL EXCISE TAXES (FT/TONNE) =				12548		
119	DOMESTIC PRICE INFLATION (%/YR, 1991-2)				25.0%		
120	DOMESTIC PRICE INFLATION (%/YR, 1993-6)				15.0%		
121	REFINERY SLATE MODIFIED ?				MAX. UPGRADING OF CURRENT UNITS		
122							
123							
124							

07-OCT-91 04:10 PM CMD CALC NUM

```
AJ105:                                                              MENU
1992-1993  1994-1996  TAXES  INFLATION
REAL ECONOMIC GROWTH FOR 1992-1993 IN % PER YEAR
       AJ         AK         AL         AM         AN         AO         AP
105
106            CURRENT SCENARIO USES:
107
108 CRUDE PRICE IN 1991 =                          $20.00
109 1992-1993 REAL ECONOMIC GROWTH RATE =           -2.5%  P.A.
110 1994-1996 REAL ECONOMIC GROWTH RATE =            6.5%  P.A.
111 RATE OF CRUDE OIL PRICE INFLATION =       WORLD INFLATION
112  (HARD CURRENCY BASIS)
113 VAT RATE =                                       10.0%
114 DOMESTIC PRICING SCENARIO =               EX ROTTERDAM
115 GASOLINE ROAD TAXES (FT/TONNE)                  15000
116 GASOLINE EXCISE TAXES (FT/TONNE) =               5000
117 DIESEL ROAD TAXES (FT/TONNE)                    12500
118 DIESEL EXCISE TAXES (FT/TONNE) =                12548
119 DOMESTIC PRICE INFLATION (%/YR, 1991-2)          25.0%
120 DOMESTIC PRICE INFLATION (%/YR, 1993-6)          15.0%
121 REFINERY SLATE MODIFIED ?          MAX. UPGRADING OF CURRENT UNITS
122
123
124
7-OCT-91  04:11 PM                    CMD        CALC       NUM
```

```
AJ105:                                                              MENU
/AT ROAD TAX-M EXCISE-M ROAD TAX-D EXCISE-D INFLATION NO INFLATION RETURN
SETS VALUE ADDED TAX RATE FOR YEARS FOLLOWING 1991
       AJ         AK         AL         AM         AN         AO         AP
105
106            CURRENT SCENARIO USES:
107
108 CRUDE PRICE IN 1991 =                          $20.00
109 1992-1993 REAL ECONOMIC GROWTH RATE =           -2.5%  P.A.
110 1994-1996 REAL ECONOMIC GROWTH RATE =            6.5%  P.A.
111 RATE OF CRUDE OIL PRICE INFLATION =        WORLD INFLATION
112  (HARD CURRENCY BASIS)
113 VAT RATE =                                       10.0%
114 DOMESTIC PRICING SCENARIO =                EX ROTTERDAM
115 GASOLINE ROAD TAXES (FT/TONNE)                  15000
116 GASOLINE EXCISE TAXES (FT/TONNE) =               5000
117 DIESEL ROAD TAXES (FT/TONNE)                    12500
118 DIESEL EXCISE TAXES (FT/TONNE) =                12548
119 DOMESTIC PRICE INFLATION (%/YR, 1991-2)          25.0%
120 DOMESTIC PRICE INFLATION (%/YR, 1993-6)          15.0%
121 REFINERY SLATE MODIFIED ?                  MAX. UPGRADING OF CURRENT UNITS
122
123
124
7-OCT-91  04:11 PM                        CMD       CALC      NUM
```

```
J105:                                                                  MENU
991-1992  1993-1996
NNUAL INFLATION RATE FOR 1991-1992
      AJ        AK        AL        AM        AN        AO        AP
05
06            CURRENT SCENARIO USES:
07
08 CRUDE PRICE IN 1991 =                          $20.00
09 1992-1993 REAL ECONOMIC GROWTH RATE =           -2.5%  P.A.
10 1994-1996 REAL ECONOMIC GROWTH RATE =            6.5%  P.A.
11 RATE OF CRUDE OIL PRICE INFLATION =        WORLD INFLATION
12  (HARD CURRENCY BASIS)
13 VAT RATE =                                       10.0%
14 DOMESTIC PRICING SCENARIO =                Ex ROTTERDAM
15 GASOLINE ROAD TAXES (FT/TONNE)                  15000
16 GASOLINE EXCISE TAXES (FT/TONNE) =               5000
17 DIESEL ROAD TAXES (FT/TONNE)                    12500
18 DIESEL EXCISE TAXES (FT/TONNE) =                12548
19 DOMESTIC PRICE INFLATION (%/YR, 1991-2)          25.0%
20 DOMESTIC PRICE INFLATION (%/YR, 1993-6)          15.0%
21 REFINERY SLATE MODIFIED ?                  MAX. UPGRADING OF CURRENT UNITS
22
23
24
7-OCT-91  04:11 PM                      CMD       CALC      NUM
```

```
AJ105:                                                              MENU
5  17.5  20   5  30  OTHER
$/BBL IN 1988
       AJ        AK        AL        AM        AN        AO        AP
105
106           CURRENT SCENARIO USES:
107
108 CRUDE PRICE IN 1991 =                          $20.00
109 1992-1993 REAL ECONOMIC GROWTH RATE =           -2.5%  P.A.
110 1994-1996 REAL ECONOMIC GROWTH RATE =            6.5%  P.A.
111 RATE OF CRUDE OIL PRICE INFLATION =        WORLD INFLATION
112  (HARD CURRENCY BASIS)
113 VAT RATE =                                       10.0%
114 DOMESTIC PRICING SCENARIO =                EX ROTTERDAM
115 GASOLINE ROAD TAXES (FT/TONNE)                  15000
116 GASOLINE EXCISE TAXES (FT/TONNE) =               5000
117 DIESEL ROAD TAXES (FT/TONNE)                    12500
118 DIESEL EXCISE TAXES (FT/TONNE) =                12548
119 DOMESTIC PRICE INFLATION (%/YR, 1991-2)          25.0%
120 DOMESTIC PRICE INFLATION (%/YR, 1993-6)          15.0%
121 REFINERY SLATE MODIFIED ?          MAX. UPGRADING OF CURRENT UNITS
122
123
124
7-OCT-91  04:10 PM                    CMD       CALC      NUM
```

```
AJ105:                                                          MENU
WORLD INFLATION  3% REAL  SHOCK  NO CHANGE  RESTORE

      AJ        AK        AL        AM        AN        AO        AP
105
106          CURRENT SCENARIO USES:
107
108 CRUDE PRICE IN 1991 =                          $20.00
109 1992-1993 REAL ECONOMIC GROWTH RATE =           -2.5%  P.A.
110 1994-1996 REAL ECONOMIC GROWTH RATE =            6.5%  P.A.
111 RATE OF CRUDE OIL PRICE INFLATION =      WORLD INFLATION
112  (HARD CURRENCY BASIS)
113 VAT RATE =                                       10.0%
114 DOMESTIC PRICING SCENARIO =              EX ROTTERDAM
115 GASOLINE ROAD TAXES (FT/TONNE)               15000
116 GASOLINE EXCISE TAXES (FT/TONNE) =            5000
117 DIESEL ROAD TAXES (FT/TONNE)                 12500
118 DIESEL EXCISE TAXES (FT/TONNE) =             12548
119 DOMESTIC PRICE INFLATION (%/YR, 1991-2)       25.0%
120 DOMESTIC PRICE INFLATION (%/YR, 1993-6)       15.0%
121 REFINERY SLATE MODIFIED ?          MAX. UPGRADING OF CURRENT UNITS
122
123
124
7-OCT-91  04:10 PM                    CMD       CALC      NUM
```


-20-

```
AJ105:                                                              MENU
FLEXIBLE  INFLATION ADJ.  NO CHANGE  EX ROTTERDAM  PART DECONTROL  MOF
ADJUSTS TO CHANGES IN REAL OIL PRICES
        AJ          AK          AL          AM          AN          AO          AP
105
106             CURRENT SCENARIO USES:
107
108 CRUDE PRICE IN 1991 =                                  $20.00
109 1992-1993 REAL ECONOMIC GROWTH RATE =                   -2.5%  P.A.
110 1994-1996 REAL ECONOMIC GROWTH RATE =                    6.5%  P.A.
111 RATE OF CRUDE OIL PRICE INFLATION =          WORLD INFLATION
112  (HARD CURRENCY BASIS)
113 VAT RATE =                                              10.0%
114 DOMESTIC PRICING SCENARIO =                  EX ROTTERDAM
115 GASOLINE ROAD TAXES (FT/TONNE)                       15000
116 GASOLINE EXCISE TAXES (FT/TONNE) =                    5000
117 DIESEL ROAD TAXES (FT/TONNE)                         12500
118 DIESEL EXCISE TAXES (FT/TONNE) =                     12548
119 DOMESTIC PRICE INFLATION (%/YR, 1991-2)               35.0%
120 DOMESTIC PRICE INFLATION (%/YR, 1993-6)               15.0%
121 REFINERY SLATE MODIFIED ?                MAX. UPGRADING OF CURRENT UNITS
122
123
124
07-OCT-91  04:13 PM                          CMD        CALC      NUM
```

```
BN65:                                                                    MENU
CURRENT  LOW  HIGH  RETURN
PRESENT OUTPUT SLATE
        BK          BL          BM          BN          BO          BP          BQ
65
66  /XMBK68~
67
68  CURRENT       LOW         HIGH    RETURN
69  PRESENT OUMINIMUM FEMAXIMUM FERETURN TO THE PARAMETERS MENU
70  {LET BP70,{LET BP70,{LET BP70,{BRANCH \M}                    1.10        1.20
71  {LET BP71,{LET BP71,{LET BP71,1.1}~{LET BQ71,1.125           1.10        1.13
72  {LET BP72,{LET BP72,{LET BP72,1.1}~{LET BQ72,1.15}           1.10        1.15
73  {LET BP73,{LET BP73,{LET BP73,1.05}~{LET BQ73,1.15           1.05        1.15
74  {LET BP74,~{LET BP74~{LET BP74,.85}~{LET BQ74,.65}           0.85        0.65
75  {LET BP75,{LET BP75,{LET BP75,.75}~{LET BQ75,.65}            0.75        0.65
76  {LET BP76,{LET BP76,{LET BP76,1.15}~{LET BQ76,1.25           1.15        1.25
77  {LET BP77,{LET BP77,{LET BP77,.85}~{LET BQ77,.75}            0.85        0.75
78  {LET BP78,{LET BP78,{LET BP78,.75}~{LET BQ78,0.65}           0.75        0.65
79  {LET AN121{LET AN121{LET AN121,MAX. UPGRADING OF CURRENT UNITS}~
80  /XQ~        /XQ~        /XQ~
81
82
83
84
7-OCT-91  04:18 PM                          CMD         CALC        NUM
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