

# Shipping Inventory Forecasts

To plan shipment of products and to schedule such shipments, the marketing department needs to know estimates of each product group's production rate and the inventory available for shipping. This information is required several weeks in advance of the actual shipment, for product sale and chartering vessels to transport products. Also, it is important to maintain the inventory level of each product group within the ullage available to the group in the refinery tankage. This is done by timely transport of products from the refinery tanks. Failure of timely off-take can cause a crisis situation in the refinery, forcing cutdown of crude throughput, shutdown or feed reduction in some downstream units, or dumping distillates into fuel oil.

To provide the marketing department with an accurate inventory forecast of all product groups, every week, the refinery estimates the production rate of each product group and uses these to revise the inventory forecasts for the remaining period of the month

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### WEEKLY PRODUCTION ESTIMATES

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These estimates are done with a spreadsheet refinery model. Here various parameters, such as unit operating modes and blend components, can be controlled more closely than in a linear programming (LP) model, which may require a major modeling effort to reflect the actual refinery situations. The information on the feed rates, operation modes of the units, product blending, and tank inventory levels can be constantly updated, and thus these hand estimates are more realistic than the LP solutions, which are price driven.

Every week the product requirements are revised and a new estimate prepared for the remaining period of the month, incorporating the latest

refinery information, such as unit throughputs, product qualities, product shipping schedule, and inventory. Also, product requirements or the specifications of a particular parcel may change, a ship may be delayed, or an important refinery unit have an unscheduled shutdown requiring revision in production estimates. If there is a major change in the normal running of refinery, such as shutting down of a key conversion unit, cut in crude rate, or any other cause that forces a significant change in the normal production rates of various product groups, a new estimate must be done to reflect these changes.

When a new estimate is made, the production rate estimate is revised. The revised production rate estimate is used for inventory forecasts for the remaining period. The production rate and inventory forecasts are updated every week.

The production rates and inventory forecasts are made for the following product groups, in a fuel refinery.

- Liquefied petroleum gas (LPG).
- Light straight run naphtha (LSR).
- Whole straight run naphtha (WSR).
- Gasolines (GASO).
- Kerosene and jet fuels (KERO).
- Automotive diesels (DSL).
- Fuel oil (FO).
- Asphalts (ASPH).

Production rates for the intermediate stocks are not generally required, as these are not exported.

## **REFINERY ESTIMATE SCHEDULE**

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The refinery estimates are revised every week for the remaining period of the month. For example, in a month, four estimates may be prepared as per the following schedule:

- First estimate: From day 1 to day 30, 30 days.
- Second estimate: From day 11 to day 30, 20 days.
- Third estimate: From day 18 to day 30, 13 days.
- Fourth estimate: From day 25 to 30, 6 days.

For the first estimate, the crude run and product grades to be made are as per the combined definitive operating plans (DOPs) of the participants. For the second estimate, the crude run is equal to the total DOP crude run minus the crude processed during the first 10 days of the month. The product target for the second estimate is the combined DOPs, plus any DOP revisions by the participants minus the product already made during the first period. Similarly, the targets for the third and fourth estimates are the parts of products still to be made.

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## PROCEDURE

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### SINGLE-OWNERSHIP REFINERIES

The procedure for establishing production rates in single-ownership refineries is straightforward. This consists of updating the refinery spreadsheet model with the latest data on available unit capacities, crude run rate, product blending, and the like. The model is run to establish refinery input and output balance. Refinery production rate estimate is used as a basis for inventory forecasts of various product groups.

### JOINT-OWNERSHIP REFINERIES

The procedure for establishing production rates in joint-ownership refineries is more complex and described in detail. Here, not only the refinery production rate is established but also the production rate for every product group is split between the participants to establish separate inventory forecasts for the two participants. Here again, the refinery spreadsheet model is used to estimate the refinery production rate.

Participants' submitted DOPs form the basis for splitting refinery production in a given period. This rough allocation is used to prepare estimates of inventory available to each participant for shipping its product.

At the start of every month, the refinery receives DOPs from both the participants, which list information about the crude throughput and the product slate of each participant. Based on this information, the refinery makes its own estimates of production of various products during the month.

## ALLOCATION OF DELTAS

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The delta between the combined DOPs of the participants and the refinery estimates, as per spreadsheet program, for each product group is examined to determine the cause of that delta and delta assigned to the participant that caused the delta. If no particular reason can be identified, the delta is allocated to the participants in the ratio of their crude run. Production of a participant is the sum of its DOP plus the allocated delta as follows:

$$\text{Participant production} = \text{participant DOP} + \text{delta}$$

The production rate is worked out by dividing the participant's production by the number of days for which the estimates are made. In this way, the production and thus production rate estimate of the refinery during the week is split between each participant's production rate for every product group.

For the allocation of deltas for various product grades, the concept of pseudoequivalencies is used, based on how the product is blended in the refinery. Pseudoequivalency is in terms of other product grades and process stocks. Important differences from the equivalencies used for product allocation are as follows:

- Pseudoequivalency is used here for the sole purpose of estimating the production rate in terms of balancing grades and process stocks instead of only in terms of balancing grades for equivalencies used in product allocation.
- As the sole purpose of these equivalencies is to investigate the effect on product grades inventories any effect on process stocks is ignored.

The following examples should clarify the use of these pseudoequivalencies.

### WSR (NAPHTHA)

The production of WSR in an estimate was 85 mb more than that listed in the combined DOPs. As no cause could be found for this additional

production, this is allocated to the participants in the ratio of each one's crude run as follows:

<b>PARTICIPANT</b>	<b>DOP, mb</b>	<b>ESTIMATES, mb</b>	<b>DELTA, mb</b>	<b>CRUDE RATIO</b>
AOC	839		71	0.8354
BOC	96		14	0.1646
<b>TOTAL</b>	<b>935</b>	<b>1020</b>	<b>85</b>	<b>1.0000</b>

### **GASOLINE GROUP DELTAS**

After an estimate, the total gasoline group delta between estimates and the DOPs was estimated as follows:

<b>GRADE</b>	<b>DELTA, mb</b>
I-387	25
I-390	24
I-395	0
I-397L	-105
I-397LL	30
<b>TOTAL GROUP</b>	<b>-16</b>

The cause of delta for certain grades could be identified, while for other grades, it could not be ascertained. In this case, delta is first allocated for grades for which the cause is known; the remaining delta is allocated to the participants in the ratio of their crude run.

### **Gasoline Grade 397L**

The delta between I-397L production and the combined DOPs is -105 mb. This delta is split between the participants in the ratio of their crude run:

<b>PARTICIPANT</b>	<b>CRUDE RATIO</b>	<b>DELTA, mb</b>
AOC	0.8354	-88
BOC	0.1646	-17
<b>TOTAL</b>	<b>1.0000</b>	<b>-105</b>

The I-397L blend contains 25% reformat (RON 95). Therefore, a -88 production change releases 22 mb reformat for AOC. Hence, AOC's gasoline allotment decreases by 22 mb while the reformat pool increases by the same amount. Similarly, BOC's gasoline pool decreases by 4 mb and the reformat pool increases by the same amount, as follows:

STOCK	AOC, mb	BOC, mb
I-397L	-22	-4
REFORMATE (RON 95)	22	4
TOTAL	0	0

### Gasoline Grade I-397LL

This grade is blended with 47% reformat and is made only for BOC. Extra production of 30 mb contains approximately 14 mb reformat, increasing the gasoline pool by that amount:

STOCK	AOC, mb	BOC, mb
I-397LL	0	14
REFORMATE (95RON)	0	-14
TOTAL	0	0

The remaining delta =  $-16 - (-22 - 4 + 14)$  or  $-4$  mb, which is allocated to the participants in their crude run ratio:

$$\text{AOC} = -3\text{mb}$$

$$\text{BOC} = 1\text{mb}$$

$$\text{AOC total delta} = (-22 - 3) = -25 \text{ mb}$$

$$\text{BOC total delta} = (-4 + 14 - 1) = 9 \text{ mb}$$

### FUEL OIL

Estimates show that production of I-961 (80cst) for AOC was 32 mb more than the DOP estimates. The effect of this delta on fuel

and diesel pools was determined as follows. The refinery blends this low viscosity fuel oil by cutting normal I-961 grade with I-888 diesel as follows:

GRADE	PRODUCT	VOLUME, mb	VISCOSITY BLEND INDEX
I-961	FUEL OIL	27.8	460
I-888	DIESEL	4.2	-30
I-961 (80 cst)	FUEL OIL	32.0	398

Production of an additional 32 mb I-961 (80 cst) for AOC increases its fuel oil by (32 - 27.8) or 4.2 mb and decreases diesel by 4.2 mb as shown next:

GRADE	GROUP	PRODUCTION, mb
I-961 (80 cst)	FUEL OIL	32.0
I-961	FUEL OIL	-27.8
I-888	DIESEL	-4.2
TOTAL		0

## DIESEL GRADES

In an estimate, the AOC production of diesel grade I-876 was increased by 79 mb to cover its lifting. Estimate its effect on AOC inventory.

The I-876 was blended in the refinery with I-888 diesel and I-440 to match the pour point of I-876 (21°F) as follows. Here, the I-876 delta is 79 mb.

GRADE	PRODUCT	VOLUME, mb	POUR INDEX
I-888	DIESEL	72.3	365
I-440	KEROSENE	6.7	46
I-876	DIESEL	79.0	338

The effect on the diesel and kerosene pool is as follows:

GRADE	GROUP	PRODUCTION, mb
I-876	DIESEL	79.0
I-888	DIESEL	-72.3
I-440	KEROSENE	-6.7
TOTAL		0

Here,

$$\begin{aligned} \text{AOC diesel pool} &= (79.0 - 72.3) \\ &= 6.7 \text{ mb} \end{aligned}$$

$$\text{AOC kerosene pool} = -6.7 \text{ mb}$$

### ASPHALT

In an estimate, production of asphalt was 10,000 barrels less for BOC due to lack of ullage. To estimate the effect of this change on other balancing-grade products the following the procedure was employed.

The delta of -10,000 bbl on asphalt production for BOC could be considered a blend of fuel oil and diesel, as per the asphalt equivalency, shown next:

GRADE	GROUP	VOLUME, mb	VISCOSITY BLEND INDEX
I-961	FUEL OIL	-17.6	460
I-888	DIESEL	7.6	-30
I-1138	ASPHALT	-10.0	832

As a result of this change, BOC gets +17.6 mb fuel oil and -7.6 mb diesel, as follows:

GRADE	GROUP	DELTA, mb
I-961	FUEL OIL	17.6
I-888	DIESEL	-7.6
I-1138	ASPHALT	-10.0
TOTAL		0



Examples of joint-ownership refinery weekly estimates, allocation of deltas, and determination of production rates during a month are shown in Tables 18-1 to 18-16. Table 18-1 shows the first refinery estimate and a comparison with combined participant DOPs and calculation of deltas. Table 18-2 show deltas by product groups. Table 18-3 shows the allocation of these deltas by participant, and Table 18-4 shows calculation of the production rate for all product groups based on the first estimate. Similar calculations are done for the second, third, and fourth estimates. Thus, production rates of various product groups are worked out for both the participants. In fact, the actual refinery production rate of various product groups has been split into the two participant's production rates. Whenever a new estimate is done, the new production rates replace the earlier ones in the refinery's inventory estimating program. Weekly estimates also ensure that crude run and product produced during the month is according to the refinery's DOP for that month.

## **INVENTORY AND ULLAGE FORECASTING SYSTEM (JOINT OWNERSHIP REFINERIES)**

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The inventory and ullage forecasting system (IUFS) is designed to provide information to the participants on their inventory and ullage situation up to 90 days ahead, to enable them to plan their product lifting schedule. Data on each product group are presented in a separate report. This is an on-line system in which participants can constantly update their shipping data, such as placing a new shipment, canceling an already-placed shipment, updating the estimated arrival time of expected shipments. The rest of the data are updated only by the refinery (see Tables 18-17 to 18-23).

The system presents estimates on the following, from present day to that 30–90 days ahead:

- The physical inventory of each saleable product group of the participants.
- The available inventory of each product group for shipment.
- The ullage available to each participant, for each product group, to further build their inventories for shipments.
- The estimated refinery production rate for every product group of the participants.

**Table 18-1**  
**Determination of Deltas between Refinery Estimates**  
**and Participants' DOPs, First Estimate (mb)**

	<b>AOC DOP</b>	<b>BOC DOP</b>	<b>COMBINED DOP</b>	<b>REFINERY ESTIMATE</b>	<b>DELTA</b>
<b>GRADE</b>					
I-150	20	0	20	20	0
I-201	0	0	0	0	0
I-210	839	96	935	1020	85
I-220	0	165	165	165	0
I-387	0	0	0	25	25
I-390	66	0	66	90	24
I-395	120	15	135	135	0
I-397LL	0	60	60	90	30
I-397L	266	11	277	172	-105
I-397R	54	15	69	69	0
I-398	36	0	36	46	10
I-400	200	0	200	200	0
I-411	8	0	8	8	0
I-419	137	0	137	238	101
I-440	371	171	542	561	19
I-876	510	0	510	510	0
I-876zp	60	0	60	60	0
I-888	1656	347	2003	1983	-20
I-892	0	0	0	0	0
I-961	1766	260	2026	1876	-150
I-961S	0	0	0	32	32
I-1138	45	45	90	90	0
<b>PROCESS</b>					
<b>STOCKS</b>					
REF 90R	0	18	18	-35	-53
REF 95R	0	9	9	-26	-35
L.C.N	0	0	0	15	15
M.C.N	0	0	0	3	3
POLY	0	-3	-3	-4	-1
HSR	0	0	0	41	41
KERO BS	0	0	0	-5	-5
DIESEL BS	0	0	0	-30	-30
DES DSL	-171	-15	-186	-243	-57
LVGO	38	51	89	63	-26
L.ISOMATE	-75	-15	-90	-111	-21
HVGO	33	41	74	259	185
M. ISOMATE	-25	0	-25	-41	-16
H. ISOMATE	0	0	0	71	71
FCC CUTTER	75	15	90	0	-90
ATM. RESID	0	0	0	4	4
PRODUCTS	6154	1185	7339	7390	51
PROCESS STOCK	-125	101	-24	-39	-15
<b>TOTAL</b>	<b>6029</b>	<b>1286</b>	<b>7315</b>	<b>7351</b>	<b>36</b>

**Table 18-2**  
**Delta by Product Group, First Estimate (mb)**

<b>PRODUCT GROUPS</b>	<b>TOTAL DELTA</b>	<b>AOC DELTA ALLOCATION</b>	<b>BOC DELTA ALLOCATION</b>
LPG	0	0	0
LSR	0	0	0
WSR	85	71	14
GASO	-16	-25	9
KERO	120	100	20
DSL	-20	-17	-3
BDSL	0	0	0
FUEL OIL	-118	-98	-20
ASPHALT	0	0	0
<b>TOTAL</b>	<b>51</b>	<b>31</b>	<b>20</b>

- The shipment schedule of participants: ship ID, dwt, parcel to be loaded (product grade and the quantity in tons or barrels), and the estimated time of arrival (ETA). The ETA is constantly updated by the participants.

This information is updated every time that

- A new refinery production estimate is done, typically, once a week. The refinery's new production rates, of all product groups based on the new estimate, are entered in the IUFS.
- The actual closing inventories of the participants from the previous month's allocation are available.
- The tankage capacity allocation of a participant is revised (due to releasing a storage tank for maintenance or adding a tank, which is put back in service after maintenance).
- There is a change in the ETA of a ship for the participant.

### REFERENCE POINT

The reference point for any product group inventory is the closing inventories of the participants from the final allocation of the previous month.

To these figures are added, the actual past production of each product group of the participant. The basis of future production rates of a

**Table 18-3**  
**Estimation of Production Change Allocation for Inventory Forecasts, First Estimate (mb)**

PRODUCT GROUP	TOTAL DELTA	AOC		BOC		BALANCE DELTA	AOC DELTA	BOC DELTA	AOC TOTAL DELTA	BOC TOTAL DELTA
		I-397L -88	I-961(80) 32	I-397L -17	I-397LL 30					
LPG	0					0	0	0	0	0
LSR	0					0	0	0	0	0
WSR	85					85	71	14	71	14
GASOLINE	-16	-22		-4	14	-4	-3	-1	-25	9
KEROSENE	120					120	100	20	100	20
DIESEL	-20		-4			-16	-13	-3	-17	-3
FUEL OIL	-118		4			-122	-102	-20	-98	-20
ASPHALT	0					0	0	0	0	0
<b>TOTAL</b>	<b>51</b>	<b>-22</b>	<b>0</b>	<b>-4</b>	<b>14</b>	<b>63</b>	<b>53</b>	<b>10</b>	<b>31</b>	<b>20</b>

NOTES:  
 CRUDE RATIO:  
 AOC 0.8354  
 BOC 0.1646

**Table 18-4**  
**Estimation of Production Rates for Inventory Forecast,**  
**First Estimate (mb)**

PRODUCT GROUPS	DOP (1)	ALLOCATED DELTA (2)	PRODUCTION INVENTORY (3)	LOCAL SALES (4)	SHIPPING (5)	PRODUCTION RATE MBPCD (6)
AOC						
LPG	20	0	20	20	0	0.0
LSR	0	0	0	0	0	0.0
WSR	839	71	910	0	910	30.3
GASOLINE	542	-25	517	136	381	12.7
KERO	716	100	816	165	651	21.7
DSL	2226	-17	2209	54	2155	71.8
BDSL	0	0	0	0	0	0.0
HVGO	0	0	0	0	0	0.0
FUEL	1766	-98	1668	0	1668	55.6
ASPHALT	46	0	46	9	37	1.2
TOTAL	6155	31	6186	384	5802	193.4
BOC						
LPG	0	0	0	0	0	0
LSR	165	0	165	0	165	5.5
WSR	96	14	110	0	110	3.7
GASOLINE	101	9	110	0	110	3.7
KERO	171	20	191	107	84	2.8
DSL	347	-3	344	0	344	11.5
BDSL	0	0	0	0	0	0.0
HVGO	0	0	0	0	0	0.0
FUEL	260	-20	240	0	240	8.0
ASPHALT	45	0	45	0	45	1.5
TOTAL	1185	20	1205	107	1098	36.6

## NOTES:

FIRST ESTGIMATE PERIOD = 10 days.

participant during the current month is the weekly allocation of the estimated production of the refinery between the participants. Estimates of production beyond current month are based on the advance DOPs of the participants.

For example, suppose today the date is June 10, from which date the IUFS data is to be entered.

**Table 18-5**  
**Determination of Deltas between Refinery Estimates and Combined DOP, Second Estimate (mb)**

<b>GRADE</b>	<b>COMBINED DOP</b>	<b>REFINERY ESTIMATE</b>	<b>DELTA</b>
I-150	12	12	0
I-201	0	0	0
I-210	693	613	-80
I-220	161	161	0
I-383	-5	-5	0
I-387	31	31	0
I-390	42	60	18
I-395	73	73	0
I-397LL	16	16	0
I-397L	181	159	-22
I-397R	69	69	0
I-398	32	32	0
I-400	200	200	0
I-411	5	5	0
I-419	8	280	272
I-440	351	154	-197
I-800	-14	-12	2
I-876	214	214	0
I-876zp	0	0	0
I-885SP	72	72	0
I-888	1080	1047	-33
I-888 52DI	348	348	0
I-892	0	0	0
I-928	65	0	-65
I-961	1251	1158	-93
I-961S	-11	0	11
I-971	0	76	76
I-1138	68	68	0
<b>INTERMEDIATE STOCKS</b>			
REF 90R	-54	-27	27
REF 95R	-32	-13	19
LCN	1	1	0
MCN	-12	-12	0
POLY	-2	-2	0
HSR	36	36	0
KERO BS	39	39	0
DIESEL BS	-23	-23	0
DES DSL	-129	-129	0
LVGO	33	33	0
L. ISOMATE	-60	-60	0
HVGO	97	85	-12
M. ISOMATE	-30	-20	10
H. ISOMATE	70	85	15
FCC CUTTER	-28	0	28
ATM. RESID	-17	0	17
PRODUCTS	4942	4831	-111
PROCESS STOCKS	-111	-7	104
<b>TOTAL</b>	<b>4831</b>	<b>4824</b>	<b>-7</b>

**Table 18-6**  
**Delta by Product Group, Second Estimate (mb)**

<b>PRODUCT GROUPS</b>	<b>TOTAL DELTA</b>	<b>AOC DELTA ALLOCATION</b>	<b>BOC DELTA ALLOCATION</b>
LPG	0	0	0
LSR	0	0	0
WSR	-80	-59	-21
GASO	-13	-11	-2
KERO	61	51	10
DSL	-28	-25	-3
BDSL	0	0	0
FUEL OIL	-71	-63	-8
ASPHALT	1	1	0
<b>TOTAL</b>	<b>-130</b>	<b>-106</b>	<b>-24</b>

1. The starting or reference point for the IUFS would be the closing inventories for all products as of April 30 (as per the final allocation report for the month of April of that year). The inventories of individual product grades are lumped together into product groups.
2. For the past period, May 1 to June 9, the actual refinery production rates for all product groups are available, and these are split into participant production rates on the basis of the weekly allocation of production for the IUFS for that period.
3. For the current date, June 10, to the end of current month, June 30, the production rates as established by latest weekly refinery estimates are used.
4. For the next 2 months, July and August, the participants' DOP's for July and August (advance DOPs) are used. The advance DOPs of the participants may not be very accurate but, nevertheless, contain useful data on the planned crude run, refinery units onstream factors, and projected product lifting schedule, if known beforehand.

Thus, participants have a useful tool to determine the inventory availability during the next 3 months and can schedule their vessels for product lifting accordingly.

The IUFS helps sense potential problems associated with the scheduling of ships and product loading, such as bunching ships, with the associated problems of berth availability, and delays or constraints on product loading system.

**Table 18-7  
Production Change Allocation For Inventory Forecasts, Second Estimate (mb)**

PRODUCT GROUP	TOTAL DELTA	AOC				BOC				BALANCE DELTA	AOC DELTA	BOC DELTA	AOC TOTAL DELTA	BOC TOTAL DELTA
		I-397L -18	I-961(80) 32	I-928 -65	I-971 76	I-397L -4	LSR ADJUST	CONDENSATE -9						
LPG	0								0	0	0	0	0	
LSR	0						9	-9	0	0	0	0	0	
WSR	-80						-9		-71	-59	-12	-59	-21	
GASOLINE	-13	-5				-1			-7	-6	-1	-11	-2	
KEROSENE	61								61	51	10	51	10	
DIESEL	-28		-2	-12	7				-21	-18	-3	-25	-3	
FUEL OIL	-71		2	-16	-7				-50	-42	-8	-63	-8	
ASPHALT	1								1	1	0	1	0	
<b>TOTAL</b>	<b>-130</b>	<b>-5</b>	<b>0</b>	<b>-28</b>	<b>0</b>	<b>-1</b>	<b>0</b>	<b>-9</b>	<b>-87</b>	<b>-73</b>	<b>-14</b>	<b>-106</b>	<b>-24</b>	

NOTES:  
CRUDE RATIO:  
AOC 0.835  
BOC 0.165



**Table 18-8**  
**Estimation of Production Rates for Inventory Forecast**

<b>PRODUCT GROUPS</b>	<b>DOP (1)</b>	<b>ALLOCATED DELTA (2)</b>	<b>PRODUCTION INVENTORY (3)</b>	<b>LOCAL SALES (4)</b>	<b>SHIPPING INVENTORY (5)</b>	<b>PRODUCTION RATE, mbcd (6)</b>
<b>AOC</b>						
LPG	10	0	10	10	0	0.0
LSR	134	0	134	0	134	6.7
WSR	579	-59	520	0	520	26.0
GASOLINE	367	-11	356	91	265	13.3
KERO	471	51	522	113	409	20.5
DSL	1420	-25	1395	36	1359	68.0
BDSL	0	0	0	0	0	0.0
HVGO	0	0	0	0	0	0.0
FUEL	1090	-63	1027	0	1027	51.4
ASPHALT	57	1	58	6	52	2.6
<b>TOTAL</b>	<b>4128</b>	<b>-106</b>	<b>4022</b>	<b>256</b>	<b>3766</b>	<b>188.3</b>
<b>BOC</b>						
LPG	2	0	2	0	2	0.1
LSR	27	0	27	0	27	1.4
WSR	114	-21	93	0	93	4.7
GASOLINE	72	-2	70	0	70	3.5
KERO	93	10	103	68	35	1.8
DSL	280	-3	277	0	277	13.9
BDSL	0	0	0	0	0	0.0
HVGO	0	0	0	0	0	0.0
FUEL	215	-8	207	0	207	10.4
ASPHALT	11	0	11	0	11	0.6
<b>TOTAL</b>	<b>814</b>	<b>-24</b>	<b>790</b>	<b>68</b>	<b>722</b>	<b>36.1</b>

ESTIMATE PERIOD = 7 DAYS

**Table 18-9**  
**Determination of Deltas between Refinery Estimates and**  
**Participants, DOP, Third Estimate (mb)**

	TARGET DOP	REFINERY ESTIMATE	DELTA
<b>GRADE</b>			
I-150	6	6	0
I-201	0	0	0
I-210	533	451	-82
I-220	39	39	0
I-383	-2	-2	0
I-387	11	11	0
I-390	20	39	19
I-395	32	32	0
I-397LL	-21	0	21
I-397L	112	107	-5
I-397R	68	68	0
I-397C	25	0	-25
I-398	21	21	0
I-400	3	3	0
I-411	4	4	0
I-419	280	280	0
I-440	138	146	8
I-800	0	0	0
I-876	111	111	0
I-876zp	0	0	0
I-885SP	72	72	0
I-888	535	496	-39
I-888 52DI	348	348	0
I-892	0	0	0
I-928	4	0	-4
I-961	909	862	-47
I-961S	-3	0	3
I-971	-12	12	24
I-1138	53	30	-23
<b>PROCESS</b>			
<b>STOCK</b>			
REF 90R	-1	12	13
REF 95R	-39	-18	21
LCN	-1	-1	0
MCN	-3	-3	0
POLY	-7	-7	0
HSR	42	42	0
KERO BS	42	42	0
DIESEL BS	0	0	0
DES DSL	-61	-61	0
LVGO	51	51	0
L. ISOMATE	-20	-20	0
HVGO	54	54	0
M. ISOMATE	-18	44	62
H. ISOMATE	86	92	6
FCC CUTTER	-66	-66	0
ATM. RESID	-84	-84	0
PRODUCTS	3286	3136	-150
TOTAL PROCESS	-25	77	102
TOTAL	3261	3213	-48

**Table 18-10**  
**Delta by Product Groups, Third Estimate (mb)**

<b>PRODUCT GROUPS</b>	<b>TOTAL DELTA</b>	<b>AOC DELTA ALLOCATION</b>	<b>BOC DELTA ALLOCATION</b>
LPG	0	0	0
LSR	0	0	0
WSR	-82	-59	-23
GASO	11	-11	22
KERO	10	51	-41
DSL	-32	-25	-7
BDSL	0	0	0
FUEL OIL	-24	-63	39
ASPHALT	-23	1	-24
<b>TOTAL</b>	<b>-140</b>	<b>-106</b>	<b>-34</b>

For example, referring to the IUFS system for whole straight run naphtha (WSR; Table 18-18),

- Column 1 refers to the calendar date.
- Column 2 refers to the physical inventory of WSR for participant AOC.
- Column 3 refers to the physical inventory of WSR for participant BOC.
- Column 4 is the total refinery inventory on the referred day, the sum of columns 2 and 3.
- Column 5 is available inventory of participant AOC, obtained by subtracting from AOC's physical inventory its allocated LI (Chapter 17).
- Column 6 is similarly the available inventory of participant BOC, obtained by subtracting from BOC's physical inventory its allocated LI.
- Column 7 is the total available inventory, the sum of columns 5 and 6.
- Column 8 is the ullage available to participant AOC for storing its product, the difference between the total storage capacity for WSR available to AOC (Chapter 17) and its present inventory.
- Column 9 is the ullage available to participant BOC for storing its product, the difference between the total storage capacity for WSR available to BOC (Chapter 17) and its present inventory.
- Column 10 is the total available ullage in the WSR group of tanks at the present inventory level. Thus,

$$\text{Inventory} + \text{ullage} = (\text{HI} - \text{LI}) \text{ for the refinery} \\ \text{as well as for participants}$$

**Table 18-11  
Production Change Allocation for Inventory Forecasts, Third Estimate (mb)**

GROUP	AOC						BOC						AOC		BOC	
	TOTAL DELTA	I-397L -5	I-961(80) 3	I-928 -4	I-971 24	ASPHALT -10	I-397C -25	I-397 21	ASPHALT -13	LSR ADJUST	CONDENSATE -6	BALANCE DELTA	AOC DELTA	BOC DELTA	TOTAL DELTA	TOTAL DELTA
LPG	0										0	0	0	0	0	
LSR	0								6	-6	0	0	0	0	0	
WSR	-82								-6		-76	-63	-13	-63	-19	
GASOLINE	11	-1					-18	10			20	17	3	16	-5	
KEROSENE	10										10	8	2	8	2	
DIESEL	-32		-1	-1	3	-8				-10	-15	-13	-2	-20	-12	
FUEL OIL	-24		1	-1	-2	18				23	-63	-53	-10	-37	13	
ASPHALT	-23					-10				-13	0	0	0	-10	-13	
TOTAL	-140	-1	0	-2	1	0	-18	10	0	0	-124	-104	-20	-106	-34	

NOTES:  
CRUDE RATIO:  
AOC 0.835  
BOC 0.165

**Table 18-12**  
**Estimation of Production Rates for Inventory Forecast, Third Estimate (bbl)**

<b>PRODUCT GROUP</b>	<b>DOP (1)</b>	<b>ALLOCATED DELTA (2)</b>	<b>ALLOCATION INVENTORY (3)</b>	<b>LOCAL SALES (4)</b>	<b>SHIPPING (5)</b>	<b>PRODUCTION RATE, mbpcd (6)</b>
<b>AOC</b>						
LPG	5	0	5	8	-3	-0.2
LSR	33	0	33	0	33	2.5
WSR	445	-63	382	0	382	29.4
GASOLINE	222	16	238	59	179	13.8
KERO	355	8	363	119	244	18.8
DSL	891	-20	871	23	848	65.2
BDSL	0	0	0	0	0	0.0
HVGO	0	0	0	0	0	0.0
FUEL	750	-37	713	0	713	54.8
ASPHALT	44	-10	34	4	30	2.3
<b>TOTAL</b>	<b>2745</b>	<b>-106</b>	<b>2639</b>	<b>213</b>	<b>2426</b>	<b>186.6</b>
<b>BOC</b>						
LPG	1	0	1	0	1	0.1
LSR	6	0	6	0	6	0.5
WSR	88	-19	69	0	69	5.3
GASOLINE	44	-5	39	0	39	3.0
KERO	70	2	72	68	4	0.3
DSL	175	-12	163	0	163	12.5
BDSL	0	0	0	0	0	0.0
HVGO	0	0	0	0	0	0.0
FUEL	148	13	161	0	161	12.4
ASPHALT	9	-13	-4	0	-4	-0.3
<b>TOTAL</b>	<b>541</b>	<b>-34</b>	<b>507</b>	<b>68</b>	<b>439</b>	<b>33.8</b>

ESTIMATE PERIOD = 7 DAYS.

**Table 18-13**  
**Determination of Deltas between Refinery Estimates**  
**and Participants' DOP, Fourth Estimate (mb)**

	TARGET DOP	REFINERY ESTIMATE	DELTA
<b>GRADE</b>			
I-150	-3	-3	0
I-201	0	0	0
I-210	257	262	5
I-220	-12	-33	-21
I-383	0	0	0
I-387	-5	-5	0
I-390	29	29	0
I-395	-5	0	5
I-397LL	7	7	0
I-397L	112	81	-31
I-397R	47	47	0
I-397C	0	0	0
I-398	-11	9	20
I-400	3	3	0
I-411	2	2	0
I-419	280	280	0
I-440	-94	-150	-56
I-800	0	0	0
I-876	55	55	0
I-876zp	0	0	0
I-885SP	72	72	0
I-888	-56	337	393
I-888 52DI	348	0	-348
I-892	1	0	-1
I-928	0	0	0
I-961	408	390	-18
I-961S	0	0	0
I-971	6	6	0
I-1138	15	12	-3
<b>PROCESS</b>			
<b>STOCKS</b>			
REF 90R	-13	-12	1
REF 95R	-16	-14	2
LCN	-18	-18	0
MCN	-9	-9	0
POLY	-8	-8	0
HSR	30	30	0
KERO BS	40	40	0
DIESEL BS	-16	-16	0
DES DSL	3	3	0
LVGO	39	39	0
L. ISOMATE	11	11	0
HVGO	-87	-20	67
M. ISOMATE	56	17	-39
H. ISOMATE	134	57	-77
FCC CUTTER	-102	-33	69
ATM. RESID	-31	-31	0
PRODUCTS	1456	1401	-55
PROCESS STOCKS	13	36	23
<b>TOTAL</b>	<b>1469</b>	<b>1437</b>	<b>-32</b>

**Table 18-14**  
**Delta by Product Groups, Fourth Estimate (mb)**

PRODUCT GROUPS	TOTAL DELTA	AOC DELTA ALLOCATION	BOC DELTA ALLOCATION
LPG	0	0	0
LSR	-21	0	-21
WSR	5	-23	28
GASO	3	4	-1
KERO	-67	-56	-11
DSL	58	48	10
BDSL	-1	-1	0
FUEL OIL	-18	-14	-4
ASPHALT	-2	-2	0
TOTAL	-43	-44	1

that is, column 5 + column 8 = HI - LI, or allocated tankage capacity, for participant AOC (Chapter 17); and column 6 + column 9 = HI - LI, or allocated tankage capacity, for participant BOC.

- Columns 11 and 12 show the volume of projected lifting of products by the participants in thousand barrels on the date shown. Column 13 shows the ship ID, or identification number. Column 14 lists the product grade to be lifted by the ship. Column 15 shows the name of the ship and the likely date when the product is to be lifted. The data in columns 11 to 15 is constantly updated by the refinery, on receipt of information on ship ETA from the participants.
- Columns 16 and 17 indicate the current production rate of participants AOC and BOC. The production rate and product shipments are reflected as follows. The actual inventories of the participants (columns 1 and 2) increase at the rate of their production rates. For example, referring to the IUFS for WSR naphtha date June 19, the physical inventory of participant AOC is 796 mb. On June 20, the inventory increases to (796 + 30) or 827 mb, the production rate being 30.3 mb per day. The inventory on June 21 is (827 + 30.3 - 450) or 407 mb. Here, 450 mb is the WSR product loaded on ship Nordflex (column 11).

**Table 18-15  
Production Change Allocation for Inventory Forecasts, Fourth Estimate (mb)**

GROUP	AOC				BOC				AOC DELTA	BOC DELTA	AOC TOTAL DELTA	BOC TOTAL DELTA
	TOTAL DELTA	I-397L -26	REFORMER FEED -127	ASPHALT -2	REFORMER FEED -42	LSR ADJUST	CONDENSATE -7	BALANCE DELTA				
LPG	0							0	0	0	0	0
LSR	-21					-14	-7	0	0	0	0	-21
WSR	5		25		24	14		-58	-48	-10	-23	28
GASOLINE	3	-7	102		18			-110	-92	-18	3	0
KEROSENE	-67							-67	-56	-11	-56	-11
DIESEL	58			-2				60	50	10	48	10
MARINE DSL	-1							-1	-1	0	-1	0
FUEL OIL	-18			4				-22	-18	-4	-14	-4
ASPHALT	-2			-2				0	0	0	-2	0
TOTAL	-43	-7	127	0	42	0		-198	-165	-33	-45	2

CRUDE RATIO:

AOC 0.8354

BOC 0.1646



**Table 18-16**  
**Estimation of Production Rates for Inventory Forecast, Fourth Estimate (mb)**

<b>PRODUCT GROUP</b>	<b>DOP (1)</b>	<b>ALLOCATED DELTA (2)</b>	<b>ALLOCATION INVENTORY (3)</b>	<b>LOCAL SALES (4)</b>	<b>SHIPPING (5)</b>	<b>PRODUCTION RATE,mbpcd (6)</b>
<b>AOC</b>						
LPG	-3	0	-3	4	-7	-1.2
LSR	-10	0	-10	0	-10	-1.7
WSR	215	-23	192	0	192	32.0
GASOLINE	145	4	149	27	122	20.3
KERO	160	-56	104	55	49	8.2
DSL	351	48	399	11	388	64.7
BDSL	0	-1	-1	0	-1	-0.2
HVGO	0	0	0	0	0	0.0
FUEL	346	-14	332	0	332	55.3
ASPHALT	13	-2	11	2	9	1.5
<b>TOTAL</b>	<b>1217</b>	<b>-44</b>	<b>1173</b>	<b>99</b>	<b>1074</b>	<b>179.0</b>
<b>BOC</b>						
LPG	0	0	0	0	0	0.0
LSR	-2	-21	-23	0	-23	-3.8
WSR	42	28	70	0	70	11.7
GASOLINE	29	-1	28	0	28	4.7
KERO	31	-11	20	0	20	3.3
DSL	69	10	79	0	79	13.2
BDSL	0	0	0	0	0	0.0
HVGO	0	0	0	0	0	0.0
FUEL	68	-4	64	0	64	10.7
ASPHALT	2	0	2	0	2	0.3
<b>TOTAL</b>	<b>239</b>	<b>1</b>	<b>240</b>	<b>0</b>	<b>240</b>	<b>40.0</b>

ESTIMATE PERIOD = 6 DAYS.

**Table 18-17**  
**Lifting for Product Group LSR, Light Straight-Run Naphtha (mb)**

DATE	ACTUAL INVENTORY			AVAILABLE INVENTORY			ULLAGE			SHIPMENT M. BARRIES		SHIP ID	GRADE CODE	SHIP NAME	PRODUCTION RATE, MBPCD	
	AOC (2)	BOC (3)	TOTAL (4)	AOC (5)	BOC (6)	TOTAL (7)	AOC (8)	BOC (9)	TOTAL (10)	AOC (11)	BOC (12)				AOC (16)	BOC (17)
1-Jun	132	76	208	80	42	122	103	80	183						0.0	5.5
2-Jun	132	81	213	80	47	127	103	75	178							
3-Jun	132	87	219	80	53	133	103	69	172							
4-Jun	132	92	224	80	58	138	103	64	167							
5-Jun	132	98	230	80	64	144	103	58	161							
6-Jun	132	103	235	80	69	149	103	53	156							
7-Jun	132	109	241	80	75	155	103	47	150							
8-Jun	132	114	246	80	80	160	103	42	145							
9-Jun	132	120	252	80	86	166	103	36	139							
10-Jun	132	125	257	80	91	171	103	31	134							
11-Jun	132	131	263	80	97	177	103	25	128							
12-Jun	132	136	268	80	102	182	103	20	123							
13-Jun	132	142	274	80	108	188	103	14	117							
14-Jun	132	147	279	80	113	193	103	9	112							
15-Jun	132	153	285	80	119	199	103	3	106							
16-Jun	132	158	290	80	124	204	103	-2	101							
17-Jun	132	164	296	80	130	210	103	-8	95							
18-Jun	132	169	301	80	135	215	103	-13	90							
19-Jun	132	175	307	80	141	221	103	-19	84							
20-Jun	132	180	312	80	146	226	103	-24	79							
21-Jun	132	186	318	80	152	232	103	-30	73							
22-Jun	132	191	323	80	157	237	103	-35	68							
23-Jun	132	197	329	80	163	243	103	-41	62							
24-Jun	132	202	334	80	168	248	103	-46	57							
25-Jun	132	-38	94	80	-72	8	103	194H	297	246	C60426	I-220	SIENNA 23-25			
26-Jun	132	-33	99	80	-67	13	103	189H	292							
27-Jun	132	-27	105	80	-61	19	103	183H	286							
28-Jun	132	-22	110	80	-56	24	103	178H	275							
29-Jun	132	-11	121	80	-50	30	103	172H	270							
30-Jun	132	313	445	80	-45	35	103	167H	264							

**Table 18-18**  
**Lifting for Product Group WSR, Whole Straight-Run Naphtha (mb)**

DATE	ACTUAL INVENTORY		TOTAL INVENTORY	AVAILABLE INVENTORY			ULLAGE			SHIPMENT		SHIP ID	GRADE CODE	SHIP NAME	PRODUCTION RATE, Mbpcd	
	AOC	BOC		AOC	BOC	TOTAL	AOC	BOC	TOTAL	AOC	BOC				AOC	BOC
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1-Jun	476	296	772	373	173	546	106	607	713						30.3	3.7
2-Jun	506	299	805	403	176	579	76	604	680							
3-Jun	536	303	839	433	180	613	46	600	646							
4-Jun	567	307	874	464	184	648	15	596	611							
5-Jun	597	310	907	494	187	681	-15	593	578							
6-Jun	627	314	941	524	191	715	-45	589	544	225		A91460	I-210	ZENATIA		
7-Jun	433	318	751	330	195	525	149	585	734							
8-Jun	463	321	784	360	198	558	119	582	701							
9-Jun	493	325	818	390	202	592	89	578	667							
10-Jun	524	329	853	421	206	627	58	574	632							
11-Jun	554	333	887	451	210	661	28	570	598							
12-Jun	584	336	920	481	213	694	-2	567	565							
13-Jun	614	340	954	511	217	728	-32	563	531							
14-Jun	645	344	989	542	221	763	-63	559	496							
15-Jun	675	347	1022	572	224	796	-93	556	463							
16-Jun	705	351	1056	602	228	830	-123	552	429							
17-Jun	736	355	1091	633	232	865	-154	548	394							
18-Jun	766	358	1124	663	235	898	-184	545	361							
19-Jun	796	362	1158	693	239	932	-214	541	327							
20-Jun	827	366	1193	724	243	967	-245	537	292	450		A91100	I-210	NORDFLEX		
21-Jun	407	370	777	304	247	551	175	533	708							
22-Jun	437	373	810	334	250	584	145	530	675							
23-Jun	467	377	844	364	254	618	115	526	641							
24-Jun	498	381	879	395	258	653	84	522	606		236	C90426	I-210	SIENNA 23-25		
25-Jun	382	294	676	279	171	450	200	609	809							
26-Jun	412	298	710	309	175	484	170	605	775							
27-Jun	443	302	745	340	179	519	139	601	740							
28-Jun	473	305	778	370	182	552	109	598	707							
29-Jun	503	309	812	400	186	586	79	594	673							
30-Jun	534	313	847	431	190	621	48	590	638							

**Table 18-19**  
**Lifting for Product Group Gasoline (mb)**

DATE	ACTUAL INVENTORY		TOTAL INVENTORY	AVAILABLE INVENTORY			ULLAGE			SHIPMENT		SHIP ID	GRADE CODE	SHIP NAME	PRODUCTION RATE, mbpcd	
	AOC	BOC		AOC	BOC	TOTAL	AOC	BOC	TOTAL	AOC	BOC				AOC	BOC
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1-Jun	230	327	557	51	207	258	234	-17	217						12.7	3.7
2-Jun	243	330	573	64	210	274	221	-20	201							
3-Jun	256	334	590	77	214	291	208	-24	184							
4-Jun	268	338	606	89	218	307	196	-28	168	19		A91790	I-397R	MASCARIN		
5-Jun	196	327	523	17	207	224	268	-17	251							
6-Jun	209	330	539	30	210	240	255	-20	235							
7-Jun	221	334	555	42	214	256	243	-24	219	26		A91820	I-395L	ASTROLOBE		
8-Jun	208	303	511	29	183	212	256	7	263							
9-Jun	221	306	527	42	186	228	243	4	247							
10-Jun	233	310	543	54	190	244	231	0	231							
11-Jun	246	314	560	67	194	261	218	-4	214							
12-Jun	259	317	576	80	197	277	205	-7	198							
13-Jun	272	321	593	93	201	294	192	-11	181	35		A91500	I-395L	LOTTE DANICA		
14-Jun	249	325	574	70	205	275	215	-15	200							
15-Jun	262	329	591	83	209	292	202	-19	183		35	C90421	I-395L	TBN 10-20		
16-Jun	275	297	572	96	177	273	189	13	202							
17-Jun	287	301	588	108	181	289	177	9	186							
18-Jun	300	305	605	121	185	306	164	5	169	18		A91840	I-395L	TBN 15-20		
19-Jun	295	308	603	116	188	304	169	2	171							
20-Jun	307	312	619	128	192	320	157	-2	155							
21-Jun	320	316	636	141	196	337	144	-6	138							
22-Jun	333	319	652	154	199	353	131	-9	122							
23-Jun	346	323	669	167	203	370	118	-13	105	44		A91780	I-397L	TBN 15-23		
24-Jun	314	327	641	135	207	342	150	-17	133	39		A92130	I-387	TBN 20-28		
25-Jun	288	331	619	109	211	320	176	-21	155	120		A91760	I-397L	TBN 20-30		
26-Jun	76	177	253	-103	57	-46	388	133	521							
27-Jun	88	181	269	-91	61	-30	376	129	505							
28-Jun	101	185	286	-78	65	-13	363	125	488							
29-Jun	114	188	302	-65	68	3	350	122	472							
30-Jun	126	192	318	-53	72	19	338	118	456							

**Table 18-20**  
**Lifting for Product Group Kerosene (mb)**

DATE	ACTUAL INVENTORY			AVAILABLE INVENTORY			ULLAGE			SHIPMENT		SHIP ID	GRADE CODE	SHIP NAME	PRODUCTION RATE, Mbpcd	
	AOC (2)	BOC (3)	TOTAL (4)	AOC (5)	BOC (6)	TOTAL (7)	AOC (8)	BOC (9)	TOTAL (10)	AOC (11)	BOC (12)				AOC (16)	BOC (17)
1-Jun	534	333	867	286	167	453	146	120	266						21.6	2.8
2-Jun	556	336	892	308	170	478	124	117	241							
3-Jun	578	339	917	330	173	503	102	114	216							
4-Jun	599	341	940	351	175	526	81	112	193							
										29		A9210	I-440	MASCARIN		
										1		A9211	I-440	MASCARIN		
										22		A9212	I-440	MASCARIN		
5-Jun	569	343	912	321	177	498	111	110	221		1	C90535	I-440	MASCARIN		
6-Jun	590	346	936	342	180	522	90	107	197							
7-Jun	612	349	961	364	183	547	68	104	172	44						
											238	A9183	I-440	ASTROLOBE		
												C90428	I-419	ATHENIAN CHARM		
8-Jun	453	251	704	205	85	290	227	202	429							
9-Jun	474	253	727	226	87	313	206	200	406							
10-Jun	496	256	752	248	90	338	184	197	381							
11-Jun	517	259	776	269	93	362	163	194	357							
12-Jun	539	262	801	291	96	387	141	191	332							
13-Jun	561	265	826	313	99	412	119	188	307	86		A9150	I-440	LOTTE DANICA 10-1		
14-Jun	496	267	763	248	101	349	184	186	370	199		A9160	I-400	TBN 13-15		
15-Jun	319	270	589	71	104	175	361	183	544							
16-Jun	340	273	613	92	107	199	340	180	520							
17-Jun	362	276	638	114	110	224	318	177	495							
18-Jun	384	279	663	136	113	249	296	174	470	64		A9184	I-440	TBN 15-20		
19-Jun	341	281	622	93	115	208	339	172	511							
20-Jun	363	284	647	115	118	233	317	169	486							
21-Jun	384	287	671	136	121	257	296	166	462							
22-Jun	406	290	696	158	282	440	274	163	437							
23-Jun	428	293	721	180	127	307	252	160	412							
24-Jun	449	295	744	201	129	330	231	158	389							
25-Jun	471	298	769	223	132	355	209	155	364							
26-Jun	492	301	793	244	135	379	188	152	340		80	C90634	I-419	TBN 21-30		
27-Jun	514	224	738	266	58	324	166	229	395							
28-Jun	536	227	763	288	61	349	144	226	370							
29-Jun	557	229	786	309	63	372	123	224	347							
30-Jun	579	232	811	331	66	397	101	221	322							

**Table 18-21**  
**Lifting for Product Group Diesel (mb)**

DATE	ACTUAL INVENTORY			AVAILABLE INVENTORY			ULLAGE			SHIPMENT		SHIP ID	GRADE CODE	SHIP NAME	PRODUCTION RATE, Mbpcd	
	AOB (1)	BOB (2)	TOTAL (3)	AOB (4)	BOB (5)	TOTAL (6)	AOB (7)	BOB (8)	TOTAL (9)	AOB (10)	BOB (11)				AOB (12)	BOB (13)
1-Jun	699	174	873	541	68	609	88	350	438	1		AC2878	I-888		71.8	11.5
											1	AJ2133	I-888	AL JABER III		
											45	C20425	I-888	NEWTYNE		
										45S	45P	C20425				
2-Jun	725	185	910	567	79	646	62	339	401	1		GB2263	I-888	STRIKER		
3-Jun	795	196	991	637	90	727	-8	328	320		1	AJ2134	I-888	ALJABER IV		
4-Jun	776	73	849	618	-33	585	11	451	462	12		A29179	I-885	MASCARIN		
										9		A29210	I-885	MASCARIN		
										14		A29211	I-885	MASCARIN		
										12		A29212	I-885	MASCARIN		
										0		GB2269	I-888	SAFANIA		
											13	C290535	I-885	MASCARIN		
5-Jun	801	71	872	643	-35	608	-14	453	439		1	AJ2135	I-888	ALJABER III		
										0		GB2270	I-888	CHELSEA		
6-Jun	873	82	955	715	-24	691	-86	442	356	1		GB2268	I-888	OCEAN TRAMP		
7-Jun	936	93	1029	778	-13	765	-149	431	282	184		A29177	I-800	TEAM FROSTA		
										41		A29183	I-888	ASTROLOBE		
											37	C20538	I-888	ASTROLOBE		
8-Jun	782	68	850	624	-38	586	5	456	461	3		AC2873	I-888	USS PUGET SOUND		
9-Jun	851	79	930	693	-27	666	-64	445	381	203		A29197	I-888	OSCO SAILOR		

**Table 18-21  
Continued**

DATE	ACTUAL INVENTORY			AVAILABLE INVENTORY			ULLAGE			SHIPMENT		SHIP ID	GRADE CODE	SHIP NAME	PRODUCTION RATE, Mbpcd	
	AO C	BO C	TOTAL	AO C	BO C	TOTAL	AO C	BO C	TOTAL	AO C	BO C				AO C	BO C
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
10-Jun	720	46	766	566	-60	502	67	478	545	4		45 C20433 AC2882	I-888 I-888	NEWTYNE 8-10 USS SPICA		
11-Jun	788	57	845	630	-49	581	-1	467	466							
12-Jun	860	69	929	702	-37	665	-73	455	382	255		A29149	I-876	PARRIOT		
13-Jun	676	80	756	518	-26	492	111	444	555	66		A29150	I-888	LOTTE DANICA 10-1		
14-Jun	682	47	729	524	-59	465	105	477	582	37		A29214	I-888	FALL VII 12-15		
15-Jun	717	58	775	559	-48	511	70	466	536							
16-Jun	789	70	859	631	-36	595	-2	454	452							
17-Jun	861	81	942	703	-25	678	-74	443	369							
18-Jun	932	93	1025	774	-13	761	-145	431	286	222		A29117	I-888	GEORGIA		
19-Jun	412	104	516	254	-2	252	375	420	795	3		AC2874	I-888	USS PUGET SOUND		
20-Jun	481	116	597	323	10	333	306	408	714	5		AC2883 A29172	I-888 I-876	USS LA SALLE COURIER		
									255			45 C20536	I-888	NEW TYNE 19-21		
										45S	45P	C20427				
21-Jun	248	127	375	90	21	111	539	397	936							
22-Jun	320	139	459	162	33	195	467	385	852							
23-Jun	391	150	541	233	44	277	396	374	770							
24-Jun	463	162	625	305	56	361	324	362	686	3		AC2875	I-888	USS PUGET SOUND		
25-Jun	532	173	705	374	67	441	255	351	606	185		A29115 C20427	I-888 I-888	TBN 20-30 TBN 20-30		
												45 C20537	I-888	NEW TYNE 24-26		
										95S	95P	C20427				
26-Jun	324	87	411	166	-19	147	463	437	900			80 C20634	I-419	TBN 21-30		
27-Jun	396	98	494	238	-8	230	391	426	817							
28-Jun	467	110	577	309	4	313	320	414	734	222		A29147	I-888	TBN 25-30		
29-Jun	317	121	438	159	15	174	470	403	873			45 C20635	I-888	TBN 28-30		
30-Jun	389	88	477	231	-18	213	398	436	834							

**Table 18-22**  
**Lifting for Product Group Fuel Oil (mb)**

DATE	ACTUAL INVENTORY			AVAILABLE INVENTORY			ULLAGE			SHIPMENT		SHIP ID	GRADE CODE	SHIP NAME	PRODUCTION RATE, Mbpcd	
	AOC	BOC	TOTAL	AOC	BOC	TOTAL	AOC	BOC	TOTAL	AOC	BOC				AOC	BOC
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1-Jun	458	144	602	260	12	272	623	577	1200						55.6	8.0
2-Jun	514	152	666	316	20	336	567	569	1136							
3-Jun	569	160	729	371	28	399	512	561	1073							
4-Jun	625	168	793	427	36	463	456	553	1009	6		GA265	1-961	MASCARIN		
5-Jun	675	176	851	477	44	521	406	545	951							
6-Jun	730	184	914	532	52	584	351	537	888							
7-Jun	786	192	978	588	60	648	295	529	824	130		A9216	1-961	AL HAMIRA 6-8		
8-Jun	457	125	582	259	-7	252	624	596	1220							
9-Jun	513	133	646	315	1	316	568	588	1156	518		A9144	1-961	SEA JEWEL		
10-Jun	43	141	184	-155	9	-146	1038	580	1618							
11-Jun	98	149	247	-100	17	-83	983	572	1555							
12-Jun	154	157	311	-44	25	-19	927	564	1491							
13-Jun	209	165	374	11	33	44	872	556	1428	32		A9150	1-961	LOTTE DANICA 10-1		
14-Jun	233	173	406	35	41	76	848	548	1396							
15-Jun	289	181	470	91	49	140	792	540	1332							
16-Jun	344	189	533	146	57	203	737	532	1269							
17-Jun	400	197	597	202	65	267	681	524	1205	130		A9154	1-961	HAMIRA 15-18		
18-Jun	325	205	530	127	73	200	756	516	1272							
19-Jun	381	213	594	183	81	264	700	508	1208							
20-Jun	437	221	658	239	89	328	644	500	1144							
21-Jun	492	229	721	294	97	391	589	492	1081							
22-Jun	548	237	785	350	105	455	533	484	1017							
23-Jun	603	245	848	405	113	518	478	476	954							
24-Jun	659	253	912	461	121	582	422	468	890							
25-Jun	715	261	976	517	129	646	366	460	826							
26-Jun	770	269	1039	572	137	709	311	452	763	65		A9056	1-961	HAMIRA 25-27		
27-Jun	761	131	892	563	-1	562	320	590	910							
28-Jun	816	139	955	618	7	625	265	582	847	518		A9083	1-961	TBN 25-30		
29-Jun	354	147	501	156	15	171	727	574	1301							
30-Jun	410	155	565	212	23	235	671	566	1237							



**Table 18-23**  
**Lifting for Product Group Asphalt (mb)**

DATE	ACTUAL INVENTORY			AVAILABLE INVENTORY			ULLAGE			SHIPMENT		SHIP ID	GRADE CODE	SHIP NAME	PRODUCTION RATE, Mbbpd	
	AO C	BO C	TOTAL	AO C	BO C	TOTAL	AO C	BO C	TOTAL	AO C	BO C				AO C	BO C
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
1-Jun	37	22	59	29	16	45	-8	-3	-11		5	BA3101	I-1138		1.2	1.5
2-Jun	38	18	56	30	12	42	-9	1	-8							
3-Jun	40	20	60	32	14	46	-11	-1	-12	7		B39215	I-1138	AL JABER 4		
4-Jun	34	21	55	26	15	41	-5	-2	-7	6		B39218	I-1138	NEWQUAY		
5-Jun	29	23	52	21	17	38	0	-4	-4		5	BS3116	I-1149			
6-Jun	30	19	49	22	13	35	-1	0	-1							
7-Jun	31	21	52	23	15	38	-2	-2	-4							
8-Jun	33	22	55	25	16	41	-4	-3	-7							
9-Jun	34	24	58	26	18	44	-5	-5	-10		7	BA3102	I-1138	SEA JEWEL		
10-Jun	35	18	53	27	12	39	-6	1	-5							
11-Jun	36	20	56	28	14	42	-7	-1	-8							
12-Jun	37	21	58	29	15	44	-8	-2	-10							
13-Jun	39	23	62	31	17	48	-10	-4	-14							
14-Jun	40	24	64	32	18	50	-11	-5	-16							
15-Jun	41	26	67	33	20	53	-12	-7	-19							
16-Jun	42	27	69	34	21	55	-13	-8	-21		7	BA3103	I-1138	ALJABER 3		
17-Jun	43	15	58	35	9	44	-14	4	-10							
18-Jun	45	16	61	37	10	47	-16	3	-13	6		B39219	I-1138	NEWQUAY 17-19		
19-Jun	40	18	58	32	12	44	-11	1	-10							
20-Jun	41	19	60	33	13	46	-12	0	-12							
21-Jun	42	21	63	34	15	49	-13	-2	-15							
22-Jun	43	17	60	35	11	46	-14	2	-12							
23-Jun	45	19	64	37	13	50	-16	0	-16							
24-Jun	46	20	66	38	14	52	-17	-1	-18							
25-Jun	47	22	69	39	16	55	-18	-3	-21							
26-Jun	48	23	71	40	17	57	-19	-4	-23		6	BS3118	I-1149	AL JABER 2		
27-Jun	49	19	68	41	13	54	-20	0	-20	6		B39220	I-1138	NEWQUAY 26-28		
28-Jun	45	20	65	37	14	51	-16	-1	-17							
29-Jun	46	22	68	38	16	54	-17	-3	-20		5	BA3105	I-1138	AL JABER 2		
30-Jun	47	18	65	39	12	51	-18	1	-17							

## MAXIMUM PARCEL SIZE

The maximum size of the product parcel of a participant should be less than or equal to the volume of storage space (HI – LI) available to it for a product group.

For example, consider the IUFS for WSR (whole range naphtha) for June 20. The maximum storage space for AOC for naphtha is (HI – LI) or 479 mb. Therefore, the single product lifting must be less than this volume. For a shipment larger than this volume, the participant is obliged to use the other participant's inventory.

Referring to the IUFS, on June 20, the available WSR inventory for AOC is 724 mb and has a negative ullage of 245 mb. This implies that participant AOC is using participant BOC's storage space, equal to its negative ullage of 245 mb, which can be done only with the prior permission of the BOC.

On the basis of IUFS-projected estimates, the refinery is ensured that

1. It does not develop overall negative ullage in any product group tanks at any time on a future date. This is done by directing participants to place shipments and relieve product storage tanks before such a situation actually develops.
2. Bunching of ships is avoided. This is a situation where, say, two or more large ships arrive within a small time interval, causing product availability as well as logistics problems for the terminal. For example, a ship may have to wait for an available berth or loading sea line, causing unnecessary demurrage payments to the ships.

The IUFS helps participants plan orderly transport of their product; foresee the effects on product inventory of situations, such as cancellation of a large shipment, temporary closure of the port due to weather conditions, or other emergencies; and plan remedial action with minimum cost to refinery.

## SINGLE-OWNERSHIP REFINERIES

The IUFS for a single-ownership refinery is shown in Tables 18-24 to 18-30. The production rates used are the ones estimated in the weekly estimates for the whole refinery. The physical inventory for past period is the actual refinery inventory. Such data, along with production rates of

**Table 18-24**  
**Lifting for Product Group LSR, Light Straight-Run Naphtha (mb)**

<b>DATE (1)</b>	<b>PHYSICAL INVENTORY (2)</b>	<b>AVAILABLE INVENTORY (3)</b>	<b>ULLAGE (4)</b>	<b>SHIPMENT (5)</b>	<b>SHIP ID (6)</b>	<b>GRADE CODE (7)</b>	<b>SHIP NAME (8)</b>	<b>PRODUCTION RATE Mbpcd (9)</b>
1-Jun	208	122	183					5.5
2-Jun	213	127	178					
3-Jun	219	133	172					
4-Jun	224	138	167					
5-Jun	230	144	161					
6-Jun	235	149	156					
7-Jun	241	155	150					
8-Jun	246	160	145					
9-Jun	252	166	139					
10-Jun	257	171	134					
11-Jun	263	177	128					
12-Jun	268	182	123					
13-Jun	274	188	117					
14-Jun	279	193	112					
15-Jun	285	199	106					
16-Jun	290	204	101					
17-Jun	296	210	95					
18-Jun	301	215	90					
19-Jun	307	221	84					
20-Jun	312	226	79					
21-Jun	318	232	73					
22-Jun	323	237	68					
23-Jun	329	243	62					
24-Jun	334	248	57	246	C60426	I-220	SIENNA 23-25	
25-Jun	94	8	297					
26-Jun	99	13	292					
27-Jun	105	19	286					
28-Jun	110	24	275					
29-Jun	121	30	270					
30-Jun	445	35	264					

**Table 18-25**  
**Lifting for Product Group WER, Whole Straight-Run Naphtha (mb)**

<b>DATE</b> <b>(1)</b>	<b>PHYSICAL</b> <b>INVENTORY</b> <b>(2)</b>	<b>AVAILABLE</b> <b>INVENTORY</b> <b>(3)</b>	<b>ULLAGE</b> <b>(4)</b>	<b>SHIPMENT</b> <b>(5)</b>	<b>SHIP ID</b> <b>(6)</b>	<b>GRADE</b> <b>CODE</b> <b>(7)</b>	<b>SHIP</b> <b>NAME</b> <b>(8)</b>	<b>PRODUCTION</b> <b>RATE Mbpcd</b> <b>(9)</b>
1-Jun	772	546	713					34.0
2-Jun	805	579	680					
3-Jun	839	613	646					
4-Jun	874	648	611					
5-Jun	907	681	578					
6-Jun	941	715	544	225	A91460	I-210	ZENATIA	
7-Jun	751	525	734					
8-Jun	784	558	701					
9-Jun	818	592	667					
10-Jun	853	627	632					
11-Jun	887	661	598					
12-Jun	920	694	565					
13-Jun	954	728	531					
14-Jun	989	763	496					
15-Jun	1022	796	463					
16-Jun	1056	830	429					
17-Jun	1091	865	394					
18-Jun	1124	898	361					
19-Jun	1158	932	327					
20-Jun	1193	967	292	450	A91100	I-210	NORDFLEX	
21-Jun	777	551	708					
22-Jun	810	584	675					
23-Jun	844	618	641					
24-Jun	879	653	606	236	C90426	I-210	SIENNA 23-25	
25-Jun	676	450	809					
26-Jun	710	484	775					
27-Jun	745	519	740					
28-Jun	778	552	707					
29-Jun	812	586	673					
30-Jun	847	621	638					

**Table 18-26**  
**Lifting for Product Group Gasoline (mb)**

<b>DATE</b> <b>(1)</b>	<b>PHYSICAL</b> <b>INVENTORY</b> <b>(2)</b>	<b>AVAILABLE</b> <b>INVENTORY</b> <b>(3)</b>	<b>ULLAGE</b> <b>(4)</b>	<b>SHIPMENT</b> <b>(5)</b>	<b>SHIP ID</b> <b>(6)</b>	<b>GRADE</b> <b>CODE</b> <b>(7)</b>	<b>SHIP</b> <b>NAME</b> <b>(8)</b>	<b>PRODUCTION</b> <b>RATE Mbpcc</b> <b>(9)</b>
1-Jun	557	258	217					16.4
2-Jun	573	274	201					
3-Jun	590	291	184					
4-Jun	606	307	168	19	A91790	I-397R	MASCARIN	
5-Jun	523	224	251					
6-Jun	539	240	235					
7-Jun	555	256	219	26	A91820	I-395L	ASTROLOBE	
8-Jun	511	212	263					
9-Jun	527	228	247					
10-Jun	543	244	231					
11-Jun	560	261	214					
12-Jun	576	277	198					
13-Jun	593	294	181	35	A91500	I-395L	LOTTE DANICA	
14-Jun	574	275	200					
15-Jun	591	292	183	35	C90421	I-395L	TBN 10-20	
16-Jun	572	273	202					
17-Jun	588	289	186					
18-Jun	605	306	169	18	A91840	I-395L	TBN 15-20	
19-Jun	603	304	171					
20-Jun	619	320	155					
21-Jun	636	337	138					
22-Jun	652	353	122					
23-Jun	669	370	105	44	A91780	I-397L	TBN 15-23	
24-Jun	641	342	133	39	A92130	I-387	TBN 20-28	
25-Jun	619	320	155	120	A91760	I-397L	TBN 20-30	
26-Jun	253	-46	521					
27-Jun	269	-30	505					
28-Jun	286	-13	488					
29-Jun	302	3	472					
30-Jun	318	19	456					

**Table 18-27**  
**Lifting for Product Group Kerosene (mb)**

<b>DATE (1)</b>	<b>PHYSICAL INVENTORY (2)</b>	<b>AVAILABLE INVENTORY (3)</b>	<b>ULLAGE (4)</b>	<b>SHIPMENT (5)</b>	<b>SHIP ID (6)</b>	<b>GRADE CODE (7)</b>	<b>SHIP NAME (8)</b>	<b>PRODUCTION RATE Mbpcd (9)</b>
1-Jun	867	453	266					24.4
2-Jun	892	478	241					
3-Jun	917	503	216					
4-Jun	940	526	193	29	A9210	I-440	MASCARIN	
				1	A9211	I-440	MASCARIN	
				22	A9212	I-440	MASCARIN	
5-Jun	912	498	221	1	C90535	I-440	MASCARIN	
6-Jun	936	522	197					
7-Jun	961	547	172	44	A9183	I-440	ASTROLOBE	
				238	C90428	I-419	ATHENIAN CHARM	
8-Jun	704	290	429					
9-Jun	727	313	406					
10-Jun	752	338	381					
11-Jun	776	362	357					
12-Jun	801	387	332					
13-Jun	826	412	307	86	A9150	I-440	LOTTE DANICA 10-1	
14-Jun	763	349	370	199	A9160	I-400	TBN 13-15	
15-Jun	589	175	544					
16-Jun	613	199	520					
17-Jun	638	224	495					
18-Jun	663	249	470	64	A9184	I-440	TBN 15-20	
19-Jun	622	208	511					
20-Jun	647	233	486					
21-Jun	671	257	462					
22-Jun	696	440	437					
23-Jun	721	307	412					
24-Jun	744	330	389					
25-Jun	769	355	364					
26-Jun	793	379	340	80	C90634	I-419	TBN 21-30	
27-Jun	738	324	395					
28-Jun	763	349	370					
29-Jun	786	372	347					
30-Jun	811	397	322					

**Table 18-28**  
**Lifting for Product Group Diesel (mb)**

<b>DATE</b>	<b>PHYSICAL INVENTORY</b>	<b>AVAILABLE INVENTORY</b>	<b>ULLAGE</b>	<b>SHIPMENT</b>	<b>SHIP ID</b>	<b>GRADE CODE</b>	<b>SHIP NAME</b>	<b>PRODUCTION RATE Mbpcd</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>	<b>(6)</b>	<b>(7)</b>	<b>(8)</b>	<b>(9)</b>
1-Jun	873	609	438	1	AC2878	I-888		83.3
				1	AJ2133	I-888	AL JABER III	
				90	C20425	I-888	NEWTYNE	
				45	C20425			
2-Jun	910	646	401	1	GB2263	I-888	STRIKER	
3-Jun	991	727	320	2	AJ2134	I-888	ALJABER IV	
4-Jun	849	585	462	12	A29179	I-885	MASCARIN	
				9	A29210	I-885	MASCARIN	
				14	A29211	I-885	MASCARIN	
				12	A29212	I-885	MASCARIN	
				0	GB2269	I-888	SAFANIA	
				13	C290535	I-885	MASCARIN	
5-Jun	872	608	439	1	AJ2135	I-888	ALJABER III	
					GB2270	I-888	CHELSEA	
6-Jun	955	691	356	1	GB2268	I-888	OCEAN TRAMP	
7-Jun	1029	765	282	184	A29177	I-800	TEAM FROSTA	
				41	A29183	I-888	ASTROLOBE	
				37	C20538	I-888	ASTROLOBE	
8-Jun	850	586	461	3	AC2873	I-888	USS PUGET SOUND	
9-Jun	930	666	381	203	A29197	I-888	OSCO SAILOR	
				45	C20433	I-888	NEWTYNE	8-10

10-Jun	766	502	545	4	AC2882	I-888	USS SPICA
11-Jun	845	581	466				
12-Jun	929	665	382	255	A29149	I-876	PARRIOT
13-Jun	756	492	555	66	A29150	I-888	LOTTE DANICA 10-1
14-Jun	729	465	582	37	A29214	I-888	FALL VII 12-15
15-Jun	775	511	536				
16-Jun	859	595	452				
17-Jun	942	678	369				
18-Jun	1025	761	286	222	A29117	I-888	GEORGIA
19-Jun	516	252	795	3	AC2874	I-888	USS PUGET SOUND
20-Jun	597	333	714	5	AC2883	I-888	USS LA SALLE
				255	A29172	I-876	COURIER
				45	C20536	I-888	NEW TYNE 19-21
				90	C20427		
21-Jun	375	111	936				
22-Jun	459	195	852				
23-Jun	541	277	770				
24-Jun	625	361	686	3	AC2875	I-888	USS PUGET SOUND
25-Jun	705	441	606	185	A 29115	I-888	TBN 20-30
				148	C20427	I-888	TBN 20-30
				45	C20537	I-888	NEW TYNE 24-26
				190	C20427		
26-Jun	411	147	900	80	C20634	I-419	TBN 21-30
27-Jun	494	230	817				
28-Jun	577	313	734	222	A29147	I-888	TBN 25-30
29-Jun	438	174	873	45	C20635	I-888	TBN 28-30
30-Jun	477	213	834				

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**Table 18-29**  
**Lifting for Product Group Fuel Oil (mb)**

<b>DATE (1)</b>	<b>PHYSICAL INVENTORY (2)</b>	<b>AVAILABLE INVENTORY (3)</b>	<b>ULLAGE (4)</b>	<b>SHIPMENT (5)</b>	<b>SHIP ID (6)</b>	<b>GRADE CODE (7)</b>	<b>SHIP NAME (8)</b>	<b>PRODUCTION RATE Mbpcd (9)</b>
1-Jun	602	272	1200					63.6
2-Jun	666	336	1136					
3-Jun	729	399	1073					
4-Jun	793	463	1009	6	GA265	I-961	MASCARIN	
5-Jun	851	521	951					
6-Jun	914	584	888					
7-Jun	978	648	824	130	A9216	I-961	AL HAMIRA 6-8	
8-Jun	582	252	1220					
9-Jun	646	316	1156	518	A9144	I-961	SEA JEWEL	
10-Jun	184	-146	1618					
11-Jun	247	-83	1555					
12-Jun	311	-19	1491					
13-Jun	374	44	1428	32	A9150	I-961	LOTTE DANICA 10-1	
14-Jun	406	76	1396					
15-Jun	470	140	1332					
16-Jun	533	203	1269					
17-Jun	597	267	1205	130	A9154	I-961	HAMIRA 15-18	
18-Jun	530	200	1272					
19-Jun	594	264	1208					
20-Jun	658	328	1144					
21-Jun	721	391	1081					
22-Jun	785	455	1017					
23-Jun	848	518	954					
24-Jun	912	582	890					
25-Jun	976	646	826					
26-Jun	1039	709	763	65	A9056	I-961	HAMIRA 25-27	
27-Jun	892	562	910					
28-Jun	955	625	847	518	A9083	I-961	TBN 25-30	
29-Jun	501	171	1301					
30-Jun	565	235	1237					

**Table 18-30**  
**Lifting for Product Group Asphalt (mb)**

<b>DATE</b> <b>(1)</b>	<b>PHYSICAL</b> <b>INVENTORY</b> <b>(2)</b>	<b>AVAILABLE</b> <b>INVENTORY</b> <b>(3)</b>	<b>ULLAGE</b> <b>(4)</b>	<b>SHIPMENT</b> <b>(5)</b>	<b>SHIP ID</b> <b>(6)</b>	<b>GRADE</b> <b>CODE</b> <b>(7)</b>	<b>SHIP</b> <b>NAME</b> <b>(8)</b>	<b>PRODUCTION</b> <b>RATE Mbpctd</b> <b>(9)</b>
1-Jun	59	45	-11	5	BA3101	I-1138		2.7
2-Jun	56	42	-8					
3-Jun	60	46	-12	7	B39215	I-1138	AL JABER 4	
4-Jun	55	41	-7	6	B39218	I-1138	NEWQUAY	
5-Jun	52	38	-4	5	BS3116	I-1149		
6-Jun	49	35	-1					
7-Jun	52	38	-4					
8-Jun	55	41	-7					
9-Jun	58	44	-10	7	BA3102	I-1138	SEA JEWEL	
10-Jun	53	39	-5					
11-Jun	56	42	-8					
12-Jun	58	44	-10					
13-Jun	62	48	-14					
14-Jun	64	50	-16					
15-Jun	67	53	-19					
16-Jun	69	55	-21	7	BA3103	I-1138	ALJABER 3	
17-Jun	58	44	-10					
18-Jun	61	47	-13	6	B39219	I-1138	NEWQUAY 17-19	
19-Jun	58	44	-10					
20-Jun	60	46	-12					
21-Jun	63	49	-15					
22-Jun	60	46	-12					
23-Jun	64	50	-16					
24-Jun	66	52	-18					
25-Jun	69	55	-21					
26-Jun	71	57	-23	6	BS3118	I-1149	AL JABER 2	
27-Jun	68	54	-20	6	B39220	I-1138	NEWQUAY 26-28	
28-Jun	65	51	-17					
29-Jun	68	54	-20	5	BA3105	I-1138	AL JABER 2	
30-Jun	65	51	-17					

each product group, are used for future physical inventory forecasts. LI and HI data for every product group tankage (Chapter 17) is used to estimate the available inventory:

Available inventory = physical inventory – LI.

Total volume available for storing a product group = (HI – LI)

(HI – LI) = actual inventory + ullage

where ullage is estimated from the preceding relationship. The rest of format for a single-ownership IUFS system is almost identical to that for joint-ownership refineries discussed earlier.

The IUFS is updated every time that

- A new refinery production estimate is done, typically, once a week. Refinery new production rates, for all product groups, based on the new estimate, are entered in IUFS.
- The tankage capacity in a product group service is revised (due to releasing a storage tank for maintenance or adding a tank, put back in service after maintenance).
- There is a change in the ETA of a ship, a new shipment is inserted, or data on an existing projected shipment is revised.