CHAPTER 4

Oil Inventory Simulation and Example

Oil inventory simulation program is a developed simulator for calculating statistic liquid quantities, at atmospheric conditions, in upright cylindrical tanks. The information needed is oil level, FW level, product temperature, ambient temperature, density. It will also be necessary to have the capacity table and applicable correction factor tables or subroutines. Any deduction that is inappropriate for a particular application will be a zero deduction, and any correction that is inappropriate will be held at 1.00000.

4.1 Simulation Volume Based Calculation Procedure

The calculation sequence follows that of the preceding section. The flow is as follows (see appendix A ,Figure A-1):

TOV → GOV → GSV

- With the oil level or gauge, enter the capacity table and records the TOV, as recorded in the table.
- b) Subtract any gauged FW volumes. The FW volume is obtained by entering the capacity table with the gauged FW level.
- c) Apply the CTSh to arrive at the GOV.
- d) Correct this quantity for any applicable FRA.
- e) Calculate API gravity @ 60 °F for finds value of CTL. The API gravity @ 60 °F is calculated by entering the API gravity observed temperature and temperature in hydrometer.
- f) Correct the GOV to standard temperature. This is done by multiplying and dividing the GOV with the CTL at 60 °F and the CTL at 86 °F to arrive at the GSV.

The mathematical formulae for the various required values can be expressed as follows:

$$GSV = \left\{ \left((TOV - FW) \times (CTSh) \right) \pm FRA \right\} \times CTL$$

4.2 Simulation Data

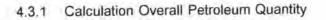
The first of data is table quantity of upright cylindrical, the calibration of vertical cylindrical tanks has been used and is a recognized method of determining the capacity of storage tanks from measurements of the circumference of a tank at various heights. These table calibration by reference ISO 7507. Oil level and FW level will be converted to quantity from table quantity of tanks.

The second of data is tank data such as weight of roof and material of tank (coefficient of expansion of material used 0.0000062 for mild steel tanks). Floating roof adjustment (FRA) and correction for the effect of temperature on the steel shell of the tank (CTSh) which will be calculated by this data.

The third of data is sampling of product such as API gravity observed temperature, hydrometer temperature and temperature of product in tanks. API gravity @ 60°F, volume correction factor (VCF or CTL) will be calculated by this data.

These data input are useful for calculating quantity petroleum in tanks which will be using equation from Chapter 3.

4.3 Simulation Flow Diagram



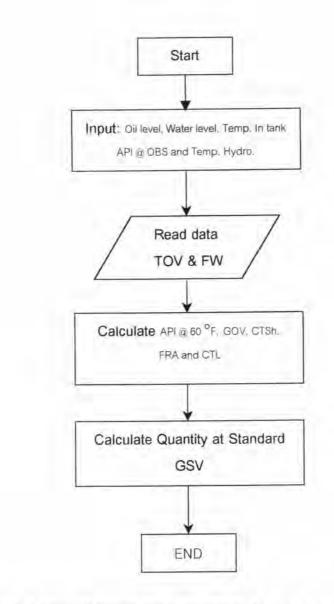


Figure 4-1 Flow Diagram for Calculation Overall Petroleum Quantity

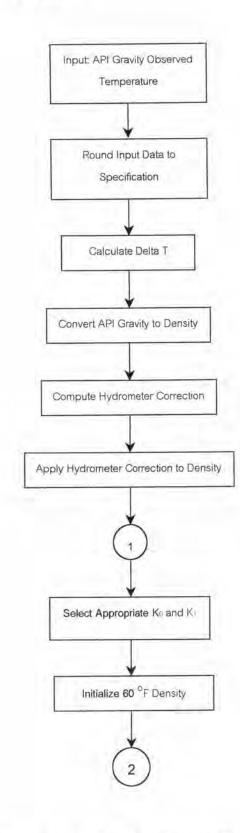
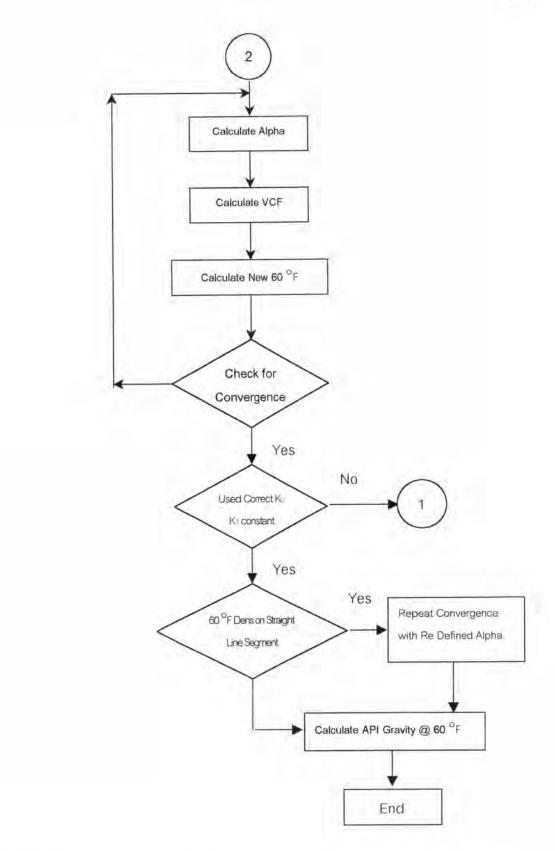
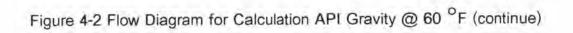


Figure 4-2 Flow Diagram for Calculation API Gravity @ 60 °F





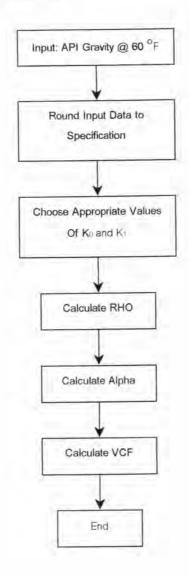


Figure 4-3 Flow Diagram for Calculation VCF

- c) Tank data
- d) Type of product
- e) Relation of Product

Scant O C I I I I I I I I I I I I I I I I I I	ster Iransaction Rep	ort <u>U</u> til E <u>s</u> it				
Iank Product Product	Zoubert.					
Produce Pglation Produce Pro						
Rglation Product						

Figure 4-5 Master Data Menu

The calculation of this simulation will be started from database of quantity table, company name, plant name, Tank number, Type of products, displacement volume table and remain volume table.

4.4.2.1 Company Data Menu

a) Add company data (see figure 4.6)

- Use menu path: Master → Company → Add Company Choose Add company menu next screen will be appears. 4.4.1 Main Menu

The program starts from Main menu as shown in Figure 4.4. There are five menus in this screen.

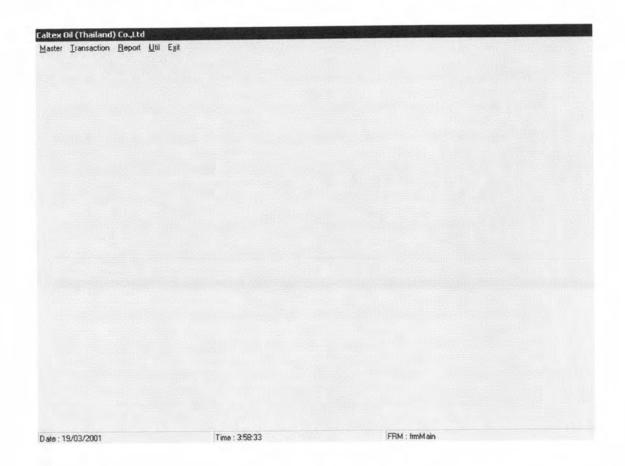


Figure 4-4 Main Menu

4.4.2 Master Data Menu

This menu consists of the following items of data for selection and input. (see Figure 4.5)

- a) Company data
- b) Plant data

	Caltex Oil (Thailand) (0.,			
		Add Com	pany Master	0	
		Comp Code :	2		
		Name English :	hulalongkom University		
		Name Thai :	มหาวิทยาลัยจุฬาลงกรณ์		
		Address1 :	Test	近時到8月前 1	
		Address2 :	Test		
		Address3 :	Test		
		ZipCode :	12130		¥
		Telephone :	2852698		
		Fax:	2852700		
	Save				
	Date : 19/03/2001	Time: 4:			
		1 8118 . 4,	50:03	- Ches	
19/03/2001		4:50:03		t : fmMain	
	Time :			l : fmMain	
: 19/03/2001 Hongaansi boogaan Maryaalaan Ba	Time :			I : fmM ain	
w OIE (Thailand) Co	Time :	4:50:03		1 : fmM ain	
w OIE (Thailand) Co	Time : st td pan এট ট১গ	4:50:03		t : fmMain	
w OIE (Thailand) Co	Time : st td pan এট ট১গ	4:50:03 10:110 Add Corr	FRM		
w OIE (Thailand) Co	Time : st td pan এট ট১গ	4:50:03 touto Add Carr Comp Code :	FRM npany Master		
w OIE (Thailand) Co	Time : st td pan এট ট১গ	4:50:03 10:110 Add Corr	FRM		
w OIE (Thailand) Co	Time : Set 1 port 12 5 524 Colless oil (Thistiand)	4:50:03 Could Corr Comp Code : Name English :	FRM npany Master		
w OIE (Thailand) Co	Time : או עוד פאי Coffees tol (Thatand)	4:50:03 Could Corr Comp Code : Name English :	FRN npany Master		
w OIE (Thailand) Co	Time : Set Life Egr Catters Od (Thistend)	4:50:03 Could Corr Comp Code : Name English :	FRN npany Master		
w OIE (Thailand) Co	Time : Set Life Egr Catters Oil (Thisteard)	4:50:03 Add Corr Comp Code : Name English : Insert Company Com	PRM Pany Master 2 Inulaiongkom University plete. Are you want to add Co		
w OIE (Thailand) Co	Time : Set Life Egr Catters Oil (Thisteard)	4:50:03 Add Corr Comp Code : Name English : Insert Company Com	PRM Pany Master 2 Inulaiongkom University plete. Are you want to add Co		
w OIE (Thailand) Co	Time : Set Life Egr Catters Oil (Thisteard)	4:50:03 Add Carr Comp Code : Name English : Insert Company Com	FRM npany Master 2 hulalongkom University plete. Are you want to add Co		
w OIE (Thailand) Co	Time : Set Life Egr Catters Oil (Thisteard)	4:50:03 Add Carr Comp Code : Name English : Insert Company Com Series Telephone :	IFRN Inpany Master 2 Inulaiongkom University piete. Are you want to add Co		
w OIE (Thailand) Co	Time : J. M port _1,10 Ep/ Calcor Off (Thadard) Calcor Off (Thadard)	4:50:03 Add Carr Comp Code : Name English : Insert Company Com Series Telephone :	IFRN Inpany Master 2 Inulaiongkom University piete. Are you want to add Co	mpary?	
w OIE (Thailand) Co	Time : Set Life Egr Catters Oil (Thisteard)	4:50:03 Add Carr Comp Code : Name English : Insert Company Com Series Telephone :	IFRM Inpany Master 2 hulalongkom University plete. Are you want to add Co No 2852698 2852700		

Figure 4-6 Add Company Menu

Follow in action click button "Save " and click button "Yes " the data will be kept in database table.

b) Edit company data (see figure 4.7)

- Use menu path: Master — Company — Edit / Delete Company Choose Edit / Delete Company menu next screen will be appears.

Caltex Oil (Thailand) Co.,Ltd			
E	dit / Delete Company N	laster	0
Comp No. : 2	Company Name :	Chulalongkorn University	
Comp No. Name Engl	ish	Name Thai	
1 Test1	orn University Thailand) Ltd.	Test1 มหาวิทยาลัยจุฬาลงกรณ์ บริษัท น้ำมันคาลเท็กซ์(ไเ	าย)จำก่
			1
			-1
LLL I			1 ⁻
BEat CO	elete		
Date: 19/03/2001	Time : 5:23:58		and an and the second

Figure 4-7 Edit / Delete Company Menu

In this screen user can be edit or delete data as show wrong data. Follow in action click button " Edit " next screen will be appears.

Coll (Thailand) Co.,Ltd Edit Company Master Comp No : Name English : Chulalongkom University Name Thai : µmາวิnunăuŋฟาลงกรณ์ Address1 : Test1 Address3 : Test1 ZipCode : 12130 Telephone : Fax : 2852700	tener (al (finition)) (;	¥4[[14]		
Comp No : Name English : Chulalongkom University Name Thai : มหาวิทบาลัยๆหาลงกรณ์ Address1 : Test1 Address3 : Test1 Address3 : Test1 ZipCode : 12130 Telephone : 2852638 Fax : 2852700	Caltex Oil (Thaila	nd) Co.,Ltd		
Name English : Chulalongkom University Name Thai : มหาวิทยาลัยจุฬาลงกรณ์ Address1 : Test1 Address2 : Test1 Address3 : Test1 ZipCode : 12130 Telephone : 2852698 Fax : 2852700		Edit Com	pany Master	81
Name English : Chulalongkom University Name Thai : มหาวิทยาลัยจุฬาลงกรณ์ Address1 : Test1 Address2 : Test1 Address3 : Test1 ZipCode : 12130 Telephone : 2852698 Fax : 2852700		Comp No :	2	
Address1 : Test1 Address2 : Test1 Address3 : Test1 ZipCode : 12130 Telephone : 2852638 Fax : 2852700			Chulalongkorn University	_
Address2 : Test1 Address3 : Test1 ZipCode : 12130 Telephone : 2852698 Fax : 2852700		Name Thai :	มหาวิทยาลัยจุฬาลงกรณ์	
Address3 : Test1 ZipCode : 12130 Telephone : 2852698 Fax : 2852700		Address1 :	Test1	
ZipCode : [12130 Telephone : [2852698 Fax : [2852700				
Telephone : 2852698 Fax : 2852700				
Fax: 2852700				
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Date	: 19/03/	2001
m. exem		

Callest OF (Tholland) Could	
Ealtest Off (Thailand) Co., Ud	
Edit Company Master	
Comp No : Chulalongkorn University	
Are you want to update ? Yes No	
Telephone : 2852698 Fax : 2852700	
Save Dose -	

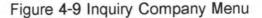
Figure 4-8 Edit Company Screen

Follow in action click button "Save "and click button "Yes " the data will be changed and update in database table.

c) Inquiry company data (see figure 4.9)

- Use menu path: Master \rightarrow Company \rightarrow Inquiry Company Choose Inquiry Company menu next screen will be appears. In this menu use for display data only.

Caltex Oil (Thailand) Co _n Ltd Inquiry	Company Master	0 -
Comp_NameThai	Comp_NameEng	Add test
▶ Test มหาวิทยาลัยจุฬาลงกรณ์	Test Chulalongkorn University	Test
บริษัท น้ำมันคาลเท็กซ์(ไทย)จำกัด	Caltex Oil(Thailand) Ltd.	104/
u		¹



4.4.2.2 Plant Data Menu

- a) Add plant data (see figure 4.10)
- Use menu path: Master → Plant → Add Plant

Choose Add Plant menu next screen will be appears. In this menu used update plant name in database.

	Caltex Oil (Thailand) Co.,Ltd		
	Add Plant Master	3	
	Plant No. : 2 Name English : [Chulalongkorn University Name Thai. : [มหาวิทยาลัยจุฬาลงกรณ์		
		58	
ite : 19/03/2001	Time : 6:09:10 FRM : frmMai	2	
ex Oil (Thailand) Co.	Ltd		
ex Oil (Thailand) Co.	Ltd	2	
tex OI (Thailand) Co.	Ltd xi Lthe Egel Collees Oil (Thodosed): Co.dtd		
te : 19/03/2001	Ltd xi Lthe Egel Collees Oil (Thodosed): Co.dtd		
tex OI (Thailand) Co.	Ed Sri Lite Eyd Calteer Off (Thisdeard): Coult to Add Plant Master Confirm X insert Plant Complete. Are you want to add Plant?		

Figure 4-10 Add Plant Menu

b) Edit / Delete plant data (see figure 4.11)

Use menu path: Master → Plant →Edit / Delete Plant
 Choose Edit / Delete Plant menu next screen will be appears. In this menu used change plant data and update plant data in database.

	Caltex Oil (Thailand) Co.,Ltd Edit / Delete Plant Master	
	Plant No. : 2 Plant Name : Chulalongkom University	
	Plant No. Name English Name Thai 1 Test1 2 Chulalongkorn University 6681 Surattani	
	11 1 20100 1 2010 1 20	
9/03/2001	Time : 6:20:51 FRIM : ImMain	
oil (Noiland) Co.,13		
Oil (Thailand) Co.,13	Edit / Delete Plant Master	
1970372001 COLLECTIONO FORM Transmine Darser	Edit / Delete Plant Master	
Oil (Thailand) Co.,13	Letter Dif (Thailand) Co.,Ltd	
oil (Noiland) Co.,13	Contex tol (thailand) Coult Edit / Delete Plant Master	

Figure 4-11 Edit / Delete Plant Menu

c) Inquiry plant data (see figure 4.12)

- Use menu path: Master -> Plant -> Inquiry Plant

Choose Inquiry Plant menu next screen will be appears. In this menu used display plant name in database only.

Caltex Oil (Tha	iland) Co.,Ltd Inquiry Plant M	aster 🕴	
Plant N	o. NameEnglish Test1	NameThai Test2	A
2 6681	Chulalongkom University (TEST Surattani	มหาวิทยาลัยจุฬาลงกรณ์ (TEST) สุราษฎร์ธานี	
			_
			-
4		<u>n c</u> o	ise -

Figure 4-12 Inquiry Plant Menu

4.4.2.3 Tank Data Menu

a) Add Tank data (see figure 4.13)

- Use menu path: Master -> Tank ->Add Tank

Choose Add Tank menu next screen will be appears. In this menu used update Tank name and weight of roof in database.

	Caltex Oil (Thailand) Co.,Ltd			
	4	Add Tank Master	8	
	Plant No. : Tank No. : Roof Weight : Name English : Name Thai :	Test 1 15045 Test		
	Save			
		ime : 6:56:15		
Date : 19/03/2001 19/03/2001 19/0500 Teamon End	Time : 6.56.15	FFIN	I : fmMain	
altes Oil (Thailand) Co		FRM	t : fmMain	
		FR	t : fmMain	
akes Oil (Tosland) Co	Litid Covit Litid Ega Confrees red (Thankord) For. 11d	FRM Add Tank Master	t: fmMain	
akes Oil (Tosland) Co	utd coll Lis Ega Colless nd (thatfored) Lo. 11d Confirm			
altes Oil (Tosland) Co	Litid Colleas rol (thostored) to Litid Confirm	Add Tank Master Iant Complete. Are you want to add Ple		

Figure 4-13 Add Tank Menu

b) Edit / Delete Tank data (see figure 4.14)

- Use menu path: Master -> Tank ->Edit / Delete Tank

Choose Edit / Delete Tank menu next screen will be appears. In this menu used change Tank name and weight of roof in database.

	Caltex Oil (Thailand) (State of the state of the			0	
		Edit / Dele	ete Tank Master		01	
	Plant : Chulalongkorn	Uni Tank No.	: Test Tank Na	me : Test		
	Plant Name	Tank No.	Name English	Name Thai	-	
	Test1 Chulalongkom Univ	T-1	Test 1 Test	Test 1 Test		
	Surattoni	1-1	Tank 1	แทงศัพนึง		
	Surattani	T-2	Tank 2	แทงที่สอง		
	Surattani	T-3	Tank 3	แทรศ์สาม	5.0	
	Surattani	T-4	Tank 4	นทงศ์สี นทงศ์ท้า		
	Surattani	T-5	Tank 5 Tank 6	แทงที่ทก		
	Surattani	T-6 T-8	Tank 8	แทรค์แปด		
	Surattani	1-9	Tank 9	แทงพ์เก้า		
	41				1	
		Delete			L Close	
		OB Delete				
					and the second	
03/2001 Ferminato Roak Transciwi - Ecco	d	713.51		FBM : InnMe	in	
k (Tholond) Costs	d			FBM : InnMa	in	
k (Tholond) Costs	d 1 <u>1</u> 01 ESA	414	ete Tank Master	FBM : hmM4	n (2)	
k (Tholond) Costs	d 1 <u>1</u> 01 ESA	J. H Edit / Delt		FRM : ImmMa		
k (Tholond) Costs	d 1 101 Est (Setter 01 (1155 And)) Co	utol Edit/Delo huni Tank No.				
k (Tholond) Costs	d 1 101 Est College of (155,000) Co Plant : [Chulalongkorn	Edit / Deli Edit / Deli n Uni Tank No o,Ltd	a : Test Tank N		0	
k (Tholond) Costs	d 1 101 Est College of (155,000) Co Plant : [Chulalongkorn	Edit / Deli Edit / Deli n Uni Tank No o,Ltd				
k (Tholond) Costs	d 1 101 Est College of (155,000) Co Plant : [Chulalongkorn	Ltd Edit / Deli n Uni Tank No. s.,Ltd Edit	i : <mark>Test Tank N</mark> I Temk Mester	ame : Test	0	
k (Tholond) Costs	d 1 101 Est College of (155,000) Co Plant : [Chulalongkorn	Ltd Edit / Del NUmi Tank No. NuLtd Edit Plant Name :	t Tank Master	ame : Test	0	
k (Tholond) Costs	d 1 101 Est College of (155,000) Co Plant : [Chulalongkorn	Edit / Dele Edit / Dele NUni Tank No. NUtd Edit Plant Name : Tank No.	t Tenk Mester	ame : Test	0	
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k (Tholond) Costs	d 1 101 Est College of (155,000) Co Plant : [Chulalongkorn	Edit / Dele Edit / Dele NUni Tank No. NUtd Edit Plant Name : Tank No.	t Tenk Mester	ame : Test	0	
k (Tholond) Costs	d 1 101 Est College of (155,000) Co Plant : [Chulalongkorn	Edit / Delo Edit / Delo NUINI Tank No NUINI Edil Plant Name : Tank No. Name English	t Tenk Mester	ame : Test	0	
k (Tholond) Costs	d 1 101 Est College of (155,000) Co Plant : [Chulalongkorn	Edit / Delo Edit / Delo NUINI Tank No NUINI Edil Plant Name : Tank No. Name English	t Tenk Mester	ame : Test	0	
k (Tholond) Costs	d 1 101 Est College of (155,000) Co Plant : [Chulalongkorn	Edit / Delo Edit / Delo NUINI Tank No NUINI Edil Plant Name : Tank No. Name English	t Tenk Mester	ame : Test	0	
k (Tholond) Costs	d 1 101 Est College of (155,000) Co Plant : [Chulalongkorn	Edit / Delo Edit / Delo NUINI Tank No NUINI Edil Plant Name : Tank No. Name English	t Tenk Mester	ame : Test	0	

Figure 4-14 Edit / Delete Tank Menu

c) Inquiry plant data (see figure 4.15)

- Use menu path: Master → Tank →Inquiry Tank

Choose Inquiry Plant menu next screen will be appears. In this menu used display plant name and tank name in database only.

		Inquiry Tank Mast	er	0	
Plant Name	Tank N	o. Name Eng	Name Thai	<u>*</u>	
Test1	T-1	Test 1	Test 1	-	
Chulalongkom U	niv:Test	Test	Test		
Surattani	T-1	Tank 1	แทงทัพนึง		
Surattani	T-2	Tank 2	แทงท์สลง		
Surattani	T-3	Tank 3	แทงค์สาม		
Surattani	T-4	Tank 4	แทงท์สี		
Surattani	T-5	Tank 5	แทงท์ท้า		
Surattani	T-6	Tank 6	แทงท์ทก		
Surattani	T-8	Tank 8	แทงค์แปต		
Surattani	T-9	Tank 9	แทงค์เก้า		
				-	
1.1				·	1
			F	D Close	-

Figure 4-15 Inquiry Tank Menu

4.4.2.4 Type of product Menu

a) Add Product Menu (see figure 4.16)

- Use menu path: Master -> Product -> Add Product

Choose Add Product menu next screen will be appears. In this menu used update product number and product name in database.

readd (thofbort) to did corr Transaction <u>Besson</u> Urt			
	Caltex Oil (Thailand) Co.,Ltd		
	Add Product Master		
	Product No. : 390728		
	Name English : Unleaded Gasoline Octane 91		
	Name Thai: น้ำมันเป็นชินธรรมตาไร้สารตะกั่ว		
	Save Di Dose		
	5		
	Date : 22/03/2001 Time : 2:43:04		
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	Confirm Insert Product Complete. Are you want to add Product again?		
	Confirm		
	Confirm X Insert Product Complete. Are you want to add Product again? Yes No		
	Confirm Insert Product Complete. Are you want to add Product again?		
	Confirm Add Product Massier Confirm Insert Product Complete. Are you want to add Product again? Yes No Yes No		
en un (riselteré) troitui en l'interior in Report 114	Confirm X Insert Product Complete. Are you want to add Product again? Yes No		
	Confirm Add Product Massier Confirm Insert Product Complete. Are you want to add Product again? Yes No Yes No		
	Confirm Add Product Massier Confirm Insert Product Complete. Are you want to add Product again? Yes No Yes No		

Figure 4-16 Add Product Menu

b) Edit / Delete Product data (see figure 4.17)

Use menu path: Master → Product → Edit / Delete Product
 Choose Edit / Delete Tank menu next screen will be appears. In this
 menu used change product number and product name in database.

Calte	x Oil (Thailand) Co	x,Ltd			
		Edit / Delete Pro	duct Master	0	
	Product No : 3	0728 Product Na	me : Unleaded Gasoline Octane S	n	
	Product No. Na	me English	Name Thai	<u> </u>	
	1 11 390628 Un ▶ 390728 Un	lead Gasoline Octane 95 leaded Gasoline Octane 91 «Dil	11 น้ำมันเบนชินพิเศษไร้สารตะกัว น้ำมันเบ็นชินธรรมดาไร้สารตะกัว น้ำมันดีเซล		
				-	
	1			٢, ٢, ٢, ٢, ٢, ٢, ٢, ٢, ٢, ٢, ٢, ٢, ٢, ٢	
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et 2 @ \$ R ; narsolar Barar 9	22/03/2001	Time : 2:48:34	nduct Master Master	0	
et 2 @ \$ R ; narsolar Barar 9	22/03/2001	Time : 2:48:34	nduct Master Master ed Gasoline Octane 31 (Test) วันซินธรรมตาไร้สารตะกัว(Test)	0	
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Figure 4-17 Edit / Delete Product Menu

c) Inquiry Product data (see figure 4.18)

Use menu path: Master → Product → Inquiry Product
 Choose Inquiry Product menu next screen will be appears. In this menu used display product number and product name in database only.

Product No. Name English Name Thai 1 11 11 330528 Unlead Gasoline Octane 95 น้ำมันเบินธินพิเศษไร้สารตะกั่ว 330728 Unleaded Gasoline Octane 91 น้ำมันเป็นธินรรรมตาไร้สารตะกั่ว 850028 GasOil น้ำมันดีเชล		Inquiry Prode	uct Master	8
1 11 11 330628 Unlead Gasoline Octane 95 น้ำมันเบนธินพิเศษไร้สารตะกั่ว 330728 Unleaded Gasoline Octane 91 น้ำมันเป็นธินรรรมตาไร้สารตะกั่ว 850028 GasOi น้ำมันดีเชล	Product N	o Name English	Name Thai	-
	1 390628 390728	11 Unlead Gasoline Octane 95 Unleaded Gasoline Octane 91	11 น้ำมันเบนซินพิเศษไร้สารตะกั่ว น้ำมันเบ็นซินธรรมดาไร้สารตะกั่ว	
				_
L				
				<u>ب</u>

Figure 4-18 Inquiry Product Menu

4.4.2.5 Relation of product Menu

a) Add Relation Product Menu (see figure 4.19)

- Use menu path: Master \rightarrow Relation Product \rightarrow Relation Product

Choose Add Relation Product menu next screen will be appears. In this menu used integrate plant name, tank number and type of product when user update relation of these data in database, program will show plant name relate with tank number and type of product.

	Add Relation	nb Plant - Tank - Pro	duct	8
	Plant :	Surattani	•	
	Tank :	Tank 9	-	
	Product :	Unleaded Gasolin	e Octane 🕄 💌	
	1			In Close
Date : 22/03/2001		: 3:20:36		
l td	🖉 Delphi S 🏼 🏹	Stock <u>A</u> teelek	Thesis	
and on us and	🖉 Delphi S 🏾 🕼	Stock (A)teelek	m∰Thesis	
.j.td		Stock <u>A</u> teelek	Thesis	
und par Qis Egr	ndj Ca.114	Stock (A)teelek		
und par Qis Egr	ndj Ca.114			
und par Qis Egr	ndj coutd Add Relation		oduct	
und par Qis Egr	ndi ce 11d Add Relation Confirm	nb Plant-Tank-Pro	oduct	
und par Qis Egr	ndi ce 11d Add Relation Confirm	nb Plant - Tank - Pro nt Complete. Are you wan	oduct	
und par Qis Egr	ndi ce 11d Add Relation Confirm	nb Plant - Tank - Pro nt Complete. Are you wan	oduct	

Figure 4-19 Add Product Menu

b) Edit / Delete Relation Product data (see figure 4.20)

- Use menu path: Master --> Relation Product --> Delete

Relation Product

Choose Delete Relation Product menu next screen will be appears. In this menu used change integrate plant name, tank number and type of product in database.

Caltex Oil (Thail	and) Co.,Ltd		
	Delete Rela	tion Plant - Tank - Product	0
Plant : Chu	ulalongkom University (Tar	nk : Test Product : 11	
Plant Nar	ne Tank Name	Product Name	-
Surattani	Tank 1	Unlead Gasoline Octane 95	
Surattani	Tank 2	Unlead Gasoline Octane 95	
Surattani	Tank 3	Unlead Gasoline Octane 95	
Surattani	Tank 4	Unlead Gasoline Octane 95	
Surattani	Tank 5	GasOil	
Surattani	Tank 6	GacOil	_
Surattani	Tank 8	GasOil	
Surattani	Tank 9	Unleaded Gasoline Octane 91	
► Chulalon	akom Test	11	
t			
			*

mastart 山@島既以家 * 型Dephis 山teelek 题Thesis-.... 優好國人の人の回る 3:30

Tabes de Clinitenti Custol Delete R	telation Plant - Tank - Product	0
Plant: Chulalongkorn University (Tank : Test Product : 11	
Plant Name Tank, Name	Product Name	
Surattani Tank 1 Surattani Tank 2 Info	Intend Gasoline Octage 95 emation	
Surattani Tank 3	Delete Relation Complete. re 95	-
Surattani Tank 4 Surattani Tank 5	e 95	
Surattani Tank 6	OK	
Surattani Tank 8 Surattani Tank 9	Unleaded Gasoline Octane 91	
Chulalongkom I Test	11	
		-
Ca Delete		II. Slove
have a second se	3 32 33	the second se

Figure 4-20 Delete Relation Product Menu

c) Inquiry Product data (see figure 4.21)

Choose Inquiry Relation Product menu next screen will be appears. In this menu used display integration of plant name, tank number and product name in database only.

 altex Oil (Thailand) C	Inquiry Relation Plan	t-Tank-Product	0
Plant Name	Tank Name	Product Name	-
Surattani	Tank 1	Unlead Gasoline Octane 95	
Surattani	Tank 2	Unlead Gasoline Octane 95	
Surattani	Tank 3	Unlead Gasoline Octane 95	
Surattani	Tank 4	Unlead Gasoline Octane 95	
Surattani	Tank 5	GasOil	
Surattani	Tank 6	GasOil	
Suratlani	Tank 8	GasOil	
Surattani	Tank 9	Unleaded Gasoline Octane 91	
			-1.1
			-1
41			1 ⁻
			Close
			Contrast Contrastante

Figure 4-21 Inquiry Relation Product Menu

4.5 Simulation Inventory of Petroleum in Tank

When the transaction menu is selected to calculate inventory of petroleum, the following menu of data entry will appear consecutively.

The program has run from selection add tank gauging from **Transaction** menu, followed with updated data in database as mentioned in 4.4.2. This menu has five data necessary to input as follow in action:

-Use menu path: Transaction \rightarrow Tank Gauging \rightarrow Add Gauging

Choose Add Gauging menu next screen will be appears. In this screen input data entry Oil level, Water level, Temp in tank (temperature of products in tanks), API @ OBS and Temp Hydro. When user input all data in this screen program will be calculation value of API @ 60° F, CTSh (effect of temperature on steel shell of tanks), GOV, VCF @ 60° F, VCF @ 86° F and GSV.

Follow in action click button " Save " the data as updated in database for run report in next step.

	Date :	22/3/2001		Tank No. :	Tank 9	
	Location :	Surattani			Unleaded Gasoline Octane 91	
			Oil Level (mm.) :	3653.0		
			Water Level (mm.):	15		
			Temp. In Tank ('F) :	88.0		
			API @ 085. :	60.0		
			Temp @ HYDRO. ('F):	140.0		
			API @ 60F :	50.8		
		(Diserved Volume (Its.):	713,052		
			Water Volume (Its.):	73.98		
			Temp Factor :	1.00002		
			Gross Volume (Its.):	689.143		
			Roof Volume (Its.):	2.450		
			Net Volume (Its.):	686.575		
			Multipier @ 60 °F :	0.3829		
			Multipier @ 86 F :	0.3941		
			Liter @ 60 'F :	674/300		
			Liter @ 86 'F :	685,819		
	Save	.				
Data	22/03/200		Time : 4:24:31			

Figure 4-22 Add Gauging Menu

-Use menu path: Transaction → Tank Gauging → Edit/Delete Gauging Choose Edit/Delete Gauging menu next screen will be appears. In this screen user can change data entry Oil level, Water level, Temp in tank (temperature of products in tanks), API @ OBS and Temp Hydro.

		E	dit / Delete	Tank Ga	auging		1	3
Date : 22/3/	2001 -		inn.		Tank No:	Tank 9		
Plant : Suratta	mi	-			Product :	Unleaded Gaso	line Octa	ine 9
Date	Plant No	Tank N	o Product N	o Oil Level	Water I	.evel Temp Tank	Api OB	IS -
19/3/2001	6681	T-9	850028	3653.0	15	88.0	60.0	-
20/3/2001	6681 6681	T-9 T-9	850028 390728	3653.0 3653.0	15 15	88.0 88.0	60.0 60.0	
دا کے Edit	া থা	2elete					ň	عت uose I

Figure 4-23 Edit / Delete Gauging Menu

Follow in action click button "Edit "next screen will be appear. When user input all data in this screen program will be recalculation value of API @ 60 $^{\circ}$ F, CTSh (effect of temperature on steel shell of tanks), GOV, VCF @ 60 $^{\circ}$ F, VCF @ 86 $^{\circ}$ F and GSV.

Follow in action click button " Save " the data as updated in database for run report in next step.

		Tank 9
Date : 22/3/2001	Tank No. :	
Location : Surattani	Product :	Unleaded Gasoline Octane 91
Oil Level (mm.) :	3653.0	
Water Level (mm.):	0	
Temp. In Tank (F):	88.0	
API @ OBS. :	60.0	- 20. 4
Temp @ HYDRD. (F):	140.0	
API @ 60F :	50.8	
Observed Volume (its.) :	713,107	
Water Volume (its.):	1	
Temp Factor :	1.00082	
Gross Volume (its.):	713,125	
Roof Volume (Its.):	2 468	
Net Volume (Its.):	710.657	
Multipier @ 60 'F :	0.9929	
Multipier @ 86 'F :	0.9841	
Liter @ 60 F :	698,498	
Liter @ 86 'F :	709.770	

	Edit Ta	nk Gauge		8
Date :	22/3/2001	Tank No. :	Tank 9	
Location :	Surattani	Product :	Unleaded Gasoline Octa	ane 91
a state for the	Oil Level (mm.):	3653.0		
		0		
		88.0		
		60.0	-	
	Temp (×	
	(i) Ares	ou want to update ?		
	Observe			
	Wate Yes	<u>No</u>		
	Gross Volume (Its.):	713 125		
	Roof Volume (Its.):	2,468		
	Net Volume (its.):	710,657		
	Multipier @ 60 F :	0.9829		
	Multipier @ 86 F :	0.9841		
	Liter @ 60 'F :	698,498		
	Liter @ 86 F :	709,770		

Figure 4-23 Change Data Gauging Menu

-Use menu path: Transaction -> Tank Gauging -> Inq Gauging

Choose Inquiry Gauging menu next screen will be appears. In this menu used display data of API @ 60 $^{\circ}$ F, CTSh (effect of temperature on steel shell of tanks), GOV, VCF @ 60 $^{\circ}$ F, VCF @ 86 $^{\circ}$ F and GSV as updated in database.

Inquiry Tank Gauge		
No Dil Level Water L	Level Ter_=	
3653.0 15	88.	
3653.0 15 3653.0 0	88.(88.(
	لتر	
-	<u>In close</u>	
		لتر.

Figure 4-24 Inquiry Gauging Menu

4.6 Simulation Reported

When the Report menu is selected to calculate inventory of petroleum, the following menu of data entry will appear consecutively.

-Use menu path: Report -> Oil inventory Report

Choose Oil inventory Report menu next screen will be appears. In this screen program will bring value from database show in this reports.

alean (d. frantseine Baba), fin Ebi Barre Trantseine Baba), fin Ebi		
	Caltex Oil (Thailand) Co.,Ltd	
	Plant: Suraitani Tank: Tank 9 Product: GasOi	
	Start Date: 23/3/2001 - End Date: 23/3/2001 -	
	Preview Brint Doce	
Astart	* 」teelek 圏Thesis · 』Delphi 5 原 Stock の密西之の人の加	5:11

Figure 4-25 Oil Inventory Report Menu

Follow in action click button " Print " next screen will be appears.

9 H 4 P H 5 5 5 6 <u>6</u>	ose					
Date : 22/3/2001			TAT	NK NO : T-9		
Location : 6681				PRODUCT : 390728		
Alla	AL YTICAL A	D OBSERVED DATA				
	Symbol	Reported Unit				
Oil level gauge (mm)	N/A		3,653	Observed data		
Free water gauge (mm)	N/A		0	Observed data		
API gravity @ OBS.	N/A	60.0		Observed data		
Hydrometer temperature ('F)	N/A	140.0		Observed data		
API gravity @ 60 'F	N/A	50.8		From Calculation		
Oil temperature ('F)	N/A	88.0		Observed data		
	CALC	ULATION				
Calculated or Derived Data	Symbol	Reported Unit				
Total observed volume	TOV		713,107			
Free water	FW					
Gross observed volume	COV		713107			
Correction for temperature of shell	CTsh	1.00002				
A REAL PROPERTY OF A REAL PROPERTY OF			713,125			
Floating roof adjustment	FRA		2,468			
		S. Salah	710,657			
Correction factor of oil @ 60 'F	N/A	0.9829				
			698,498			
Correction factor of oil @ 86 'F Gross Standard volume	N/A GSV	0.9841	709,770			

Figure 4-26 Oil Inventory Report