Gas Station Transaction System

By

Ms. Monsigarn Puangdech

Final Report of the Three - Credit Course
CS 6998 System Development Project

Submitted in Partial Fulfillment
of the Requirements for the Degree of
Master of Science
in Computer Information Systems
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Project Title	Gas Station Transaction System
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Academic Year	July 1999

The Graduate School of Assumption University has approved this final report of the three-credit course, CS 6998 System Development Project, submitted in partial fulfillments of the requirements for the degree of Master of Science in Computer Information Systems.

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ABSTRACT

This project presents the analysis and design of the gas station transaction system of PMS Company. PMS Company would like to implement the new computerized system in order to replace the previous manual operation of the gas station section. This is because the management would like to improve the efficiency of work of this section.

The analysis team is responsible for proposing the new gas station transaction system to be used within the gas station section. We need to find the opportunity to introduce the new computerized system for gas station transaction. We start from studying the existing system and perceiving problems of the current operation. Then, the requirement analysis, system design and implementation are followed. The users will have a hand-on training for a few weeks. The proposed system will be run in parallel with the existing system until the users feel confident with the new system. The final outcomes from the study is an information system that can serve the information needs of the gas station section and the management.

ACKNOWLEDGEMENTS

The writer would like to take this opportunity to express her sincere appreciation and gratitude to Air Marshal Dr. Chulit Meesajjee, the advisor of this project for his suggestions, guidance, painstaking corrections and encouragement throughout this course of work.

Thanks to Khun Anucha Pengmeesri, from PMS Company, for giving her such a useful information about the gas station transaction system and its operation.

Finally, she would like to thank all of my instructors from first to last, and all of her friends for their support and kind consistence.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

I. INTRODUCTION

1.1 Background of the Project

Information is important for business nowadays. Information at the right time to the right person is crucial for business management. But a major problem of today's managers is the unmanageable large volume of information.

Thus, the database system is very important for managing all interrelated data. It provides an environment that is both convenient and efficient to use in retrieving and storing information.

PMS Company is an accounting company. It has to serve customers with honesty and secrecy. The managing director of PMS Company found out that there are many problems in the gas station customer service section. All work process is kept manually in paper. It is difficult to search and keep. Most of the time, the reports have been delayed by the official tasks.

Therefore, the managing director thinks of developing a new gas station transaction system to serve better operation performance. Not only will the operation tasks be computerized, the managing director also further realizes that records kept in the computer system will be more secure and easy for doing reports.

1.2 Objectives

The objectives of the Gas Station Transaction System are as follows:

1. To figure out the problems occurred under the existing system environment.
2. To analyze the causes of the problems from the existing system.
3. To figure out the way to solve the problems from the existing system.
4. To design the Gas Station Transaction System for the company by using the database management systems and application tools to enhance the operation

and reports for better efficiency.

5. To implement the Gas Station Transaction System for using within the Gas Station Customer Service Section.
6. To suggest the maintenance procedures and methodologies after the Gas Station Transaction System is implemented.

1.3 Scope

This project will focus on developing only the new system for the Gas Station Customer Service Section. The scopes of work for the project are as follows:

1.3.1 Collecting information and requirements by interviewing the employees in the Gas Station Customer Service Section for better understanding the operation.

1.3.2 Studying the forms, reports and any existing documents required by the gas station and the Revenue Department.

1.3.3 Installing the Gas Station Transaction System.

1.3.4 The Gas Station Transaction System will provide the graphic user interface screen to enter or query the data.

1.3.5 The Gas Station Transaction System will provide the reports, which serves the needs and requirements of the gas station and the Revenue Department.

1.3.7 Training class is provided for the users.

II. EXISTING SYSTEM

2.1 Background of the Organization

The PMS Company was established in 1985. It is an accounting company. The natures of an accounting company business are to audit account and make the account for customers. The PMS Company also has to make reports for the requirements of the customers and the Revenue Department.

The PMS Company is a small company. It is located at Wongsawang Road, Bangkok, occupying area for two hundred square meters. There are about 25-30 employees in the company. It employs 20 accountants, 2 clerks, 2 computer officers, and 1 messenger.

The name of the company comes from the initials of the surname of the owner. The owner's surname is Pengmeesri. He is an auditor. He had run the gas station business before setting up the PMS Company. Therefore, he knows well about the operation and account of gas stations. Most customers of the company also come from the gas stations. About 200-300 gas stations become the customers of the company. The rest of the customers come from general companies such as shipping company, travelling company, and import & export company.

Financial and accounting information are the confidential information for every company. Therefore, the accounting company has to keep them as a top secret. The PMS Company will serve the customers with honesty, punctuality, and secrecy.

The figure 2.1 will illustrate the organization chart of PMS Company. The organization chart shows that the Managing Director is at the top level of the company. The Managing Director has an Assistant Managing Director. All of the department

managers directly report to the Assistant Managing Director. Each staff directly reports to his managers.

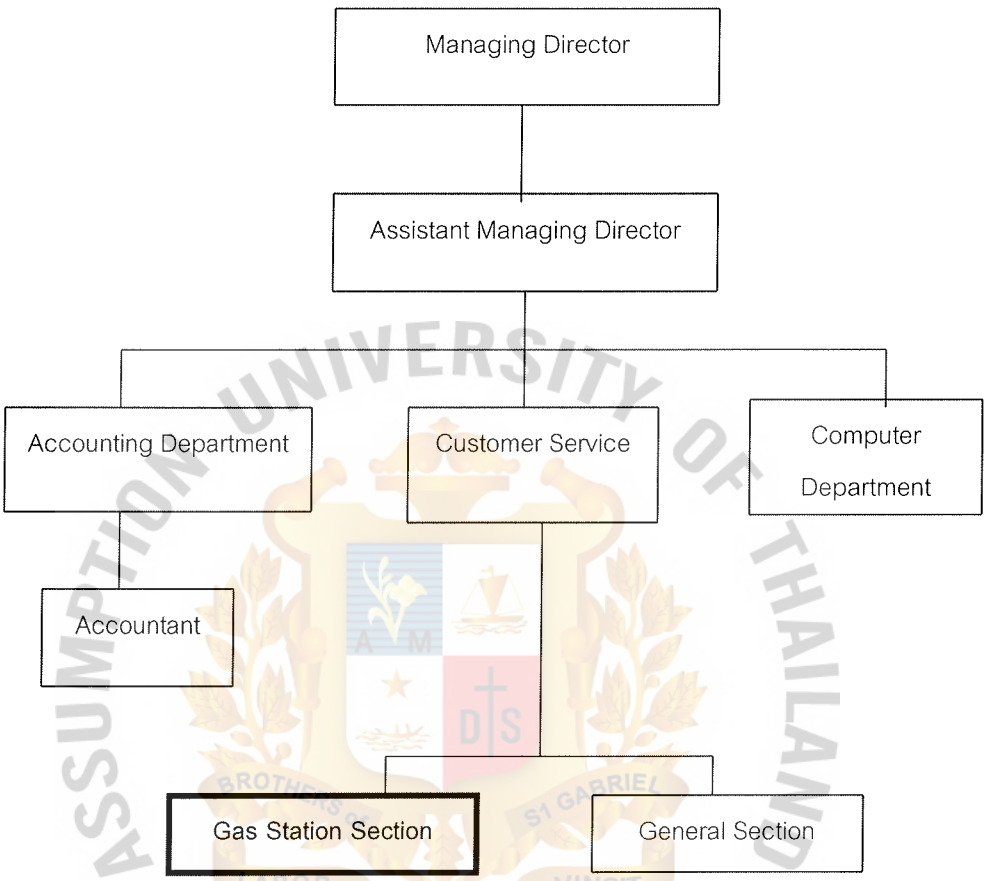

Figure 2.1. Organization Chart of PMS Company.

2.2 Existing Business Function

The PMS Company business can be divided into three major business functions listed as follows:

- Accounting Function
- Customer Service Function
- Computer Function

Accounting Function

Major responsibility of the accountant is to take care of the statements of money received, spent and owed of PMS Company. The responsibilities of accounting function can be listed as follows:

1. To determine the policy and the method in making accounting records and financial statements in agreement with the management objectives, general accounting standard and government regulation.
2. To prepare the financial statements and the accurate statistical information for proposing to the management.
3. To perform annually and monthly the company budgets for proposing to the management.
4. To update and change the accounting system for supporting the company progress.

Customer Service Function

The customer service function acts as the front of the company. It is where the customers make their first contact. This function has been divided into two sections by market segmentation: the gas station section and the general section. The gas station section serves the gas station. The general section serves general companies. This function consists of employees as follows:

1. Clerk

The clerks have two major responsibilities. The first is to contact the customers. The second is to prepare the documents and information which are used for making the reports for the customers' requirements. When customers send the transaction documents and information to PMS Company, the clerks have to verify and classify the

documents. Then they distribute the documents to the accountants according to their accounts.

2. Accountant

The major responsibility of the accountants is to make the transaction reports according to the customers' requirements. The accountants calculate all transactions before they send the transactions to the programmer. Other responsibilities of the accountants are listed below:

1. To manage and keep the transaction documents of the customers.
2. To update and change the accounting system for supporting the customer service.
3. To make the customer reports according to the requirements of the management.
4. To update VAT and the Revenue Department information for supporting work progress.

3. Chief Account

The chief account is an auditor. He is responsible for examining the accounts of the customers' companies. When the accountants send the transaction reports to the chief account, he will audit the reports and sign up to show that the reports have already been examined. Then he will send the audited reports back to the accountants. The chief account also has responsibilities for planning the customer service policy and assigning works to the accountants.

Computer Function

The computer function consists of two programmers. The responsibilities of the programmers can be listed as follows:

1. To maintain the computer system.
2. To give advice about the computer information system to the other functions.

3. To enter data according to the requirements of the other functions.

4. To make the reports according to the requirements of the management.

5. To help the customer service function to make the transaction reports.

2.3 Current Problems and Areas for Improvements

The area for improvements of this project covers the system of the gas station section of the customer service function of PMS Company. Presently, the gas station section faces many problems caused by a large number of customers and improper information management system. The accountants spend a lot of time justifying the information before they calculate transactions. The customer-growing rate is high but the process of work is slow. It cannot cover the requirements of the customers.

At the beginning of the month, the clerk receives the documents from the customers. These documents are used for calculating transactions. There are abundant documents. The clerk has to verify the data whether they are complete or not. If they are not complete, the transactions will be wrong. Before the clerk sends them to the accountants, she also classifies the documents according to their types. The accountants will calculate all transactions by manual procedures, which takes a long time to finish. At first, they have to calculate VAT transaction. Then they will write down the calculated transaction into the form for sending it to the programmers. The programmers will key the transaction into the form. It may have a wrong entry if the written transaction is not clear. As a result, the VAT transaction reports may also be wrong. When the programmers print those reports to the accountants, they have to recheck the reports again. Then they send the reports to the chief account for auditing the reports. The chief account will send the audited reports back to the accountants. The accountants will send them to the customers and the Revenue Department. Next, the accountants will calculate sales ledger and write the calculated ledger for the

programmers to make an entry and print the reports. When the accountants get the sales ledger reports back, they will send them to the customers. The accountants keep all transaction data and the customer information in the form of documents.

It takes a long time for calculating process because it is still based on manual procedures. It wastes time running the processes. The accountants have to spend a lot of time finding out the documents. Sometimes, the data have been lost because the gas station section does not have a good system for keeping the data. Traditionally, they still keep the data in the form of documents.

The problem of report error also exists because some written font is not clear. The programmers may enter the wrong data. The transaction reports may also be wrong and it takes time to find out the mistakes or recalculate the transactions.

The major cause of the problems is too much manual operation. We can summarize the problems of the current situation as follows:

- It takes long time for calculating transactions.
- The reports often have the errors.
- It is difficult to manage and find out the data kept in the form of documents.
- The data have been lost.
- The working process cannot flow efficiently from one department to other departments.

In conclusion, to improve the gas station transaction system, the analysis team should focus on how to reduce the manual operation by trying to convert it to an automated system. When the data are well-organized by using computerized system, not only can it enhance the business services, but it also can give opportunity to provide useful information for any future decision-making.

III. PROPOSED SYSTEM

3.1 User Requirements (System Specification)

The analysis team used the interview technique to get the necessary information from the gas station section and the related departments. We asked those people how they want to store, process, and query or print the data. The team want to know also on how the data should flow in system.

Presently, every document in the gas station section is in the form of written document, as described earlier, and is kept in the cabinet. No information is kept in the computer at all. We can summarize the user requirements as follows:

1. **Input Requirements**
   - **GUI**: The input screen should be designed to motivate the users for using it. It should have more graphic user interface (GUI).
   - **Less Time for Key In**: The number of data entry should take as less time as possible. There must not be any repetitious entry. Only the necessary data for transaction should be keyed in.
   - **Easy to Use**: The function key of the program should be easy to use. There should be some explanation as user guide.
   - **Easy to Understand**: The program should be easy to understand. It will be better if the input screen uses the Thai language.
2. **Operation Requirements**
   - **Reduce Process of Work**: The operation of the program should help reduce the work process.
   - **Automated Operation**: The operation should be automated. The next step can be run when the previous step is already finished.

- **Automated Calculation**: The program to calculate the transaction should be automated. It should be easy to get the calculated transaction.
- **Automated Report**: The program to convert the calculated transaction to the form of the report should be automated. The users do not have to get the data and make the report by themselves again.
- **Security**: The program should authorize the user for accessing the program. The customer's information is known by the responsible accountant only. Other people should not know or modify the information without authorization.
- **Backup**: The proposed system should have a backup system because the account information have to be kept for, at least, 10 years. If the government agent would like to check the company's transactions, the system should be able to trace back the data for them.

3. **Output requirements (Report)**
   - **Easy to Get**: The users can get the report easily. They may just choose the required report and then click the button. They will get the report immediately.
   - **Beauty**: The format of the report should be beautiful so that it will be easy to read and understand.
   - **Standard Form**: The form of the report, especially the VAT report should be correct as the standard of the Revenue Department and the customers' requirements.
   - **Smaller Size**: The size of the report should be smaller than the current size. Most of the current reports have to be printed on B3 paper. It is so big and difficult to keep. It will be better if the size of the report is smaller and can be printed on A4 paper.

3.2 System Design

Since the analysis team knows all of the user requirements mentioned above, the team begins to design the proposed system by starting from the system output, input and then the database requirements.

- **Output Design**

Normally, the system output includes the screens and the reports. The screens represent necessary forms that look exactly like the documents used within the gas station transaction for easy understanding. However, they include some menus and buttons to manipulate the data. Some form screens can be used as the system input to enter the data, or fill in the blank form. The other type of the system output is the reports.

The analysis team tries to design the reports according to the requirements of the customers and the standard of the Revenue Department. The outputs of the proposed system consist of 13 reports. The reports can be divided into two major groups as follows:

Group 1: They are the reports that have to be sent to the Revenue Department. There are three reports in this group. The forms of the reports are designed according to the standard of the Revenue Department. The language of the reports has to be in Thai. Therefore, only these three reports are in Thai.

Group 2: They are the sales reports of the gas station. They do not have to be sent to the Revenue Department. There are ten reports in this group. The forms of the reports are designed according to the requirements of the users. Most of the reports are concerned about sales volume of gasoline based on each category – pump, tank, dispenser- in any period of time.

- **Input Design**

For the system input, due to the present programming technology, it allows us to enter the data via the form of the system output screen. Therefore, the system input will be quite similar to the system output design.

The screens will be in Thai so that it is easy for the users to use and understand. There are about 18 screens in the system. The screens will be divided into three categories: gasoline, miscellaneous, and report. The gasoline category is the screens for entering the data for making the reports. After the users key in the data to these input screens, the data will automatically be transferred to the database which is ready to create the reports. The miscellaneous category is the screens for keying in the configuration of the program. The report category is the screens for getting all of the reports in the system.

- **Database Design**

There are many entities to concern for running the developed system. The major entities of the developed system consist of gas stations, employees, tanks, pumps, and dispensers. Appendix E will show the entity relationship of the system. For the database, it has been normalized so that it is easy to manage and less redundant.

The system input, output screens and reports and the Entity-Relationship (E-R) Diagram will be illustrated in the appendix section.

The gas station transaction system, designed by the analysis team, consists of three different major processes. Each of them has been designed to meet all the user requirements needed for the different departments. Each process will represent how to handle and process the data.

This section shows all the necessary processes that exist in this gas station transaction system. The detail of each process specification, including the purposes,

inputs, and outputs parameters will be described in the appendix section as well as their structure charts.

List of Process

Process 0 : Gas Station Transaction System

Process 1.0 : Prepare Information

- Process 1.1 : Collect and Verify Information
- Process 1.2 : Distribute Information

Process 2.0 : Make Transaction Report

- Process 2.1 : Input Gas Station Information
- Process 2.2 : Input Transaction Information
- Process 2.3 : Calculate Transaction
- Process 2.4 : Print Transaction Report

Process 3.0 : Audit Transaction Report

- Process 3.1 : Verify Report
- Process 3.2 : Audit Report

3.3 Hardware and Software Specification

This new proposed gas station transaction system is installed in the PC computer terminal that will be hooked together as a network within the gas station section. The analysis team implements the client-server technology for this system because the system can easily maintain and the data will be kept only in one place.

The server is served as the database server where all the data are kept. The server will have the database management system (DBMS) installed. The DBMS will manage all the transactions or concurrency control automatically and provide necessary features and utilities such as system monitoring, user management, backup and restoring.

The client is the PC computers, which install the runtime application software written in the graphic user interface mode. The PC itself does not store the data but whenever the user saves the data, it will save at the server by passing the data through the network. Therefore, each computer will be installed together as the network.

In Figure 3.1, it will illustrate the overall system that is installed within the gas station section. It shows how each terminal is connected to each other. The detail of each hardware and software specification required for the system will be described as follows.

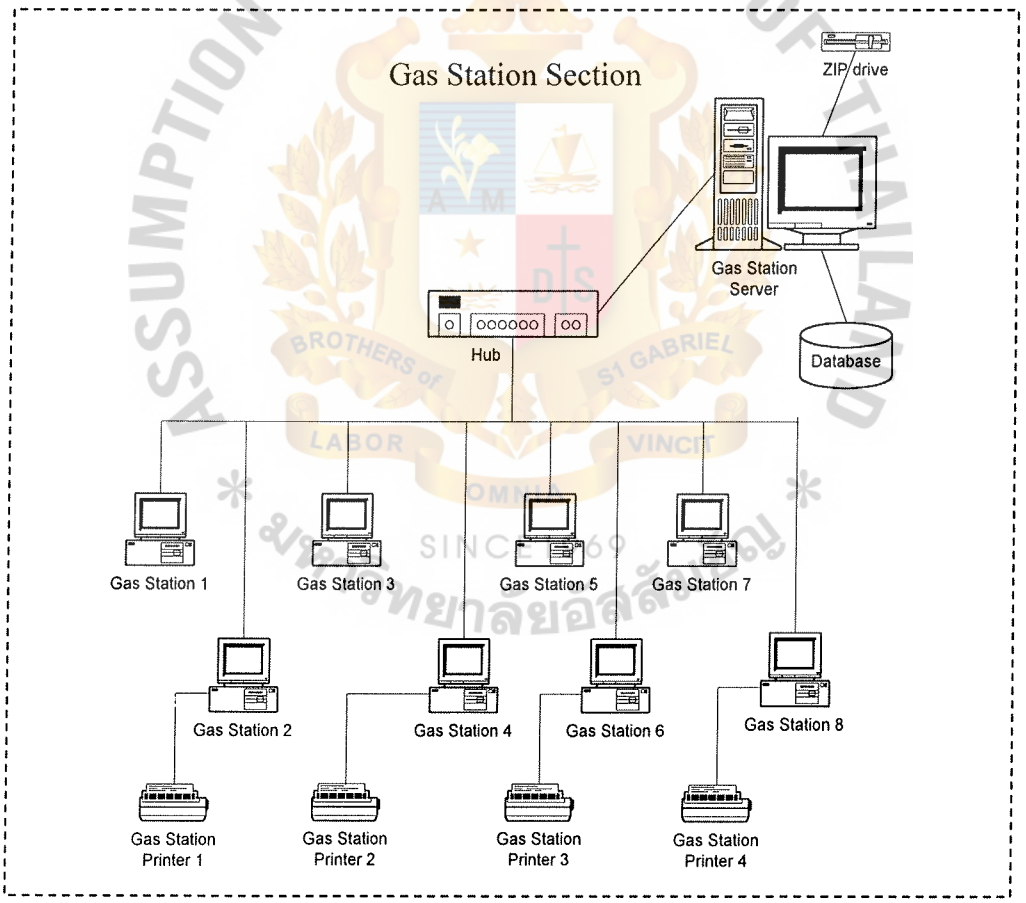

Figure 3.1. The System Configuration Diagram.

Hardware Specification

1. 1 set of server computer :

    - IBM PC Compatible, Pentium II 300 MHz,
    - SDRAM 128 MB memory
    - 2 x 4GB EIDE hard disk
    - 40X Atapi CD-ROM
    - 10/100 Network Card, RJ-45 port connector

2. 9 sets of client computer

    - IBM PC compatible, Celeron 333 MHz
    - SDRAM 32 MB
    - 3.2 GB EIDE hard disk
    - 14" SVGA digital color monitor
    - 2 up to 4 MB SVGA Card
    - 16 Bit sound card with speaker
    - 3.5" Floppy drive 1.44 MB
    - 10/100 Network Card, RJ-45 port connector

3. 2 sets of 24 Pin dot-matrix printer
4. 1 set of 8 port HUB
5. Rj-45 connector ant CAT 5 Network cable
6. 1 set of UPS server

Software Specification

1. Server Unit

    - Windows NT 4.0 Operating System
    - FOXPRO Server for Windows NT

2. Client Units

- Windows 98 Operating System
- FOXPRO 5.0 Runtime of Windows 95/98
- GST Application System

For the network management, the Windows NT itself is bundled with the TCP/IP protocol which the gas station transaction system can make use of. In addition, the windows 98 provide the TCP/IP by itself so it can communicate with Windows NT.

3.4 Security and Control

In all computer based systems the security issues can be partitioned into those affecting hardware facilities, those mostly concerned with software construction, those involving interface, and those of personnel. Physical security control in the proposed system is designed as follows:

- Each key-in field should be validated before entering the database.
- Input documents must be kept in specified office, which will be used for comparing the data during recovery and should be designed or checked by the authorized person.
- Login password can be accessed only by the authorized person.
- Data entry, modification and verification must be made only by the authorized person.
- The database should be accessed only by the authorized person.
- To prevent loss of the data during power failure, a UPS (Uninterrupted Power Supply) is recommended.

Since the gas station transaction system uses the client-server technology, the security and controlling issues seem not to produce any problem because all the data are kept on the server side which is taken care of by the computer department.

The computer department is responsible for managing the database system. This means they need to monitor, manage, control and maintain the database files and keep them as transparency from the regular users. Moreover, they need to control the disk space usage as well as tune the performance for the database in case the system runs slower. There is only the computer department staff who has authorization to access the server. The server computer is also protected by the operating system password.

For the client side, only the runtime application programs are installed on each PC. Whenever the users need to access the data, they need to sign on the system by entering their username and password. However, if the unexpected error occurs, such as the program files are missing or the files are infected by virus, the computer staff just simply restores the damaged files from the original source without concerning the data.

The users of the client side are kept from the database server. Whenever they would like to access the data, they need to manipulate only via the form screen on their terminal. There are no other tools installed on the client side that permit direct access to the data. This is to prevent the users from any unexpected operation causing damage to the whole system.

Moreover, the computer department is required to back up the data regularly, e.g. once a week by using the ZIP drive that can handle up to 100 MB per diskette.

3.5 System Cost Evaluation and Comparison

Since the PMS Company decided to initiate the Gas Station Transaction System, the management considers the cost of investment for this new project. They would like to be ensure that the new system could gain the benefits to the company.

Then the analysis team started to determine and gather all the information regarding the new project cost. The comparison between cost and benefit of the proposed system and the existing system is showed in Table 3.1-3.3 and Figure 3.2-3.3.

The two quantitative figures before and after implementing the new system are also listed here. The information system cost is classified into two categories:

Development Cost - (Initial cost)

Operation Cost - (Yearly maintenance cost)

Development Cost

The costs listed below are based on the system hardware and software requirements mentioned above. Costs are determined in Baht.

Hardware :

• Server (120,000 x 1 unit)	120,000
• Client PCs (50,000 x 8 units)	400,000
• Printer (20,000 x 4 units)	80,000
• Network Accessories (Hub, Wire and etc.)	27,500
• Network wiring	25,000
Total Hardware Cost	652,500

Software :

• Operating System (Windows NT)	45,000
• Operating System (Windows 95/98)	40,000
• Application software	320,000
Total Software Cost	405,000

Operation Cost

The operational cost includes all of the costs that will occur when the operation begins. It includes the cost of maintenance of hardware and software, the personnel (labor) cost to operate this system. The cost of maintenance is estimated to increase in progressive rate each year. The additional of employee salary or personnel cost will be

reduced 20,000 Baht per year. Other operating cost is reduced in regressive rate each year. The detail of the operation cost is listed as follows.

System maintenance / year	30,000
Computer staff / year (15,000/Mth)	180,000
Other operating cost / year	168,000
Total Operation Cost	378,000

Break-Even Analysis

The break-even analysis provides the information for the decision-makers to see how worthy the new proposed system is. It contains two curves, a cost curve and a benefit curve. The cost curve is a one-time system development cost. The benefit curve is a gain on the implementation of the new system.

Benefits

In this section, the benefits will be found after the new system is implemented. The benefits can be measured in two different approaches:

- Tangible Benefit
- Intangible Benefit

Tangible Benefit

Previously, the gas station section of PMS Company never used the computer system for their operation, the analysis team cannot really measure the difference between the new computerized system and the previous manual system. Therefore, the tangible benefits of the new proposed system can be measured by the increasing number of transaction entries per day.

Assumption:

Before implementing the new system scenario:

Current Staff	8	Persons

Recruitment per year	1	Person
Staff ability to handle gas station per person	5	Companies
Customer growth per year	5	Companies
Average number of customer per month	40	Companies
Average charge per company per month	15,000	Baht
Average profit per company per month	900	Baht
Average yearly company income in Baht (15,000 x 40 x 12)	7,200,000	Baht
Other operating expense per year	10%	
Office supply is increasing in progressive rate that starts from	5%	

After implementing the new system scenario:

Assumption the system last for	5	Years
Staff	8	Persons
Recruitment computer staff	1	Person
Average number of customer per month	45	Companies
Average charge per company per month	15,000	Baht
Average yearly company income in Baht (15,000 x 45 x 12)	8,100,000	Baht
Average customer growth per year	5	Companies
Average profit per company per month	1,900	Baht
Training cost	30,000	Baht
Miscellaneous	20,000	Baht

Table 3.1. Comparison between Cost and Benefit of Proposed System, in Baht.

Cost items	Year					
	0	1	2	3	4	5
Estimated Savings						
Improved Service		1,026,000	1,140,000	1,254,000	1,368,000	1,482,000
Estimated Initial Cost (One Time)						
Hardware Acquisition	652,500					
Software Acquisition	405,000					
Training	30,000					
Miscellaneous	20,000					
Total	1,107,500					
Estimated Operating Cost						
System Maintenance		30,000	35,000	45,000	60,000	70,000
Personnel Cost		100,000	80,000	60,000	40,000	20,000
Recruitment (1 Admin.)		180,000	186,000	192,000	198,000	204,000
Other Operating Cost		68,000	56,000	44,000	32,000	20,000
Total		378,000	357,000	341,000	330,000	314,000
Net Savings (Losses)	1,107,500	648,000	783,000	913,000	1,038,000	1,168,000
Discount 10%		0.9090	0.8264	0.7513	0.6830	0.6209
Net Present Value	1,107,500	589,032	647,071	685,937	708,954	725,211

Table 3.2. Comparison between Cost and Benefit of Existing System, in Baht.

Cost items	Year					
	0	1	2	3	4	5
Estimated Savings						
Project Investment Savings	432,000	486,000	540,000	594,000	648,000	702,000
Total	432,000	486,000	540,000	594,000	648,000	702,000
Estimated Existing Cost						
Personnel Cost	40,000	48,000	54,000	60,000	66,000	72,000
Recruitment	-	132,000	132,000	132,000	132,000	132,000
Office Supply	90,000	100,000	105,000	115,500	132,825	159,390
System Maintenance	50,000	60,000	80,000	110,000	150,000	180,000
Depreciation Cost	50,000	45,000	40,500	36,450	32,805	29,525
Miscellaneous	64,000	70,000	76,000	82,000	88,000	94,000
Total	294,000	455,000	487,500	535,950	601,630	666,915
Net Savings (Losses)	138,000	31,000	52,500	58,050	46,370	35,086

Table 3.3. Comparison Cost between Existing System and Proposed System, in Baht.

Year	Existing System		Proposed System	
	Cost	Cumulative Cost	Cost	Cumulative Cost
0	294,000	294,000	1,107,500	1,107,500
1	455,000	749,000	378,000	1,485,500
2	487,500	1,236,500	357,000	1,842,500
3	535,950	1,772,450	341,000	2,183,500
4	601,630	2,374,080	330,000	2,513,500
5	666,915	3,040,995	314,000	2,827,500

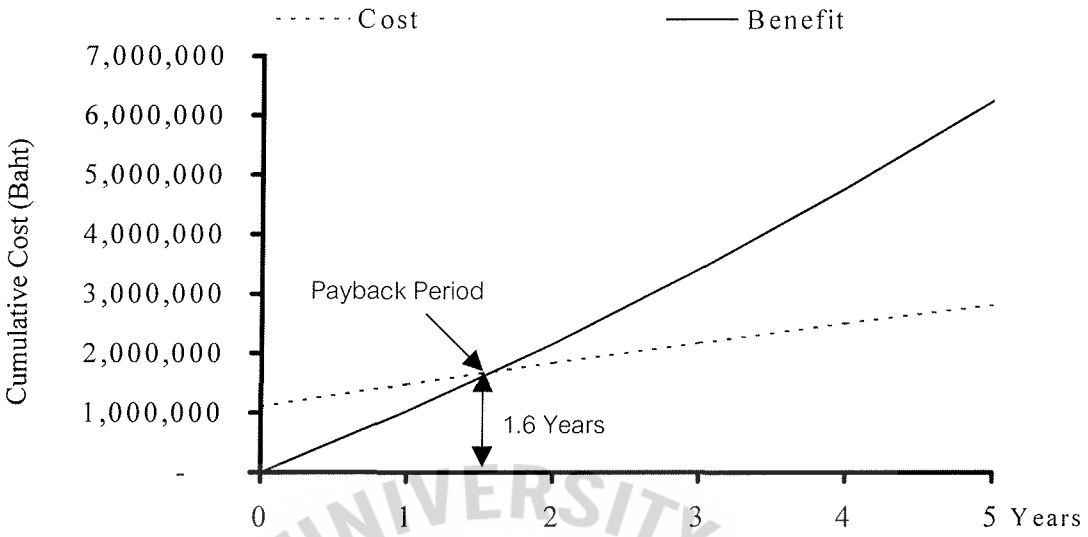

Figure 3.2. Comparison between Cost and Benefit of Proposed System.

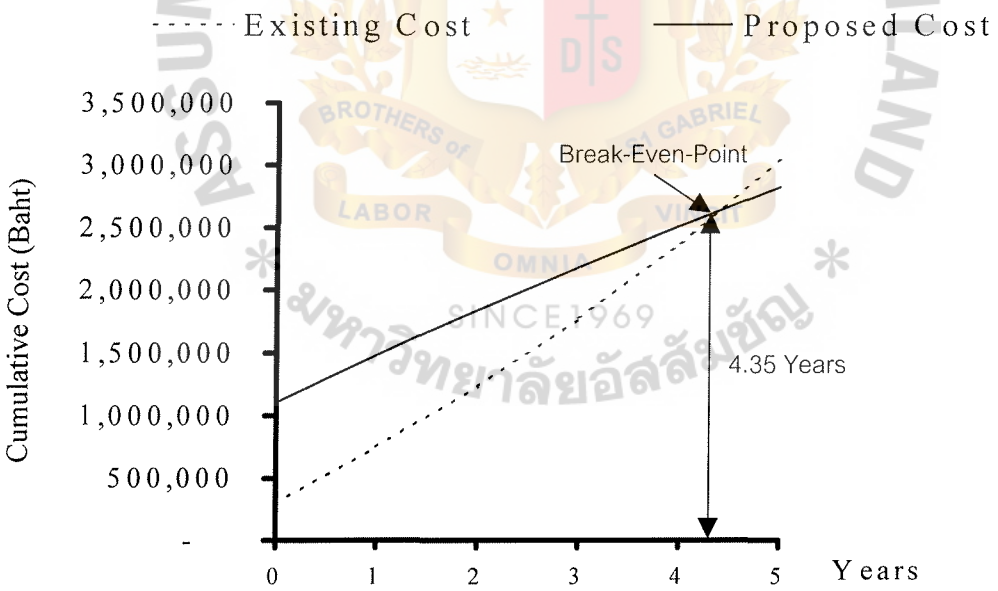

Figure 3.3. Comparison Cost between Proposed System and Existing System.

Intangible Benefit:

Not only can the quantitative figure be measured by determining the increasing number of customers, the gas station section of PMS Company can also improve many areas of operation after the new system is implemented.

The accountants and the programmers can greatly improve their work process. For example, the accountants can get the automated transaction, which will save calculation process time. It also helps to reduce the error of the transaction reports. The data will be better managed and easy to find out because all documents are stored properly in a record format and are able to be retrieved immediately whenever needed.

IV. PROJECT IMPLEMENTATION

4.1 Overview of Project Implementation

Up to this step, the analysis team has finished designing all the system outputs and inputs as well as the database design. The implementation schedule begins by setting up the developer team to code the program by following the guideline of process specification stated in the appendix section. Project plan (Gantt Chart) is also illustrated in the appendix section.

The developer team uses the prototyping technique to develop this system because it gives better communication between the users and the developer team. The team builds the prototype and demonstrates it to the users until the program has met all their requirements. The users may be involved in refining their requirements when the team is developing the prototype; however, it should be a reasonable change.

After the developer team finished coding the whole system, the analysis team and the users will join together to test the overall system.

System Conversion

Up to this point, the whole gas station transaction system has been tested and the system conversion for the actual use is prepared. The analysis team starts to acquire all the hardware and software. Then, the team sets them to be proper for use. The proposed system will be run in parallel with the existing system until the processes can be run smoothly.

User Training

The analysis team still has to train the users on how to operate the new system at this phase. The team decides to train the users by using the on-the-job training method because there are not many people to operate the system. The user training should

include the way to solve the simple problems of the system. Moreover, the computer staff also need to be trained for any technical issues because they have to support the whole system. The technical analyst will guide them how to monitor and manage the hardware, and operate the software and DBMS.

System Maintenance

The computer staff are required to back up and restore all the data on the database server. This is to prevent the loss or damage of the data or any unexpected event. The computer staff are also responsible for printing log file report. In the emergency case, the computer staff should keep in touch with the hardware and software vendors.

The original application software must be kept in the safe place and taken care of by the management. However, it should be duplicated more than one copy. The copied software should be taken care of by the chief account and the computer department.

4.2 Test Plan and Result

Testing

The analysis team decides to use the black-box testing method to test all the processes after the coding was completed. At this step, the users are also involved in the procedure. The team concentrates on the system inputs and outputs, holding to the view that one needs only to look at inputs or outputs of a process to determine which test to run. The testing tasks of the proposed system can be listed as follows:

- Testing individual program: unit test.
- Creating data tests: create all condition data test.
- Linking testing: test related programs such as creating and maintaining record program as well as the report program of the database.
- System test: fill modules and programs are tested together.

- Backup and restoring testing: prepare a backup copy of the data. Testing also covers recovering data test in case the data are lost accidentally or when the system fails.

Result

The analysis team is satisfied with the result of the system testing because every function passes the standard of the system testing. It does not have any problem during the system tests. The system can be run smoothly. The backup system and the restoring system can protect the data when there is some accident or when the system fails.

V. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

This system development project aims to produce Gas Station Transaction System for Gas Station Section of PMS Company. The Gas Station Transaction System is a computerized system, which is developed to replace the existing manual system.

This study applies the structured analysis and design techniques starting from studying the physical existing system, developing logical existing system, analyzing and obtaining user requirements to produce a logical proposed system and, finally, converting the system to the physical system. The data flow diagrams, process specifications, and data stores are used as documentation for both the existing and the proposed system during the analysis and design phase.

The new system will use the client-server for controlling the operation. Each client is doing the same functions. The functions are calculating the transactions and making the transaction reports.

The new system can greatly improve the overall gas station section operation. Appendix M will show the comparison time achievement between proposed system and existing system. Many operations are now computerized and the data can flow without the intervention of human beings. The information are kept into the database file, which is easy for searching and keeping. The new system also reduces the time consuming when compared with the manual system.

The new gas station transaction system can provide such a good report for the customers and the Revenue Department. It also decreases the rate of the human errors which usually occurred before. The new system can also improve the performance of

work in the gas station section. The gas station section can serve more customers per month that means it can provide more income for the company.

5.2 Recommendations

Though this gas station transaction system can improve the gas station section's operation into more systematic, the analysis team recommends that it should still be further improved in order to make the system more applicable.

Nowadays, many gas station companies use high technology for automating gasoline transaction data. For example, most of Esso gas stations use Gillbarco to keep gasoline transaction and link it with their back office system. Therefore, some more advanced technology can also be applied to this system such as modem and web integration. The gas station service section may have the automated linkage information system with the customer site. The customers can automatically update the gas station transaction to this section daily.

Although there are so many excellent application software available in the market, they are ignored by the users because many users lack technical knowledge or have very limited computer experience. They can function well in today's business whether they are in-house developed programs or instant software package. Many people are still reluctant to use the computerized system because they are afraid of making mistakes, which can easily be found. Therefore, if we only have proper training or make computer more familiar to them, the users will later realize that it will facilitate their day-to-day operation.

The successful implementation of this gas station transaction system is to make the staff be familiar with the system and use the system as a normal business operation. The data should be up to date and kept in secret. Moreover, the system maintenance should not be overlooked and it needs to be taken a good care of by the computer staff.

APPENDIX A

CONTEXT DIAGRAM (EXISTING SYSTEM)

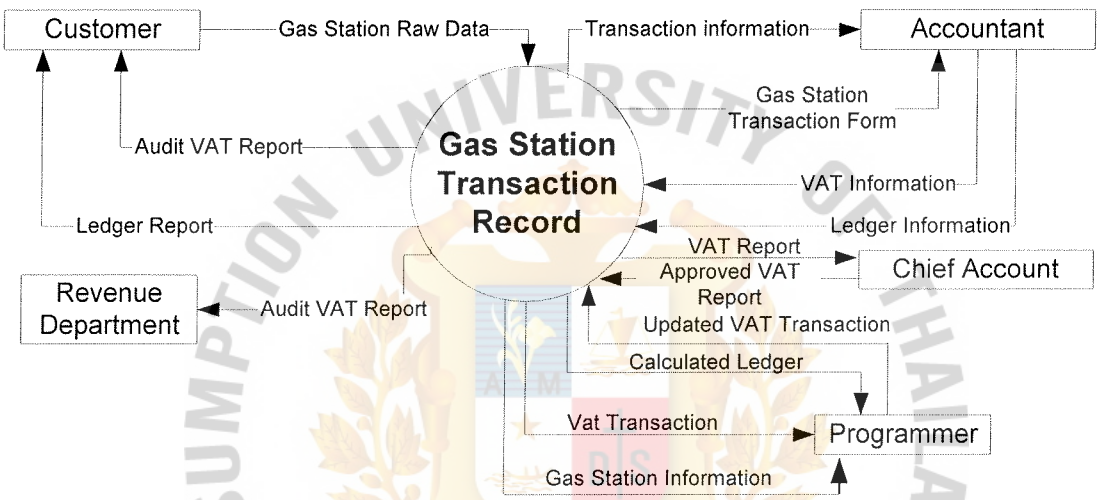

Figure A.1. Context Diagram Existing System.

APPENDIX B

DATA FLOW DIAGRAM (EXISTING SYSTEM)

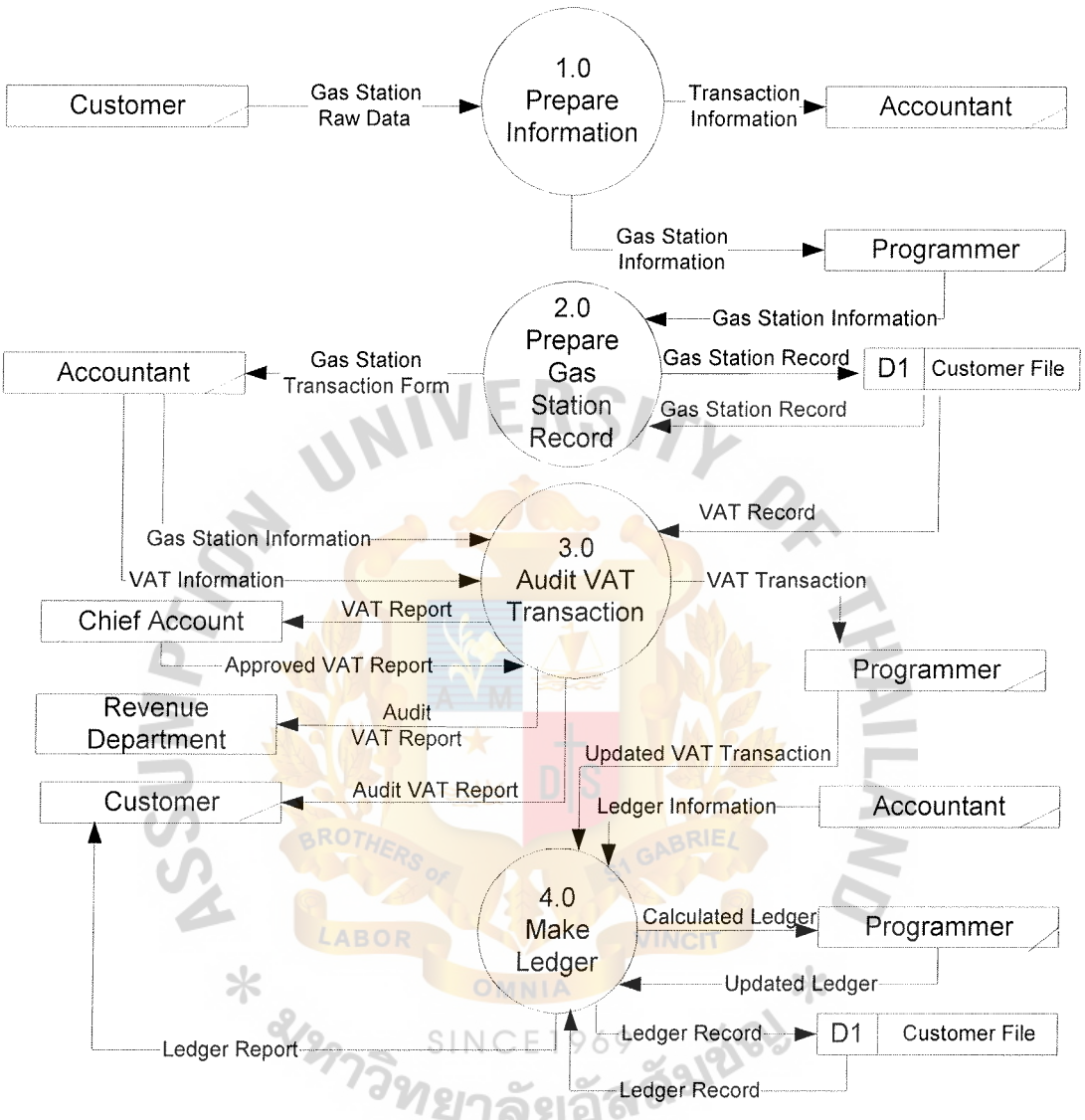

Figure B.1. Data Flow Diagram Level 0 Existing System.

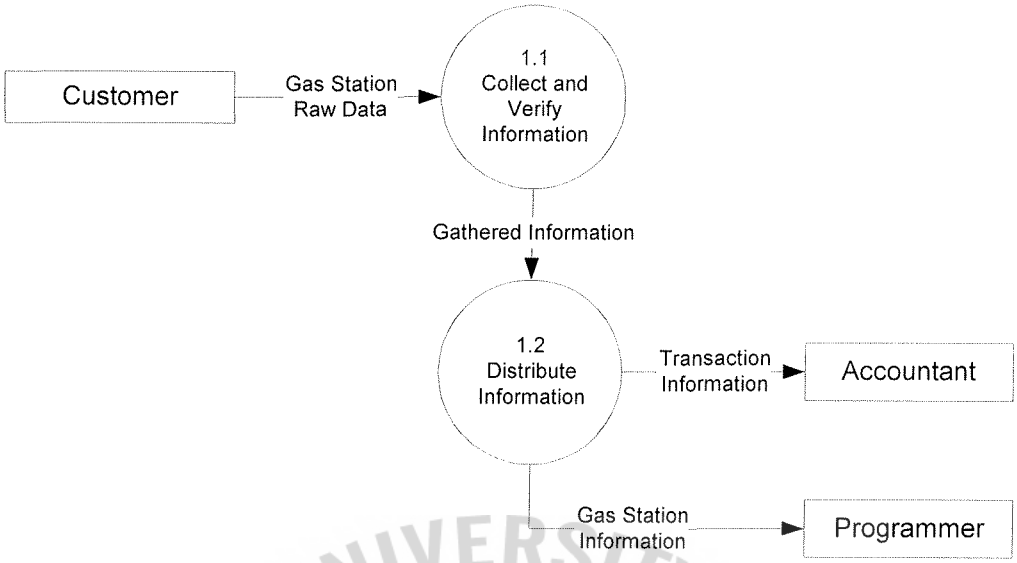

Figure B.2. Data Flow Diagram Level 1 Prepare Information.

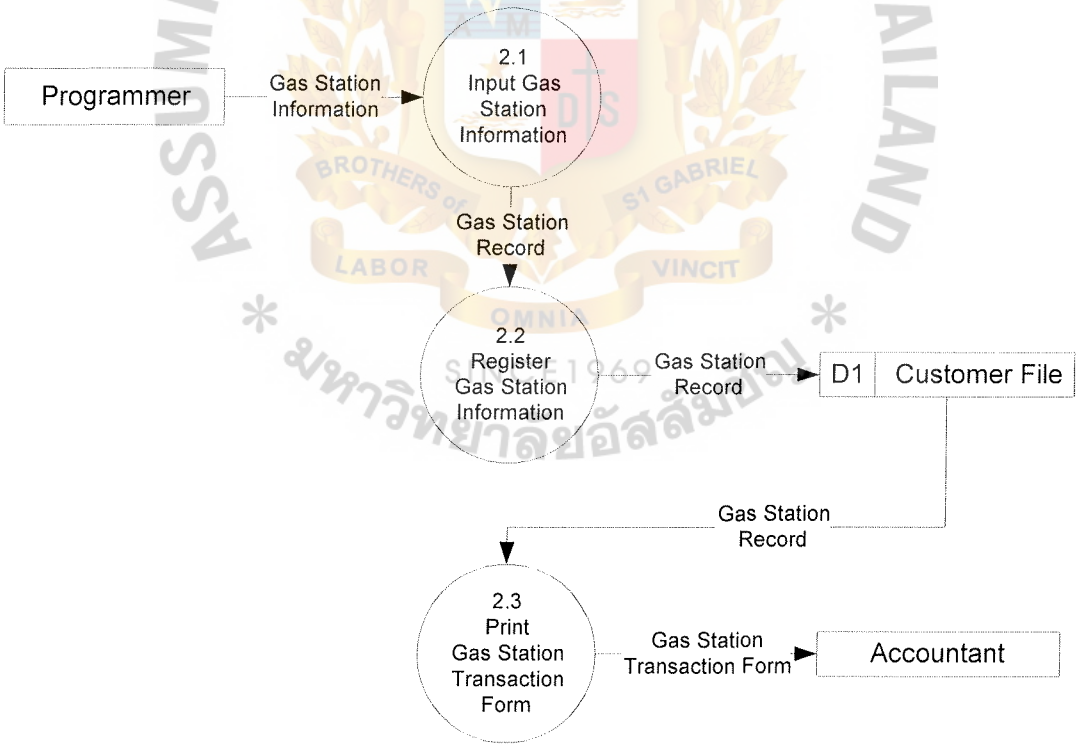

Figure B.3. Data Flow Diagram Level 1 Prepare Gas Station Record.

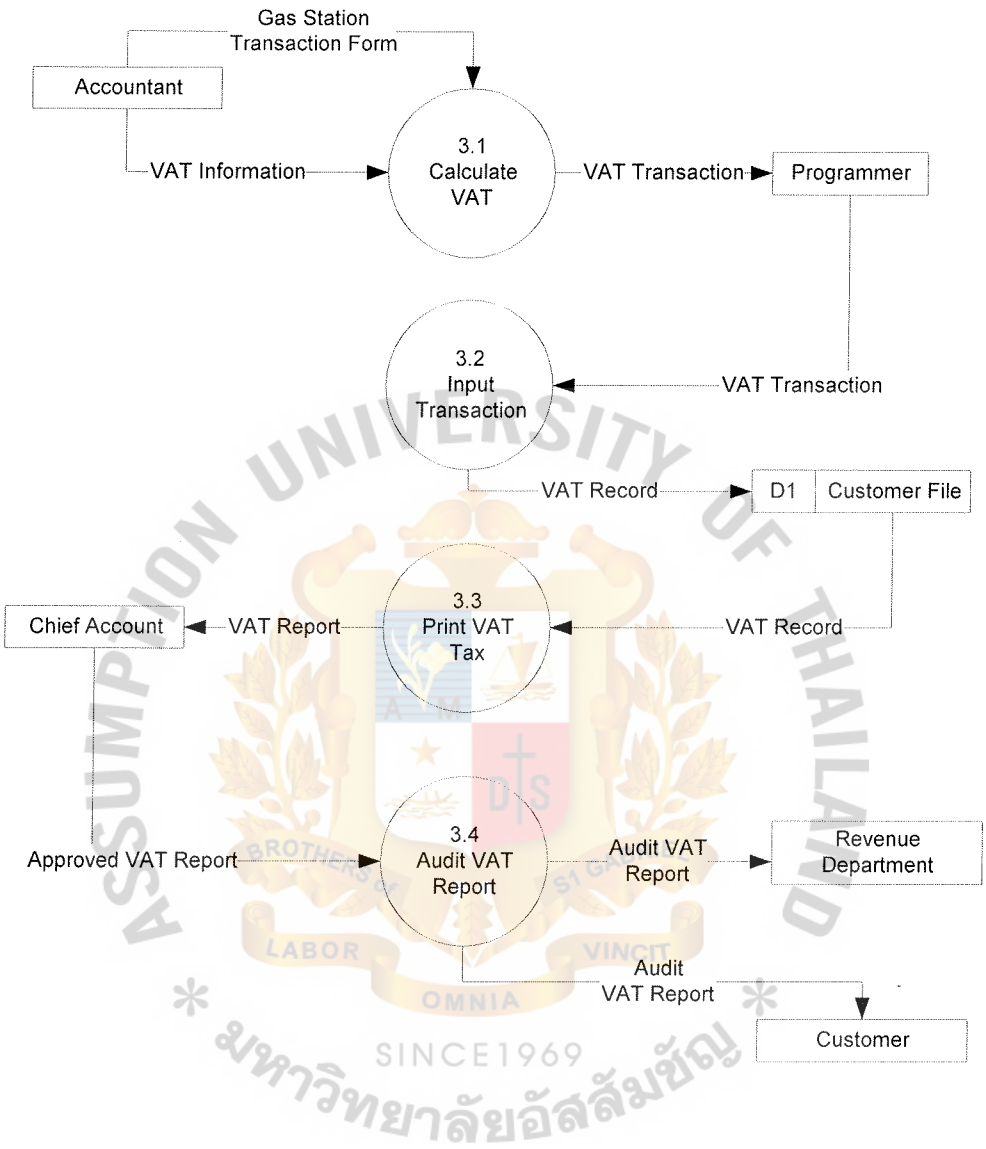

Figure B.4. Data Flow Diagram Level 1 Audit VAT Transaction.

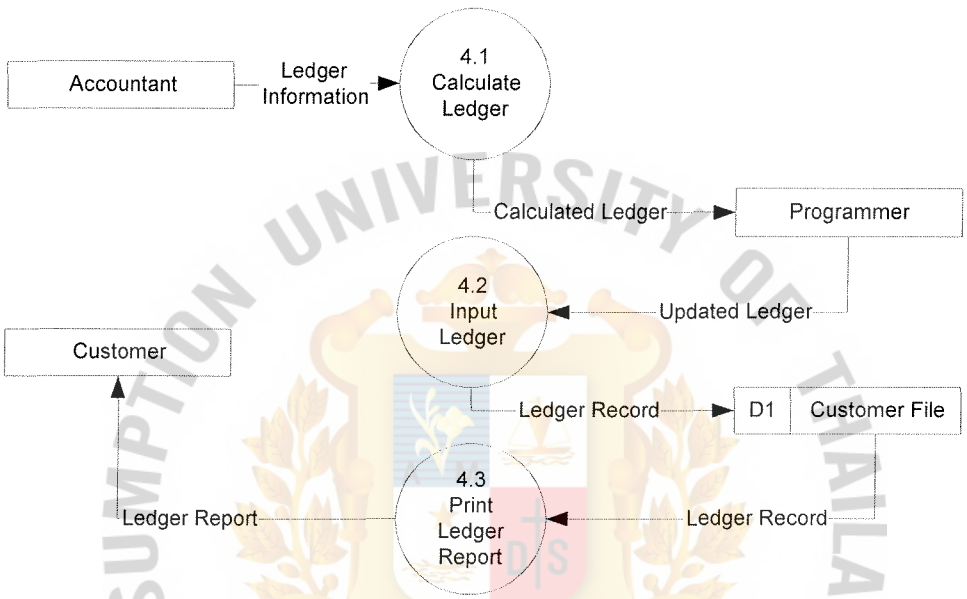

Figure B.5. Data Flow Diagram Level 1 Make Ledger.

APPENDIX C

CONTEXT DIAGRAM (PROPOSED SYSTEM)

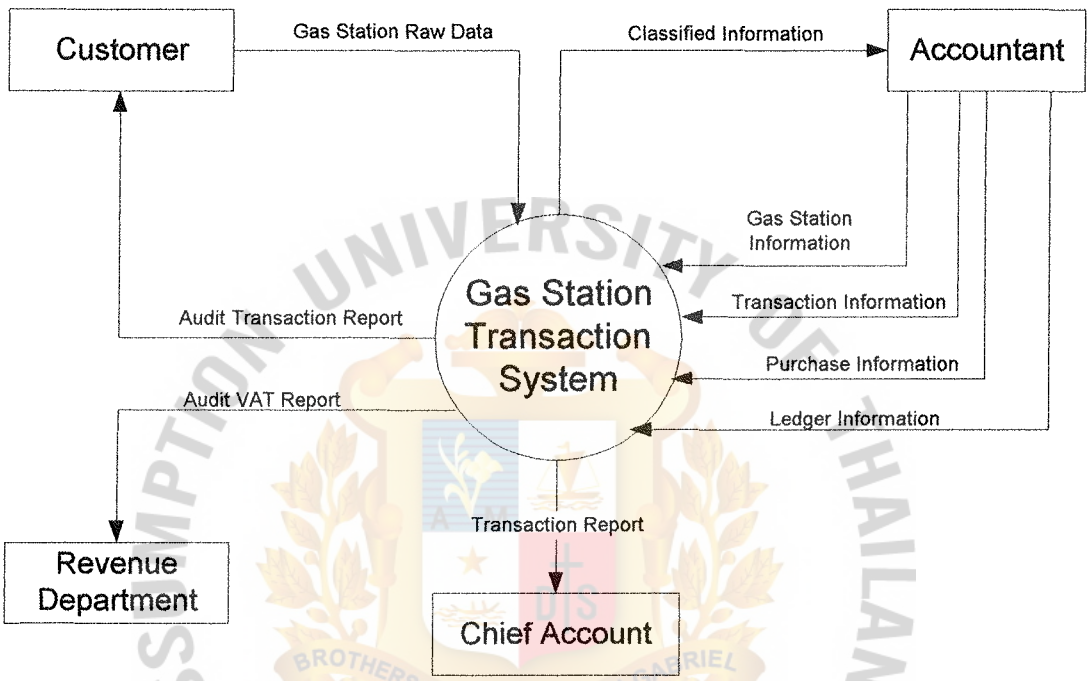

Figure C.1. Context Diagram Proposed System.

APPENDIX D

DATA FLOW DIAGRAM (PROPOSED SYSTEM)

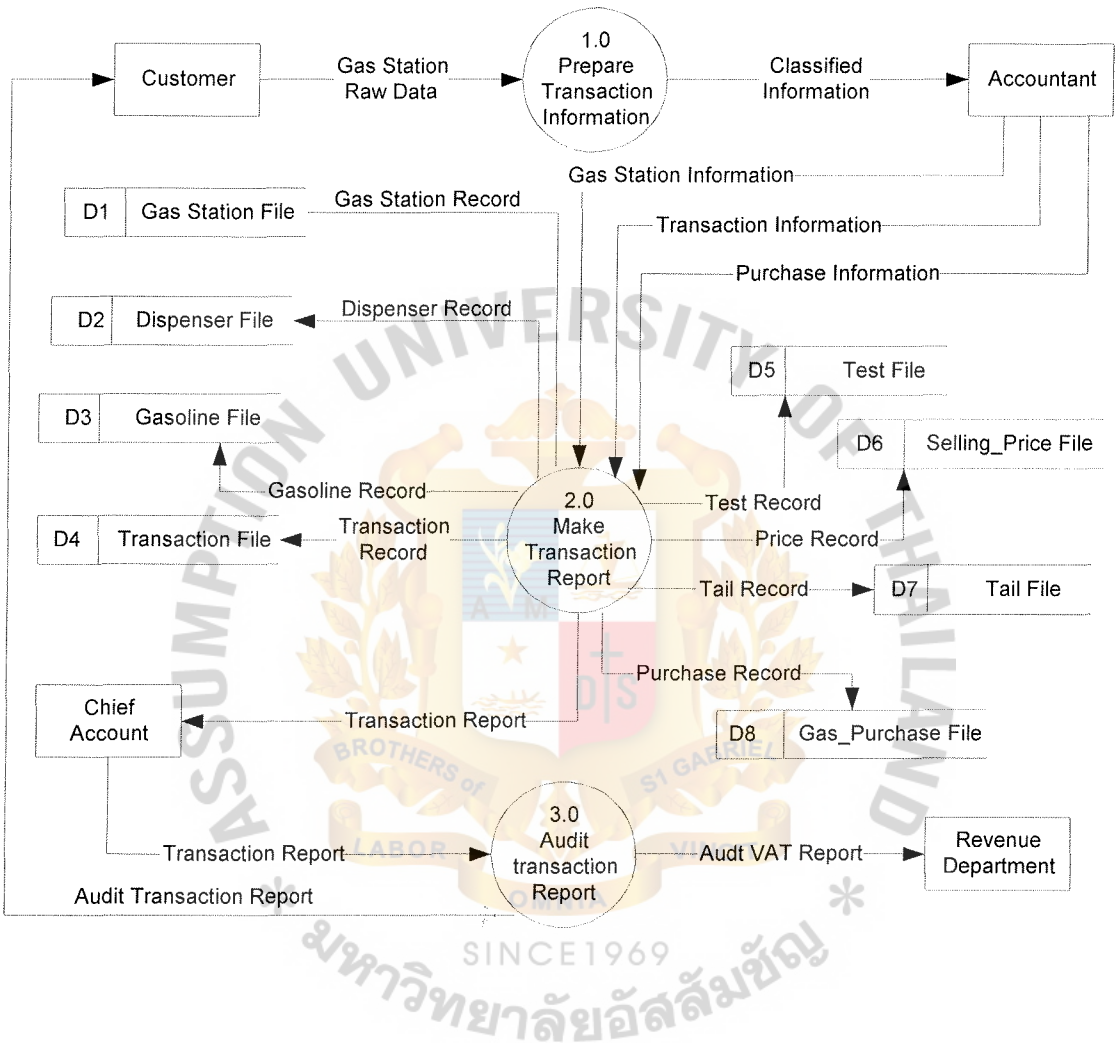

Figure D.1. Data Flow Diagram Level 0 Proposed System.

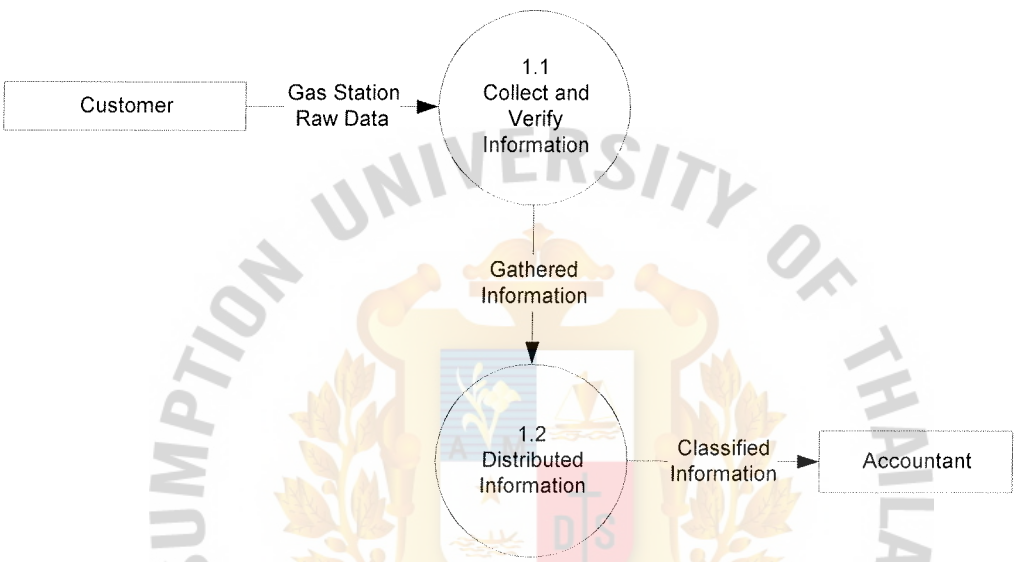

Figure D.2. Data Flow Diagram Level 1 Prepare Transaction Information.

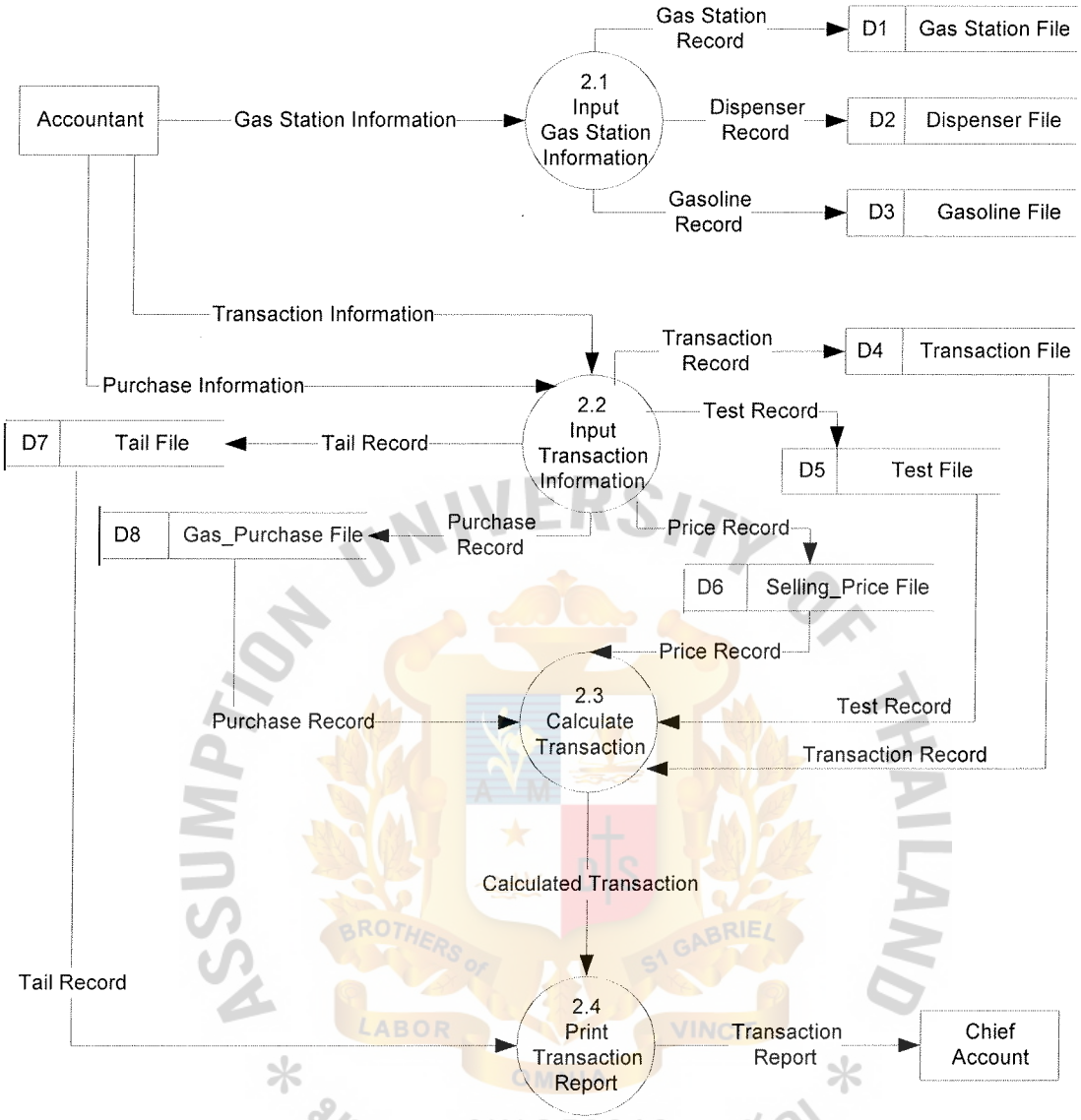

Figure D.3. Data Flow Diagram Level 1 Make Transaction Report.

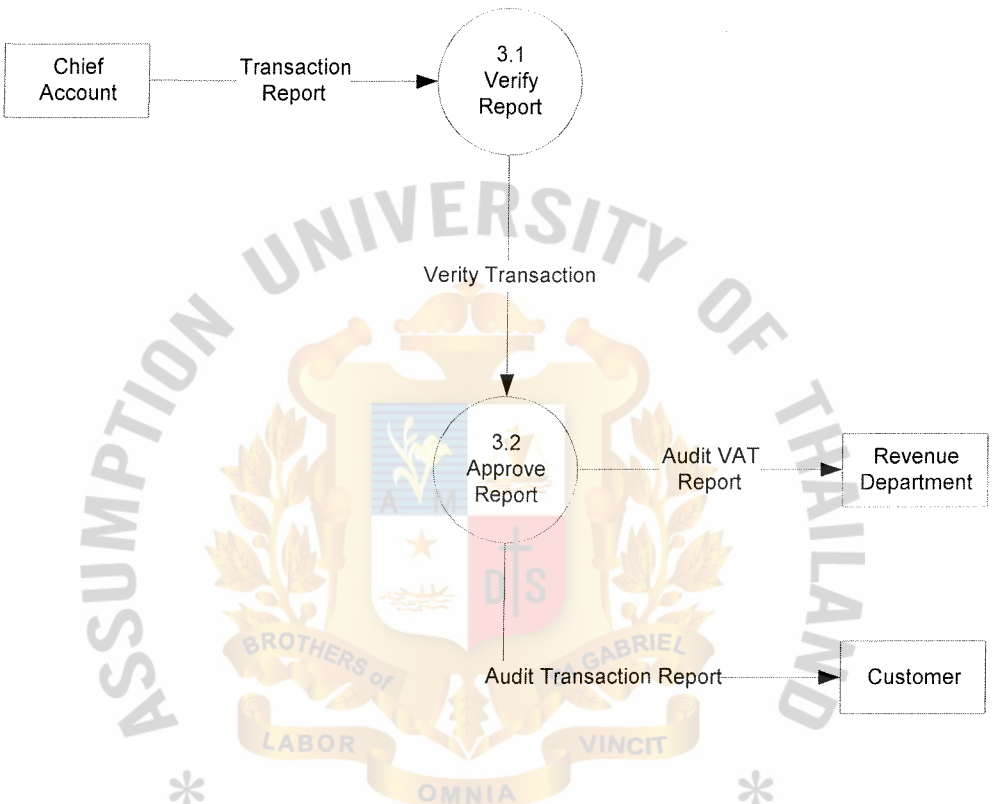

Figure D.4. Data Flow Diagram Level 1 Audit Transaction Report.

APPENDIX E

PROCESS SPECIFICATION

Process 1.0	:	Prepare Information
Input	:	Gas Station Raw Data
Output	:	Classified Information
Logic	:	This process receives all the gas station information from the customer, the clerk will distribute the information to the concerned accountant.
Process 2.0	:	Make Transaction Report
Input	:	Gas Station Information Transaction Information Purchase Information
Output	:	Transaction Report
Logic	:	This process is to make the transaction report, and then send it to the chief account for auditing.
Process 3.0	:	Audit Transaction Report
Input	:	Transaction Report
Output	:	Audit VAT Report, Audit Transaction Report
Logic	:	The chief account will verify and audit the transaction report, and then send it to the Revenue Department and the customers.
Process 1.1	:	Collect and Verify Information
Input	:	Gas Station Raw Data
Output	:	Gather information
Logic	:	The clerk will collect the information from the customers, and then verify the information to make sure that the information is complete.

Process 1.2	:	Distribute Information
Input	:	Gather Information
Output	:	Classified Information
Logic	:	The clerk will classify the information according to the types, and then distribute it to the responsible accountant.
Process 2.1	:	Input Gas Station Information
Input	:	Gas Station Information
Output	:	Gas Station Record Dispenser Record Gasoline Record
Logic	:	The accountant will input the gas station information into the database file.
Process 2.2	:	Input Transaction Information
Input	:	Transaction Information Purchase Information
Output	:	Transaction Record Test Record Price Record Tail Record Purchase Record
Logic	:	To record the transaction information into the database file, it will be used for calculating transaction.
Process 2.3	:	Calculate Transaction
Input	:	Transaction Record Test Record

		Price Record
		Tail Record
		Purchase Record
Output	:	Calculated Transaction
Logic	:	To calculate transaction and then send the transaction to be printed out at process 2.4.
Process 2.4	:	Print Transaction Report
Input	:	Calculated Transaction
Output	:	Transaction Report
Logic	:	To print the transaction report to the chief account.
Process 3.1	:	Verify Report
Input	:	Transaction Report
Output	:	Verified Report
Logic	:	The chief account will verify the report whether the transaction is correct or not.
Process 3.2	:	Approve Report
Input	:	Verified Report
Output	:	Audit VAT Report
		Audit Transaction Report
Logic	:	The chief account will audit the report and then sign his name on the report if it passes the audit.

APPENDIX F

STRUCTURE CHART

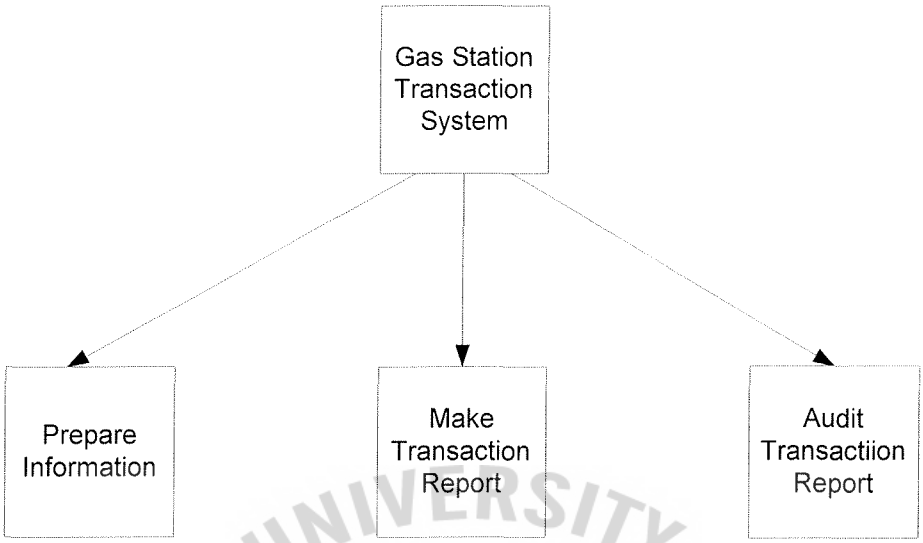

Figure F.1. Process 0 Gas Station Transaction System.

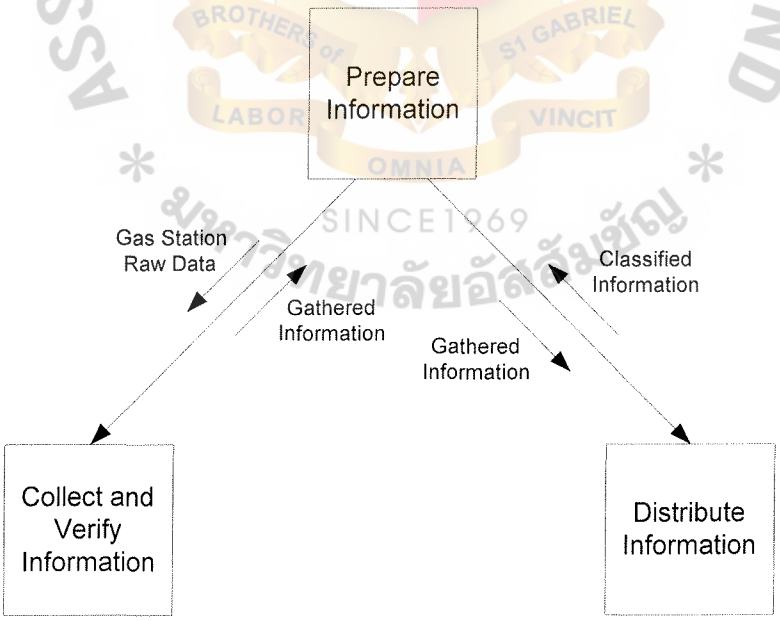

Figure F.2. Process 1.0 Prepare Information.

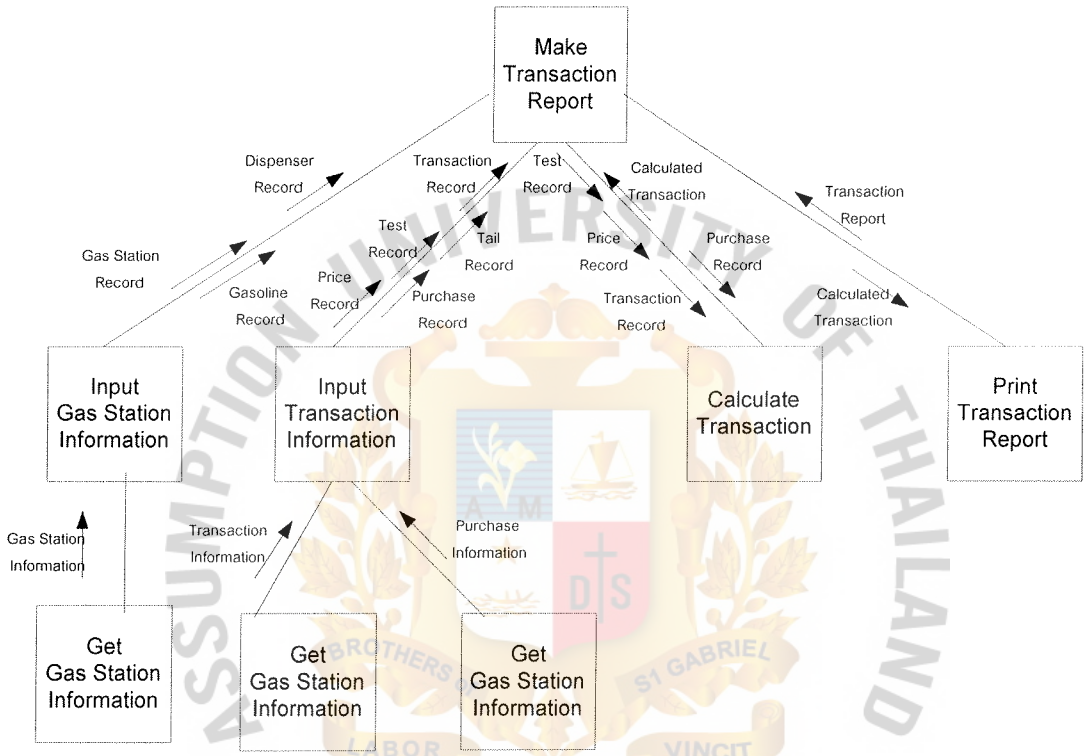

Figure F.3. Process 2.0 Make Transaction Report.

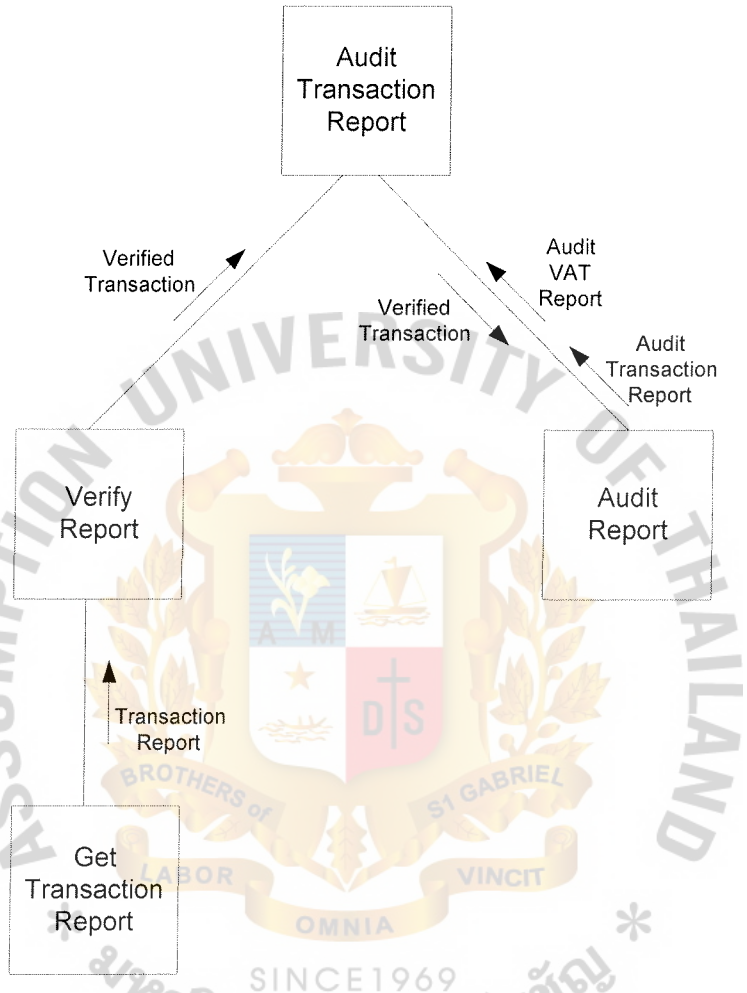

Figure F.4. Process 3.0 Audit Transaction Report.

APPENDIX G

ENTITY RELATIONSHIP DIAGRAM

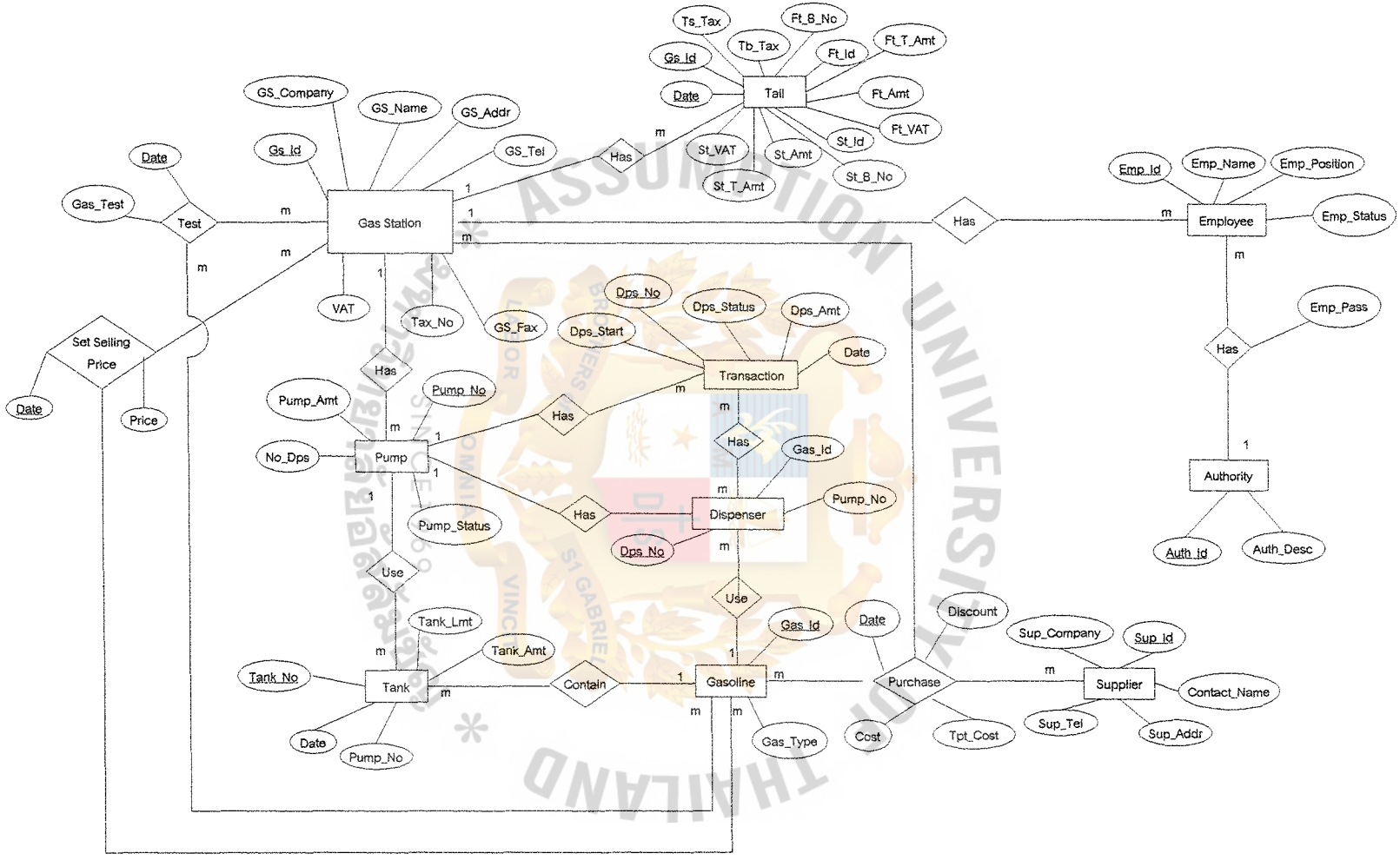

Figure G.1. Entitiy Relationship Diagram Gas Station Transaction System.

APPENDIX H

DATA STORE DEFINITION

DATA STORE DEFINITION

Table D.1. Gas Station File. Table Name : Gas Station

Field Name	Field Type	Column Width	Constraint
Gs_Id	Number	6	Primary Key
Tax_No	Character	30	Primary Key
Gs_Company	Character	50	
Gs_name	Character	50	
Gs_Address	Character	50	
Gs_Tel	Character	30	
Gs_FAX	Character	30	
VAT	Number	2	

Table D.2. Dispenser File. Table Name : Dispenser

Field Name	Field Type	Column Width	Constraint
Dps_No	Number	6	Primary Key
Gas_Id	Number	6	
Pump_No	Number	6	

Table D.3. Gasoline File. Table Name : Gasoline

Field Name	Field Type	Column Width	Constraint
Gas_Id	Number	6	Primary Key
Gas_Type	Character	10	

Table D.4. Transaction File. Table Name : Transaction

Field Name	Field Type	Column Width	Constraint
Dps_no	Number	6	Primary Key
Dps_Start	Number	6	
Dps_Sales	Number	6	
Dps_Status	Number	1	
Date	Date	8	

Table D.5. Test File. Table Name : Test

Field Name	Field Type	Column Width	Constraint
Date	Date	8	Primary Key
Gs_ID	Number	6	Foreign Key
Gas_Id	Number	6	Foreign Key
Gas_Test	Number	6	

Table D.6. Selling Price File. Table Name : Selling Price

Field Name	Field Type	Column Width	Constraint
Date	Date	8	Primary Key
Gs_Id	Number	6	Foreign Key
Gas_Id	Number	6	Foreign Key
Price	Number	7	

Table D.7. Tail File. Table Name : Tail

Field Name	Field Type	Column Width	Constraint
Date	Date	8	Primary Key
Gs_Id	Number	6	Foreign Key
Ts_Tax	Number	7	
Tb_Tax	Number	7	
Ft_B_No	Number	7	
Ft_Id	Number	10	
Ft_Amt	Number	2	
Ft_Tamt	Number	8	
Ft_VAT	Number	8	
St_B_No	Number	7	
St_Id	Number	10	
St_Amt	Number	2	
St_Tamt	Number	8	
St_VAT	Number	8	

Table D.8. Gas Purchase File. Table Name : Gas Purchase

Field Name	Field Type	Column Width	Constraint
Date	Date	8	Primary Key
Gs_Id	Number	6	Foreign Key
Gas_Id	Number	6	Foreign Key
Sup_Id	Number	3	Foreign Key
Cost	Number	7	
Discount	Number	7	
Tpt_Cost	Number	7	

Table D.9. Table Name : Employee.

Field Name	Field Type	Column Width	Constraint
Emp_ID	Number	6	Primary Key
Emp_Name	Character	50	
Emp_Position	Character	50	
Emp_Status	Number	1	
Emp_Pass	Character	10	
Auth_Id	Number	6	Foreign Key
Gs_Id	Number	6	Foreign Key

Table D.10. Table Name : Authority.

Field Name	Field Type	Column Width	Constraint
Auth_Id	Number	6	Primary Key
Auth_Desc	Character	50	

Table D.11. Table Name : Pump.

Field Name	Field Type	Column Width	Constraint
Pump_no	Number	6	Primary Key
No_Dps	Number	3	
Pump_Amt	Number	6	
Pump_Sales	Number	7	
Pump_Status	Number	1	

Table D.12. Table Name : Tank.

Field Name	Field Type	Column Width	Constraint
Tank_No	Number	6	Primary Key
Tank_Lmt	Number	6	
Tank_Amt	Number	6	
Date	Date	8	
Pump_No	Number	6	Foreign Key
Gas_ID	Number	6	Foreign Key

Table D.13. Table Name : Supplier.

Field Name	Field Type	Column Width	Constraint
Sup_ID	Number	3	Primary Key
Sup_Name	Character	50	
Contact_Name	Character	50	
Sup_Addr	Character	50	
Sup_Tel	Character	50	

APPENDIX I

DATA DICTIONARY

Object Name:	Audit Transaction Report
Object Type:	Data Flow
Definition:	Audit VAT Report + Audit Sales Ledger Report
Short Description:	All completed transaction reports that have already been audited by the chief account. They are ready to be sent to the customers.
Object Name:	Audit VAT Report
Object Type:	Data Flow
Definition:	
Short Description:	Completed VAT report that has already been audited by the chief account. It is ready to be sent to the Revenue Department and the customers.
Object Name:	Calculated Transaction
Object Type:	Data Flow
Definition:	
Short Description:	Transactions that are completely calculated.
Object Name:	Classified Information
Object Type:	Data Flow
Definition:	
Short Description:	Gas station information that has been classified according to the type of document.
Object Name:	Dispenser Record
Object Type:	Data Flow
Definition:	Dps_No + Gas_Id
Short Description:	Dispenser information that is kept as a record in a file.
Object Name:	Gas Station Information
Object Type:	Data Flow
Definition:	
Short Description:	The information that concerns gas station.
Object Name:	Gas Station Record
Object Type:	Data Flow
Definition:	Tax_No + Gs_Company + Gs_Name + Gs_Address
Short Description:	Gas station information that is already kept as a record in a file.
Object Name:	Gasoline Record
Object Type:	Data Flow
Definition:	Gas_Id + Gas_Type
Short Description:	Gasoline information that is kept as a record in a file.
Object Name:	Gas Station Raw Data
Object Type:	Data Flow
Definition:	Monthly update.
Short Description:	All documents and information of gas station such as invoice, bill, and etc.
Object Name:	Gathered Information
Object Type:	Data Flow
Definition:	
Short Description:	Gas station data that have been collected and verified by the clerk.

Object Name:	Price Record
Object Type:	Data Flow
Definition:	Price
Short Description:	Selling price of gasoline that is kept as a record in a file.
Object Name:	Purchase Information
Object Type:	Data Flow
Definition:	
Short Description:	The information that concerns gasoline purchasing such as supplier, purchase price, etc.
Object Name:	Purchase Record
Object Type:	Data Flow
Definition:	Cost + Discount + Tpt_Cost
Short Description:	Gasoline purchasing information that is kept as a record in a file.
Object Name:	Tail Record
Object Type:	Data Flow
Definition:	Ts_Tax + Tb_Tax + Ft_B_No + Ft_Id + Ft_Amt + Ft_Tamt + Ft_VAT + St_B_No + St_Id + St_Amt + St_Tamt + St_VAT
Short Description:	Tax book information that is kept as a record in a file.
Object Name:	Test Record
Object Type:	Data Flow
Definition:	Gas_Test
Short Description:	Gasoline testing information that is kept as a record in a file.
Object Name:	Transaction Information
Object Type:	Data Flow
Definition:	
Short Description:	The information that will be used for calculating transaction.
Object Name:	Transaction Record
Object Type:	Data Flow
Definition:	Dps_No + Dps_Start + Dps_Sales + Date
Short Description:	Transaction information that is kept as a record in a file.
Object Name:	Transaction Report
Object Type:	Data Flow
Definition:	VAT Reports + Sales Report
Short Description:	All gas station transaction reports.
Object Name:	Verified Transaction
Object Type:	Data Flow
Definition:	
Short Description:	The transactions that have been verified by the chief account.
Object Name:	Audit report
Object Type:	Data Process
Definition:	
Short Description:	To audit the transaction report, performed by the chief account.

Object Name:	Approve Report
Object Type:	Data Process
Definition:	
Short Description:	To audit the transaction report. The chief account will sign his name on the report if it passes the audit.
Object Name:	Calculate Transaction
Object Type:	Data Process
Definition:	
Short Description:	To calculate all the transactions of gas station, performed by the accountant.
Object Name:	Collect and Verify Information
Object Type:	Data Process
Definition:	
Short Description:	To gather the information from the customers and then verify the information whether it is complete or not.
Object Name:	Distribute Information
Object Type:	Data Process
Definition:	
Short Description:	To distribute the information to the person concerned.
Object Name:	Input Gas Station Information
Object Type:	Data Process
Definition:	
Short Description:	To input the gas station information, performed by the accountant.
Object Name:	Input Transaction Information
Object Type:	Data Process
Definition:	
Short Description:	To input transaction information, performed by the accountant.
Object Name:	Make Transaction Report
Object Type:	Data Process
Definition:	
Short Description:	To make the transaction report.
Object Name:	Prepare Information
Object Type:	Data Process
Definition:	
Short Description:	To prepare all needed information.
Object Name:	Print Transaction Report
Object Type:	Data Process
Definition:	
Short Description:	To print out the transaction report, prepared by the accountant.
Object Name:	Verify Report
Object Type:	Data Process
Definition:	
Short Description:	To verify the transaction report whether the transaction is correct or not, performed by the chief account.
Object Name:	Accountant

Object Type:	External Entity
Definition:	
Short Description:	The person who is responsible for making the account.
Object Name:	Chief Accountant
Object Type:	External Entity
Definition:	
Short Description:	The person who is responsible for auditing or examining the account and transaction reports before sending them to the customers.
Object Name:	Customer
Object Type:	External Entity
Definition:	
Short Description:	The customers of gas station section which are gas station companies.
Object Name:	Revenue Department
Object Type:	External Entity
Definition:	
Short Description:	The government organization that is responsible for keeping VAT and taxation.
Object Name:	Authority Table
Object Type:	Data Structure
Definition:	
Short Description:	Database table that records the authority level.
Object Name:	Dispenser Table
Object Type:	Data Structure
Definition:	Dps_No + Gas_Id + Pump_No
Short Description:	Database table that records the specification of each dispenser.
Object Name:	Employee Table
Object Type:	Data Structure
Definition:	
Short Description:	Database table that records the employee information.
Object Name:	Gas Purchase Table
Object Type:	Data Structure
Definition:	
Short Description:	Database table that records the gas purchase information.
Object Name:	Gas Station Table
Object Type:	Data Structure
Definition:	
Short Description:	Database table that records the gas station information.
Object Name:	Gasoline Table
Object Type:	Data Structure
Definition:	
Short Description:	Database table that records the type of gasoline in the gas station.
Object Name:	Pump Table
Object Type:	Data Structure
Definition:	

Short Description:	Database table that records the pump information and pump transaction.
Object Name:	Selling Price Table
Object Type:	Data Structure
Definition:	Update only when price is changed.
Short Description:	Database table that records the movement of gasoline selling price.
Object Name:	Supplier Table
Object Type:	Data Structure
Definition:	
Short Description:	Database table that records the supplier information (the supplier is not the dealer of the gas station.).
Object Name:	Tail Table
Object Type:	Data Structure
Definition:	
Short Description:	Database table that records the general information, which has to be shown at the bottom of VAT reports according to the Revenue Department's standard.
Object Name:	Tank Table
Object Type:	Data Structure
Definition:	
Short Description:	Database table that records the specification of tank and tank data that will be used for calculating transaction.
Object Name:	Test Table
Object Type:	Data Structure
Definition:	Record only when there is gasoline testing.
Short Description:	Database table that records the gasoline testing information. Ex. When there is gasoline testing, type of gasoline test and amount of gasoline.
Object Name:	Transaction Table
Object Type:	Data Structure
Definition:	Daily record.
Short Description:	Database table that records the dispenser transaction.
Object Name:	Auth_Desc
Object Type:	Data Element
Definition:	
Short Description:	Description of authority id.
Object Name:	Auth_Id
Object Type:	Data Element
Definition:	
Short Description:	Authority identifier number
Object Name:	Contact_Name
Object Type:	Data Element
Definition:	
Short Description:	Name of contact person
Object Name:	Cost
Object Type:	Data Element
Definition:	

Short Description:	Purchase price of gasoline
Object Name:	Date
Object Type:	Data Element
Definition:	dd/mm/yyyy
Short Description:	Date of record
Object Name:	Discount
Object Type:	Data Element
Definition:	
Short Description:	Discount of gasoline purchase
Object Name:	Dps_No
Object Type:	Data Element
Definition:	
Short Description:	Dispenser number
Object Name:	Dps_Sales
Object Type:	Data Element
Definition:	Different amount of Dps_Start
Short Description:	Amount of gasoline sales in each dispenser (Liter).
Object Name:	Dps_Start
Object Type:	Data Element
Definition:	To record number daily.
Short Description:	Start number of gasoline amount
Object Name:	Dps_Status
Object Type:	Data Element
Definition:	Use number code to declare status such as 1 = Work, 2 = Out of Service
Short Description:	Status of Dispenser Ex. Work, Out of Service
Object Name:	Emp_Id
Object Type:	Data Element
Definition:	Year + Emp_Id
Short Description:	Employee Identifier
Object Name:	Emp_Name
Object Type:	Data Element
Definition:	
Short Description:	Employee's Name
Object Name:	Emp_Pass
Object Type:	Data Element
Definition:	
Short Description:	Password of employee that is used for log in the system.
Object Name:	Emp_Position
Object Type:	Data Element
Definition:	Use number code to declare each position such as 1 = Managing Director
Short Description:	Position of Employee Ex. Accountant, Chief Account, Programmer
Object Name:	Emp_Status
Object Type:	Data Element
Definition:	Use alphabet code to declare each status such as E = Employed, R = Retired

Short Description:	Status of Employee Ex. Employed, Retired
Object Name:	Ft_Amt
Object Type:	Data Element
Definition:	
Short Description:	Amount of book of full form tax bill.
Object Name:	Ft_B_No
Object Type:	Data Element
Definition:	
Short Description:	Book number of full form tax bill.
Object Name:	Ft_Id
Object Type:	Data Element
Definition:	
Short Description:	Id number of tax bill. The tax bill is preferred in full form.
Object Name:	Ft_Tamt
Object Type:	Data Element
Definition:	
Short Description:	Total amount of money in tax bill. The tax bill is preferred in full form.
Object Name:	Ft_VAT
Object Type:	Data Element
Definition:	
Short Description:	VAT amount in tax bill. The tax bill is preferred in full form.
Object Name:	Gas_Id
Object Type:	Data Element
Definition:	
Short Description:	Gasoline Identifier Number
Object Name:	Gas_Test
Object Type:	Data Element
Definition:	
Short Description:	Amount of Testing Gasoline (Liter)
Object Name:	Gas_Type
Object Type:	Data Element
Definition:	Use alphabet code to declare the type such as S = Super,
Short Description:	D = Diesel Type of Gasoline Ex. Super, Diesel, ULG
Object Name:	GS_Address
Object Type:	Data Element
Definition:	
Short Description:	Address of gas station
Object Name:	GS_Company
Object Type:	Data Element
Definition:	
Short Description:	Company name of gas station Ex. ABC Company
Object Name:	GS_Fax
Object Type:	Data Element
Definition:	

Short Description:	Fax number of gas station
Object Name:	GS_Id
Object Type:	Data Element
Definition:	
Short Description:	Gas station identifier number
Object Name:	GS_Name
Object Type:	Data Element
Definition:	
Short Description:	Name of gasoline dealer company Ex. Shell, Esso, Star
Object Name:	GS_Tel
Object Type:	Data Element
Definition:	
Short Description:	Telephone number of gas station
Object Name:	No_Dps
Object Type:	Data Element
Definition:	
Short Description:	Number of dispenser in a pump.
Object Name:	Price
Object Type:	Data Element
Definition:	Record only when the price is changed.
Short Description:	Selling price of gasoline.
Object Name:	Pump_Amt
Object Type:	Data Element
Definition:	Sum of Dps_Sales of all dispensers in the pump.
Short Description:	Amount of gas sales of each pump
Object Name:	Pump_No
Object Type:	Data Element
Definition:	
Short Description:	Pump Number
Object Name:	Pump_Sales
Object Type:	Data Element
Definition:	Sum (Dps_Sales * Price)
Short Description:	Amount of money received from gasoline sales.
Object Name:	Pump_Status
Object Type:	Data Element
Definition:	Use number code to declare status such as 1 = Work, 2 = Out of Service
Short Description:	Status of pump Ex. Work, Out of Service
Object Name:	St_Amt
Object Type:	Data Element
Definition:	
Short Description:	Amount of book of short form tax bill.
Object Name:	St_B_No
Object Type:	Data Element
Definition:	
Short Description:	Book number of short form tax bill.
Object Name:	St_Id
Object Type:	Data Element

Definition:	
Short Description:	Id number of tax bill. The tax bill is preferred in short form.
Object Name:	St_Tamt
Object Type:	Data Element
Definition:	
Short Description:	Total amount of money in tax bill. The tax bill is preferred in short form.
Object Name:	St_VAT
Object Type:	Data Element
Definition:	
Short Description:	VAT amount in tax bill. The tax bill is preferred in short form.
Object Name:	Sup_Addr
Object Type:	Data Element
Definition:	
Short Description:	Address of supplier
Object Name:	Sup_Id
Object Type:	Data Element
Definition:	
Short Description:	Supplier Identifier Number
Object Name:	Sup_Name
Object Type:	Data Element
Definition:	
Short Description:	Company name of supplier
Object Name:	Sup_Tel
Object Type:	Data Element
Definition:	
Short Description:	Telephone number of supplier
Object Name:	Tank_Amt
Object Type:	Data Element
Definition:	Daily record
Short Description:	Amount of gasoline in the tank.
Object Name:	Tank_Lmt
Object Type:	Data Element
Definition:	
Short Description:	Limit of gasoline amount that can be contained in the tank. (Liter)
Object Name:	Tank_No
Object Type:	Data Element
Definition:	
Short Description:	Tank Number (No. 1, No. 2, etc.)
Object Name:	Tax_No
Object Type:	Data Element
Definition:	
Short Description:	Tax number of gas station
Object Name:	Tb_Tax
Object Type:	Data Element

Definition:	
Short Description:	Total Buy Tax
Object Name:	Tpt_Cost
Object Type:	Data Element
Definition:	
Short Description:	Transportation Cost
Object Name:	Ts_Tax
Object Type:	Data Element
Definition:	
Short Description:	Total Sales Tax
Object Name:	VAT
Object Type:	Data Element
Definition:	
Short Description:	VAT value

APPENDIX J

SCREEN OUTPUT

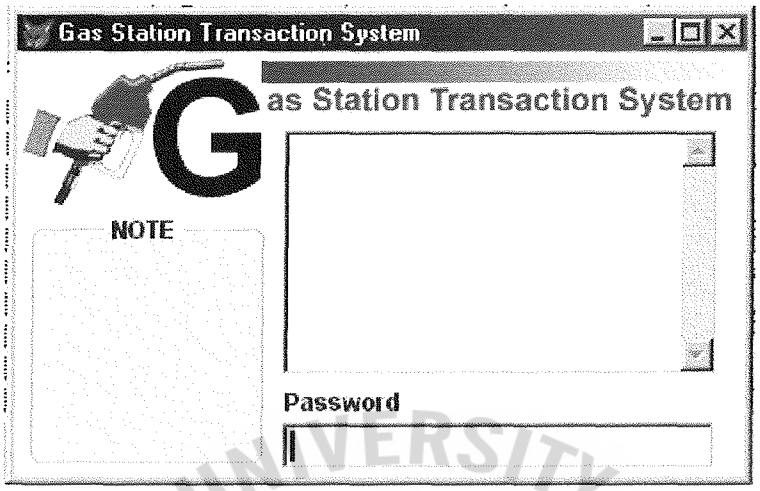

Figure J.1. Login Screen.

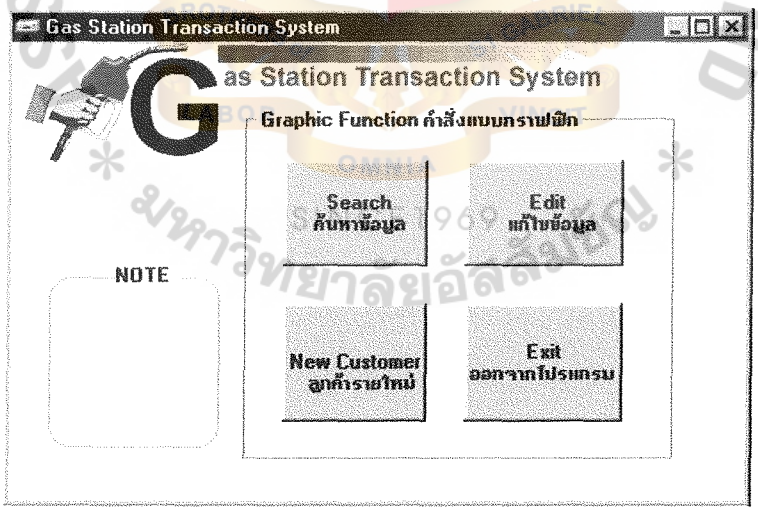

Figure J.2. Main Customer Screen.

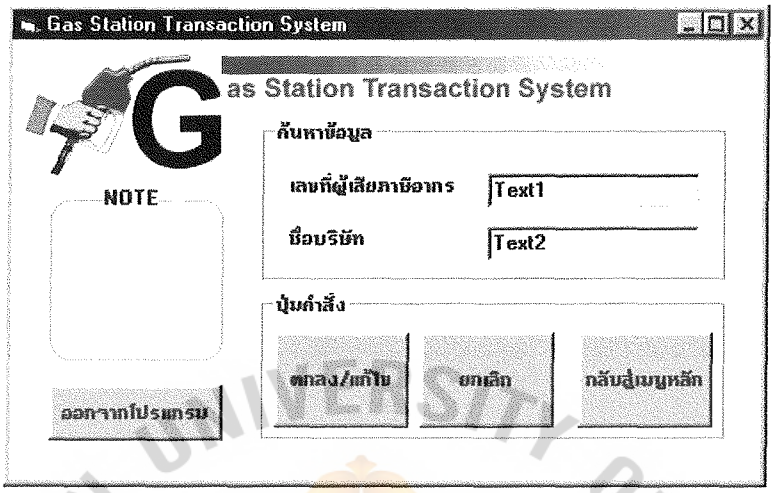

Figure J.3. Customer Search Screen.

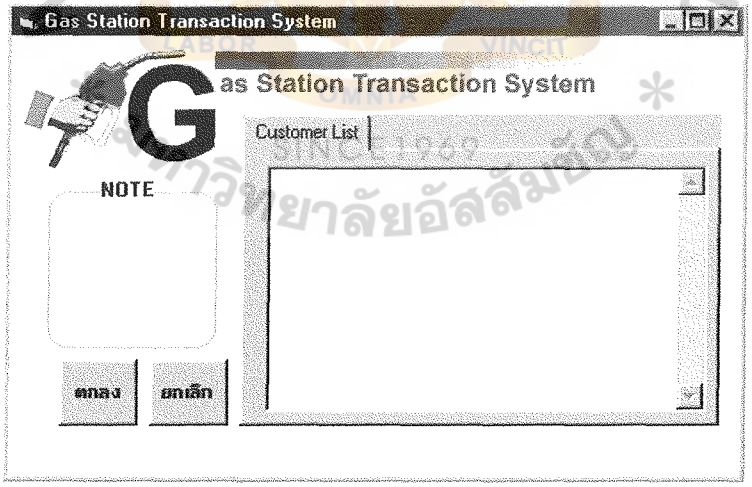

Figure J.4. Customer List Screen.

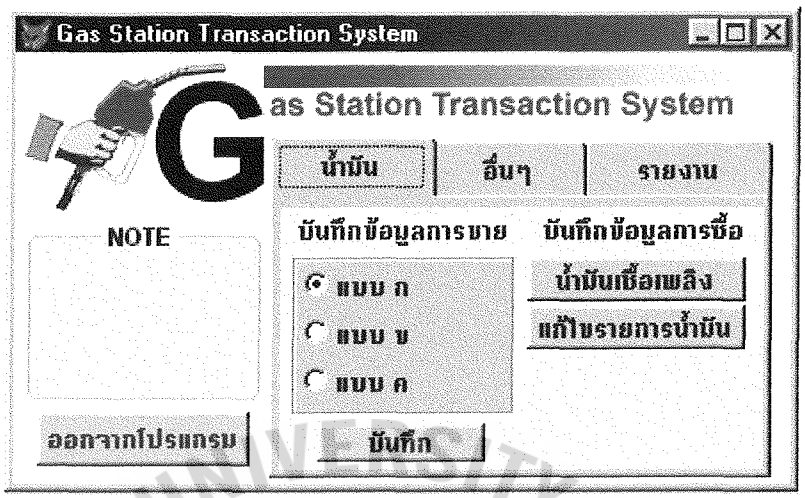

Figure J.5. Main Screen.

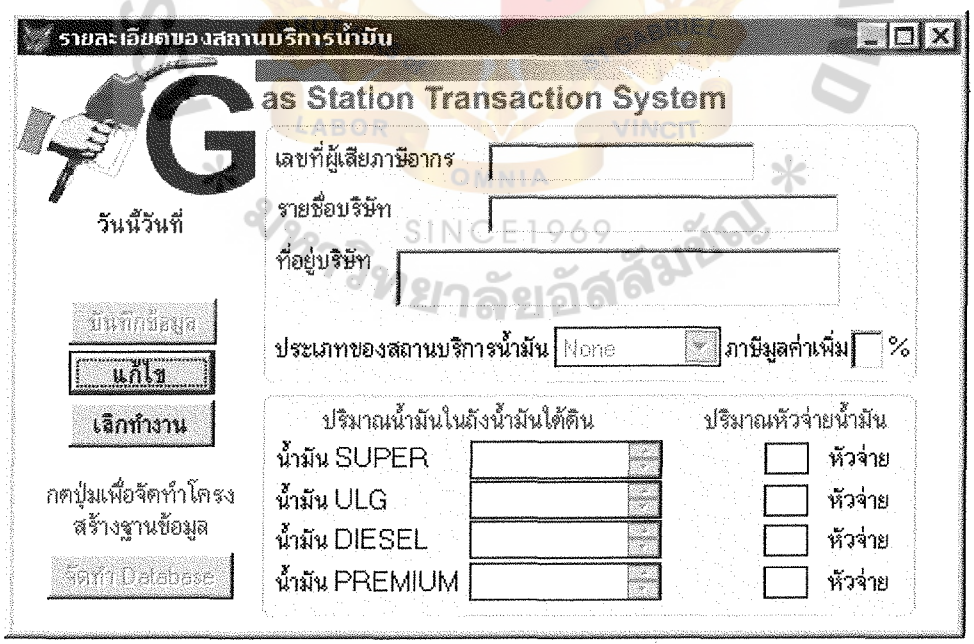

Figure J.6. Configuration Screen.

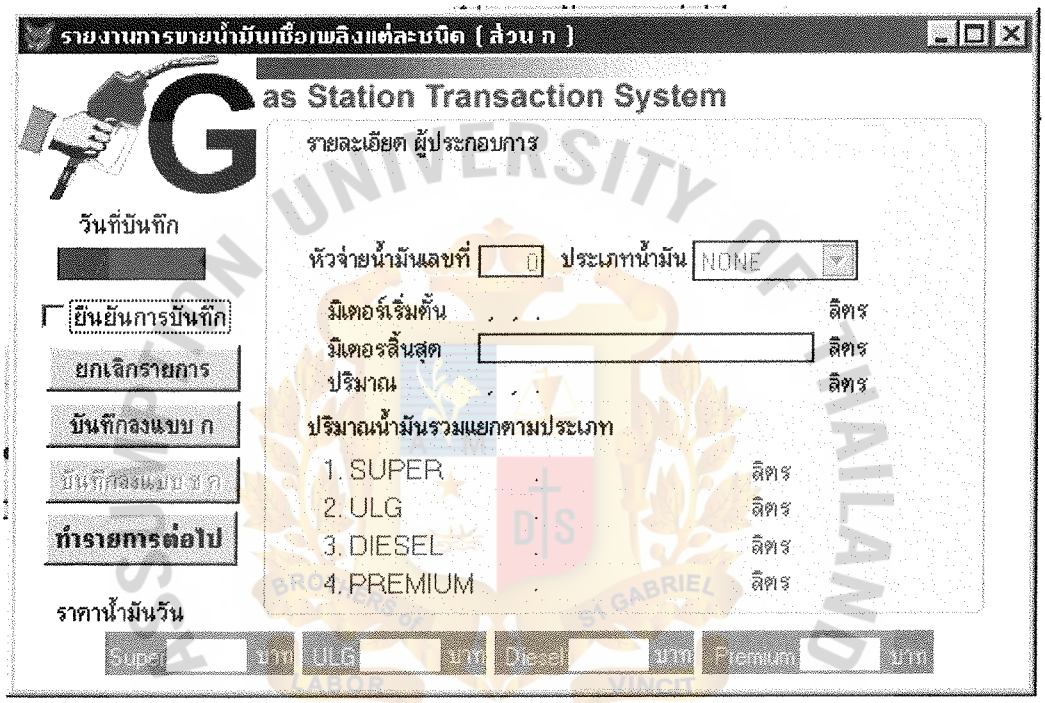

Figure J.7. Form A Input Screen.

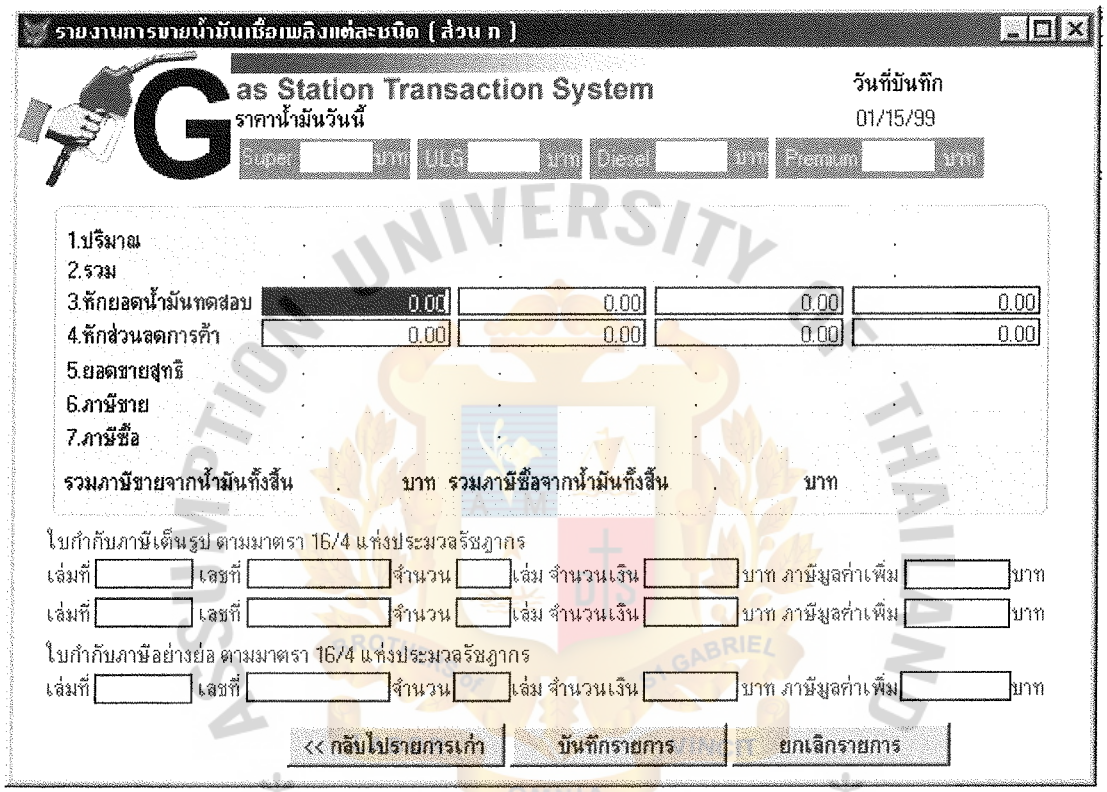

Figure J.8. Form A Part 2 Input Screen.

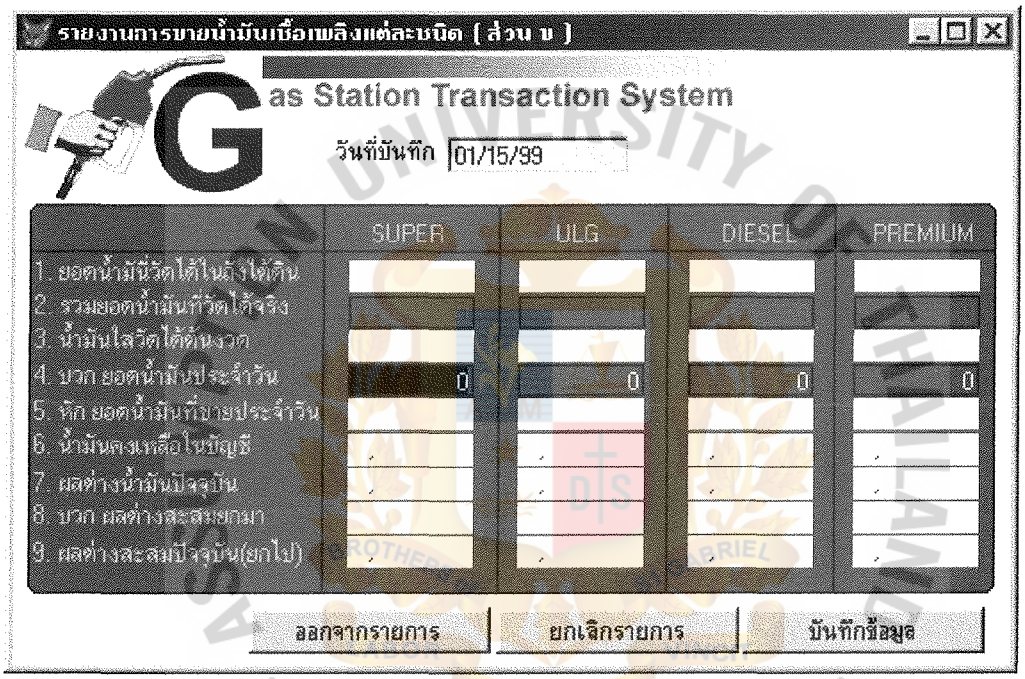

Figure J.9. Form B Input Screen.

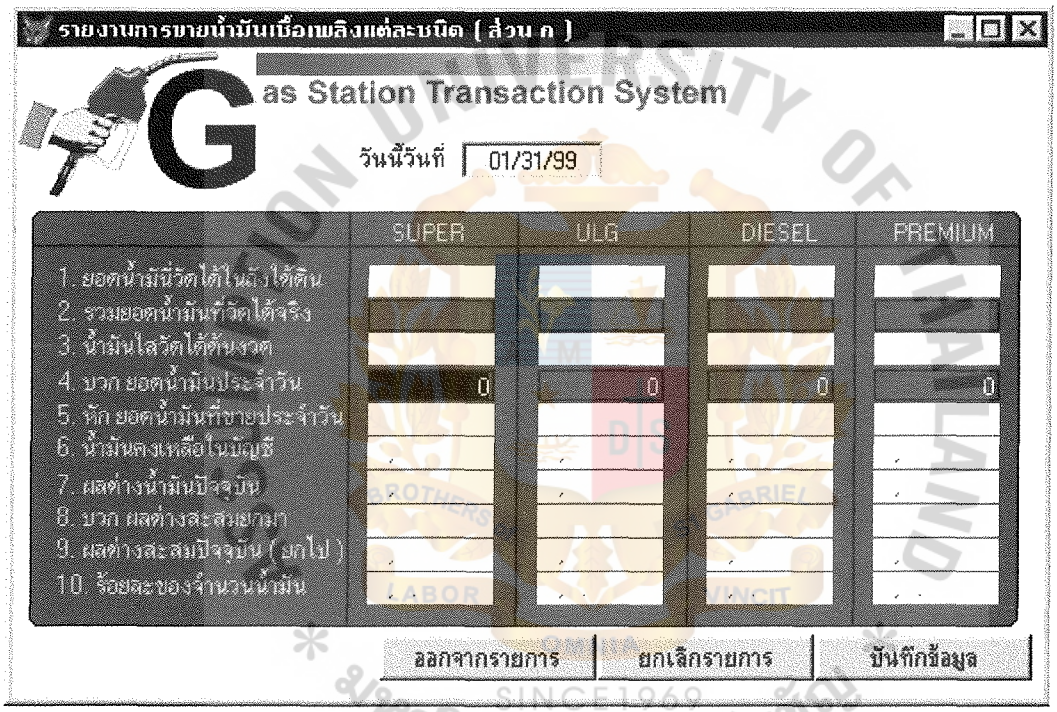

Figure J.10. Form C Input Screen.

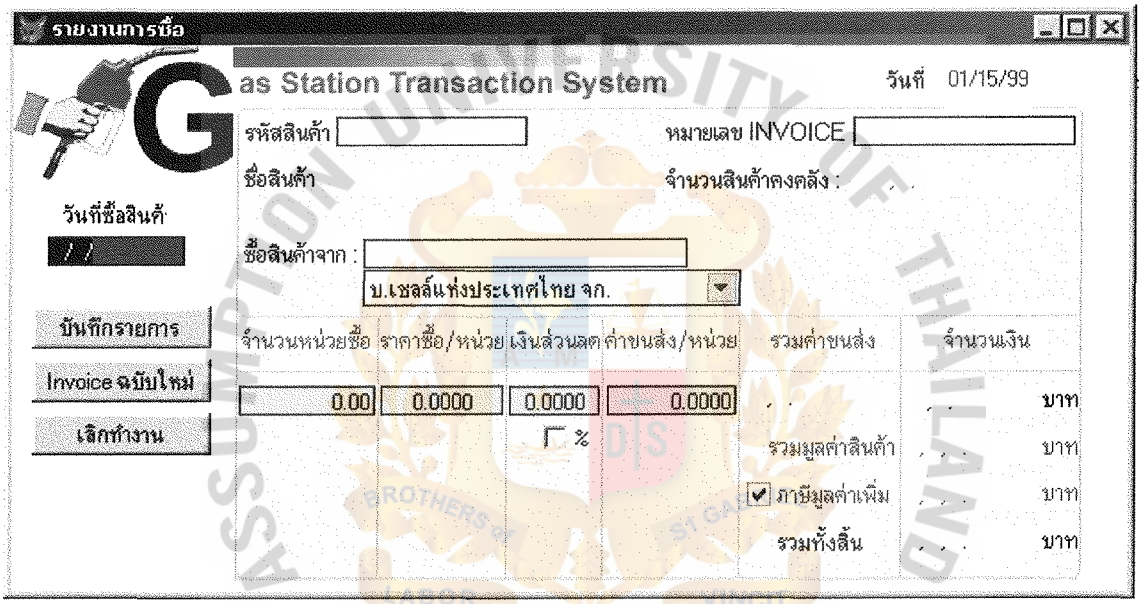

Figure J.11. Purchase Input Screen.

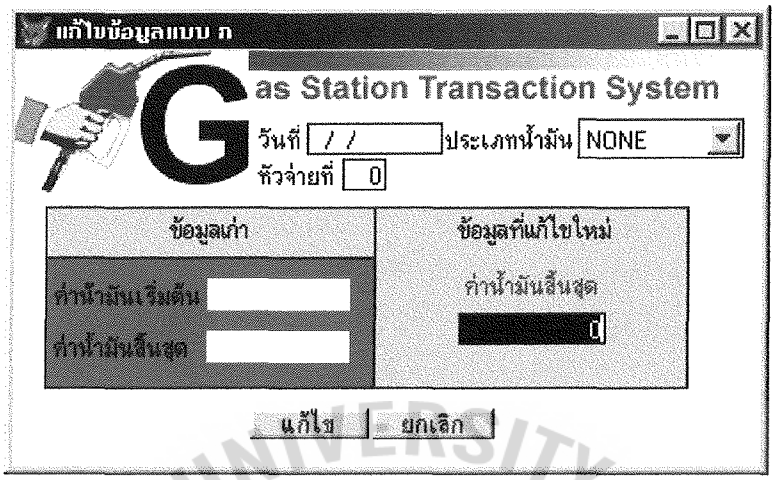

Figure J.12. Form 1 Gas correction Screen.

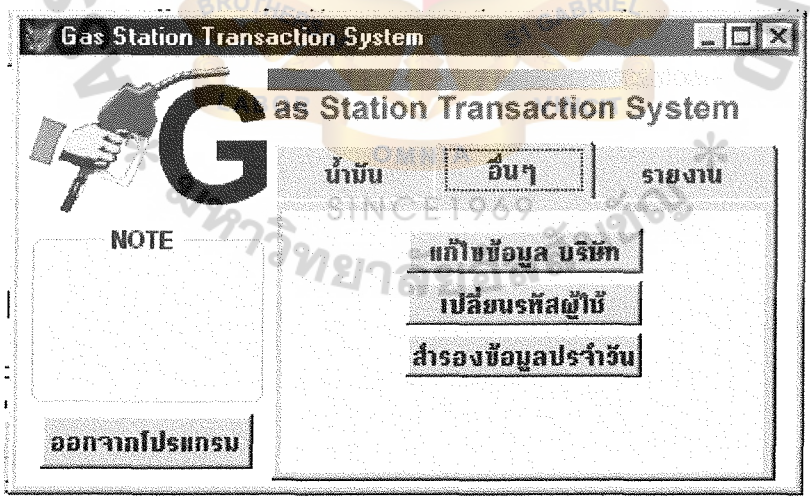

Figure J.13. Miscellaneous Screen.

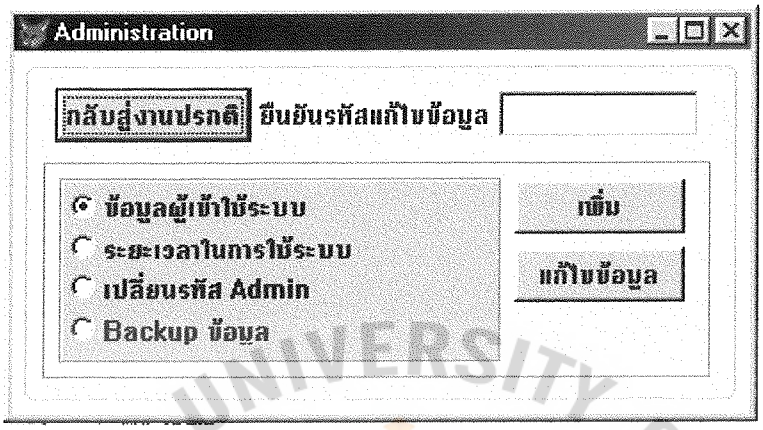

Figure J.14. Administrator Screen.

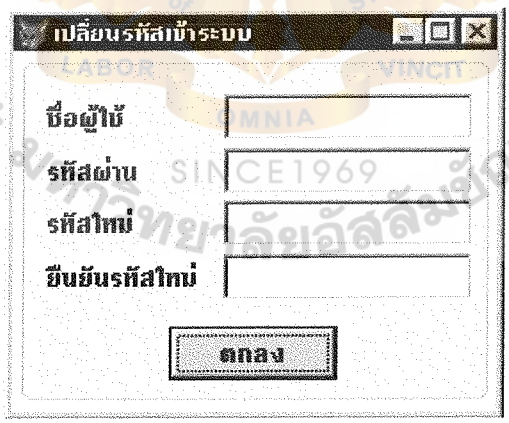

Figure J.15. Change User Password Screen.

Figure J.16. Edit User Screen.

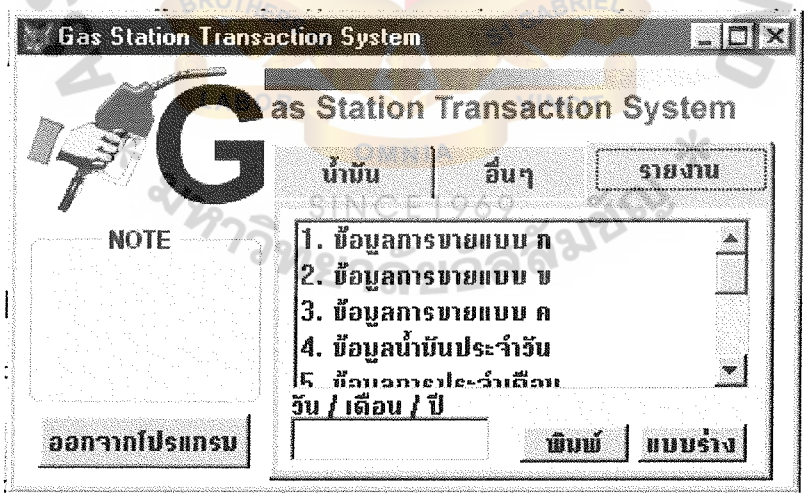

Figure J.17. Report Screen.

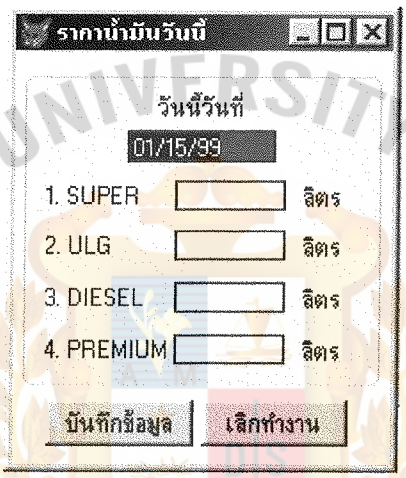

Figure J.18. Today Gas Screen.

APPENDIX K

REPORT OUTPUT

รายงานแสดงรายละเอียดการขายน้ำมันเชื้อเพลิงแต่ละชนิด

ณ วันที่ 21 ตุลาคม 2542

ชื่อผู้ประกอบการ A&D Company

ชื่อสถานีบริการ Caltex

ที่อยู่ 27/97 ถนนสุนทรโกษา แขวง/เขต คลองเตย กทม. เลขประจำตัวผู้เสียภาษีอากร 3011082324

ลำดับที่	SUPER					ULG					DIESEL					PREMIUM				
	หัวจ่าย	มิเตอร์ เริ่มต้น	มิเตอร์ สิ้นสุด	ปริมาณ	จำนวนเงิน	หัวจ่าย	มิเตอร์ เริ่มต้น	มิเตอร์ สิ้นสุด	ปริมาณ	จำนวนเงิน	หัวจ่าย	มิเตอร์ เริ่มต้น	มิเตอร์ สิ้นสุด	ปริมาณ	จำนวนเงิน	หัวจ่าย	มิเตอร์ เริ่มต้น	มิเตอร์ สิ้นสุด	ปริมาณ	จำนวนเงิน
1	1	146,136.00	147,291.00	1,155.00	11,388.30	1	225,795.00	226,469.00	644.00	6,279.00	1	86,956.00	87,244.00	288.00	2,494.08					
2	2	164,671.00	165,626.00	955.00	9,416.30	2	218,025.00	218,268.00	243.00	2,369.25	2	198,374.00	198,976.00	602.00	5,213.32					
3	3	101,161.00	101,161.00			3	72,729.00	73,577.00	848.00	8,268.00	3	105,868.00	106,510.00	642.00	5,559.72					
4	4	101,049.00	101,393.00	344.00	3,391.84	4	56,777.00	57,140.00	363.00	3,539.25	4	228,031.00	229,430.00	1,399.00	12,115.34					
5						5	244,441.00	245,243.00	802.00	7,819.50										
6						6	218,108.00	218,357.00	249.00	2,427.75										
7						7	216,577.00	217,080.00	503.00	4,904.25										
8						8	128,761.00	128,963.00	202.00	1,969.50										
1. รวม				2,454.00	24,196.44				3,854.00	37,576.50				2,931.00	25,382.46					
2. หักยอดน้ำมันทดสอบ					0					0					0					
3. ยอดขายน้ำมันประจำวัน					24,196.44					37,576.50					25,382.46					
4. หักส่วนลดการค้า					0					0					0					
5. ยอดขายสุทธิ					24,196.44					37,576.50					25,382.46					
6. ภาษีขาย					2,199.67					3,416.04					2,307.49					
7. ภาษีซื้อ																				

รวมภาษีจากการขายน้ำมันเชื้อเพลิงทั้งสิ้น 8417.11 บาท รวมภาษีจากการซื้อน้ำมันเชื้อเพลิงทั้งสิ้น 7189.14 บาท

ใบกำกับภาษีเต็มรูป ตามมาตรา 16/4 แห่งประมวลรัษฎากร

เล่มที่ 005 เลขที่ 221-231 จำนวน 10 ฉบับ จำนวนเงิน 4888 บาท ภาษีมูลค่าเพิ่ม 319.78 บาท

ใบกำกับภาษีอย่างย่อ ตามมาตรา 16/4 แห่งประมวลรัษฎากร

เล่มที่ 470-474 เลขที่ 23451-2370 จำนวน 5 ฉบับ จำนวนเงิน 27143 บาท ภาษีมูลค่าเพิ่ม 1317.77 บาท

ราคาน้ำมันวันนี้

SUPER	9.86 บาท/ลิตร
ULG	9.75 บาท/ลิตร
DIESEL	8.66 บาท/ลิตร
PREMIUM	0 บาท/ลิตร

Figure K 1. Detail of Gasoline Sales (Form A).

รายงานรายละเอียดการขายน้ำมันเชื้อเพลิงแต่ละชนิด

เดือน ตุลาคม

ชื่อผู้ประกอบการ A&D Company เลขประจำตัวผู้เสียภาษีอากร 301108232

ชื่อสถานีบริการ CALTEX

ที่อยู่ 27/97 ถนนสุนทรโกษา แขวง/เขต คลองเตย กทม.

รายการ	SUPER		ULG		DIESEL	
	เลขที่ถังน้ำมัน	จำนวนลิตร	เลขที่ถังน้ำมัน	จำนวนลิตร	เลขที่ถังน้ำมัน	จำนวนลิตร
1. ยอดน้ำมันสะสมที่วัดได้ในถังใต้ดิน	1	4,870	1	15,880	1	3,940
2. รวมยอดน้ำมันสะสมในถังน้ำมันที่วัดได้จริง		4,870.00		15,880.00		3,940.00
3. น้ำมันใสวัดได้ต้นงวด		6,040.00		13,650.00		7,600.00
4. บวก ยอดน้ำมันประจำวัน		95,000.00		136,000.00		101,000.00
5. หัก ยอดน้ำมันที่ขายประจำวัน		95,846.00		133,111.00		104,881.00
6. น้ำมันคงเหลือในบัญชี		5,194.00		16,539.00		3,719.00
7. ผลต่างน้ำมันปัจจุบัน		-324.00		-659.00		221.00
8. บวก ผลต่างสะสมยกมา		0.00		0.00		0.00
9. ผลต่างสะสมปัจจุบัน (ยกไป)		-324.00		-659.00		221.00
10. ร้อยละของจำนวนน้ำมันเพิ่มขึ้น (ลดลง) ต่อปริมาณน้ำมันที่ขาย (7/5)		-0.00		-0.00		0.00

หมายเหตุ: ตามข้อ 3 แห่งประกาศอธิบดีกรมสรรพากร เกี่ยวกับภาษีมูลค่าเพิ่ม (ฉบับที่ 54)

Figure K.2. Details of Gasoline Sales Report (Form B).

รายงานรายละเอียดการขายน้ำมันเชื้อเพลิงแต่ละชนิด

ณ วันที่ 21 ตุลาคม 2542

ชื่อผู้ประกอบการ A&D Company เลขประจำตัวผู้เสียภาษีอากร 301108232

ชื่อสถานีบริการ CALTEX

ที่อยู่ 27/97 ถนนสุนทรโกษา แขวง/เขต คลองเตย กทม.

รายการ	SUPER		ULG		DIESEL	
	เลขที่ถังน้ำมัน	จำนวนลิตร	เลขที่ถังน้ำมัน	จำนวนลิตร	เลขที่ถังน้ำมัน	จำนวนลิตร
1. ยอดน้ำมันสะสมที่วัดได้ในถังใต้ดิน	1	6,030	1	15,790	1	7,670
2. รวมยอดน้ำมันสะสมในถังน้ำมันที่วัดได้จริง		6,0300.00		15,790.00		7,670.00
3. น้ำมันใสวัดได้ต้นงวด		6,040.00		13,650.00		7,600.00
4. บวก ยอดน้ำมันประจำวัน		3,000.00		6,000.00		3,000.00
5. หัก ยอดน้ำมันที่ขายประจำวัน		3,005.00		3,854.00		2,931.00
6. น้ำมันคงเหลือในบัญชี		6,035.00		15,796.00		7,669.00
7. ผลต่างน้ำมันปัจจุบัน		-5.00		-6.00		1.00
8. บวก ผลต่างสะสมยกมา		0.00		0.00		0.00
9. ผลต่างสะสมปัจจุบัน (ยกไป)		-5.00		-6.00		1.00

ใบจ่ายน้ำมันหรือใบกำกับขนส่งน้ำมันลำดับที่_____เลขที่_____ลงวันที่_____เดือน_____พ.ศ._____

ของผู้ค้าส่งน้ำมันราย Caltex Co., Ltd. (Thai) ผู้จ่ายน้ำมัน Caltex Co., Ltd. (Thai)

Figure K.3. Details of Gasoline Sales Report (Form C).

GAS STATION TRANSACTION SYSTEM

DAILY LEVELTANK REPORT

Date: 24/06/1998

Time: 07:30 P.M.

Tank	Grade	Start Volume (L)	End Volume (L)	Price (Baht/L)	Sales Volume (L)	Money (Baht)
1	Super	24,648	23,504	12.25	1,144	14,014.00
2	ULG	12,464	9,977	11.95	2,487	29,719.65
3	Diesel	26,448	24,294	9.75	2,154	21,001.50
4	Premium	36,478	34,930	11.75	1,548	18,189.00
5	Super	22,356	20,260	12.25	2,096	25,676.00
6	ULG	15,487	12,938	11.95	2,549	30,460.55
7	Diesel	15,489	12,758	9.75	2,731	26,627.25
8	Premium	35,747	34,278	11.75	1,469	17,260.75
TOTAL					16,178.00	182,948.70

Prepared by: Monsigarn Puangdech

Approved by

Noppadol Na Talang

Manager

Caltex Gas Station SG Company 123 Ladprao Road, Ladyao, Chatuchak, Bangkok 10900 Tel. 513-1411 Fax. 513-2066

Figure K.4. Daily Level Tank Report.

GAS STATION TRANSACTION SYSTEM

DAILY PUMP REPORT

Date: 24/06/1998

Time: 07:30 P.M.

Pump	Dispenser	Grade	Start Volume (L)	End Volume (L)	Price (Baht/L)	Sales Volume (L)	Money (Baht)
1	1	Super	6,321	5,177	12.25	1,144	14,014.00
1	2	Super	6,274	5,187	12.25	1,087	13,315.75
2	1	ULG	5,435	3,870	11.95	1,565	18,701.75
2	2	Diesel	7,654	6,689	9.75	965	9,408.75
3	1	ULG	2,546	676	11.95	1,870	22,346.50
3	2	ULG	5,698	4,242	11.95	1,456	17,399.20
4	1	Super	4,879	3,609	12.25	1,270	15,557.50
4	2	Diesel	5,797	4,752	9.75	1,045	10,188.75
TOTAL						10,402.00	120,932.20

Prepared by: Monsigarn Puangdech

Approved by

Nopadol Na Talang

Manager

Caltex Gas Station SG Company 123 Ladprao Road, Ladyao, Chatuchak, Bangkok 10900 Tel. 513-1411 Fax. 5132066

Figure K.5. Daily Pump Report.

GAS STATION TRANSACTION SYSTEM — MONTHLY TANK REPORT
January, 1998
Time: 07:30 P.M.

Tank 1 Super

Period	Start Volume (L)	End Volume (L)	Price (Baht/L)	Sales Volume (L)	Money (Baht)
1/01/1998	16,000	14,602	12.25	1,398	17,125.50
2/01/1998	14,602	13,331	12.25	1,271	15,569.75
3/01/1998	13,331	11,875	12.25	1,456	17,836.00
4/01/1998	11,875	10,311	12.25	1,564	19,159.00
5/01/1998	10,311	8,435	12.25	1,876	22,981.00
6/01/1998	8,435	6,888	12.25	1,547	18,950.75
7/01/1998	6,888	4,910	12.25	1,978	24,230.50
8/01/1998	4,910	3,331	12.25	1,579	19,342.75
9/01/1998	3,331	1,452	12.25	1,879	23,017.75
10/01/1998	16,000	13,985	12.25	2,015	24,683.75
11/01/1998	13,985	12,337	12.25	1,648	20,188.00
12/01/1998	12,337	10,552	12.25	1,785	21,866.25
13/01/1998	10,552	8,904	12.25	1,648	20,188.00
14/01/1998	8,904	7,026	12.25	1,878	23,005.50
15/01/1998	7,026	5,759	12.25	1,267	15,520.75
16/01/1998	5,759	3,881	12.25	1,878	23,005.50
17/01/1998	3,881	2,332	12.25	1,549	18,975.25
18/01/1998	2,332	768	12.25	1,564	19,159.00
19/01/1998	16,000	14,646	12.25	1,354	16,586.50
20/01/1998	14,646	13,492	12.25	1,154	14,136.50
21/01/1998	13,492	11,946	12.25	1,546	18,938.50
22/01/1998	11,946	10,686	12.25	1,260	15,435.00
23/01/1998	10,686	9,146	12.25	1,540	18,865.00
24/01/1998	9,146	7,598	12.25	1,548	18,963.00
25/01/1998	7,598	6,471	12.25	1,127	13,805.75
26/01/1998	6,471	5,256	12.25	1,215	14,883.75
27/01/1998	5,256	3,816	12.25	1,440	17,640.00
28/01/1998	3,816	2,268	12.25	1,548	18,963.00
29/01/1998	2,268	1,133	12.25	1,135	13,903.75
30/01/1998	16,000	14,105	12.25	1,895	23,213.75
31/01/1998	14,105	12,917	12.25	1,188	14,553.00
Total				47,730	584,692.50

Caltex Gas Station SG Company 123 Ladprao Road, Ladyao, Chatuchak, Bangkok 10900 Tel. 513-1411 Fax. 5132066

Figure K.6. Monthly Tank Report.

GAS STATION TRANSACTION SYSTEM — MONTHLY PUMP REPORT
January, 1998
Time: 07:30 P.M.

Pump: 1 Dispenser: 1 Grade: Super

Period	Start Volume (L)	End Volume (L)	Price (Baht/L)	Sales Volume (L)	Money (Baht)
1/01/1998	16,000	14,602	12.25	1,398	17,125.50
2/01/1998	14,602	13,331	12.25	1,271	15,569.75
3/01/1998	13,331	11,875	12.25	1,456	17,836.00
4/01/1998	11,875	10,311	12.25	1,564	19,159.00
5/01/1998	10,311	8,435	12.25	1,876	22,981.00
6/01/1998	8,435	6,888	12.25	1,547	18,950.75
7/01/1998	6,888	4,910	12.25	1,978	24,230.50
8/01/1998	4,910	3,331	12.25	1,579	19,342.75
9/01/1998	3,331	1,452	12.25	1,879	23,017.75
10/01/1998	16,000	13,985	12.25	2,015	24,683.75
11/01/1998	13,985	12,337	12.25	1,648	20,188.00
12/01/1998	12,337	10,552	12.25	1,785	21,866.25
13/01/1998	10,552	8,904	12.25	1,648	20,188.00
14/01/1998	8,904	7,026	12.25	1,878	23,005.50
15/01/1998	7,026	5,759	12.25	1,267	15,520.75
16/01/1998	5,759	3,881	12.25	1,878	23,005.50
17/01/1998	3,881	2,332	12.25	1,549	18,975.25
18/01/1998	2,332	768	12.25	1,564	19,159.00
19/01/1998	16,000	14,646	12.25	1,354	16,586.50
20/01/1998	14,646	13,492	12.25	1,154	14,136.50
21/01/1998	13,492	11,946	12.25	1,546	18,938.50
22/01/1998	11,946	10,686	12.25	1,260	15,435.00
23/01/1998	10,686	9,146	12.25	1,540	18,865.00
24/01/1998	9,146	7,598	12.25	1,548	18,963.00
25/01/1998	7,598	6,471	12.25	1,127	13,805.75
26/01/1998	6,471	5,256	12.25	1,215	14,883.75
27/01/1998	5,256	3,816	12.25	1,440	17,640.00
28/01/1998	3,816	2,268	12.25	1,548	18,963.00
29/01/1998	2,268	1,133	12.25	1,135	13,903.75
30/01/1998	16,000	14,105	12.25	1,895	23,213.75
31/01/1998	14,105	12,917	12.25	1,188	14,553.00
Total				47,730	584,692.50

Caltex Gas Station SG Company 123 Ladprao Road, Ladyao, Chatuchak, Bangkok 10900 Tel. 513-1411 Fax. 513-2066

Figure K.7. Monthly Pump Report.

GAS STATION TRANSACTION SYSTEM						MONTH TO DATE TANK REPORT January - March, 1998 Time: 07:30 P.M.	
Period	Tank	Grade	Start Volume (L)	End Volume (L)	Price (Baht/L)	Sales Volume (L)	Money (Baht)
January	1	Super	16,000	14,602	12.25	1,398	17,125.50
	2	ULG	14,602	13,331	12.25	1,271	15,569.75
	3	Diesel	13,331	11,875	12.25	1,456	17,836.00
	4	Premium	11,875	10,311	12.25	1,564	19,159.00
	5	Super	10,311	8,435	12.25	1,876	22,981.00
	6	ULG	8,435	6,888	12.25	1,547	18,950.75
	7	Diesel	6,888	4,910	12.25	1,978	24,230.50
	8	Premium	4,910	3,331	12.25	1,579	19,342.75
Subtotal						12,669	155,195.25
February	1	Super	16,000	13,985	12.25	2,015	24,683.75
	2	ULG	13,985	12,337	12.25	1,648	20,188.00
	3	Diesel	12,337	10,552	12.25	1,785	21,866.25
	4	Premium	10,552	8,904	12.25	1,648	20,188.00
	5	Super	8,904	7,026	12.25	1,878	23,005.50
	6	ULG	7,026	5,759	12.25	1,267	15,520.75
	7	Diesel	5,759	3,881	12.25	1,878	23,005.50
	8	Premium	3,881	2,332	12.25	1,549	18,975.25
Subtotal						13,668	167,433.00
March	1	Super	10,686	9,146	12.25	1,540	18,865.00
	2	ULG	14,646	13,492	12.25	1,154	14,136.50
	3	Diesel	13,492	11,946	12.25	1,546	18,938.50
	4	Premium	11,946	10,686	12.25	1,260	15,435.00
	5	Super	10,686	9,146	12.25	1,540	18,865.00
	6	ULG	9,146	7,598	12.25	1,548	18,963.00
	7	Diesel	7,598	6,471	12.25	1,127	13,805.75
	8	Premium	6,471	5,256	12.25	1,215	14,883.75
Subtotal						10,930	133,892.50
Total						37,267	456,520.75
Caltex Gas Station SG Company 123 Ladprao Road, Ladyao, Chatuchak, Bangkok 10900 Tel. 513-1411 Fax. 513-2066							

Figure K.8. Month to Date Tank Report.

GAS STATION TRANSACTION SYSTEM — MONTH TO DATE PUMP REPORT

January - March, 1998

Time: 07:30 P.M.

Period	Pump	Grade	Start Volume (L)	End Volume (L)	Price (Baht/L)	Sales Volume (L)	Money (Baht)
January	1	Super	16,000	14,602	12.25	1,398	17,125.50
	2	ULG	13,331	11,875	12.25	1,456	17,836.00
	3	ULG	10,311	8,435	12.25	1,876	22,981.00
	4	Diesel	6,888	4,910	12.25	1,978	24,230.50
Subtotal						6,708	82,173.00
February	1	Super	16,000	13,985	12.25	2,015	24,683.75
	2	ULG	12,337	10,552	12.25	1,785	21,866.25
	3	ULG	8,904	7,026	12.25	1,878	23,005.50
	4	Diesel	3,881	2,332	12.25	1,549	18,975.25
Subtotal						7,227	88,530.75
March	1	Super	10,686	9,146	12.25	1,540	18,865.00
	2	ULG	13,492	11,946	12.25	1,546	18,938.50
	3	ULG	10,686	9,146	12.25	1,540	18,865.00
	4	Diesel	6,471	5,256	12.25	1,215	14,883.75
Subtotal						5,841	71,552.25
Total						19,776	242,256.00

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Figure K.9. Month to Date Pump Report.

GAS STATION TRANSACTION SYSTEM — YEAR TO DATE TANK REPORT

Year 1998

Time: 07:30 P.M.

Tank 1

Period	Grade	Start Volume (L)	End Volume (L)	Price (Baht/L)	Sales Volume (L)	Money (Baht)
January	Super	16,000	14,602	12.25	1,398	17,125.50
February	Super	14,602	13,331	12.30	1,271	15,633.30
March	Super	13,331	11,875	12.33	1,456	17,952.48
April	Super	11,875	10,311	12.20	1,564	19,080.80
May	Super	10,311	8,435	12.15	1,876	22,793.40
June	Super	8,435	6,888	12.50	1,547	19,337.50
July	Super	6,888	4,910	12.53	1,978	24,784.34
August	Super	4,910	3,331	12.57	1,579	19,848.03
September	Super	3,331	2,086	12.38	1,245	15,413.10
October	Super	2,086	16,000	12.33	1,730	21,330.90
November	Super	16,000	14,558	12.29	1,442	17,722.18
December	Super	14,558	12,979	12.53	1,579	19,784.87
Subtotal					18,665	230,806.40
Tank 2						
January	ULG	16,000	13,985	12.25	2,015	24,683.75
February	ULG	13,985	12,337	12.18	1,648	20,072.64
March	ULG	12,337	10,552	12.22	1,785	21,812.70
April	ULG	10,552	8,904	12.15	1,648	20,023.20
May	ULG	8,904	7,026	12.00	1,878	22,536.00
June	ULG	7,026	5,759	12.23	1,267	15,495.41
July	ULG	5,759	3,881	12.35	1,878	23,193.30
August	ULG	3,881	2,332	12.41	1,549	19,223.09
September	ULG	2,332	445	12.52	1,887	23,625.24
October	ULG	16,000	14,755	12.38	1,245	15,413.10
November	ULG	14,775	12,990	12.57	1,785	22,437.45
December	ULG	12,990	11,270	13	1,720	21,586.00
Subtotal					20,305	250,101.88
Total					38,970	480,908

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Figure K.10. Year to Date Tank Report.

GAS STATION TRANSACTION SYSTEM — YEAR TO DATE PUMP REPORT

Year 1998

Time: 07:30 P.M.

Pump 1

Period	Grade	Start Volume (L)	End Volume (L)	Price (Baht/L)	Sales Volume (L)	Money (Baht)
January	Super	16,000	14,602	12.25	1,398	17,125.50
February	Super	14,602	13,331	12.30	1,271	15,633.30
March	Super	13,331	11,875	12.33	1,456	17,952.48
April	Super	11,875	10,311	12.20	1,564	19,080.80
May	Super	10,311	8,435	12.15	1,876	22,793.40
June	Super	8,435	6,888	12.50	1,547	19,337.50
July	Super	6,888	4,910	12.53	1,978	24,784.34
August	Super	4,910	3,331	12.57	1,579	19,848.03
September	Super	3,331	2,086	12.38	1,245	15,413.10
October	Super	2,086	16,000	12.33	1,730	21,330.90
November	Super	16,000	14,558	12.29	1,442	17,722.18
December	Super	14,558	12,979	12.53	1,579	19,784.87
Subtotal					18,665	230,806.40
Pump 2						
January	ULG	16,000	13,985	12.25	2,015	24,683.75
February	ULG	13,985	12,337	12.18	1,648	20,072.64
March	ULG	12,337	10,552	12.22	1,785	21,812.70
April	ULG	10,552	8,904	12.15	1,648	20,023.20
May	ULG	8,904	7,026	12.00	1,878	22,536.00
June	ULG	7,026	5,759	12.23	1,267	15,495.41
July	ULG	5,759	3,881	12.35	1,878	23,193.30
August	ULG	3,881	2,332	12.41	1,549	19,223.09
September	ULG	2,332	445	12.52	1,887	23,625.24
October	ULG	16,000	14,755	12.38	1,245	15,413.10
November	ULG	14,775	12,990	12.57	1,785	22,437.45
December	ULG	12,990	11,270	13	1,720	21,586.00
Subtotal					20,305	250,101.88
Total					38,970	480,908

Caltex Gas Station SG Company 123 Ladprao Road, Ladyao, Chatuchak, Bangkok 10900 Tel. 513-1411 Fax. 513-2066

Figure K.11. Year to Date Pump Report.

GAS STATION TRANSACTION SYSTEM

TANK COST REPORT

January - March, 1998

Time: 07:30 P.M.

Period	Tank	Grade	Volume	Cost/unit	Supplier
January	1	Super	16,000	10.25	CALTEX Co., Ltd.
	2	ULG	13,331	10.38	CALTEX Co., Ltd.
	3	ULG	10,311	10.30	CALTEX Co., Ltd.
	4	Diesel	12,450	9.95	CALTEX Co., Ltd.
Subtotal			52,092		
February	1	Super	16,000	10.27	CALTEX Co., Ltd.
	2	ULG	12,337	10.37	CALTEX Co., Ltd.
	3	ULG	8,904	10.33	CALTEX Co., Ltd.
	4	Diesel	3,881	9.90	CALTEX Co., Ltd.
Subtotal			41,122		
March	1	Super	10,686	10.33	CALTEX Co., Ltd.
	2	ULG	13,492	10.40	CALTEX Co., Ltd.
	3	ULG	10,686	10.39	CALTEX Co., Ltd.
	4	Diesel	6,471	9.93	CALTEX Co., Ltd.
Subtotal			41,335		
Total			134,549		

Caltex Gas Station SG Company 123 Ladprao Road, Ladyao, Chatuchak, Bangkok 10900 Tel. 513-1411 Fax. 513-2066

Figure K.12. Tank Cost Report.

รายงานการซื้อสินค้า

วันที่ 15 มกราคม 2542

รหัสสินค้า	00001	หมายเลข INVOICE	01/42	
ชื่อสินค้า	น้ำมันไร้สารตะกั่ว	จำนวนสินค้าคงคลัง :	5000	ลิตร

ซื้อสินค้าจาก : บริษัท เชลล์แห่งประเทศไทย จำกัด

จำนวนหน่วยซื้อ	ราคาซื้อ/หน่วย	เงินส่วนลด	ค่าขนส่ง/หน่วย	รวมค่าขนส่ง	จำนวนเงิน
20,000.00	9.00	-	100.00	1,000.00	180,000.00
				รวมมูลค่าสินค้า	181,000.00
				ภาษีมูลค่าเพิ่ม	18,100.00
				รวมทั้งสิ้น	199,100.00

หมายเหตุ : 1. ภาษีมูลค่าเพิ่ม 10% ของราคาสินค้า

2. ผู้ซื้อจะต้องวางเงินมัดจำเป็นจำนวน 50% ของราคาสินค้าทั้งหมด และชำระส่วนที่เหลือเมื่อได้รับมอบสินค้า

3. สินค้าถือเป็นของผู้ขายจนกว่าผู้ซื้อจะชำระเงินครบทั้งหมด

ลงชื่อ ลงชื่อ

ผู้ขาย ผู้ซื้อ

Figure K.13. Purchase Report.

APPENDIX L

PROJECT PLAN

Implementation	Duration (Week)	January				February				March				April				May				June			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Phase 1 : Analyze Existing System	6 Weeks	6 Weeks																							
1. Meet the management for requirement and work scope	2 Weeks																								
2. Interviews all staff associated with the sys	1 Week																								
3. Study all procedures of the system	2 Weeks																								
4. Study all current documentation	2 Weeks																								
5. Analyze the results of all gathered details	1 Week																								
Phase II : Analyze and Design New System	7 Weeks									7 Weeks															
1. Define new system requirements	1 Week																								
2. Design the system																									
- Data Flow Diagarm	1 Week																								
- Data Dictionary	1 Week																								
- Data Store	1 Week																								
- Screen Layout	2 Weeks																								
- Report Layout	1 Week																								
Phase III : Implementation	11 Weeks																	11 Weeks							
1. System Testing	3 Weeks																								
2. Evaluate the design system	1 Week																								
3. Management Approval	1 Week																								
4. User Training	4 Weeks																								
5. Data Conversion	2 Weeks																								

Figure L.1. Project Plan Diagram.

APPENDIX M

COMPARISON TIME ACHIEVEMENT

Table M.1. Comparison Time Achievement between Proposed System and Existing System, in Minute.

Process	Proposed System (Time spent)	Existing System (Time spent)
Data Input Process	5 Minutes	10 Minutes
Searching Process	1 Minute	15 Minutes
Editing Process	2 Minutes	5 Minutes
Making Report Process	2 Minutes	30 Minutes
Auditing Report Process	5 Minutes	15 Minutes
Total	15 Minutes	75 Minutes

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