SPE 112112

ADMA-OPCO Process Management System (APMS)

Alaeddin Al Badawna, Abu Dhabi Marine Operating Company

Acknowledgement

I would like to express my thanks to Our Senior Management and Information Technology Division (ITD) Management for their support in making ADMA-OPCO Process Management System (APMS) a success story.

Appreciation for the successful deployment of the system should go to the Offshore Business Units Management, Team Leaders and Supervisors.

My sincere thanks go also to our Development Team for their dedicated and devoted efforts to produce the final product that has made a considerable impact on the workforce, processes and Organization.

In the same context, we owe gratitude to ITD-Technical Support Department for their continuous cooperation on the Hardware, the Database and Oracle development/runtime tools acquisition installation and setup issues.

1- Introduction

This paper will demonstrate how information technology is invested in automating the reporting of activities within the plant operations in our Organization 'ADMA-OPCO'. It will highlight how that automation has brought about change on People, Process and Organization **(PPO).** The paper will emphasize how the workforce becomes enabled to streamline the reporting of their shift activities in a coherent and standardized manner. It will finally conclude how safety standards get promoted, integration gets facilitated and decision making process enhanced.

Prior to that, a brief account will be given of the Company's profile, its core business and the issues that it has encountered in managing its operation activities at offshore sites. Afterwards, a description of the ADMA-OPCO Process Management System (APMS) will follow, covering various aspects: business functionality, technical specification and system features.

2- Company's Profile

Abu Dhabi Marine Operating Company (ADMA-OPCO) is a major oil and gas producer in the region whose vision is to perform as a world class hydrocarbon producer from the offshore concession reserves, ensuring facilities integrity, protecting health, safety and the environment for the next 50 years.

ADMA-OPCO is shared between Abu Dhabi National Oil Company (ADNOC) of the Emirate of Abu Dhabi, British Petroleum (BP), Total of France, and Japan Oil Development Company (JODCO). Its operations, which are centered in the offshore areas of Abu Dhabi (UAE), date back to the 1950s. Oil and gas production are produced from two major fields Umm-Shaif and Zakum, where the latter is one of the largest oilfields in the world. The crude is collected from these fields using giant steel structures called super complexes, and then transferred to Das-Island, a nearby industrial base. Das Island has got various oil and gas installations and tanker berths for processing, storing and export.

Oil discovery in Abu Dhabi, at an economic scale, was first made in 1958 in Umm Shaif and the first oil shipment exported from Abu Dhabi to the world market came out on July 4th, 1962 from the same field.

Oil production is based on exploration and drilling activities which are the most sophisticated and the most expensive. Advancement in drilling is necessitated by the need to optimize oil and gas production operations. The Company has adopted the latest in drilling techniques and technologies, starting with vertical, then deviated and ultimately horizontal drilling.

3- ADMA-OPCO Business

ADMA-OPCO core business is concentrated in the following functional areas:

3.1 Exploration and Drilling

- Planning a Well – Develop, evaluate and choose an option
- Designing a Well – Detailed Engineering up to Well Program
- Executing and Operating and delivering a high quality Well
- Review and learn - Completion report

3.2 Oil and Gas Coordination

- Coordinates Shareholders requirement for oil
- Coordinate supply of gas to ADGAS
- Control storage of oil
- Produce production plans

3.3 Oil and Gas Production

- Control production of oil and gas
- Process gas and control its delivery to Abu Dhabi Gas Liquefaction Company (ADGAS)
- Manage the flaring of surplus of gas
- Comply with production schedules
- Mange capacity and storage

3.4 Oil Accounting and Shipping

- Calculation of daily production
- Preparation of export and stock statements
- Issuing the Bill Of Lading (BOL) documents

3.5 Reservoir Management

- Exploring and developing resources
- Optimization of resources
- Identify and develop reserves
- Provide optimum yield from exploited reservoirs
- Provide production schedules

4- Concerns and Issues

Several concerns were identified as causing precarious impact on the Company's operations. The multi dimensional aspects of these concerns were carefully studied and as a result, a decision was taken to explore means to resolve them and/or improve the underlying settings creating them:

4.1 Health, Safety and Environment Protection: Because of its critical importance, process management within the Oil and Gas industry, is focused on matters related to plant safety, employees' health and safety, and environment protection. It is also concerned in demonstrating adherence of plant operational processes and procedures to regulatory compliance. ADMA-OPCO Shareholders have clear commitment to these issues, and have taken keen arrangements to embrace them in their vision, HSE policies, and public media.

4.2 Paper-based Reporting: ADMA-OPCO has for long utilized a paper-based system to monitor its plant operation processes. Monitoring plant operation processes using a paper-recording system is vulnerable, no matter how rigorously it is done. This type of monitoring and reporting was completely reliant in the most part of it upon the attentiveness and operational knowledge of the individual staff concerned, which could for various reasons, discontinue or fail

4.3 Communication: Coordination of activities amongst internal plant operational staff requires a considerable amount of discipline and a high degree of communication. This quality of communication is especially needed with external parties involved with maintenance jobs on the plant. Irrespective of what procedures are used for internal plant operation, communications between operational shifts is indispensable.

4.4 Data Storage: Storing piles of paper-based records of plant operations in the control room is awkward. Even worse is the practice of using boxes to collect these paper-log records and moving them to bulk storage areas somewhere in the plant. A clear realization of the problem associated with effective and efficient storing of paper documents, and their successful retrieval when needed, has always been a worry to Operations Management.

4.5 Data Retrieval: With a paper-based method, locating plant operation records becomes, as a consequence, exceedingly cumbersome and a very time-consuming job. The case becomes more frustrating and critical when an urgent requirement for some records is chased.

4.6 Availability and Traceability: Recording information about the status of the plant operation on MS Word and MS Excel Sheet documents is messy. In addition to being of low credibility, this information is neither visible to the Management nor traceable on-line. With that type of media, the real cause of problems cannot be traced backward as searching and/or correlating information is impossible. The impact will be high where immaculate attention to maintenance, environment/safety issues, and production operations are required.

4.7 Sensible Decisions: It is very difficult, complicated and hazardous to make sound decisions on incomplete or inaccurate information. For this purpose, knowledge of the plant operational status should be kept synchronized between different shifts. Moreover, statistical analysis leading to detecting trends cannot be drawn unless bulk of history data is put under macroscopic and microscopic scrutiny. Even more important is the speed at which outcome of these analyses are reached. A lack of sound and rational decision at the right time could intensify the likelihood of harmful results.

5- System's Requirement

In light of the above issues, an Information System was explored and then recommended by ITD. The objective of the system was to satisfy the Company's need for an effective changeover and plant operations loggings that minimize the potential risk of accidents, and facilitate the following business necessities:

- Maintain the safety, integrity, efficiency and compliance of operations
- Allow accurate recording and retrieving of information on plant status, production conditions and ongoing activities
- Make on-line reliable and consistent view of operations to all concerned personnel
- Allow tracing historical events in pursuit of the cause of an arising problem
- Improve communication within and across all Teams
- Refer to historical and professional experience of others to rectify operational problems
- Provide powerful search and reporting capabilities
- Perform statistical analyses for detecting problems, identifying trends and making informed decisions

6- The Solution

The IT strategy within ADMA-OPCO is to buy and not build. A market search for a comprehensive package that meets our customers' needs on DAS and offshore Super Complexes was not fruitful. Some tracking packages were located at the time, but none of them were, at the bare minimum, satisfactory.

As a result, a decision was taken to build a computer system that incorporates all the business needs required for providing the necessary information that helps in the proper management of the plant processing activities. Information Technology Division (ITD) within the Company was approached and APMS was subsequently born both to satisfy the users' needs and to resolve the prevailing issues and concerns as detailed above.

7- System Description

Description of the system will be accounted for based on the following headings:

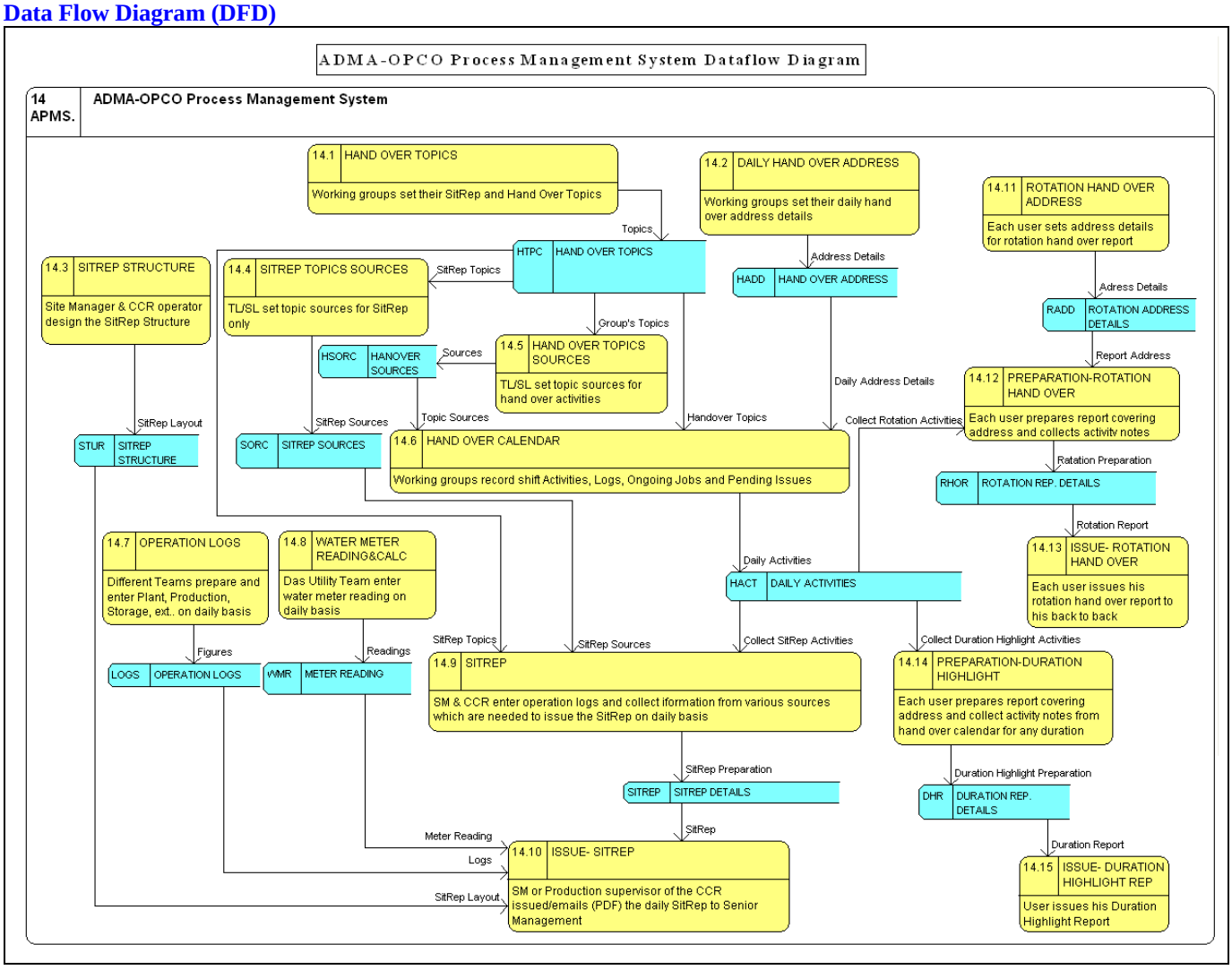
- **Analysis - Models**
- **Business Functionality**
- **System Development**
- **System Expansion**
- **Technical Specifications**
- **System Features**

7.1 Analysis - Models

Tools that are concerned with the analysis, design and generation of parts (or all) of the software application product is called CASE tools. These stand for Computer Aided Software Engineering that has been introduced in the Information Technology industry in the late eighties.
ADMA-OPCO was amongst the first to use Oracle CASE Tools for the complete Technical documentation of its in-house developed applications. Recently, Oracle has upgraded its CASE tool with a new version, 'The Oracle Designer', which has been used to produce many of the diagrams that APMS application was built on. Because of its flexibility, MS Visio was also used to produce some of those diagrams.

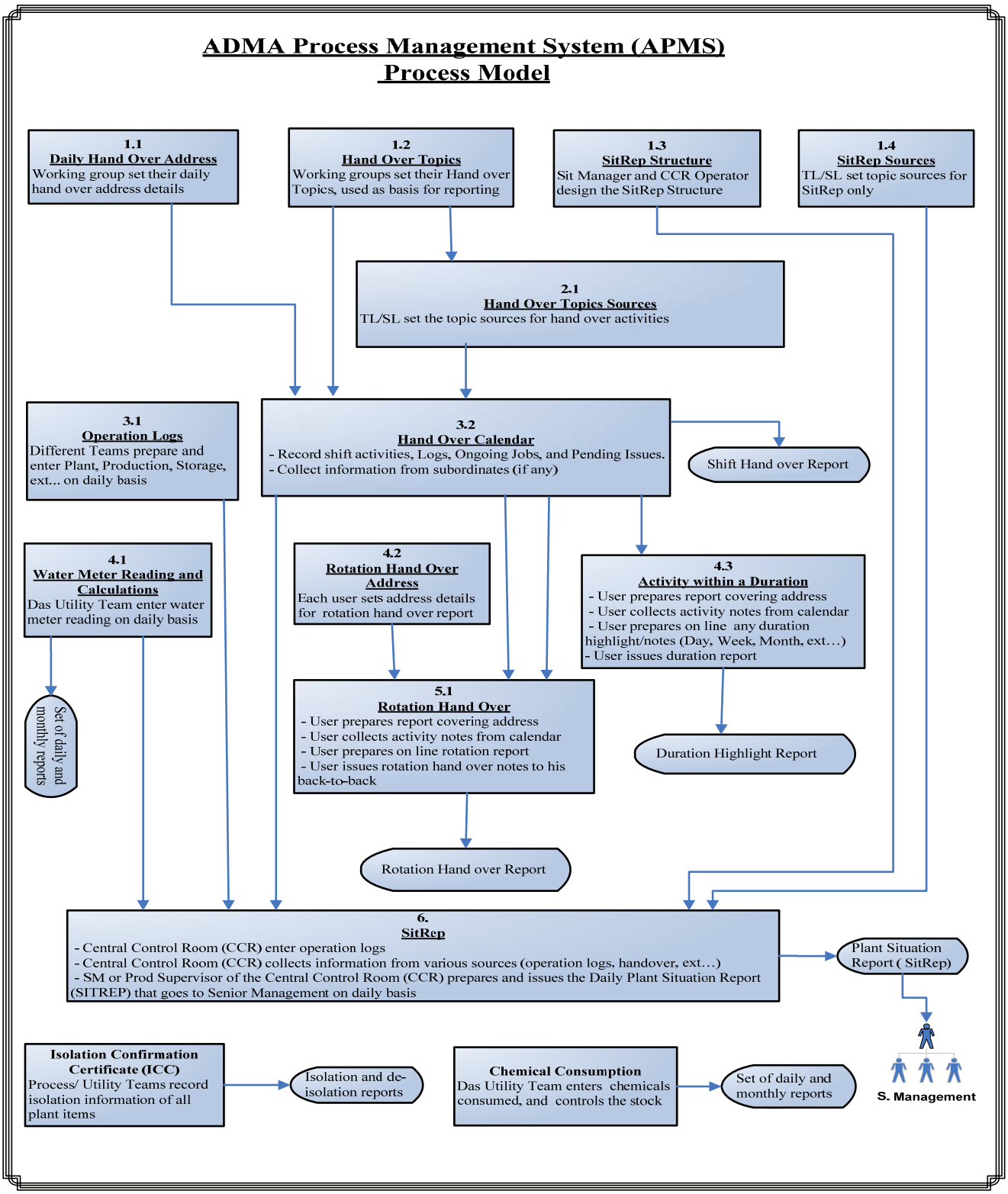
During the analysis stage of the development process, modeling techniques were used as a transition to transform the system from the real world to the computer world. Modeling for Processes, Data Flow, Entity Relationship and Function Hierarchy are used for the purpose. Samples of these models are shown in the following sub-sections:

7.1.1 **Data Flow Diagram (DFD)**



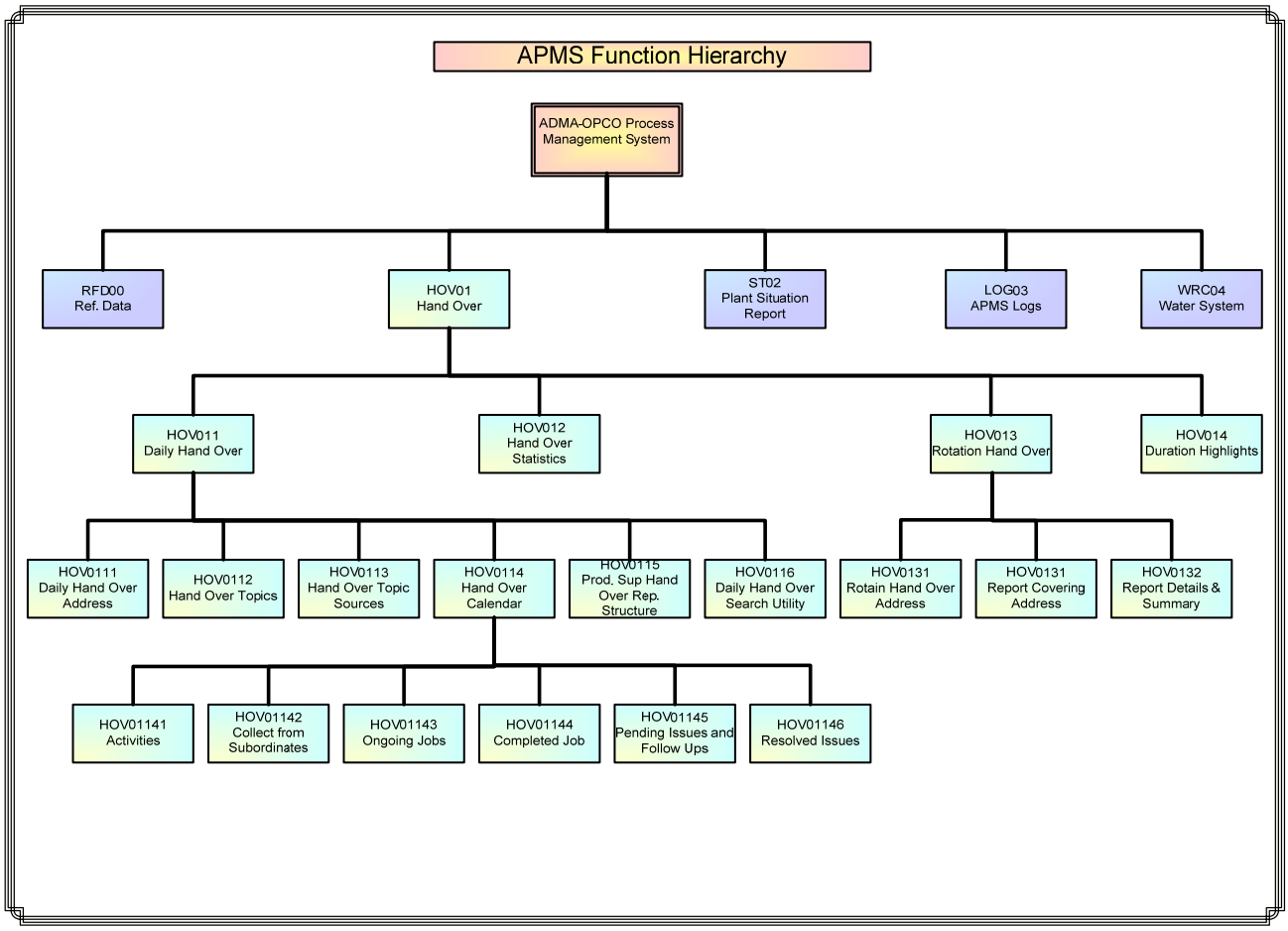
7.1.2

7.1.2 Business Process Model (BPM)



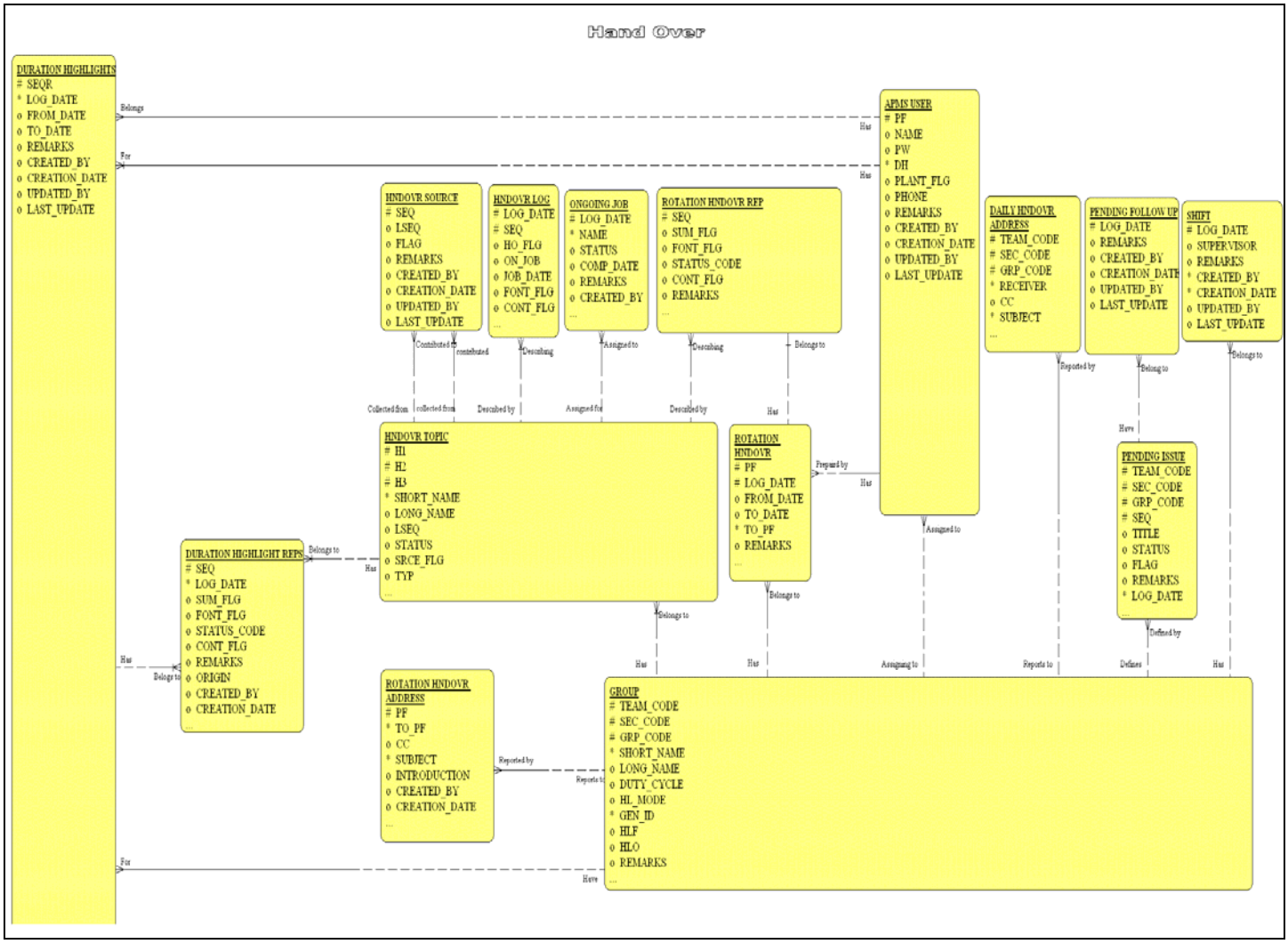
7.1.3 Function Hierarchy Model (FHD)

This is only a sample of the bigger APMS Function Model. It represents only the Hanover Sub-system.



7.1.4 Entity Relationship Diagram (ERD)

This is just a sample of the larger ERD of the system. It covers only the Shift Handover



7.2 Business Functionality

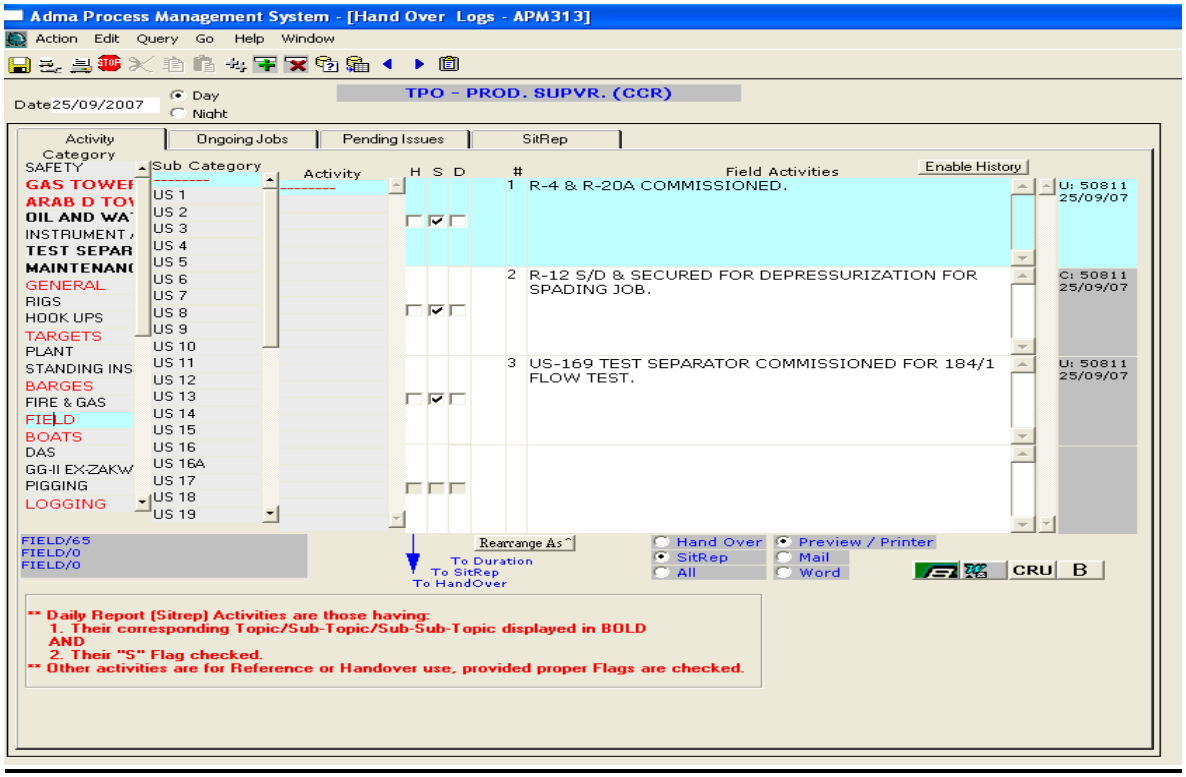
The main functions that APMS is addressing are:

- Shift Hand Over
- Work Cycle Rotation Hand Over
- Operation Logs
- Manpower
- Equipment Availability and Reliability
- Water Meter Reading and Calculation
- Isolation Confirmation Certificate
- Chemical Consumption
- SitRep

Of particular mention is the ‘DAS Major Projects’ topic against which progress reporting is regularly issued to Senior Management.

7.2.1 Shift Hand Over:

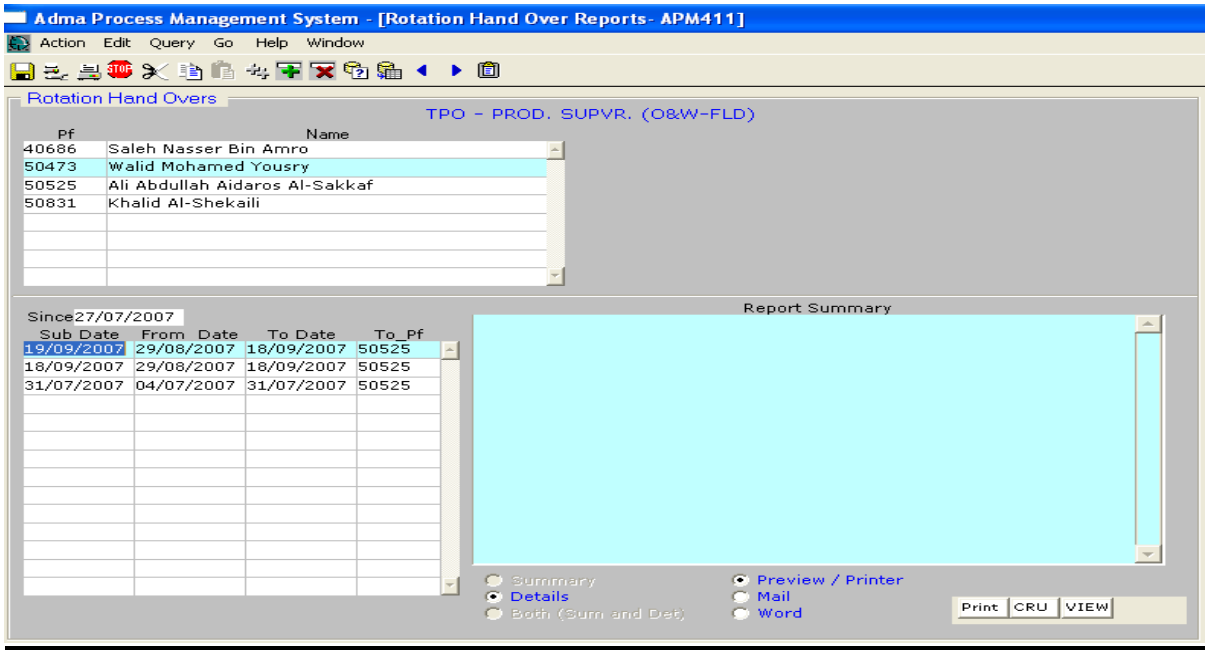
a) As a prerequisite to this main function, topic subjects, topic sources and address details must have been prepared in a different function.
b) This function records the daily activities, on-going jobs and resolution of pending issues
c) Some Teams has got in addition to the above sub-functions operational log data including amongst others daily production, Gas usage, Filling tank Analysis, etc.

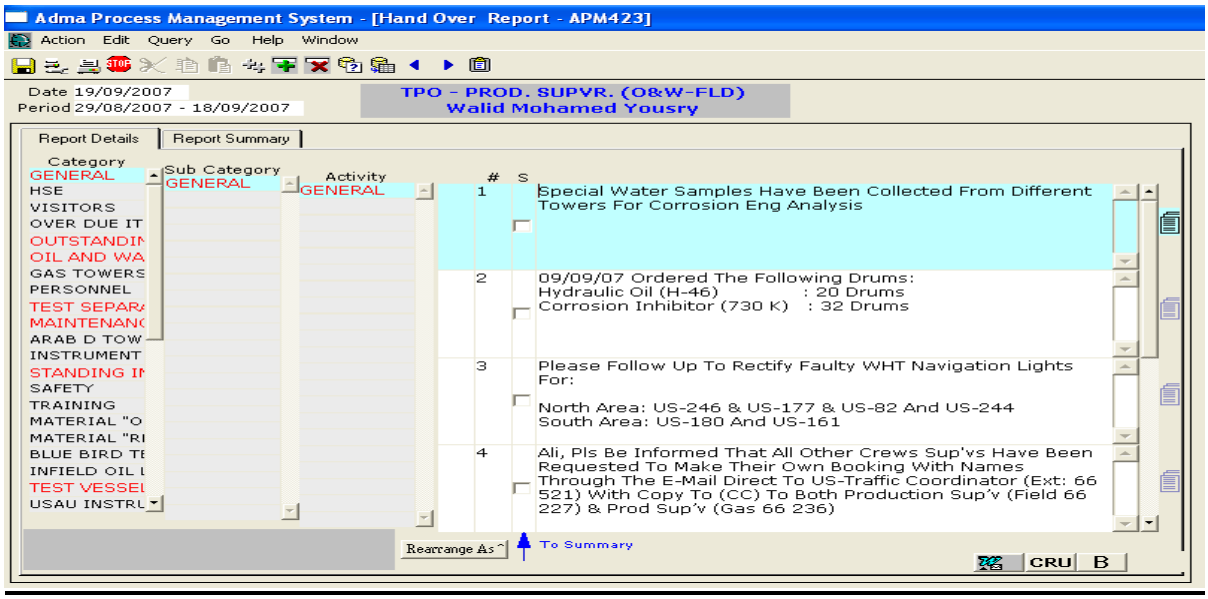


7.2.2 Work Cycle Rotation Hand Over:

This function allows for:

a) Viewing/Reporting the previous rotation Handover details of the back-to-back
b) Set collection requirement parameters from daily activities (From whom, Period of data collection and Submission date)
c) Collecting rotation data of the Team members in accordance with the above set parameters.
d) Add/modify or delete any of the collected data as required
e) Allow delegation of responsibility

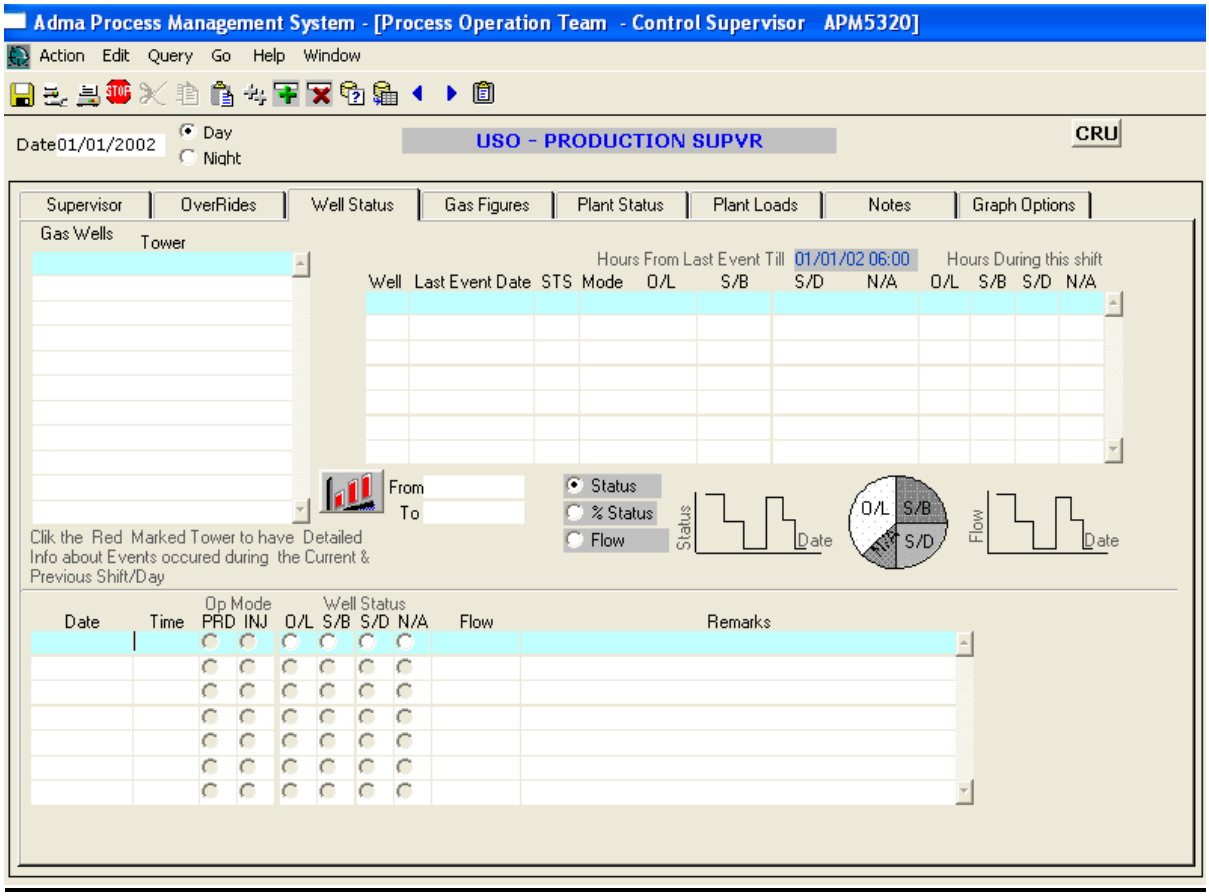

Adma Process Management System - [Rotation Hand Over Reports- APM411]
Action Edit Query Go Help Window
Rotation Hand Overs
TPO - PROD. SUPVR. (O&W-FLD)
Pf Name
40686 Saleh Nasser Bin Amro
50473 Walid Mohamed Yousry
50525 Ali Abdullah Aidaros Al-Sakkaf
50831 Khalid Al-Shekaili
Since 27/07/2007
Sub Date From Date To Date To_Pf
19/09/2007 29/08/2007 18/09/2007 50525
18/09/2007 29/08/2007 18/09/2007 50525
31/07/2007 04/07/2007 31/07/2007 50525
Report Summary
Summary
Details
Both (Sum and Det)
Preview / Printer
Mail
Word
Print CRU VIEW

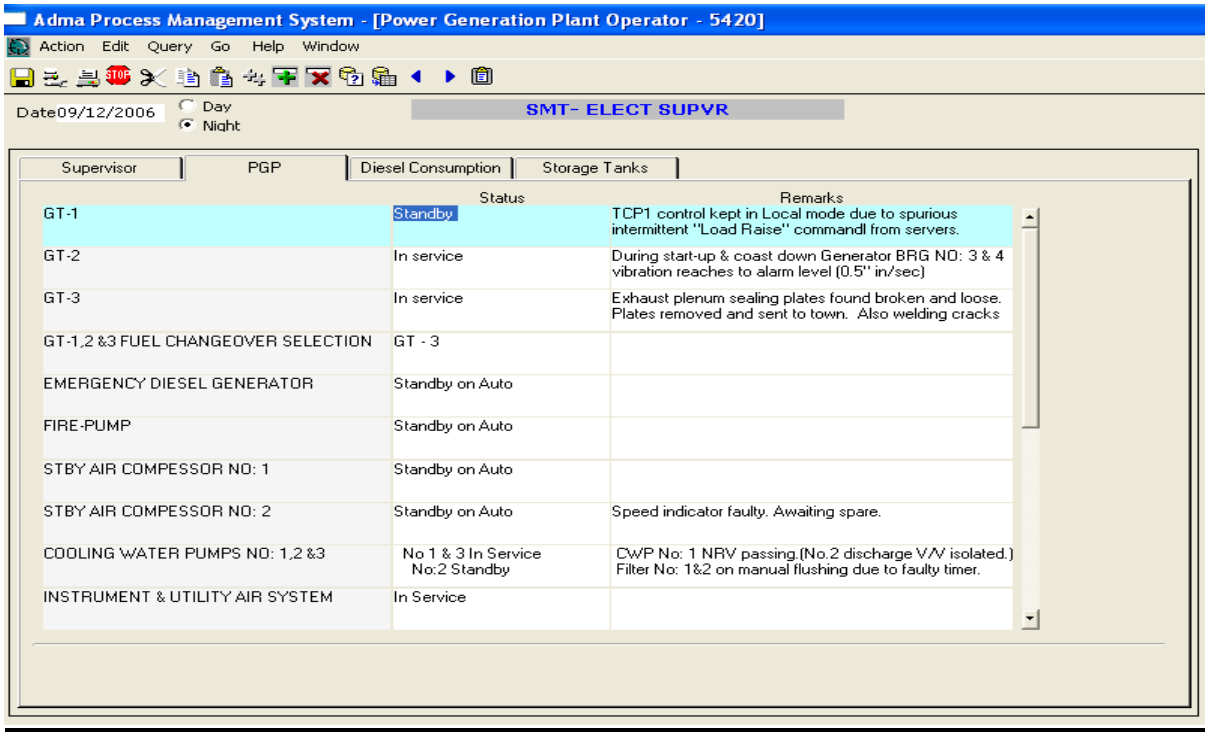

Adma Process Management System - [Hand Over Report - APM423]
Action Edit Query Go Help Window
Date 19/09/2007
Period 29/08/2007 - 18/09/2007
TPO - PROD. SUPVR. (O&W-FLD)
Walid Mohamed Yousry
Report Details
Report Summary
Category
Sub Category
Activity
S
1 Special Water Samples Have Been Collected From Different Towers For Corrosion Eng Analysis
2 09/09/07 Ordered The Following Drums:
Hydraulic Oil (H-46) : 20 Drums
Corrosion Inhibitor (730 K) : 32 Drums
3 Please Follow Up To Rectify Faulty WHT Navigation Lights For:
North Area: US-246 & US-177 & US-82 And US-244
South Area: US-180 And US-161
4 Ali, Pls Be Informed That All Other Crews Sup'vs Have Been Requested To Make Their Own Booking With Names Through The E-Mail Direct To US-Traffic Coordinator (Ext: 66 521) With Copy To (CC) To Both Production Sup'v (Field 66 227) & Prod Sup'v (Gas 66 236)
Rearrange As
To Summary
CRU B

7.2.3 Operation Logs

This function allows entry of log data pertaining to:

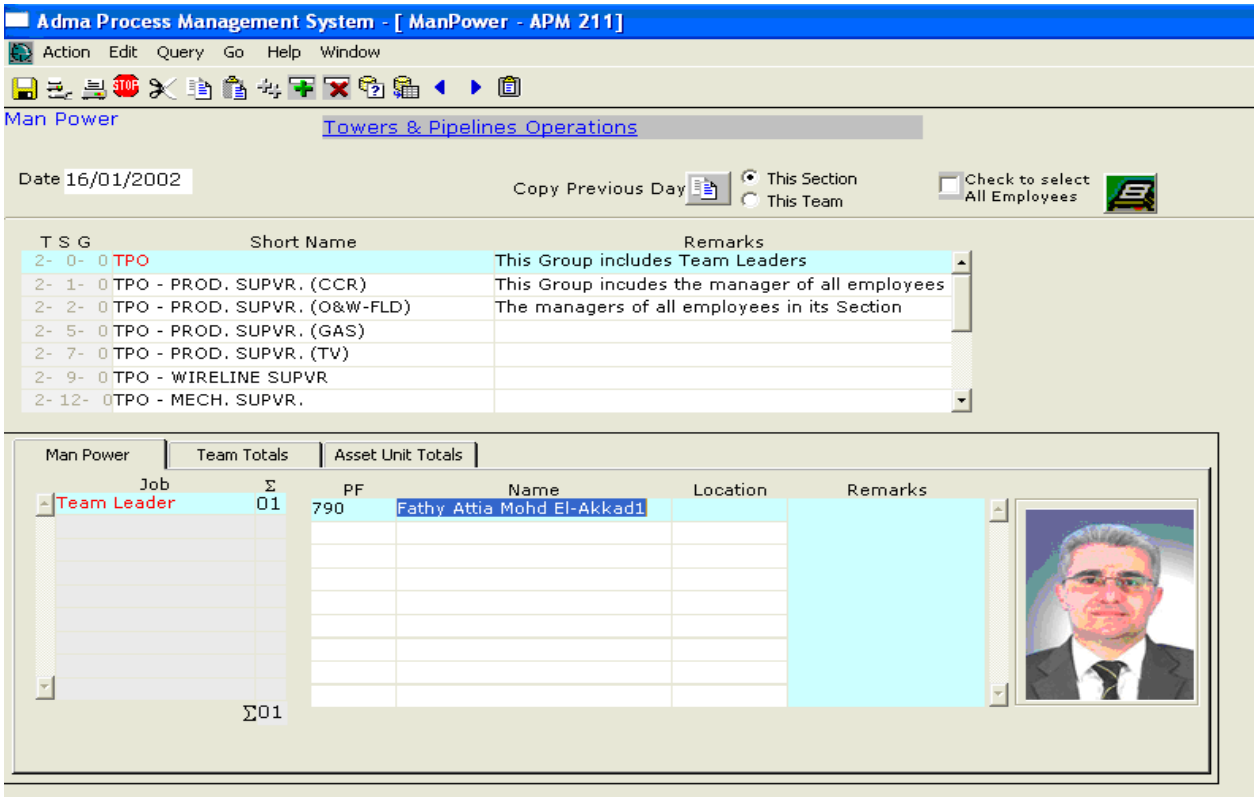
- Daily Production (Oil/Gas Production , Gas Export to ADGAS, Condensate to DAS)
- Gas Usage as Fuel Gas & Utilities , Filling Tank Analysis
- Pentane Spiking, Jiskoot Analysis, API Separators & Dewatering
- Gas Streams & Gas Flaring, Shipment details
- Well Status & String Availability, Oil/Gas Plant Availability
- Gas Treatment Plant Loads, Wire Lint Jobs and logging
- Main Trunk Lines Status, Annulus Pressure





7.2.4 Manpower:

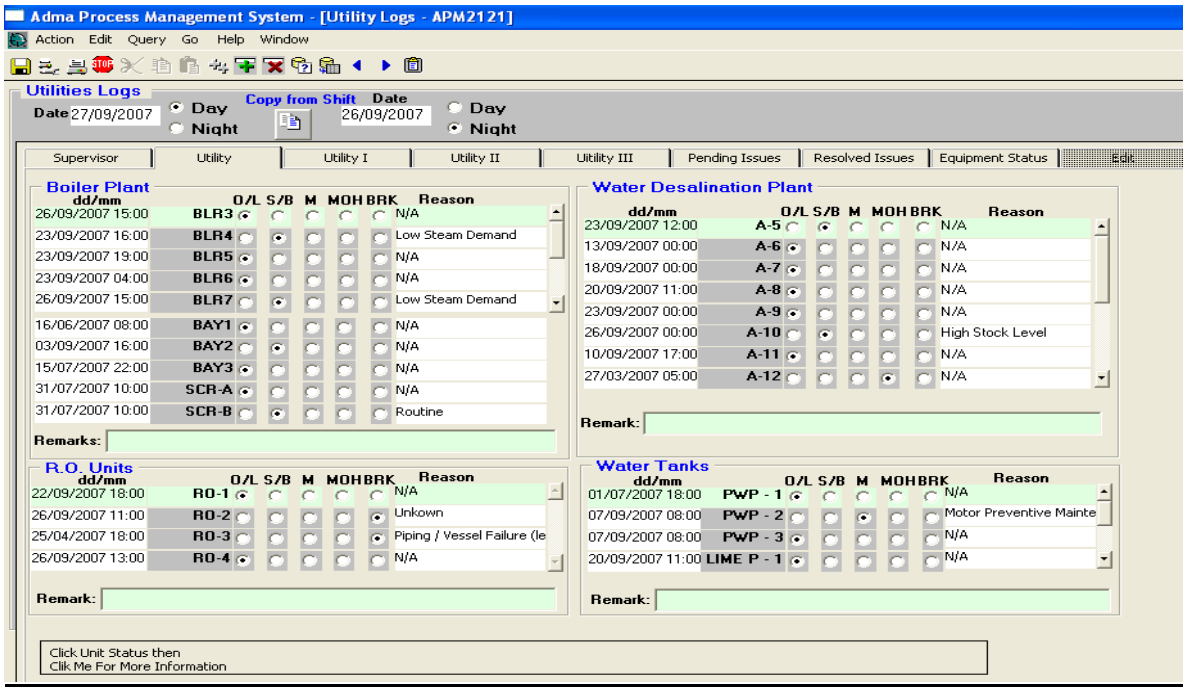
This function lists manpower on-duty for each working Group, Section and Team members pertinent to each shift wherever applicable.

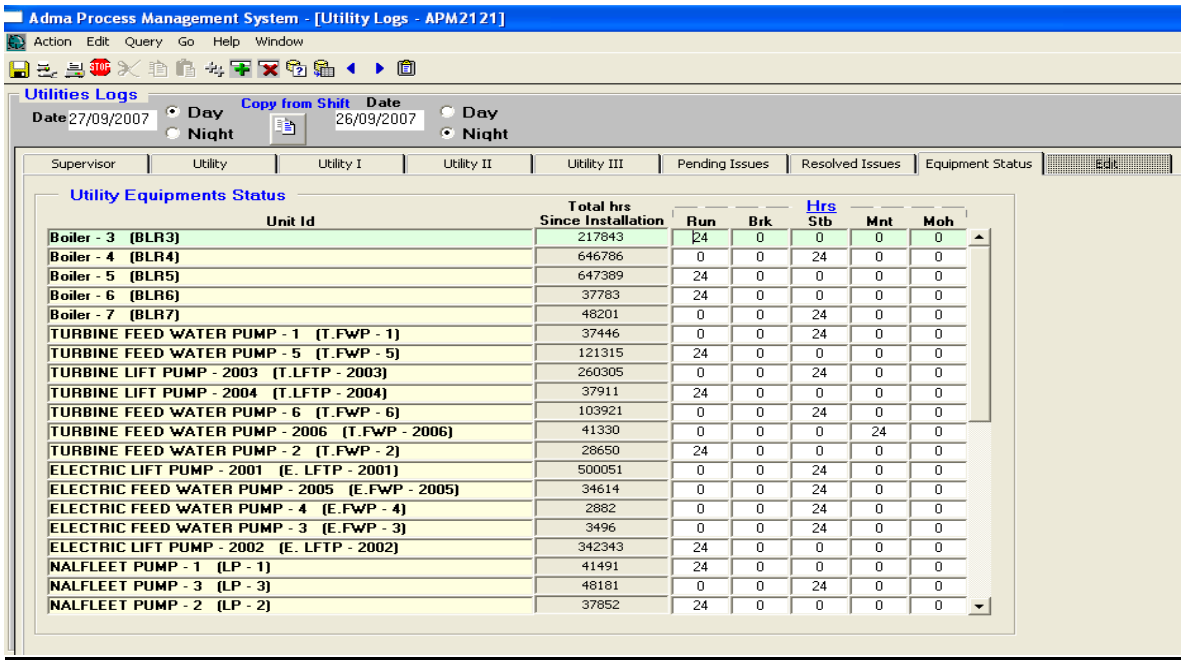


7.2.5 Equipment Availability and Reliability:

This function allows for:

a) Recording the status changes of each equipment (Available and stand-by, available and running, under maintenance) for Operation Unit categories
b) Calculates the number of hours for the status of each equipment
c) Evaluate the reliability of each equipment based on a preset criteria
d) Analyze current/history data to monitor plant operation against failure frequency

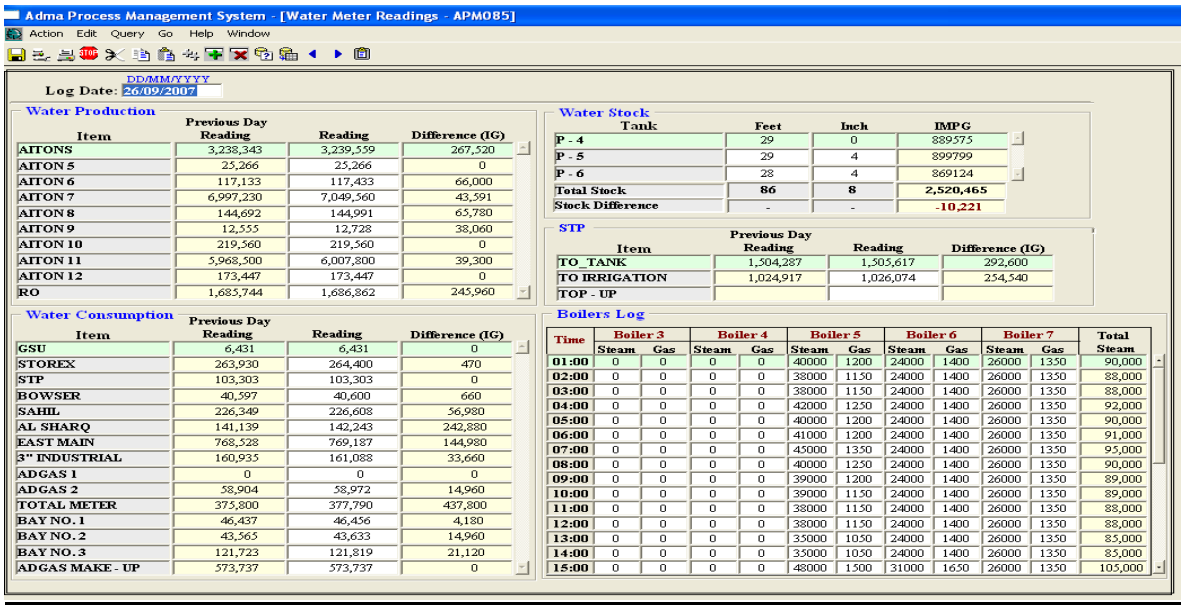




7.2.6 Water Meter-Reading and Calculation

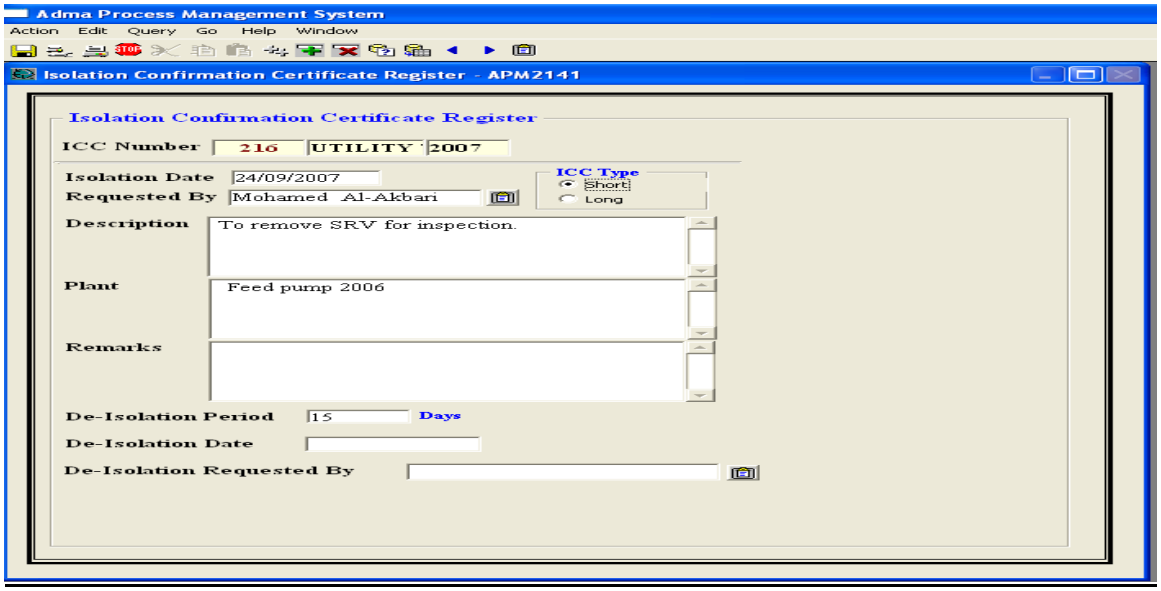
The purpose of this module is to provide sufficient quantities of water to satisfy Das-Island needs. It allows to:

- Maintain water meters readings
- Calculate amount of water production, consumption and stock levels
- Issue various daily, weekly and monthly reports



7.2.7 Isolation and Confirmation Certificate

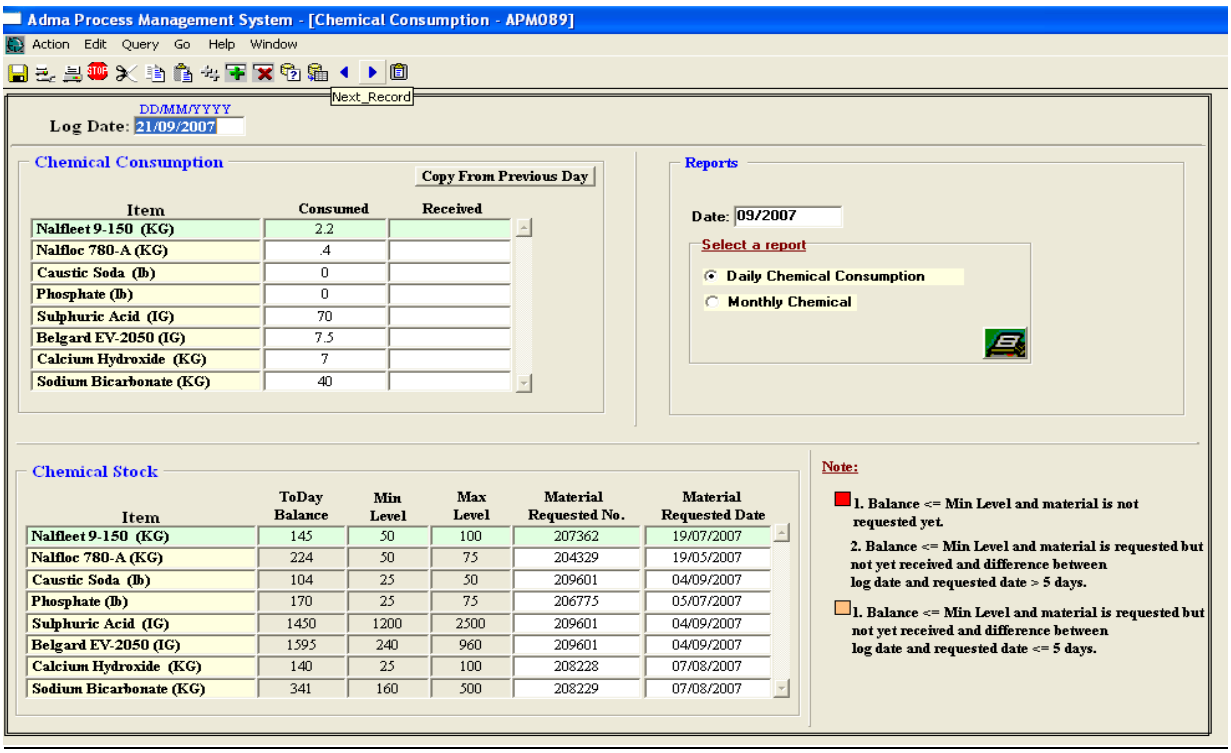
The purpose of this module is to ensure safe isolation of the shutdown of plant/equipment in order to safely avail it to maintenance teams. It issues a certificate stipulating that the plant/equipment is completely isolated.



7.2.8 Chemical Consumption

This function allows to:

a) Monitor and maintain chemical consumption
b) Establish chemical inventory for boilers and water desalination units
c) Analyze data and determine best chemical dosage to minimize costs
d) Enhance maintenance program



7.2.9 Situation report - SitRep

Smooth and easy flow of relevant information from Supervisors to Team Leaders to Site Manager is used to generate the plant situation report (SitRep). It captures information from the daily input of all relevant business units, and is issued daily to Senior Management. See section 7.6.2 F.

7.3 System Development

Amongst the distinctive features of offshore sites are their dispersed geographical locations and unusual shift and work patterns. Due to this special working environment, it was very difficult to adequately gather and record all user requirements ahead of time. Thus, a prototype model approach was adopted for the development of APMS. Several iterative sessions has been conducted with users to reach a consensus on the design of the system. The Prototyping Model uses an early and approximate simulation of a final system that is reworked as necessary until an acceptable product is finally achieved. A final product has been developed afterwards from the final accepted prototype. It is an iterative, trial-and-error process that took place between our Analysts/Developers and the users.

Each prototype step has undergone one or more of the System Development Life Cycle (SDLC) stages (Analysis, Design, Development, Testing, Deployment and Post Implementing). Each one of these stages has been thoroughly considered, applied and documented.

7.4 System Expansion

After the successful implementation of the system in DAS Island, it was requested that APMS be expanded to cover other offshore sites: Umm-Shaif and Zakum (West & Central) Super Complexes. The system has proved to payoff at a time when personnel at all levels became able to record their shift activities notes in a fast, accurate and timely manner.

7.5 Technical Specification

#	Platform	Specification
1-	**Architecture**	Client / Server
2-	**Back End (Server)**	3 GB CPU, 4 GB RAM
	O/S	MS Windows 2000
	Database	Oracle 5 then 9i (9.2.0.6.0)
3-	**Front End (Client)**	
	O/S	MS Windows 2000, MS Windows XP
	Runtime	Developer 6i suite (Patch set 13)
	Email	
	MS Office	
	Acrobat Reader	
4-	**Development Tools**	Oracle 6i suite (patch 13)
5-	**CASE and Graphics Tools**	Oracle Designer and MS Visio
6-	**Network**	TCP / IP Ethernet
7-	**Statistics**	
	No. of users	500 across DAS-Island, US-Shaif and Zakum super complexes
	No. of concurrent users	100 users
	Peak times	Daily Shift Handover 06:00 and 18:00 Abu Dhabi Mean Time
	Backup :Mode, Time & Duration	Offline, 03:00 Abu Dhabi Mean Time, 45 Min
	No. of records	Around 1 million records

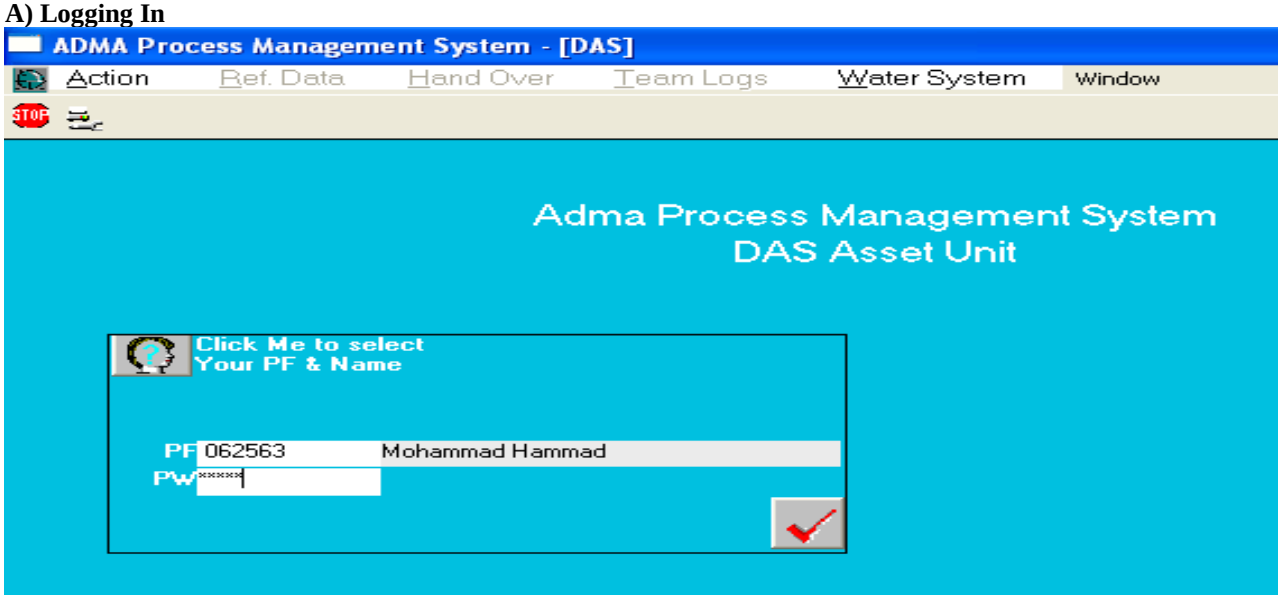
7.6 System Main Features

- Administration and Security
- Reporting
- Search
- Analysis

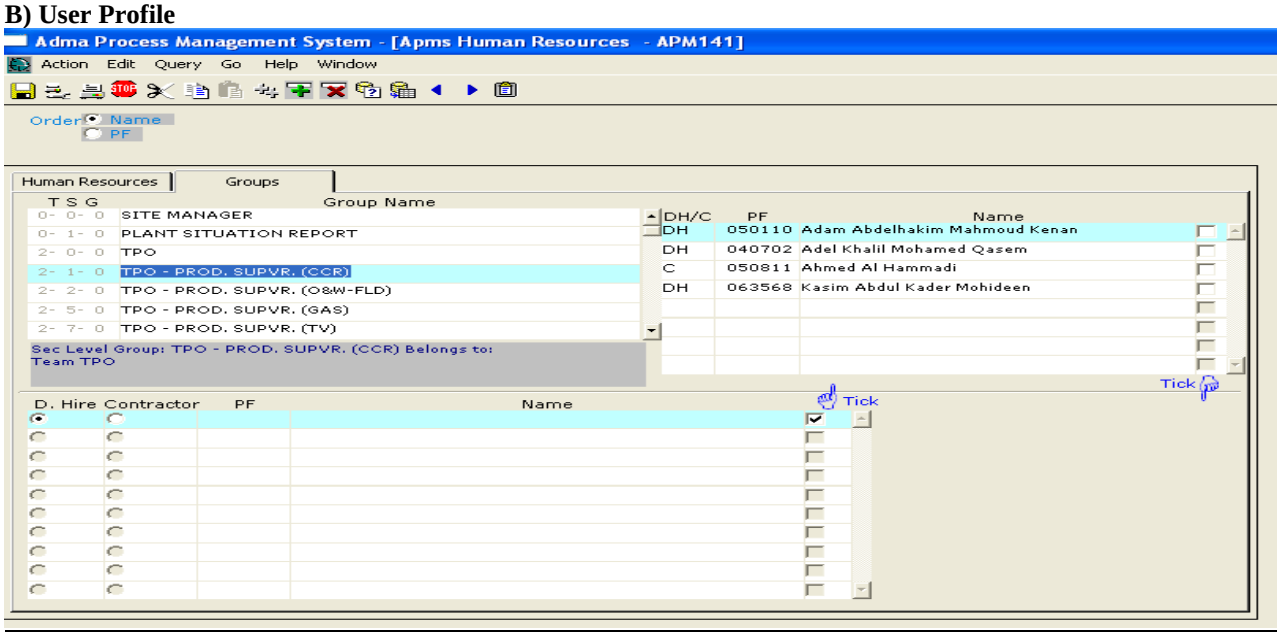
7.6.1 Administration and Security

Provide systems, module and block access rights to authorized personnel.
Update system lookup tables and user access, to maintain system integrity.

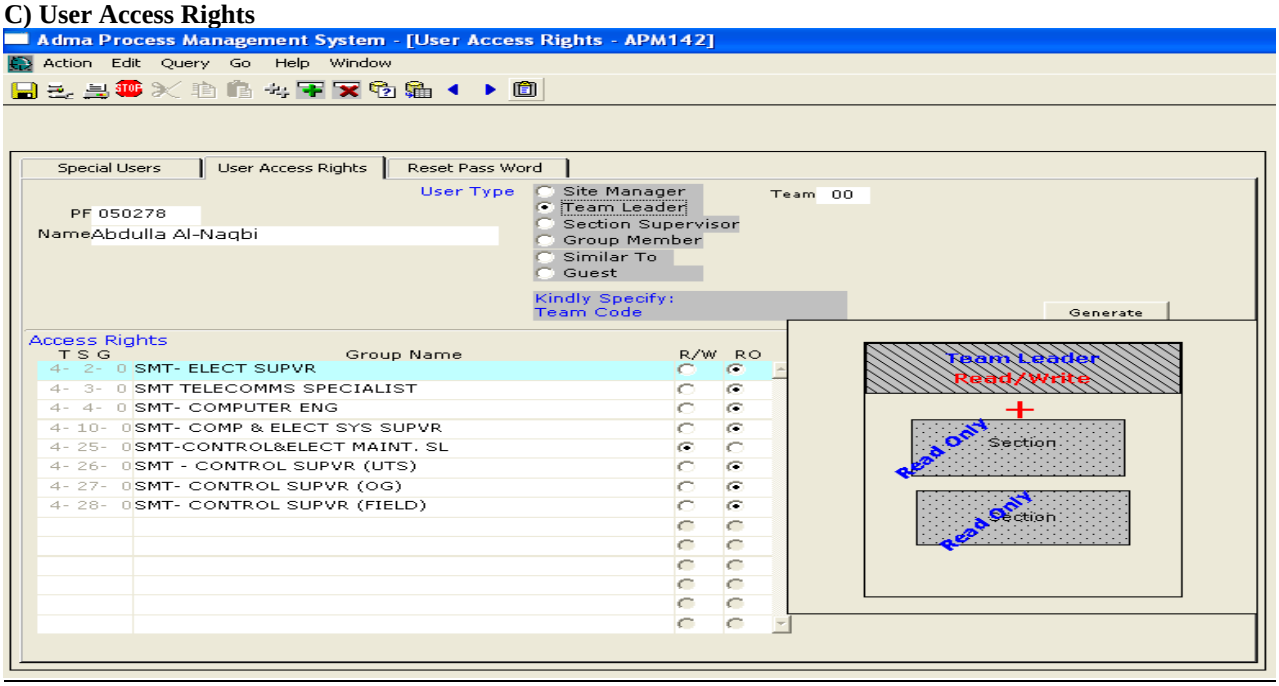
A) Logging In



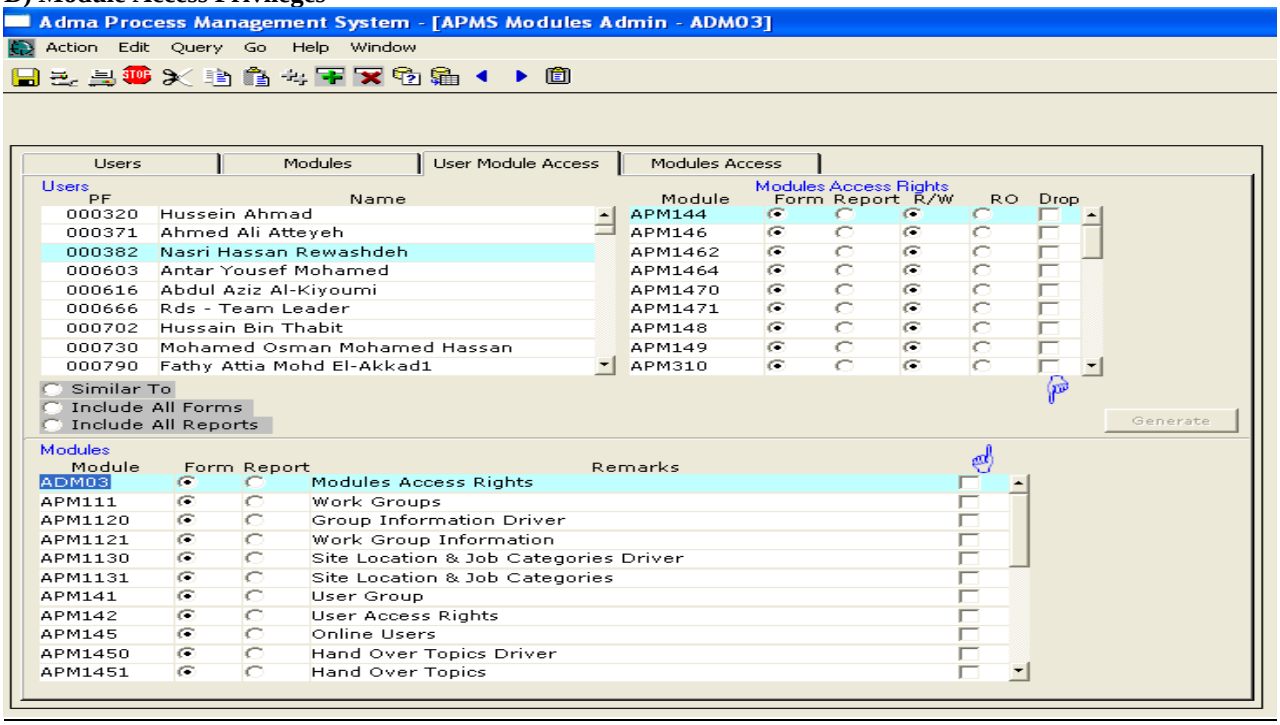
B) User Profile



C) User Access Rights



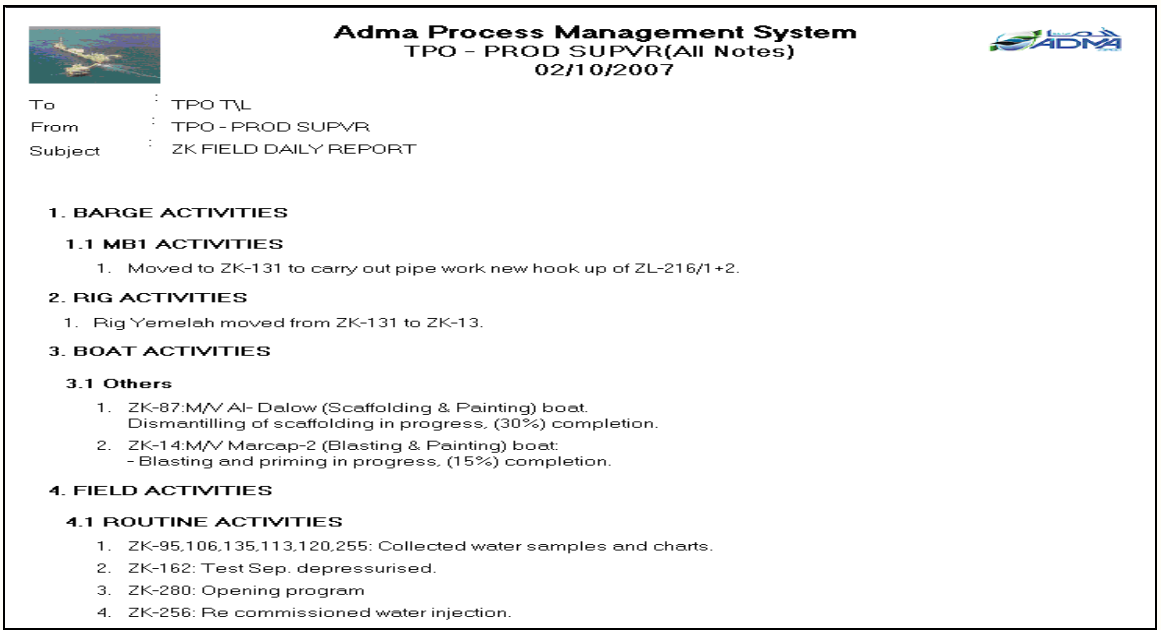
D) Module Access Privileges



7.6.2 Reporting

There are many reports that can be generated from APMS. The following are just a sample of them:

A) Shift Hand-Over Reports:



Adma Process Management System
TPO – PROD SUPVR(All Notes)
02/10/2007

To : TPO T\L
From : TPO - PROD SUPVR
Subject : ZK FIELD DAILY REPORT

1. BARGE ACTIVITIES

1.1 MB1 ACTIVITIES

1. Moved to ZK-131 to carry out pipe work new hook up of ZL-216/1+2.

2. RIG ACTIVITIES

1. Rig Yemelah moved from ZK-131 to ZK-13.

3. BOAT ACTIVITIES

3.1 Others

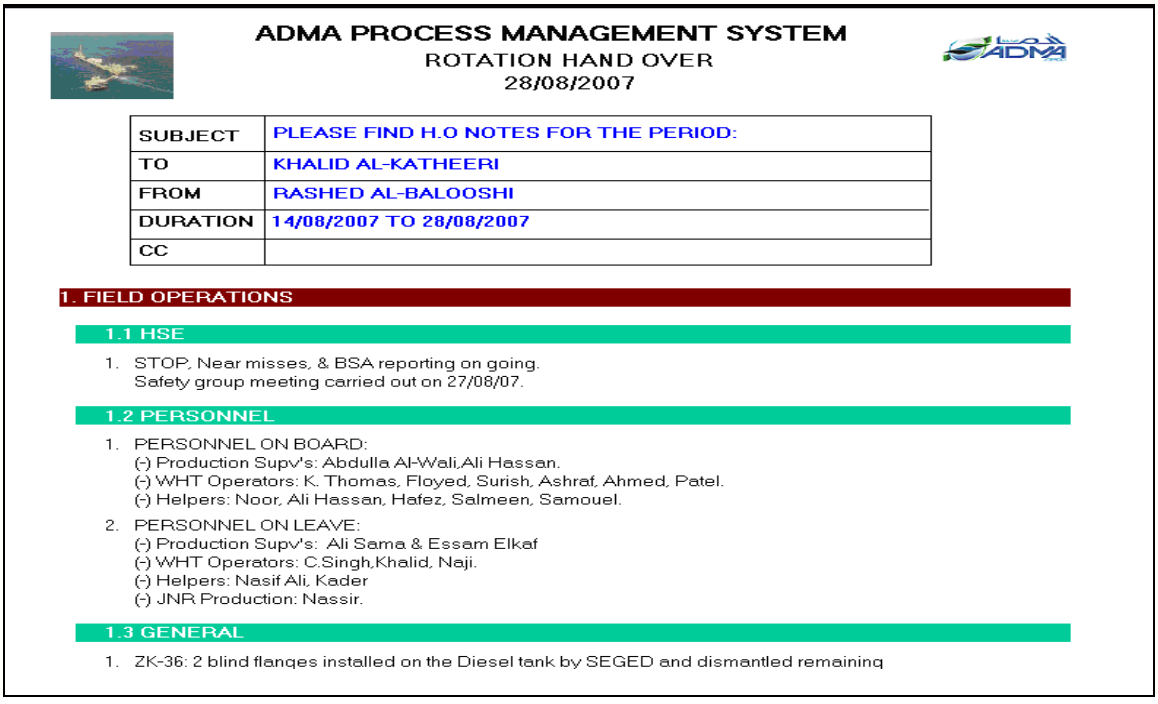
1. ZK-87:M/V Al- Dalow (Scaffolding & Painting) boat.
   Dismantilling of scaffolding in progress, (30%) completion.
2. ZK-14:M/V Marcap-2 (Blasting & Painting) boat:
   - Blasting and priming in progress, (15%) completion.

4. FIELD ACTIVITIES

4.1 ROUTINE ACTIVITIES

1. ZK-95,106,135,113,120,255: Collected water samples and charts.
2. ZK-162: Test Sep. depressurised.
3. ZK-280: Opening program
4. ZK-256: Re commissioned water injection.

B) Rotation and Highlights reports:



ADMA PROCESS MANAGEMENT SYSTEM
ROTATION HAND OVER
28/08/2007

SUBJECT	PLEASE FIND H.O NOTES FOR THE PERIOD:
TO	KHALID AL-KATHEERI
FROM	RASHED AL-BALOOSHI
DURATION	14/08/2007 TO 28/08/2007
CC	

1. FIELD OPERATIONS

1.1 HSE

1. STOP, Near misses, & BSA reporting on going.
   Safety group meeting carried out on 27/08/07.

1.2 PERSONNEL

1. PERSONNEL ON BOARD:
   (-) Production Supv's: Abdulla Al-Wali,Ali Hassan.
   (-) WHT Operators: K. Thomas, Floyed, Surish, Ashraf, Ahmed, Patel.
   (-) Helpers: Noor, Ali Hassan, Hafez, Salmeen, Samouel.
2. PERSONNEL ON LEAVE:
   (-) Production Supv's: Ali Sama & Essam Elkaf
   (-) WHT Operators: C.Singh,Khalid, Naji.
   (-) Helpers: Nasif Ali, Kader
   (-) JNR Production: Nassir.

1.3 GENERAL

1. ZK-36: 2 blind flanges installed on the Diesel tank by SEGED and dismantled remaining

C) Equipment-Status Report

DATE: 04-OCT-2007
TIME: 11:01:53
PAGE: 1 OF 2

ADMA PROCESS MANAGEMENT SYSTEM (APMS)

Monthly Utility Plant Reliability and Availability Report For : September , 2007

Utility Plant	Run	Stb	Brk	Mnt	Moh	Total hrs Since Installation	SUM
AIR COMPRESSOR							
Air Compressor -1 (IAC-1)	8	710	0	2	0	172659	720
Air Compressor -2 (IAC-2)	720	0	0	0	0	237010	720
Air Compressor -3 (IAC-3)	720	0	0	0	0	238246	720
Air Compressor -4 (IAC-4)	0	0	720	0	0	225397	720
Air Compressor -5 (IAC-5)	720	0	0	0	0	208231	720
Air Compressor -6 (IAC-6)	17	703	0	0	0	200637	720
Air Compressor -7 (IAC-7)	695	15	7	3	0	174590	720
HOLMAN (HOLMAN)	5	715	0	0	0	241	720
Air Dryer -6 (DRYER-6)	488	188	0	44	0	235391	720
Air Dryer -7 (DRYER-7)	232	485	0	3	0	88857	720
AITON							
Aiton No.5 (A-5)	332	360	16	12	0	221452	720
Aiton No.6 (A-6)	630	41	0	49	0	201318	720
Aiton No.7 (A-7)	428	292	0	0	0	170564	720
Aiton No.8 (A-8)	521	167	32	0	0	196852	720
Aiton No.9 (A-9)	530	98	93	0	0	193513	720
Aiton No.10 (A-10)	455	135	0	130	0	161457	720
Aiton No.11 (A-11)	489	231	0	0	0	146884	720
Aiton No.12 (A-12)	0	0	0	0	720	158511	720
BOOSTER PUMP (BSTRP)	0	720	0	0	0	68	720
BOILER							
Boiler - 3 (BLR3)	79	26	0	0	615	217889	720
Boiler - 4 (BLR4)	118	152	24	0	426	646786	720
Boiler - 5 (BLR5)	704	16	0	0	0	647460	720
Boiler - 6 (BLR6)	599	121	0	0	0	37845	720
Boiler - 7 (BLR7)	684	31	5	0	0	48275	720
TURBINE FEED WATER PUMP - 1 (T.FWP - 1)	387	333	0	0	0	37511	720
TURBINE FEED WATER PUMP - 2 (T.FWP - 2)	327	393	0	0	0	28653	720
TURBINE FEED WATER PUMP - 5 (T.FWP - 5)	64	656	0	0	0	121291	720
TURBINE FEED WATER PUMP - 6 (T.FWP - 6)	96	624	0	0	0	104017	720
TURBINE FEED WATER PUMP - 2006 (T.FWP - 200	236	324	0	160	0	41330	720
TURBINE LIFT PUMP - 2003 (T.LFTP - 2003)	393	327	0	0	0	260370	720
TURBINE LIFT PUMP - 2004 (T.LFTP - 2004)	327	389	0	4	0	37918	720
ELECTRIC FEED WATER PUMP - 2005 (E.FWP - 20	324	396	0	0	0	34614	720
ELECTRIC FEED WATER PUMP - 3 (E.FWP - 3)	51	669	0	0	0	3545	720
ELECTRIC FEED WATER PUMP - 4 (E.FWP - 4)	45	675	0	0	0	2927	720
ELECTRIC LIFT PUMP - 2001 (E. LFTP - 2001)	424	296	0	0	0	500147	720
ELECTRIC LIFT PUMP - 2002 (E. LFTP - 2002)	300	416	0	4	0	342323	720
NALFLEET PUMP - 1 (LP - 1)	720	0	0	0	0	41563	720
NALFLEET PUMP - 2 (LP - 2)	160	560	0	0	0	37924	720

D) Equipment Availability & Reliability

DATE: 18-OCT-2007
TIME: 12:53:01
PAGE: 1 OF 1

ADMA PROCESS MANAGEMENT SYSTEM (APMS)

Water and Steam Production and Consumption Statistics For : September , 2007

Distillation Units								
	A-10	A-11	A-12	A-5	A-6	A-7	A-8	A-9
Hours Run	455	489	0	332	630	428	521	530
S/By Hrs (WW)	135	231	0	360	41	292	167	98
Planned Maint. Hrs	130	0	0	12	49	0	0	0
Brk Down Maint.	0	0	0	16	0	0	32	93
MOH Hrs	0	0	720	0	0	0	0	0
Unit Reliability	100%	100%	0%	95%	100%	100%	94%	85%
Unit Availability	63%	68%	0%	46%	88%	59%	72%	74%

Boilers				
BLR3	BLR4	BLR5	BLR6	BLR7
79	118	704	599	684
26	152	16	121	31
0	0	0	0	0
0	24	0	0	5
615	426	0	0	0

Steam Production

Total Steam (lbs) = 86,561,000
Max Steam Flow (lbs/hr) = 166,000
Min Steam Flow (lbs/hr) = 0

Fresh Water (IG)

Aiton Production = 7,890,300
RO Production = 7,330,400
Total Production = 14,147,222
Total Consumption = 14,951,738
STP Irrigation = 8,679,660

Reliability = (Total Hrs - S/By Hrs (WW) - MOH Hrs - Planned Maint. - Break down Maint. Hrs) X 100 / (Total Hrs - S/By Hrs (WW) - MOH Hrs - Planned Maint.)

Availability = (Total Hrs - S/By Hrs (WW) - MOH Hrs - Planned Maint. - Break down Maint. Hrs) X 100 / Total Hrs

E) Water Consumption Report

DATE: 03-OCT-2007
TIME: 11:08:18
PAGE: 1 OF 1

ADMA PROCESS MANAGEMENT SYSTEM (APMS)

Water Consumption For : September , 2007

** Water Consumption Table

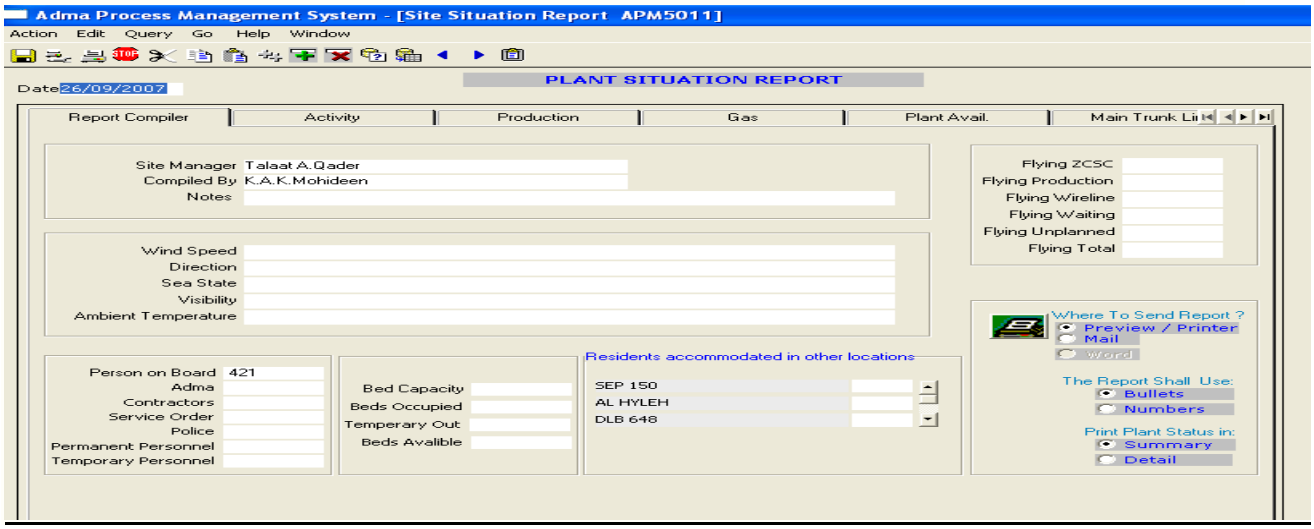
Day	GSU (Inds. W)	Storex	Utilities (Inds. W)	Process (Inds. W)	3 "Indus. Area (Pot. W)	Total Inds. Areas	East Main (Pot. W)	Al Sharq (Pot. W)	Al Sahil (Pot. W)	Bowser (Pot. W)	STP	Meters Total Consumption	Total Consumption	ADGAS1 (Pot. W)	ADGAS2 (Pot. W)	ADGAS Total
1	440	0	1,000	35,540	27,940	63,480	138,600	226,820	56,320	12,100	220	462,000	497,540	0	15,180	15,180
2	1,100	0	1,000	30,700	23,540	54,240	130,680	216,480	46,640	10,780	440	428,560	459,260	0	14,300	14,300
3	1,320	0	1,000	31,360	24,200	55,560	146,080	206,580	61,600	12,320	220	451,000	482,360	0	13,200	13,200
4	1,100	200	1,000	29,360	28,380	57,740	182,820	162,580	54,560	0	0	428,340	457,700	0	13,860	13,860
5	1,100	20	1,000	34,240	22,000	56,240	149,380	205,480	50,380	7,260	220	434,720	468,960	0	14,080	14,080
6	1,320	10	1,000	29,390	28,160	57,550	174,900	174,900	63,580	4,400	220	446,160	475,550	0	17,380	17,380
7	880	0	1,000	26,960	21,780	48,740	188,320	181,940	59,620	2,420	220	454,300	481,260	0	20,460	20,460
8	1,100	320	1,000	27,040	32,120	59,160	181,500	174,900	54,560	12,980	0	456,060	483,100	0	19,580	19,580
9	1,100	170	1,000	30,328	29,480	59,808	166,980	193,380	59,180	3,300	220	432,540	482,868	0	15,620	15,620
10	3,080	0	1,000	17,720	28,820	46,540	139,040	240,460	64,020	0	220	472,560	490,280	0	13,200	13,200
11	7,040	0	1,000	35,760	29,040	64,800	131,340	229,680	67,320	220	220	457,820	493,580	0	13,200	13,200
12	6,820	10	1,000	44,130	31,240	75,370	146,300	247,720	57,200	660	0	483,120	527,250	0	13,860	13,860
13	7,040	120	1,000	34,340	31,240	65,580	135,080	235,180	58,520	0	220	460,240	494,580	0	12,980	12,980
14	6,820	680	1,000	30,060	29,040	59,100	133,760	238,920	62,260	660	0	464,640	494,700	0	11,440	11,440
15	6,380	190	1,000	29,350	37,180	66,530	134,860	235,620	56,760	0	220	464,640	493,990	0	12,320	12,320
16	7,260	0	1,000	37,860	44,440	82,300	138,820	236,060	53,900	220	1,760	475,200	513,080	0	14,300	14,300
17	7,700	320	1,000	41,360	44,660	86,020	137,060	230,120	59,180	0	220	471,240	512,600	0	13,420	13,420
18	6,820	3,300	1,000	38,180	47,080	85,260	140,580	237,600	55,220	0	220	480,700	518,880	0	12,760	12,760
19	5,940	1,690	1,000	39,210	48,840	88,050	139,260	241,780	66,880	0	0	496,760	535,970	0	12,760	12,760
20	1,320	280	1,000	43,060	36,740	81,800	137,500	233,200	61,600	0	220	469,260	514,320	0	12,320	12,320
21	1,540	30	1,000	48,770	27,940	76,710	141,460	242,660	51,700	1,320	0	465,080	513,830	0	11,660	11,660
22	880	150	1,000	43,170	32,780	75,950	142,340	240,020	50,380	220	220	465,960	509,130	0	13,200	13,200
23	220	90	1,000	39,370	35,200	74,570	140,580	238,260	51,260	0	220	465,520	504,890	0	12,760	12,760
24	0	640	1,000	42,340	34,320	76,660	142,560	237,820	56,100	2,200	0	473,000	515,340	0	12,760	12,760
25	0	0	1,000	47,640	30,580	78,220	145,640	241,780	56,540	0	220	474,760	522,400	0	14,960	14,960
26	0	470	1,000	41,730	33,660	75,390	144,980	242,880	56,980	660	0	479,180	520,890	0	14,960	14,960
27	0	0	1,000	43,680	32,780	76,460	142,120	237,820	51,480	1,980	220	466,400	510,080	0	13,640	13,640
28	1,320	0	1,000	42,800	29,260	72,060	143,000	243,320	55,220	0	220	471,020	513,820	0	13,860	13,860
29	220	0	1,000	24,890	29,260	54,150	137,280	231,660	55,220	660	0	454,080	478,970	0	13,640	13,640
30	0	0	1,000	31,140	31,020	62,160	137,060	234,080	50,380	660	220	453,420	484,560	0	13,420	13,420
Total	79,860	8,890	30,000	1,073,478	962,720	2,036,198	4,389,880	6,739,700	1,704,560	75,020	6,380	13,878,260	14,951,738	0	421,080	421,080

F) SitRep

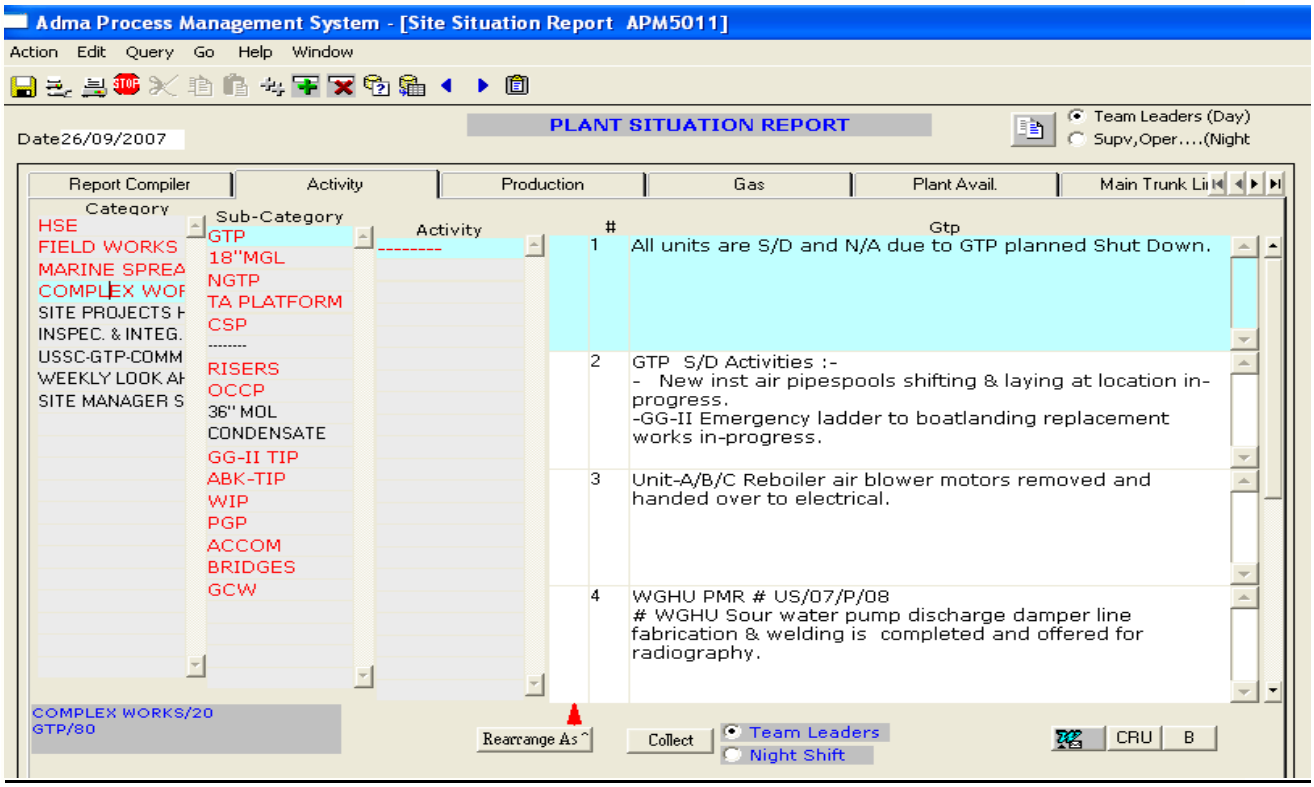
There are 3 SitReps, one for each site: DAS SitRep, Umm-Shaif SitRep and Zakum SitRep. The first 4 screens (F1 – F4) show the steps used to issue the Zakum SitRep (was randomly chosen).

N.B:
Das SitRep will follow afterwards to emphasize the importance of 'DAS Major Projects' topic. Because of its significant concern to Senior Management, reporting on the progress of this topic occupies an independent portion of the said report (See Screen F5 – F6).

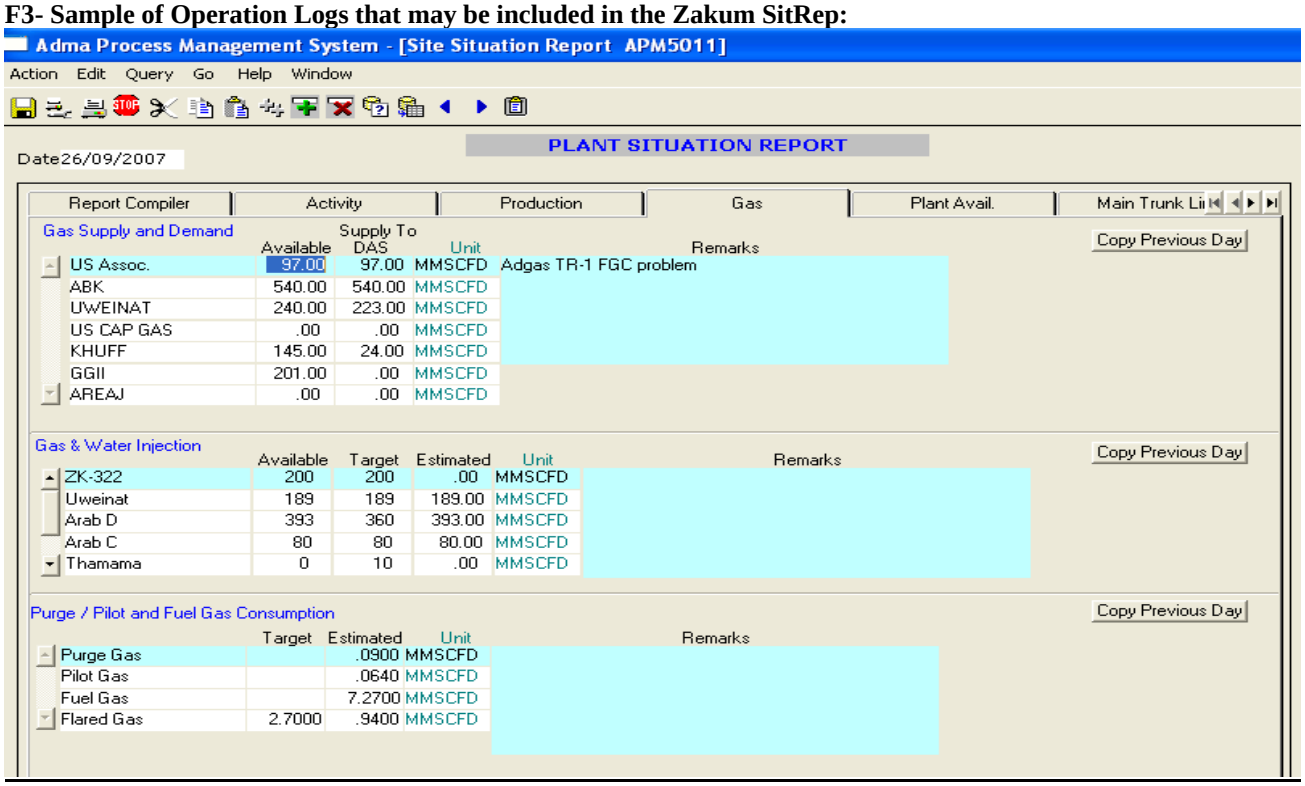
F1- Preparation of Zakum SitRep:



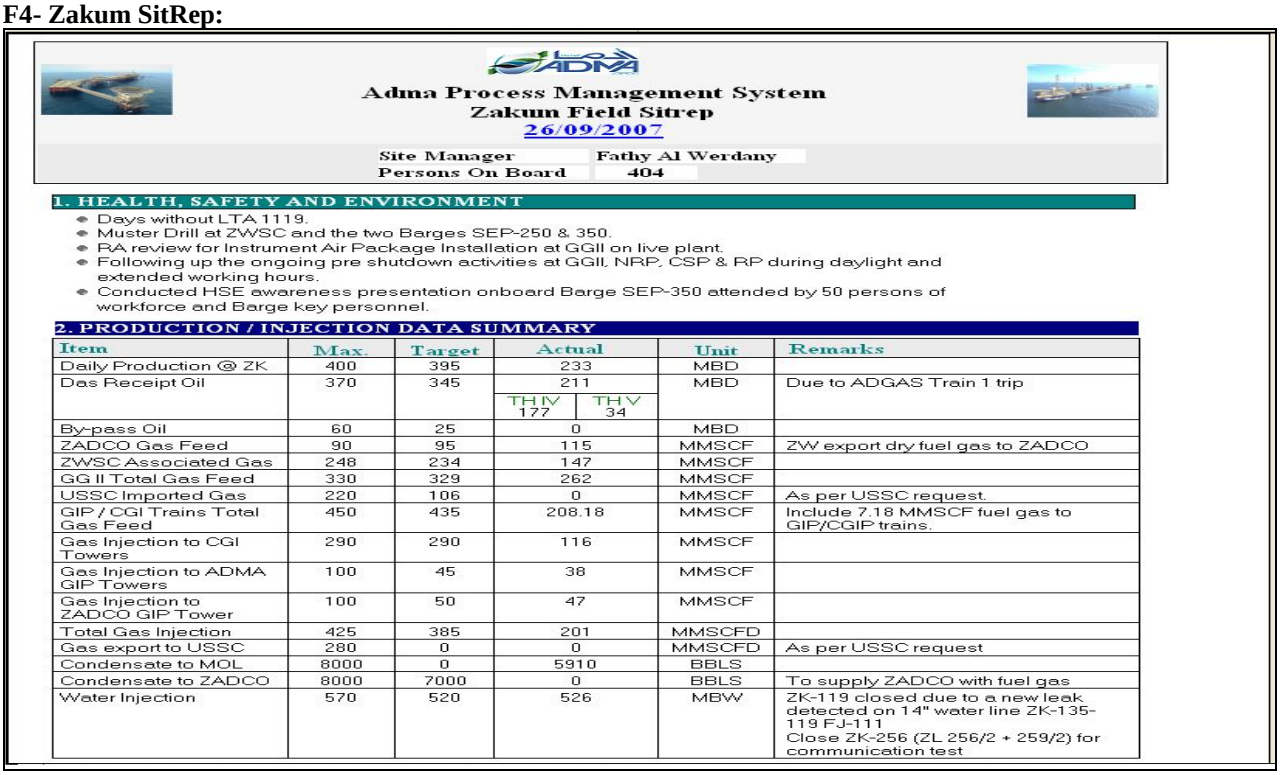
F2-Collection of activities that will be included in the Zakum SitRep:



F3- Sample of Operation Logs that may be included in the Zakum SitRep:



F4- Zakum SitRep:



Adma Process Management System
Zakum Field Sitrep
26/09/2007

Site Manager: Fathy Al Werdany
Persons On Board: 404

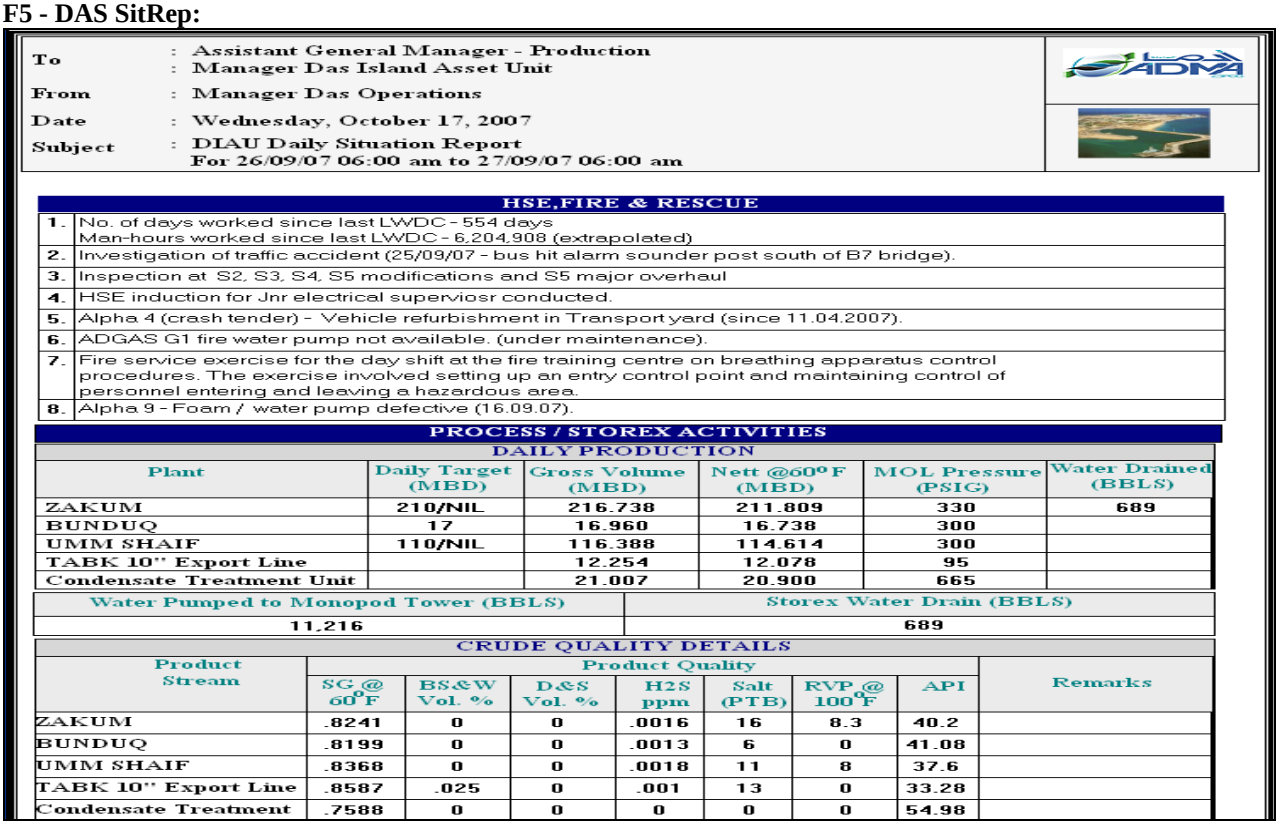
1. HEALTH, SAFETY AND ENVIRONMENT

- Days without LTA 1119.
- Muster Drill at ZWSC and the two Barges SEP-250 & 350.
- RA review for Instrument Air Package Installation at GGII on live plant.
- Following up the ongoing pre shutdown activities at GGII, NRP, CSP & RP during daylight and extended working hours.
- Conducted HSE awareness presentation onboard Barge SEP-350 attended by 50 persons of workforce and Barge key personnel.

2. PRODUCTION / INJECTION DATA SUMMARY

Item	Max.	Target	Actual	Unit	Remarks
Daily Production @ ZK	400	395	233	MBD	
Das Receipt Oil	370	345	211 (THIV 177 / THV 34)	MBD	Due to ADGAS Train 1 trip
By-pass Oil	60	25	0	MBD	
ZADCO Gas Feed	90	95	115	MMSCF	ZW export dry fuel gas to ZADCO
ZWSC Associated Gas	248	234	147	MMSCF	
GG II Total Gas Feed	330	329	262	MMSCF	
USSC Imported Gas	220	106	0	MMSCF	As per USSC request.
GIP / CGI Trains Total Gas Feed	450	435	208.18	MMSCF	Include 7.18 MMSCF fuel gas to GIP/CGIP trains.
Gas Injection to CGI Towers	290	290	116	MMSCF	
Gas Injection to ADMA GIP Towers	100	45	38	MMSCF	
Gas Injection to ZADCO GIP Tower	100	50	47	MMSCF	
Total Gas Injection	425	385	201	MMSCFD	
Gas export to USSC	280	0	0	MMSCFD	As per USSC request
Condensate to MOL	8000	0	5910	BBLS	
Condensate to ZADCO	8000	7000	0	BBLS	To supply ZADCO with fuel gas
Water Injection	570	520	526	MBW	ZK-119 closed due to a new leak detected on 14" water line ZK-135-119 FJ-111 Close ZK-256 (ZL 256/2 + 259/2) for communication test

F5 - DAS SitRep:



To : Assistant General Manager - Production
: Manager Das Island Asset Unit
From : Manager Das Operations
Date : Wednesday, October 17, 2007
Subject : DIAU Daily Situation Report
For 26/09/07 06:00 am to 27/09/07 06:00 am

HSE,FIRE & RESCUE

1.	No. of days worked since last LWDC - 554 days Man-hours worked since last LWDC - 6,204,908 (extrapolated)
2.	Investigation of traffic accident (25/09/07 - bus hit alarm sounder post south of B7 bridge).
3.	Inspection at S2, S3, S4, S5 modifications and S5 major overhaul
4.	HSE induction for Jnr electrical superviosr conducted.
5.	Alpha 4 (crash tender) - Vehicle refurbishment in Transport yard (since 11.04.2007).
6.	ADGAS G1 fire water pump not available. (under maintenance).
7.	Fire service exercise for the day shift at the fire training centre on breathing apparatus control procedures. The exercise involved setting up an entry control point and maintaining control of personnel entering and leaving a hazardous area.
8.	Alpha 9 - Foam / water pump defective (16.09.07).

PROCESS / STOREX ACTIVITIES

DAILY PRODUCTION

Plant	Daily Target (MBD)	Gross Volume (MBD)	Nett @60° F (MBD)	MOL Pressure (PSIG)	Water Drained (BBLS)
ZAKUM	210/NIL	216.738	211.809	330	689
BUNDUQ	17	16.960	16.738	300	
UMM SHAIF	110/NIL	116.388	114.614	300	
TABK 10" Export Line		12.254	12.078	95	
Condensate Treatment Unit		21.007	20.900	665	

Water Pumped to Monopod Tower (BBLS)	Storex Water Drain (BBLS)
11,216	689

CRUDE QUALITY DETAILS

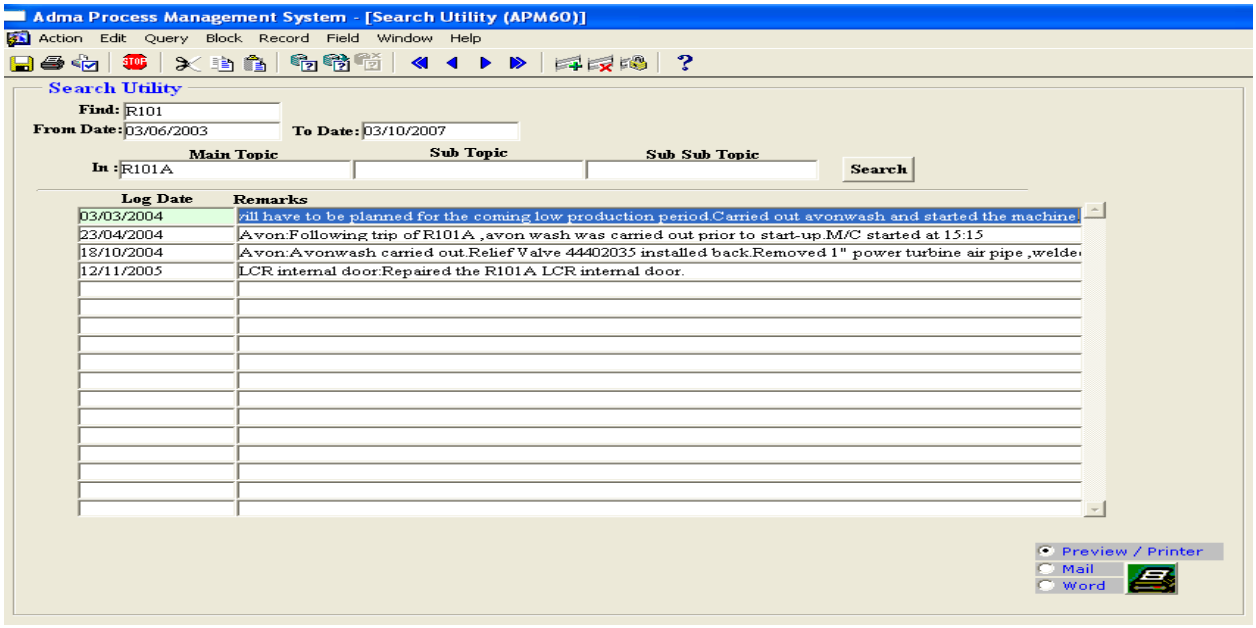
Product Stream	Product Quality							Remarks
	SG @ 60° F	BS&W Vol. %	D&S Vol. %	H2S ppm	Salt (PTB)	RVP @ 100° F	API	
ZAKUM	.8241	0	0	.0016	16	8.3	40.2	
BUNDUQ	.8199	0	0	.0013	6	0	41.08	
UMM SHAIF	.8368	0	0	.0018	11	8	37.6	
TABK 10" Export Line	.8587	.025	0	.001	13	0	33.28	
Condensate Treatment	.7588	0	0	0	0	0	54.98	

F6 - Das Major Projects (part of DAS SitRep)

DAS PROJECTS		
1.	ED082	**BOILERS 3,4 & 5 CONTROL SYSTEM UPGRADE** • Cable glanding and termination for boiler 5 completed. • Removal of the old instruments, cable, tubing connection from boilers 3 & 4 area completed. • Punch list items clearance completed for Boilers 3 & 4. • Boiloer 3 commissioning in progress. • Waiting for Boiler 5 shutdown to start changeover works.
2.	ED07E	**FIRE & GAS DETECTION SYSTEM IN PROCESS PLANTS** • Punch list items for STOREX, CTU Plants, FMSS Tank Farm and CCB equipment clearance in progress. • Fire detectors installation in, Zakum and Bunduq plants in progress. • Cable tray installation for Bunduq Plant in progress. • Punch list items of Zakum and Bunduq Plant installations - clearance in progress. • Commissioning of AB PLC System in Tank Farm in progress. • The RIO network commissioning in progress. • ESCR, Allan Bradly PLC system upgrading and commissioning in progress.
3.	MD258	**BUND STABILISATION OF SPHEROIDS & ZK SEPARATORS AREA** • Concreting for S1/S3 spheroids bunds in progress. • Demolition of stair case in S4 & S5 bunds in progress.
4.	ED05	**SPHEROIDS S1, S2, S3 & S5 MODIFICATIONS & MOH (SPHEROID S1)** • Pre-fabrication for piping in progress. • Cutting window on galleries in progress. • Removal of striffeners at inlet pipes in progress. • Radiography for pre-fab. pipes in progress.
5.		**COANDA FLARE IGNITION SYSTEM - FFG-1 PIPE SUPPORT MODIFICATION** • GBA instalaltion is planned after completion of inshore flares segregation project.
6.	ED08E	**Re-Routing of Relief Header in Process Plants** • Material procurement in progress. • Pipe support fabrication/piping spools for tie-in scope in progress. • Steel reinforcement & shuttering works in progress. • Excavation works at west K.O.D. and ZK Separator area in progress. • Fabrication of structural pipe bridges in progress. • Hydrotest for 20" dia. Bunduq tie-in spools in progress.
7.	ED124	**Extension of Arzanah Restaurant - Das Island** • Caravan assembly on site in progress. • Manufacturing of new HVAC package units in progress. • Power cable feed points and routing checks in progress.
8.	ED06E	**Replacement of Buried Pipework in STOREX Area - Das Island** • Construction sequences, tie-ins and bund crossings verification in progress.
9.	ED116	**Construction of Blast Proof Building- Das Island** • Site Survey in progress. • Contractor's mobilisation in progress.
10.		**CIVIL MAINTENANCE SERVICES FOR MUNICIPAL, PROCESS & HARBOUR AREA** • Major overhaul works of API Separator No. 2 in progress. • Construction of shed at Oasis Club Arabic Majilis in progress. • Construction of foundation for temporary saddle for HP separator at BQ plant in

7.6.3 Search

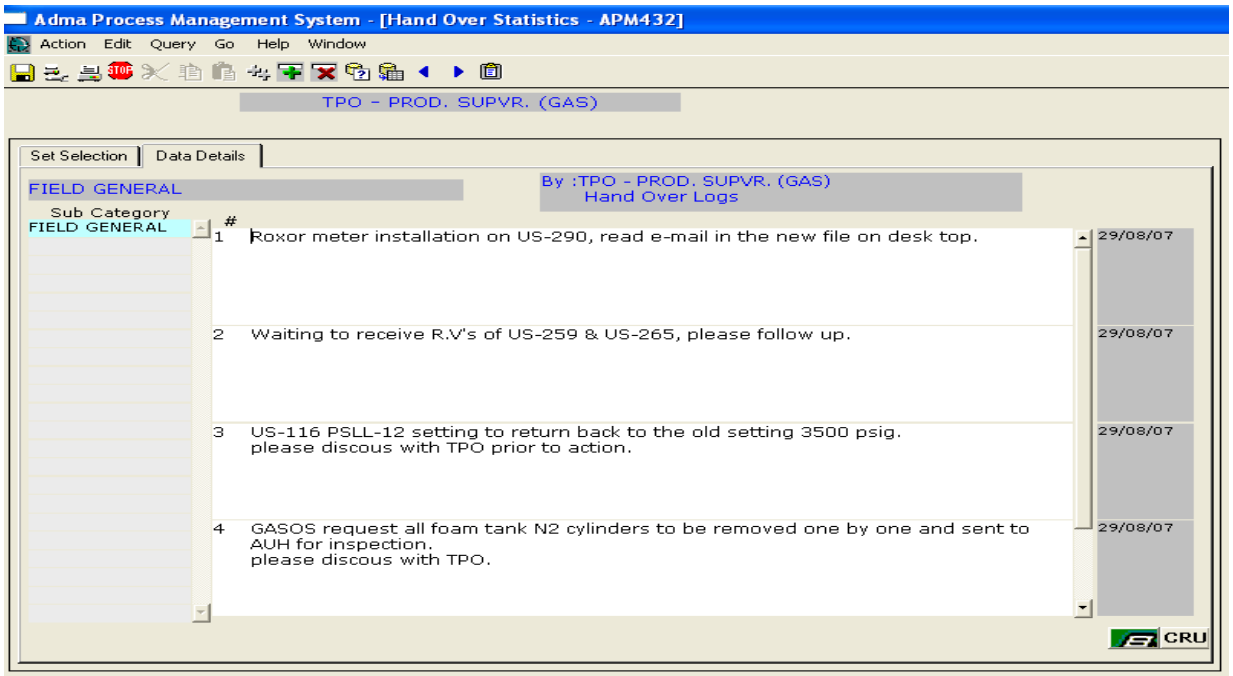
APMS offers search capability that allows entries containing instances of a particular phrase or keyword during a specified period and included in main topic, sub-topic or sub-sub-topic. It makes queries on 'What', 'When', and 'Who'.



7.6.4 Analysis

A) Criteria:

B) Outcome:



8- Issues Resolved

8.1 HSE

The first and foremost important concern is the health and safety of the manpower, and the protection of the environment (HSE). APMS has helped in the effective implementation of ADMA-OPCO HSE standards all over sites where operations are taking place. Compliance with safety regulations became the norm, and awareness of the importance of the HSE issues amongst all employees has been alleviated.

8.2 Standards

Another worry that APMS has relieved is the enforcement of standards. This covers the topic subjects of the reports, codes of different statuses, report structures and business rules as below:

- Prior to the introduction of APMS, topics that employees were reporting against, were randomly selected and inconsistently used by different shift groups. Nowadays, topics are unified across all different plant locations.

- Codes related to the statuses of work to be performed, equipments to be operated, shipments to be loaded and reasons for changes are now all standardized and users are obliged to choose the required status code from a list of values that is already stored within the system.

- All reports including the SitRep(s) follow standard layouts and structures designed by Team Leaders and Supervisors and subsequently cannot be modified arbitrarily by individuals.

- Business rules have been enforced to validate data entry across all functional modules. Data integrity becomes standardized.

8.3 Operations

Using APMS, reporting on the plant status, production conditions and ongoing activities in an accurate and timely manner has minimized the potential risk of accidents. In the absence of a proper reporting mechanism, production operations will be inefficient and product quality would likely be affected.

8.4 Analysis Tools

Operation history data is critical in so much as it helps in detecting problems or deducing trends. Management is unable to take sound decisions if proper analysis tools are lacking. While it is impossible to perform analysis tasks using a paper-based system, it will be quite easy to do that using an automated one.

APMS provides the facility to query on operational data by a set of criteria of interest. In no time, they will be able to view outcomes of these queries and draw conclusions. For the problems detected, managers would be able to choose a more reliable and optimized solution.

8.5 Communication and Continuity

One of the goals of shift handover is to ensure accurate and reliable communication of task-relevant information across shift changes. Communication becomes an issue especially when the task is shared between communities of people.

Another goal of shift handover is the continuity of services in industries where processes are operating around the clock. Continuity is maintained across shift changes via shift changeover.

APMS has facilitated proper communication and uninterrupted services, thus allowing complete and accurate information to be passed to the right person in the right form at the right time.

8.6 Data Availability and Visibility

Serious problems at plants have been traced back to inconsistent views of the same operational data. With APMS, everyone gets the same consistent view of plant operations data. Relevant information will be always available to Shift Teams, and this would reduce the chance of misunderstandings and the potential risk of accidents.

8.7 Efficiency

APMS has played a considerable role in improving the efficiency of the workforce. Personnel at all levels can do things not only faster but also better. This has been revealed in the many features that APMS is providing:

- The system is allowing a fast and reliable data entry mechanism.
- Extensive, exhaustive and tiresome calculations involving numerous figures are now stored as routines in the system, thus relieving users of the boredom and tediousness accompanied with the manual-way calculations.
- Retrieval of historical events or data has changed with APMS from a nightmare to an excitement.
- Issuing the SitRep and all other reports is now an easier and faster process.
- APMS has helped in communicating information from one shift to the other in a smooth and comprehensive way. Without this proper shift handover, it would be inefficient to diagnose effects resulting from actions on previous shifts.

8.8 System Security

Authorized access to system as a whole and to individual modules is guaranteed through tight privilege rights built within APMS. Some users have full access on a module, while others have limited access.

An audit trail is built within the system to be able to identify who did what on a certain day. This will enable tracing a particular problem or issue.

8.9 Knowledge Retention

The audit trail built within APMS has two roles. One is related to security as indicated in section 8.8 while the other has to do with the preservation of knowledge of experienced personnel.

An individual's name is associated with every recorded entry and the link to a knowledgeable person can always be found. Even in the absence of this person, this knowledge, being beneficial, can always be re-used.

8.9 Management

APMS is an important enabler for the proper management of the changes that occur throughout a shift. If APMS is properly and continuously utilized, operators will be equipped to deal with dynamic process changes. They will be able to manage confidently equipment changes, from a more in-depth perspective. Maintenance will become pro-active and predictive.

Moreover, having a better understanding of what people do and how they do it will allow better decision-making when changes are proposed.

9- APMS Impact

Information technology is of no value if it does not inflict constructive change on its customers. In addition to the essential benefits it has on the accuracy, speed and security of data, Information Technology has rather played and is playing more sophisticated roles. It is a powerful enabler and catalyst for business innovation and transformation. APMS application in ADMA-OPCO has demonstrated some of these enabling capabilities in different facets and dimensions. Of remarkable relevance is the change that has been brought about on people, process and the organization as a whole. APMS has also participated in fostering integration amongst different functional units and initiated some pioneering cultural values and merits within the company.

9.1 On People

- Workers, Supervisors and Team Leaders no longer waste their time in daunting searches for shift information or in verifying and correcting the activities' notes. Their time is focused on enhancing their operational knowledge and experience. APMS provides search capabilities that extract the required information on-line in no time. As a result, users' productivity, performance and quality have alleviated.

- Accountability and responsibility are being enforced by the facility of audit trailing where each record entered is associated with the ID of the person who has entered/modified it.

- APMS has improved proper communication and collaboration between and across teams and has spread the information sharing culture.

- APMS has provided the ability to record accurate and timely information on the different plant and machinery statuses. In addition, APMS has allowed reporting on incidents and the reason for their occurrences. The first helps in minimizing the potential risk of incidents, and the second promotes the awareness of HSE issues. Both have helped in improving the overall safety records of individuals on site.

9.2 On Process

- The process of gathering and collecting operational data has been streamlined, better controlled and more efficient. The once-wholly-manual process has changed into a fully automated system that is easier, friendlier and faster to use.

- Review and verification of Daily and Rotation Handover activities are done online away from the boring and cumbersome manual handling through logbooks.

9.3 On Organization

- Compliance with Health, Safety and Environment Protection (HSE) behavior is very much linked to the occurrence of incidents, which are caused by erroneous, inaccurate or untimely information. APMS avoids these deficiencies by allowing each authority to review and verify his activity notes and those of his individual subordinates before they are officially reported.

- Adopting standard topic subjects and topic sources has allowed a better monitoring of the accuracy of information. Management can thus exercise a tighter control on information pertinent to production and export facilities.

- APMS is helping the Organization to optimize the utilization of its resources. Accurate information about the reliability and availability of equipment minimizes their potential risk of failure. Better estimates of production figures, water and chemical consumption participate in the reduction of expenses.

- Experience and knowledge of people implicitly recorded in the shift and rotation handover can be re-used at a later time. Even juniors do have the opportunity to build their operational knowledge by scanning previous operational and logging activities.

- Teams working on major projects on Das Island are able to report their progress on their individual projects on a daily basis. Senior Management is kept abreast of the issues/problems to which their intervention is early alerted.

With all the above, employees are now doing more work and are doing it better, faster and safer.

9.4 Integration

- With a single database for all sites-information, consistent view of operational data is made available to all concerned. Data entered at offshore is readily accessible to users in the Main Office in land.

- The facility of collecting information from different Teams into one single data store removes functional boundaries.

- The Situation report (SitRep) is being aggregated from different offshore sources and issued as a PDF file to Senior Management in Main Office, thus eliminating the geographical boundaries within the Organization.

9.5 Innovation

- APMS brings people and groups together, allows sharing of information and facilitates collaboration among teams. It helps to maintain knowledge of skillful and experienced people that is indispensable for making complex judgments.

- Operational data becomes available online, stored in a safe environment and secured against any unauthorized access. An easy, friendly and versatile analysis interface is provided to conduct statistical studies and trends conclusion that would lead to a more reliable and optimized problem solution. Moreover, the available search and analytical tools provide capability to track progress on parameters of KPI significance.

- APMS is now the common communication medium for plant operations across offshore sites and Head Quarter in land. Shift Leaders are now using the system to monitor plant operations. Valuable operational knowledge is being provided before conducting physical plant inspection and maintenance.

- ADMA-OPCO is influenced by the amalgamation of technology, processes and people. A trend is emerging on demonstrating compliance with regulatory matters for the proper and safe operations. This is exemplified in the adoption of practices that enforces responsibility, accountability, and adherence to standards, procedures and policies. APMS has participated in building a corporate culture in which sharing of information, collaboration and proper communication is becoming a real value.

10- Potential Enhancements

APMS is subject to continuous improvement, and will keep changing as the technology or the business requirements change. Summary of envisaged changes follow:

- Convert the system to Web – A project is underway

- Automate Capturing of Log Data from Scada System

- Expand capturing of log data to include all aspects of operations in all sites

- Explore possible interface with other applications (E.g. ERP system MAXIMO)

11- Conclusion

11.1 Return on Investment

In adopting APMS, ADMA-OPCO has returned on the investment it has made. Some of these returns are implicit and intangible as emphasized in the changes effected on people and processes. Others are explicit and have direct impact on the organization in terms of safety, cost reduction and better estimates. Returns of this type fall under the following categories:

- Safety records
- Availability and Reliability of equipment
- Chemical consumption
- Water calculation and consumption
- Forecasting of production Targets
- Consumption of paper – Reporting at all levels are via the system

11.2 Overall Benefits

To conclude, the Company has attained the following benefits by moving away from a paper based system to a computerized one for its operation activities.

- Take advantage of new IT Technology
- Improved communications with better transparency and consistency
- Speed and ease of change - Increased Productivity
- Site-wide visibility
- Improved log entry details and very efficient Shift Handover
- Secure and safe storage and archival of historical data
- Historical data retention and accessibility for future plant performance analysis
- High audit traceability
- Enhanced Plant Safety
- Excellent tool for extracting and making special queries for better future planning
- Improved Shift handover processes & procedures