

# PLANNING FOR RELIABILITY

IT'S SAP THAT BRINGS IT ALL  
TOGETHER

# PRESENTATION

- Introduction
- Fundamentals
- Planning & Scheduling
- Reliability Engineering

# Qenos Overview

- **As Australia's sole manufacturer and leading supplier of polyethylene (PE)**
- **Manufacturing facilities at Altona (Vic) and Botany (NSW)**
- **Ownership change to China National Chemical Corporation (100%) – “ChemChina” effective February 2006**
- **Directly employs ~800 people**
- **Annual turnover A\$700M-A\$900M**
- **Have used SAP since 1995**



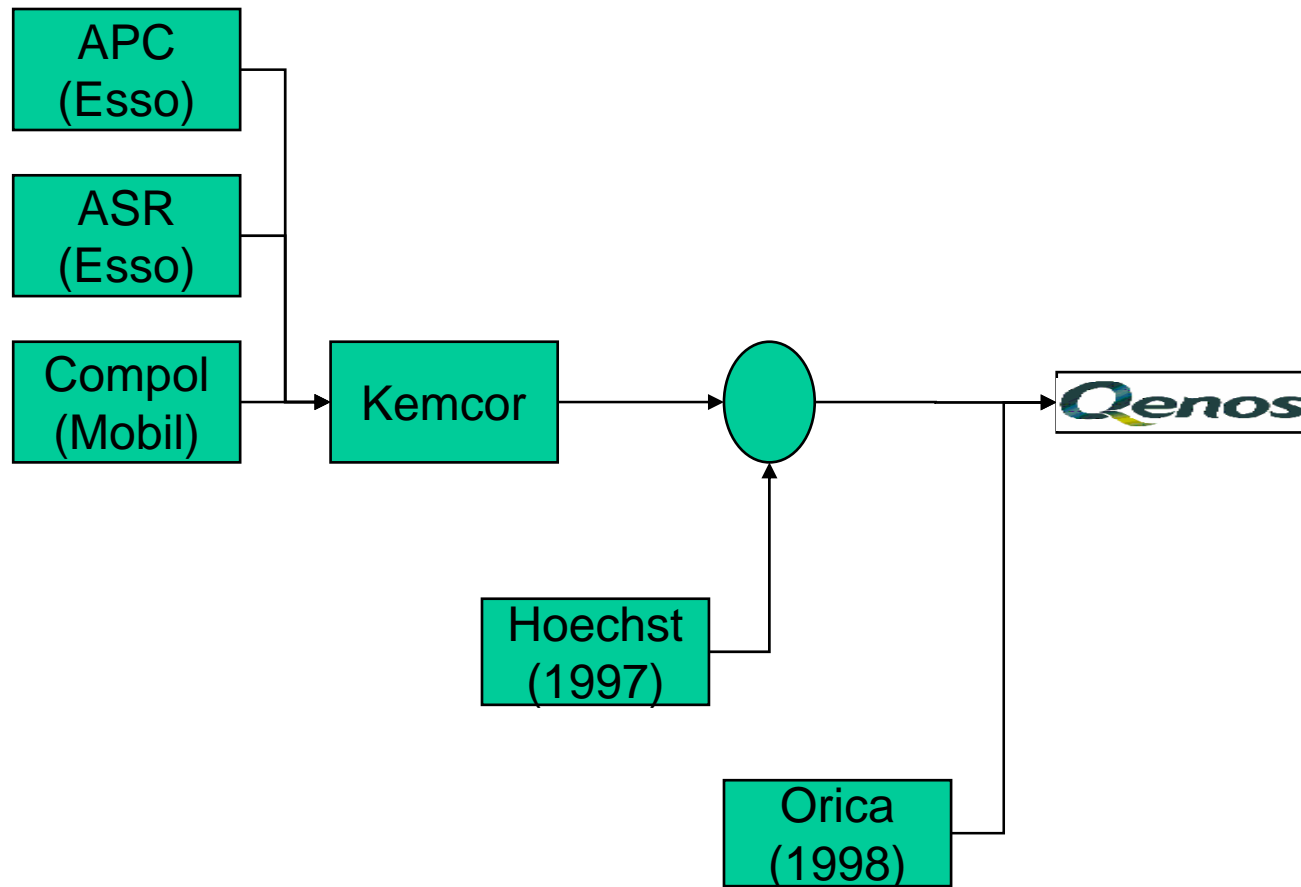
*Shaping Our Future*



**Qenos**

*Shaping Our Future*

# EVOLUTION OF QENOS



This mixed parentage has led to problems in agreeing best SAP implementation

# SAP AT QENOS

- SAP has been used as an ERP system since 1995 integrating materials management, maintenance and financials
- Commenced with SAP R2 in 1995 and upgraded to SAP R3 later the same year
- Upgrade to SAP ECC 6.0 Mar 2008

# SAP PM MODULE

- IS A MULTI-PURPOSE TOOL
- WILL SUPPORT WORLD'S BEST MAINTENANCE AND RELIABILITY PRACTICE ...
- JUST AS WELL AS IT WILL SUPPORT WORLD'S WORST MAINTENANCE AND RELIABILITY PRACTICE

IT DOES NOT DISCRIMINATE

# SAP PROCESSES

- SAP does not dictate what your process should be.
- Know what your processes are.
- Understand how SAP supports and can enhance these processes.
- Deliver training in the process not just in SAP

# FUNDAMENTALS

Technical Objects

Work Centers

Failure Codes















# TECHNICAL OBJECTS

- FUNCTIONAL LOCATIONS
  - Structures the maintenance objects of a company.
  - A functional location represents the place at which a maintenance task is performed.
- EQUIPMENT
  - An individual, physical object that is maintained as an autonomous unit.
- MATERIALS / ASSEMBLIES
  - The goods that are the subject of business activity.
  - A technical object can be divided into assemblies to separate it into more clearly defined units.
  - Assemblies are used for maintenance bills of material and maintenance task lists.

## Functional Location Structure: Structure List


Functional loc.	RES	Valid F
Description	Resins Plant	
<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>RES</li> <li>RES/AUX</li> <li>RES/GRAN</li> <li>RES/LABS</li> <li>RES/POLY1                             <ul style="list-style-type: none"> <li>RES/POLY1/ANLYS</li> <li>RES/POLY1/CTLST</li> <li>RES/POLY1/DIST</li> <li>RES/POLY1/DRYNG</li> <li>RES/POLY1/GASTN</li> <li>RES/POLY1/MISC</li> <li>RES/POLY1/REACT</li> <li>RES/POLY1/UTIL</li> <li>RES/POLY1/WRKUP</li> </ul> </li> <li>RES/POLY2</li> </ul> </li> </ul>	Resins Plant AUXILIARIES GRANULATION LABORATORIES POLYMERISATION 1 ANALYSERS CATALYST DISTILLATION DRYING GAS STATION MISCELLANEOUS REACTORS UTILITIES WORKUP POLYMERISATION 2	

## Functional Location Structure: Structure List

Functional loc.	RES		
Description	Resins Plant		
  RES/POLY1/WRKUP/S4128		S4128	DECAN
  1032835			DECANTER
  1034840			ELECTRIC MOTOR
  1058990			CYCLOGEAR
  1058991			LUBRICATION SYSTEM
  1058992			COUPLING FLUID
  RES/POLY1/WRKUP/S4129		S4129	DECAN

▼	RES/POLY1/WRKUP/S4128	S4128 DECANTER 1 (WEST)	POL 5301		
▼	1032835	DECANTER	11214		
▶	5011280	DECANTER		1 EA	
▶	5011287	PIPING/MISCELLANEOUS		1 EA	
▶	5011288	OVERLOAD PROTECTION		1 EA	
▼	5017721	ESPEY SHAFT SEAL - DRIVE END		1 EA	GENI
▶	46298	FACE, SEAL, K-M DECANTER, KVZ80		1 EA	C
	44162	RING, SEAL, K-M DECANTER, KVZ80		9 EA	C
▶	5017722	ESPEY SHAFT SEAL - FEED END		1 EA	GENI
▶	1034840	ELECTRIC MOTOR	51547		

# WORK CENTER - DEFINITION

- Work centers can be:
  - Machines
  - People
  - Production lines
  - Groups of craftsmen 
- The activities performed at or by the work center are valued by charge rates, which are determined by cost centers and activity types.
- The work center has an available capacity.

# WORK CENTER - CAPACITY HEADER

## Change Capacity: Header

Intervals and Shifts		Intervals		Available Capacity Profile		Reference Available Capacity	
Plant	RES	QENOS RESINS PLANT					
Work center	SHMECH	Mechanical					
Capacity category	002						
<b>General data</b>							
Capacity planner grp	RM	Resins Mechanical					
<input type="checkbox"/> Pooled capacity		Grouping <input type="checkbox"/>					
<b>Available capacity</b>							
Factory calendar ID	KE	Kemcor 24 Hour - 7 Day/Week					
Active version	1	Normal available capacity					
Base unit of meas.	H	Hour					
<b>Standard available capacity</b>							
Start	07:00:00	Capacity utilization <input type="text" value="100"/>					
Finish	16:30:00	No. of indiv. cap. <input type="text" value="11"/>					
Length of breaks	01:00:00	Capacity <input type="text" value="93.50"/>					
Operating time	8.50	<input type="text" value="H"/>					
<b>Planning details</b>							
<input checked="" type="checkbox"/> Relevant to finite scheduling	Overload <input type="text" value=""/> %						
<input checked="" type="checkbox"/> Can be used by several operations	<input checked="" type="checkbox"/> Long-term planning						

We target 100% utilisation for scheduling

# INTERVAL AVAILABLE CAPACITY

## Change Capacity: Shifts

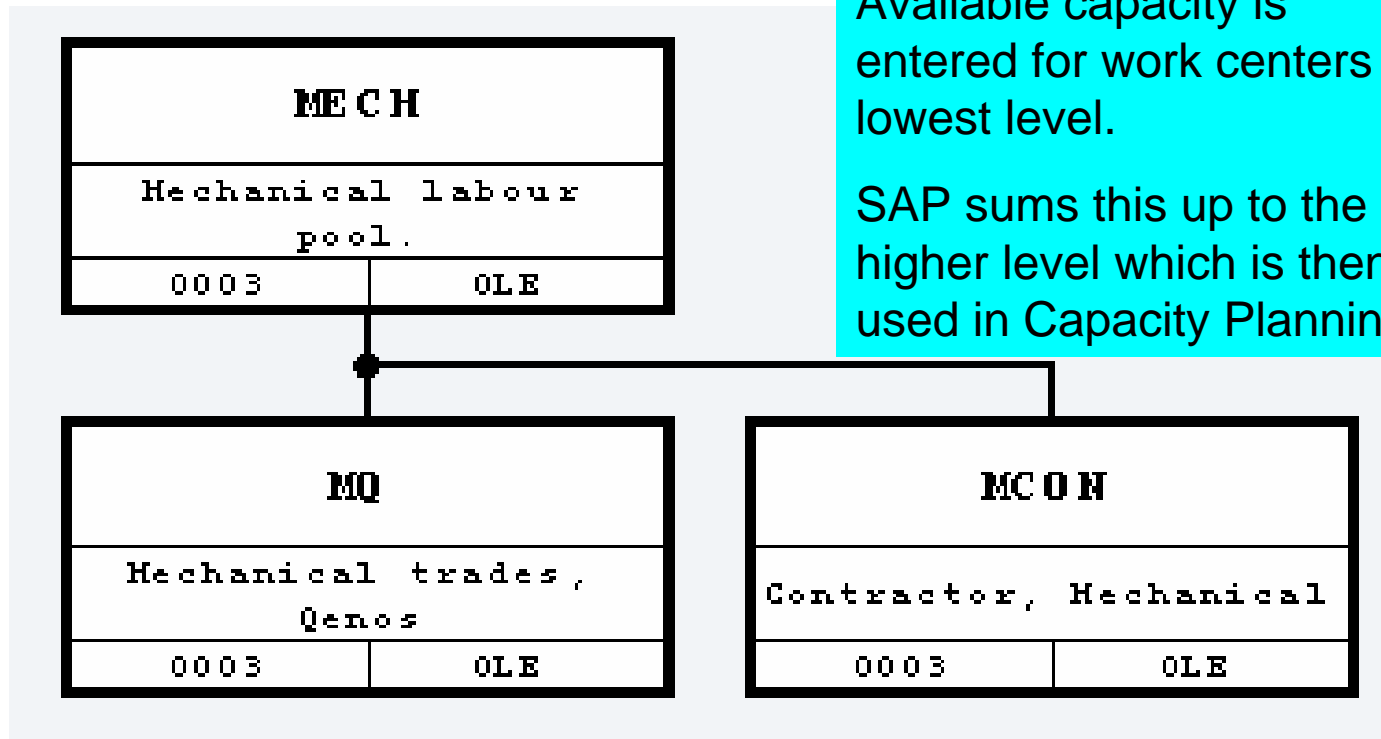
Plant: RES      GE  
 Work center: SHMECH      Me  
 Capacity category: 002      No  
 Version: 1

**Interval of available capacity**  
 Valid From: 17.03.2008      Valid to: 31.12.2010  
 Shift sequence:      Number of shifts: 1  
 Length of cycle: 7      Workdays:   
 Stand. avail. cap.

Day	SNo	Day	Shift	Start	Finish	Breaks	Cap.	No.	Oper.	Capacity	Un
1	1	Mo		07:00:00	16:30:00	01:00:00	100	3	8.50	25.50	H
2	1	Tu		07:00:00	16:30:00	01:00:00	100	7	8.50	59.50	H
3	1	We		07:00:00	16:30:00	01:00:00	100	7	8.50	59.50	H
4	1	Th		07:00:00	16:30:00	01:00:00	100	7	8.50	59.50	H
5	1	Fr		07:00:00	16:30:00	01:00:00	100	4	8.50	34	H
6	1	Sa		07:00:00	16:30:00	01:00:00	100		8.50	0	H
7	1	Su		07:00:00	16:30:00	01:00:00	100		8.50	0	H

Intervals created to reflect the actual available capacity available for the period

# WORK CENTER - HIERARCHY



# FAILURE CODES

# FAILURE CODES

**Codes used should be consistent throughout the organisation to enable easy comparison**

**Guidance on code selection and use is available in ISO 14224 Second**

**Edition – 2006;** Petroleum, petrochemical and natural gas industries — Collection and exchange of reliability and maintenance data for equipment

# CATALOGS

The screenshot shows the SAP Display View 'Catalogs for notificatio...'. The interface includes a menu bar with 'Table View', 'Edit', 'Goto', 'Selection', and 'Utilities'. Below the menu bar is a toolbar with various icons. The main content area is divided into several sections:

- Notification type:** A table with two rows:

Notification type	M1	Maintenance request
Notification type	01	Plant maintenance
- catalog profile:** A section with a sub-section 'Catalogs for' containing a table:

Catalog profile	000000001	General maintenance catalog
Coding	<input type="checkbox"/>	
Problems	C	Overview of damage
Causes	5	Causes
Tasks	2	Tasks
Activities	A	Activities (PM)
ObjectParts	B	Object parts

The bottom status bar shows 'SPRO holmes INS'.

- Catalogs can be assigned to
  - Notification Types
  - Technical Objects
    - Functional Locations
    - Equipment

# CODING

- Failure Mode as observed by operator
- Not currently used at Qenos
- = RCM Functional Failure
- See ISO 14224 Tables B.6 – B.12
- Examples:
  - Low Output
  - No Output
  - Vibration
  - External Leakage – process medium

# SAP – ISO 14224

SAP Catalog	ISO 14224
Coding	Failure Mode; Tables B.6 – B.12 (Failure Mode as observed by operator – RCM Functional Failure)
Problems	Condition; Table B.2
Causes	Cause; Table B.3
Activities	Maintenance Activity; Table B.5
ObjectParts	Maintainable Item; Annex A

# OBJECT PARTS (MAINTAINABLE ITEMS)

Catalog	B	Object parts
Code group	OMPUMP01	Cent Pumps Group
Codes		
	Code	Short text for code
	0130	Barrier/Flushing System
	0140	Baseplate
	0160	Bearing
	0170	Bearing Housing
	0180	Bearing Seal
	0250	Bolting
	0310	Bushing
	0390	Casing
	0570	Coupling
	0640	Diffuser
	0690	Drive Belt/Chain

# DAMAGE CODES

Catalog	C	Overview of damage
Code group	DAM001	Damage Codes Machinery List
Codes		
Code	Short text for code	LTe
DM12	Deformed/Buckled/Bent/Damaged	
DM16	Erosion/Corrosion	
DM20	Exploded/Burst	
DM24	Fatigue	
DM28	Fouling/Coking	
DM32	Heat Checked	
DM36	Looseness	
DM4	Cracked/Broken/Fractured	
DM40	Misalignment	
DM44	No Problem/Damage Found	
DM48	Other, Provide Desc.	

# CAUSES

Catalog	5	Causes
Code group	CAU001	Qenos Cause Codes

Codes	
Code	Short text for code
C10	Acceptable Wear/Deterioration
C100	Improper Mechanical Design
C110	Inadequate /Lack of Maintenance
C120	Inadequate Part(s)
C130	Inadequate Tool(s)
C140	Inadequate Training
C150	Inadequate/Incorrect Maint. Procedure
C160	Inadequate/Incorrect Oper. Procedure
C170	Maintenance Error
C180	Operating Error

# ACTIVITIES

Catalog	A	Activities (PM)
Code group	ACT001	Qenos Activity Codes
Codes		
Code	Short text for code	
A10	Adjusted/Calibrated	
A20	Checked	
A30	Inspected/Condition Monitored	
A40	Modified	
A50	Other	
A60	Refit/Serviced/Overhauled	
A70	Repaired	
A80	Replaced Part	
A90	Tested	

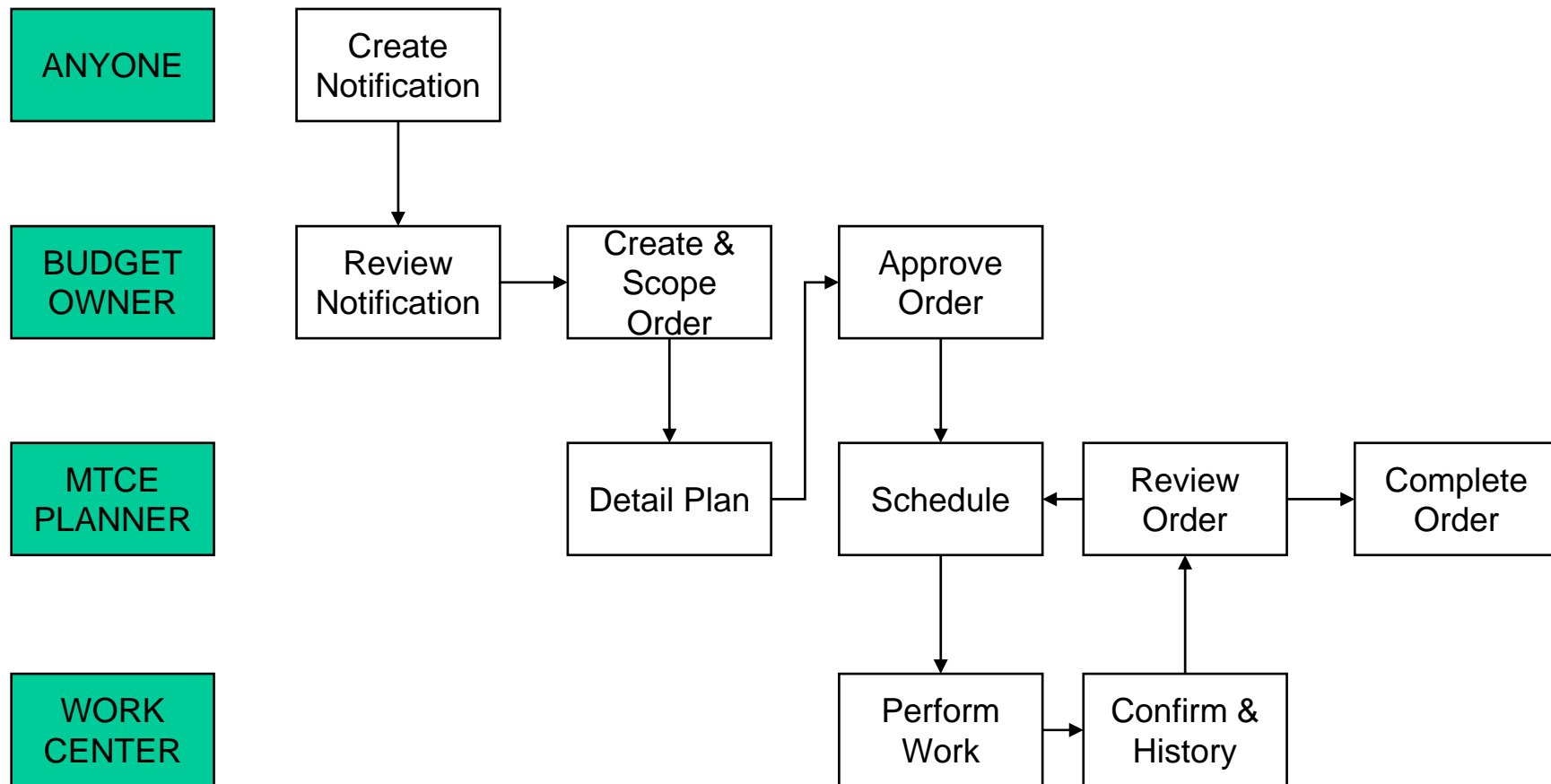
# PLANNING & SCHEDULING

NOTIFICATIONS

ORDERS

SCHEDULING

# PLANNED WORK LIFE CYCLE



# NOTIFICATIONS

- Used to request maintenance work
- Record as a minimum
  - Short description of task
  - Location (to equipment level preferred)
  - Priority
- All SAP PM users can create notifications
- Note: SAP does not enforce the use of notifications for work requests. You may choose to create work orders directly or notifications and orders in the one transaction – Choose one option and stick to it.

## Change PM Notification: Maintenance request



Notification	1133734	M1	Low N2 pressure for G/Box seal.	
Status	NOPT OSNO			
Order				

Notification    Reference object    Malfunction, breakdown    Location data    Scheduling overview

Reference object			
Functional loc.	RES/POLY1/CTLST/P...	PI2236 CAT HOLD V4103 AGIT N2 SEAL PRE...	
Equipment	1065112	TRANSMITTER	
Assembly			

Start/End Dates			
Required Start	31.05.2008	08:38:58	Priority Break into schedule
Required End		00:00:00	<input type="checkbox"/> Breakdown

Subject		
Description	Low N2 pressure for G/Box seal.	
<p>G/Box N2 seal P12236 has a low pressure and flow controller need to be fixed. P = 54.7 kpa , Vessel press is 200 kpa. Ref Wain.</p>		

# ORDERS

- Contain data for planning and executing tasks
- Functions in orders integrate with other modules
  - Materials Management (MM)
  - Project System (PS)
  - Controlling (CO)
  - ...

# ORDER HEADER DATA

**Change Maint.Order - Planned Work 9246198: Central Hea**

Complete (business)

Order MOPW 9246198 R-501 piping repairs.

R-501 piping repairs.  
Change out entire line from FRC-512 to flanges on 80-0A1n-1343 & 50mm bypass. A standard flange is to replace the flow tapped flange.

Sys.Status REL PCNF ESTC GMPS MACM PRC SETC SETA PLND

HeaderData Operations Components Costs Objects Addit. Data Location

Person responsible  
PlannerGrp OM1 OLE OLE Mechanical 1  
Mn.wk.ctr MECH / OLE Mechanical labou...

Notifctn  
Costs 3,000.00 AUD  
PMActType R Reactive - Rep...  
SysCond.

Dates  
Bsc start 01.10.2007 Priority Complete by deadline  
Basic fin. 04.10.2007 Revision MAKESAFE Olefins Makesafe post Conve

Reference object  
Func. Loc. OLE/SCAL1/BEAL /R-5... R-501 Cooker Settler Reactor [CONV]  
Equipment 1002227 Reactor  
Assembly

**JOB OWNER**


**COST ESTIMATE**

**REVISION**

**LOCATION INFORMATION**

# PLANNED ORDER - BASIC


## Change Maint.Order - Planned Work 9227008: Operation Overview

 Complete (business)

Order: MOPW 9227008    Repack valve gland on CVL5701.

Sys.Status: REL ESTC CSER MANC NMAT PRC SETC    SETA PLND

HeaderData   **Operations**   Components   Costs   Objects   Addit. Data   Location   Planning   Control



OpAc	SOp	Work ctr	Plant	Co...	StTextK	S...	Operation short text	LT	Work	Un	N...	Durat	Un	C
0010		ELEC	OLE	PM01			Repack valve gland on CVL5701.			2H	1		2H	Ca
0020		ELEC	OLE	PM01						H			H	

# PLANNED ORDER – MULTIPLE OPERATIONS







 **Change Maint.Order - Maintenance Plans 9250928: Operation Overview**

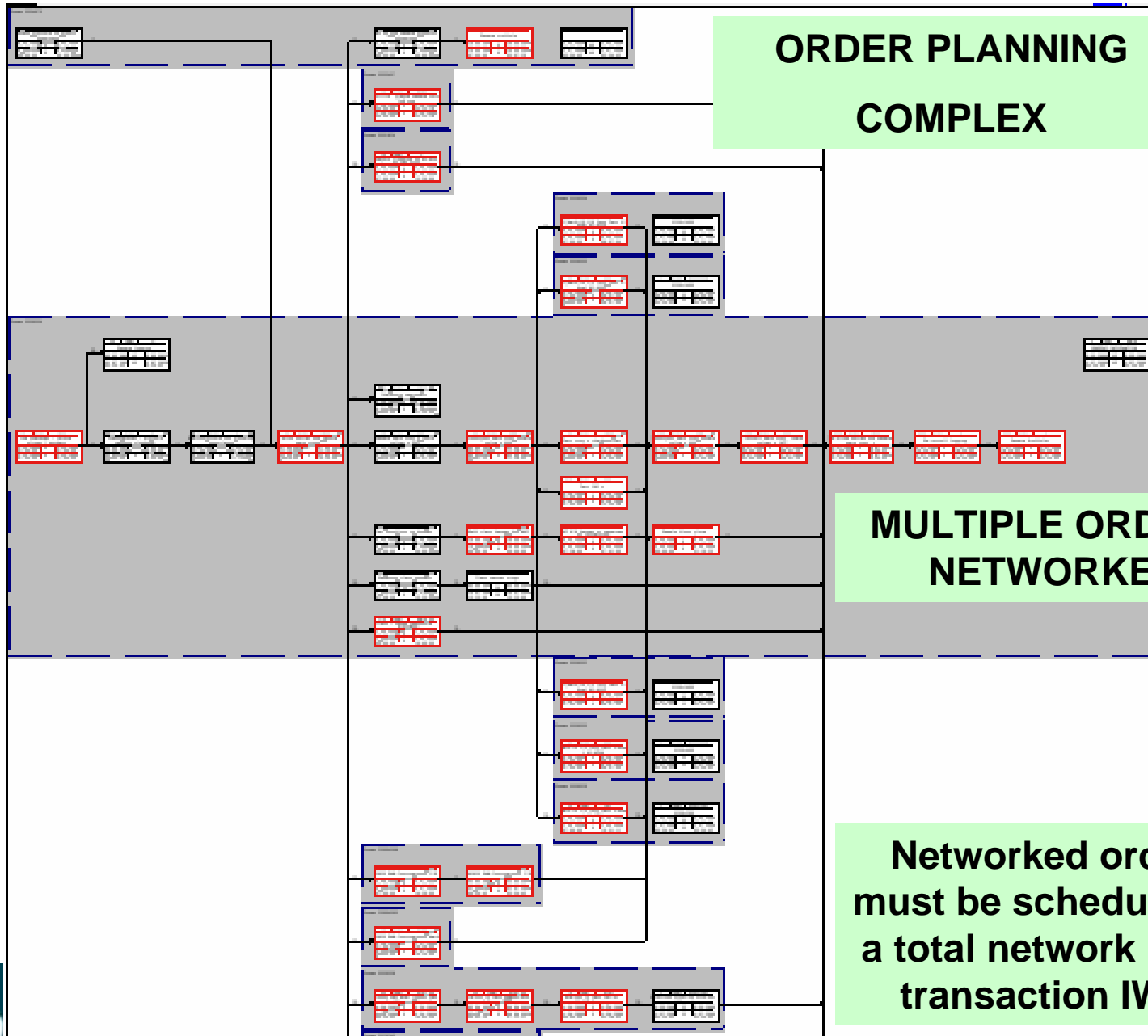
 Complete (business)

Order: MOMP 9250928 SV-8006B Safety Valve TK-806 <WVR1 13/6/

Sys.Status: REL PRT MANC NMAT PRC SETC  MPLN PLND WVR SETA 

HeaderData | **Operations** | Components | Costs | Objects | Addit. Data | Location | Planning | Con

OpAc	SOp	Work ctr	Plant	Co...	S...	Operation short text	LT	Work	Un	N...	Durat	Un	Cck
0001		BUDGCOST	OLE	PM03		OP20=750,OP30=950							
0010		PSV	OLE	PM01		Remove SV-8006B		2H	2		1H		Calc
0010	0010	C50	OLE	PM01		Crane to assist remove		1H	1		1H		Calc
0030		PSV	OLE	PMSV	I	[C]Mech-10.1/2,Insp,Test,O/Haul SV-8006		10H	2		5H		Calc
0040		PSV	OLE	PM01		Install SV-8006B		2H	2		1H		Calc
0040	0010	C50	OLE	PM01		Crane to assist install		1H	1		1H		Calc



**ORDER PLANNING  
COMPLEX**

**MULTIPLE ORDERS  
NETWORKED**

**Networked orders  
must be scheduled as  
a total network using  
transaction IW70**

# COMPONENTS

**Change Maint.Order - Planned Work 9246198: Component Overview**

Order: MOPW 9246198 R-501 piping repairs.  
Sys.Status: REL PCNF ESTC GMPS MACM PRC SETC SETA PLND

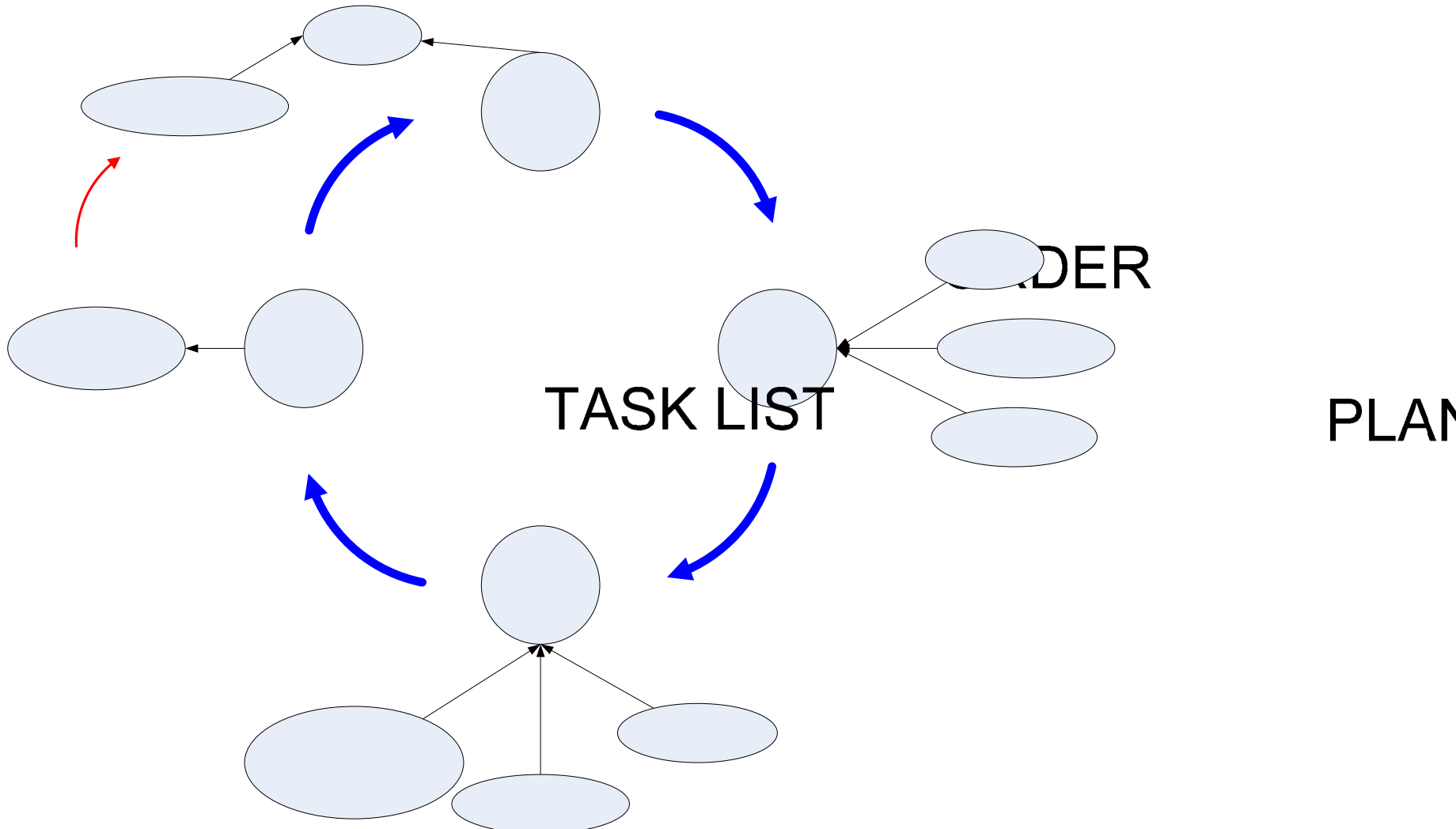
HeaderData Operations **Components** Costs Objects Addit. Data Location Planning Control

Item	Component	Description	LT	Reqmnt Qty	UM	IC	S...	SLoc	Plnt	OpAc
0010	6878	PIPE,SMLS,CS A106-B,100MM SCH40,BE	[edit]		18	FT	L	0L01	OLE	0010
0020	6992	ELBOW,90 LR,CS A234 WPB,100MM,SC...	[edit]		3	EA	L	0L01	OLE	0010
0030	37724	FLANGE,WN,CS A105,100MM,300#,SCH...	[edit]		1	EA	L	0L01	OLE	0010
0050	6997	FLANGE,WN,CS,A105,80MM,150#,SCH4...	[edit]		1	EA	L	0L01	OLE	0010
0060	6996	FLANGE,WN,CS A105,50MM,150#,SCH4...	[edit]		1	EA	L	0L01	OLE	0010
0070		TEE,Reducing,BW,CS,100MM X 50MM SC...	[edit]		1	EA	Z		OLE	0010
0080	34017	REDUCER,CONC,BW,CS,100MM X 80MM...	[edit]		1	EA	N		OLE	0010
0090										
0100										
0110										
0120										
0130										
0140										
0150										
0160										
0170										
0180										

Gen. Data Purch. List Graph... Asse... Material Where-Used Repl.

**Components can be easily added from Bills of Materials**

# IMPROVEMENT CYCLE



# Task Lists

- Set-up operations data in task lists for re-use later
- Reduce planning effort
- Capture learning
- Three Types
  - Functional Location
  - Equipment
  - General - Assembly
- Hierarchical Task Lists - task lists can reference other task lists



**NEW**



## Display Functional Location Task List: TL Overview



Header



Operation

Func. Loc. RES/POLY1/REACT/R4926 R4926 REACTOR 26

Group 3000703

### Gen. Task List Overview

	Ctr	TL Desc.	PInt	Del.	Strategy	Usage
	1	R4926 Internal Inspection	RES	<input type="checkbox"/>	INTEG	4
	2	R4926 External Inspection	RES	<input type="checkbox"/>	INTEG	4
	3	R4926 REACTOR 26 OPEN FOR INSPECTION	RES	<input type="checkbox"/>		4
	4	R4926 Reactor 26 Mech Seal Replacement	RES	<input type="checkbox"/>		4
	5	R4926 Plunge Transfer Line	RES	<input type="checkbox"/>		4

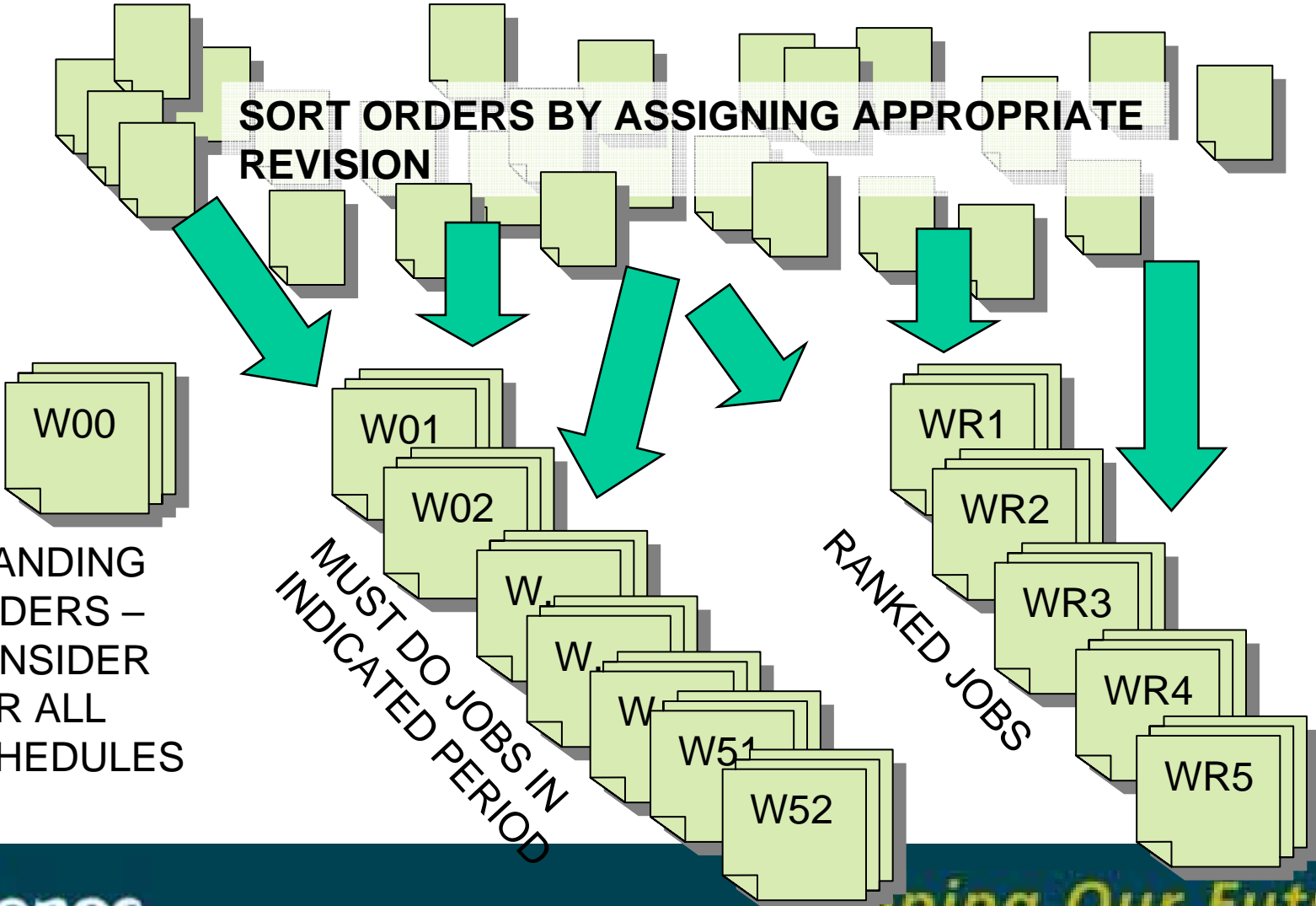
Planner should always ask is there a task list for this job (or similar). If yes then use it.

If not, then consider whether a new task list should be created.

# SCHEDULING

- SAP Planning Board is used for scheduling
- If the work order hasn't been planned then it cannot be scheduled.

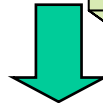
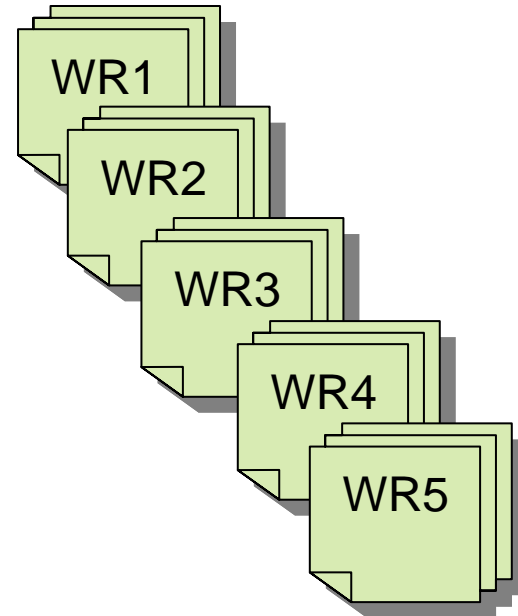
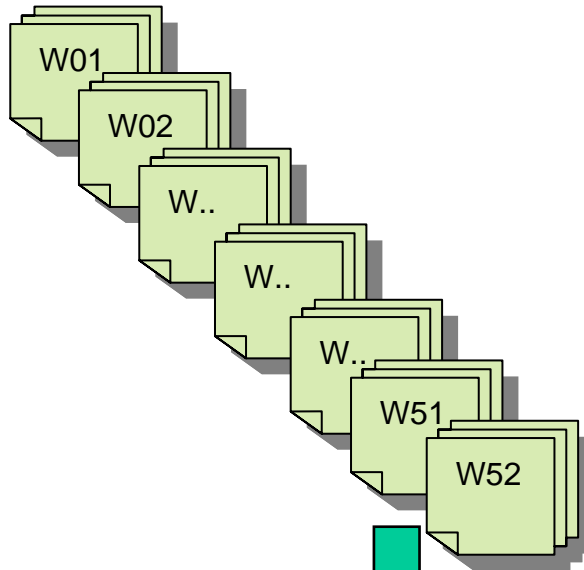
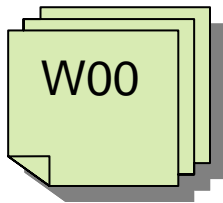
# Scheduling Overview



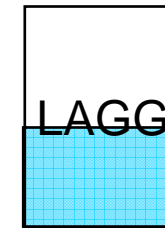
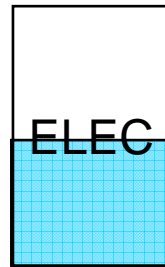
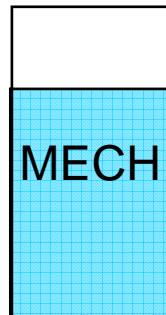
STANDING ORDERS – CONSIDER FOR ALL SCHEDULES

MUST DO JOBS IN INDICATED PERIOD

RANKED JOBS



Work Center Capacity determines size of bucket



## Change Orders and Operations: List of Orders and Operations

Revision	PIS	Order	Description	OpAc	Operation short text	Op.WorkCtr	Erl. start
W25	PLP	9247977	South East Aerator Overhaul	0085	Overhaul/Replace electric motor	SHELEC	19.06.2008
	PLP		South East Aerator Overhaul	0095	Franna support required	SHMECH	19.06.2008
	PLP		South East Aerator Overhaul		Re-install Aerator after overhaul	SHMECH	19.06.2008
	PLP		South East Aerator Overhaul	0105	Reconnect Electric motor	SHELEC	19.06.2008
	PLP		South East Aerator Overhaul	0115	Replace gearbox pit cover	SHMECH	20.06.2008
	PLP	9253789	check / replace deluge pipework	0020	Crane required to assist	SHMECH	10.03.2008
	PLP		check / replace deluge pipework		install piping	SHMECH	10.03.2008
	PLP		check / replace deluge pipework	0030	dismantle scaffold as required	FDS	11.03.2008
	PLP	9254899	Extruder emergency stop button 167Jun08	0001	0	OPSPLA	16.06.2008
	PLP		Extruder emergency stop button 167Jun08	0010	Test emergency stop button (6mth)	OPSPLA	16.06.2008
	PLP	9254957	Check/Calibrate Controller TCV 66000-19	0001	300	SHELEC	16.06.2008
	PLP		Check/Calibrate Cor			SHELEC	16.06.2008
	PLP	9256551	Regas hyd accumul			CONTRACT	16.06.2008
	PLP		Regas hyd accumul			CONTRACT	16.06.2008
	PLP	9256553	Performance Test #			OPSPLA	16.06.2008
	PLP	9256554	Performance Test #			OPSPLA	16.06.2008
	PLP	9256555	Change Pump Sucti			SHMECH	16.06.2008
	PLP		Change Pump Sucti			SHMECH	16.06.2008
	PLP	9256556	Empty oil collection l			SHMECH	16.06.2008
	PLP		Empty oil collection l			SHMECH	16.06.2008
	PLP	9256569	Change auger on fe			SHELEC	16.06.2008
	PLP		Change auger on fe			SHMECH	16.06.2008
	PLP		Change auger on fe			MECH1	16.06.2008
	PLP		Change auger on fe			SHELEC	16.06.2008
	PLP	9256657	Replace PLC B/U Bakery - Raw Syst Cont.	0001	200	SHELEC	14.06.2008

- Review backlog of ready orders and assign to appropriate revision

- Check material availability: *Go To – List of Available Material*

- Select orders to take to planning board

- Go to – *Planning Board*

# Period Requirements per Resource

		24.2008	25.2008	26.2008	27.2008	28.2008	29.2008	30.2008	31.2008	32.2008
PLA	SHELEC Sh...	105.0	86.8	135.0	135.0	135.0	135.0	135.0	135.0	135.0
PLA	SHMECH Sh...	49.0	54.0	204.0	204.0	204.0	204.0	204.0	204.0	204.0
QAL	COLLEX CO...	7.0	135.7	147.7	147.7	147.7	147.7	147.7	147.7	147.7
QAL	OPSPLA	0.0	50.6	50.6	50.6	50.6	50.6	50.6	50.6	50.6
								85.0	85.0	85.0
								69.5	69.5	69.5

**CAPACITY**

Remaining Available Capacity - Hours

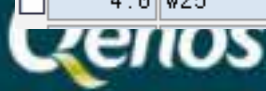
% Available Capacity Dispatched

**REQUIREMENTS**

Tot.req	Revision	PMA	S	F Work Ctr			
4.0	W00	P 9251156	PLA/UTIL/197/15600	0110 Empty Septic Tank HPPE Mon	16.06.2008	16.06.2008	COLLEX
2.0	W25	C 9258350	PLA/AUX /921	0020 HV operator support required	16.06.2008	16.06.2008	SHELEC
50.0	W25	001 3900671	PLA/LFIN/600/60001	0010 Run new water line.	16.06.2008	18.06.2008	CONTRACT
50.0	W25	001 3900671	PLA/LFIN/600/60001	0020 Run new air line.	18.06.2008	23.06.2008	CONTRACT
40.0	W25	001 3900671	PLA/LFIN/600/60001	0030 Run new electrical supply cabl	23.06.2008	29.06.2008	SHELEC
2.0	W25	R 9258115	PLA/LFIN/693/60805	eder 5 S/W	16.06.2008	16.06.2008	SHMECH
4.0	W25	P 9256736	PLA/LFIN/693/61001		16.06.2008	16.06.2008	SHMECH
6.0	W25	P 9256551	PLA/LFIN/693/61100	0010 Regas accumulator (6 mthly)	16.06.2008	16.06.2008	CONTRACT
4.0	W25	P 9256555	PLA/LFIN/693/61100	0010 Change Pump Suction Filter	16.06.2008	16.06.2008	SHMECH
0.1	W25	R 9256569	PLA/LFIN/693/67702	0005 Rack out feeder 9. 67702	16.06.2008	16.06.2008	SHELEC
4.0	W25	R 9256569	PLA/LFIN/693/67702		16.06.2008	16.06.2008	SHMECH
0.1	W25	R 9256569	PLA/LFIN/693/67702		16.06.2008	16.06.2008	SHELEC
1.0	W25	PIC 9254899	PLA/LFIN/693/67702		16.06.2008	16.06.2008	OPSPLA
4.0	W25	R 9258014	PLA/LFIN/693/67702		16.06.2008	16.06.2008	SHELEC

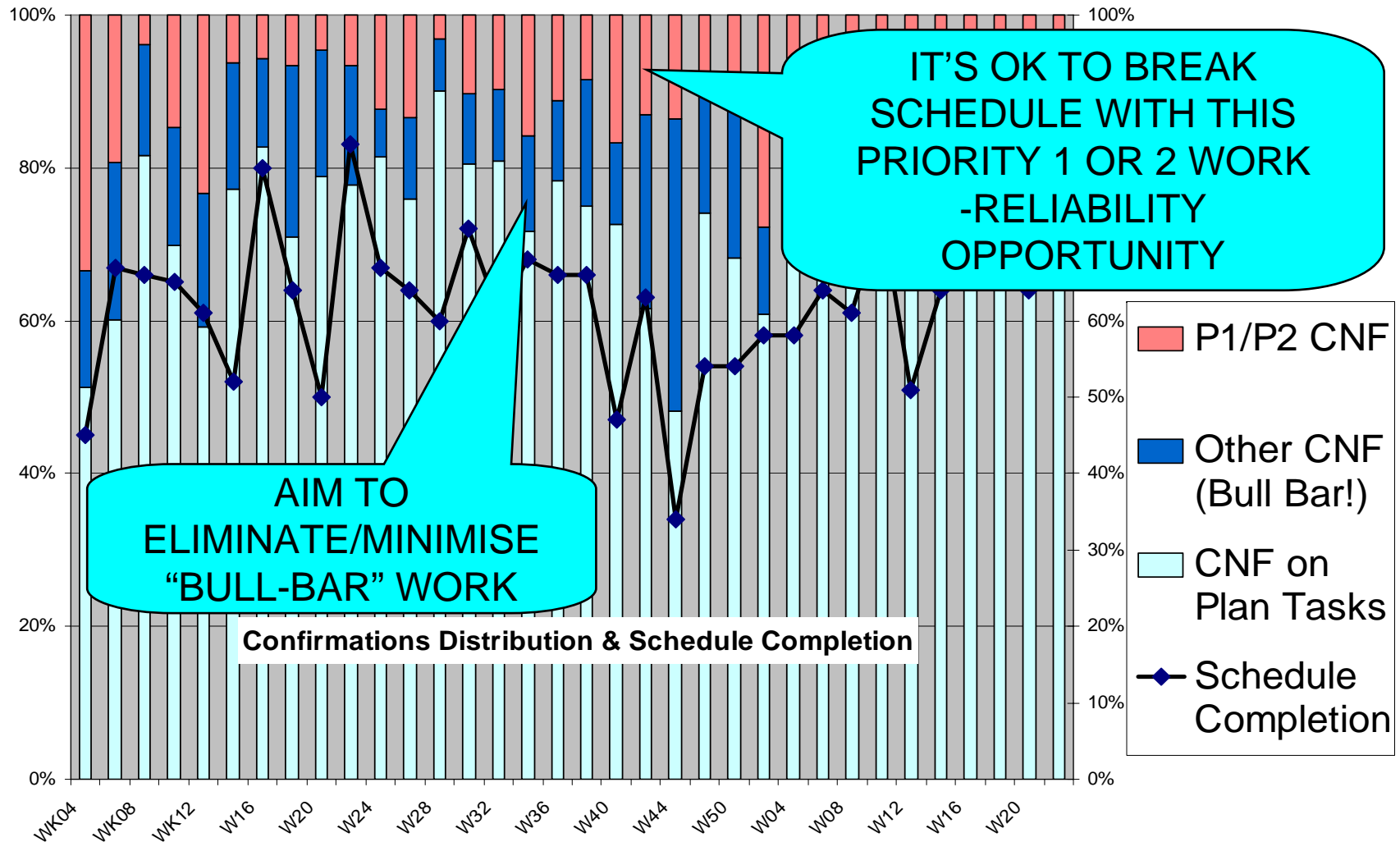
Planning board is configured to match the Qenos scheduling process

Dispatch sequence by Revision

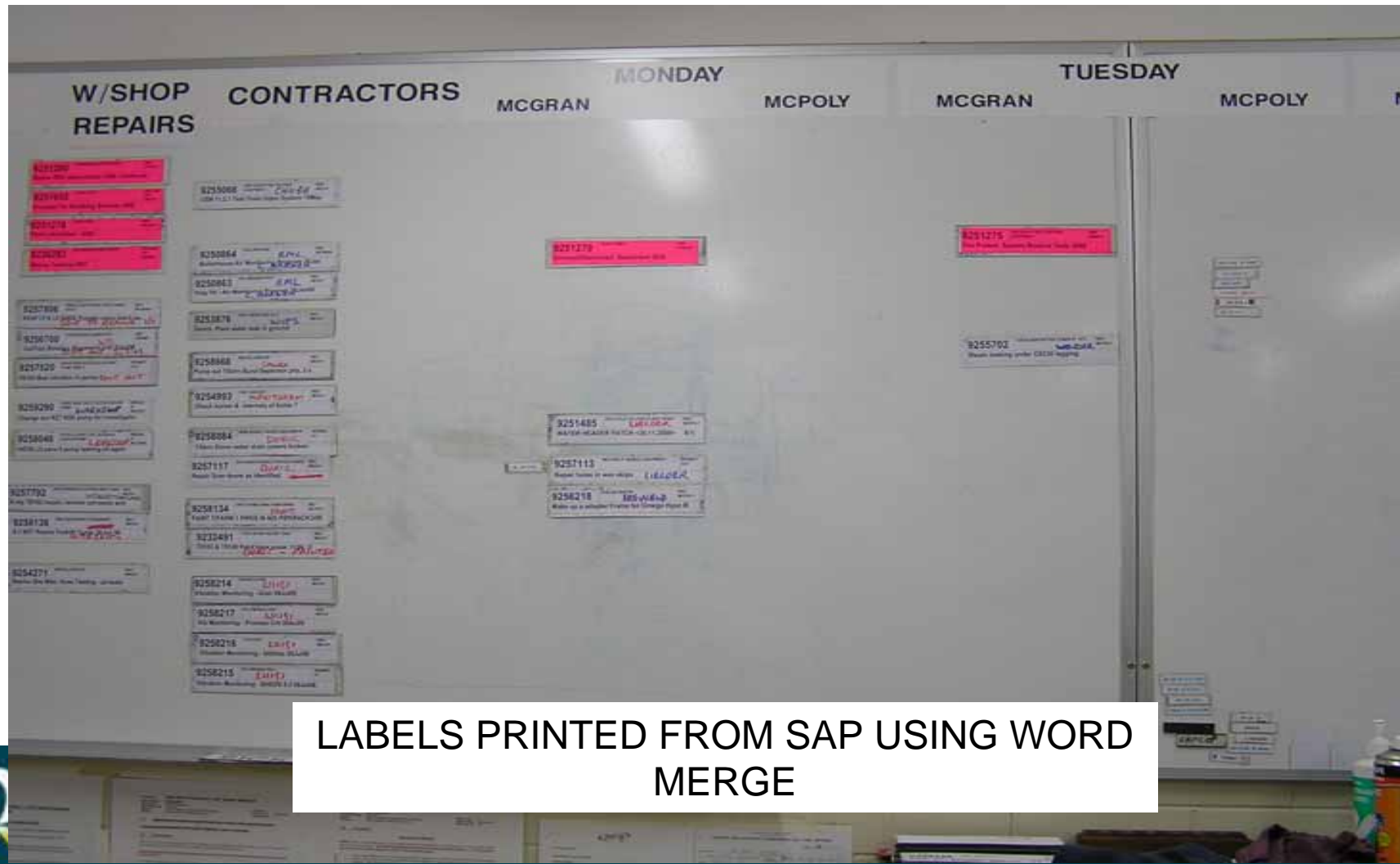


Future

# RESULTS

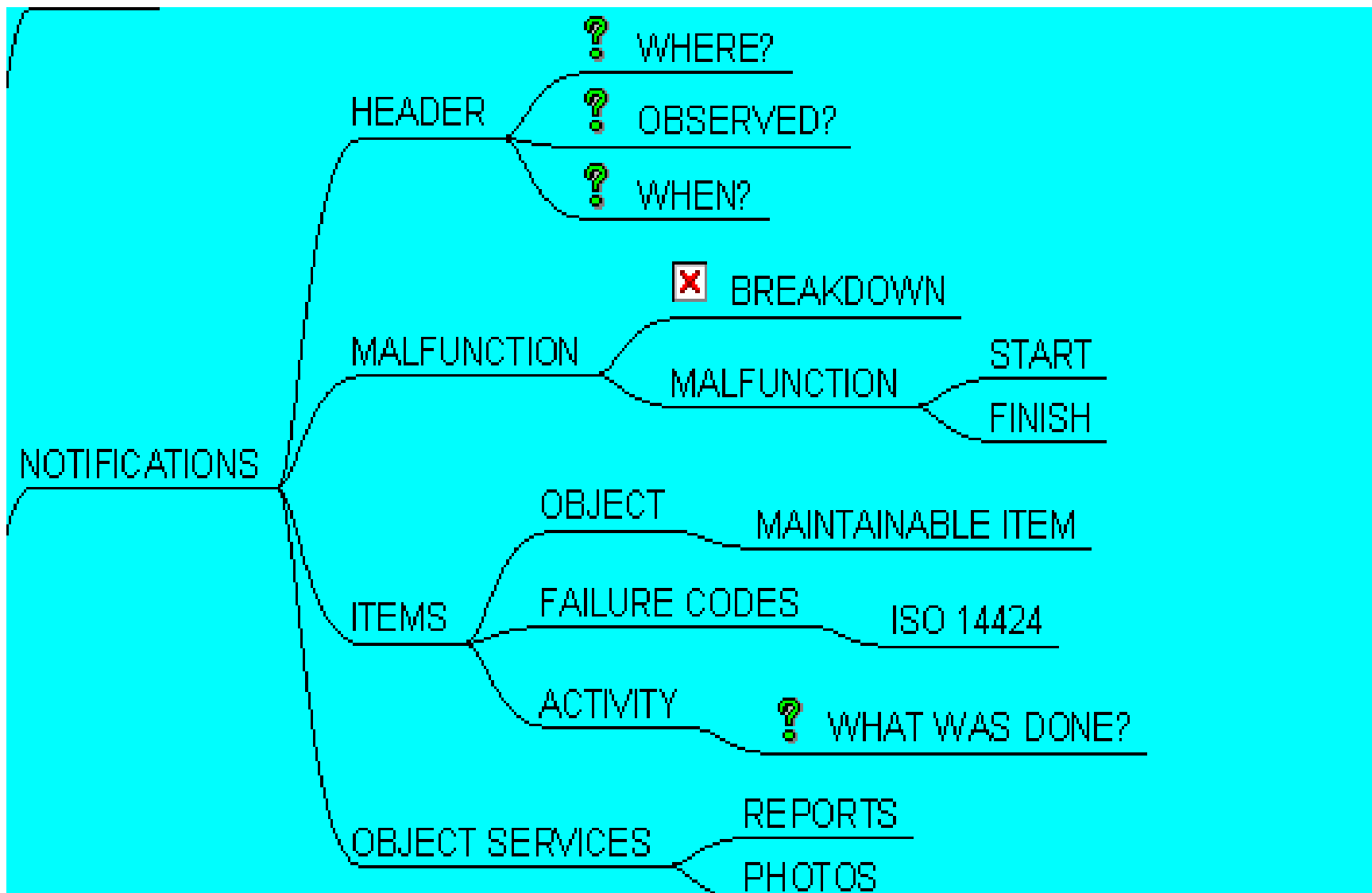


# SOMETIMES OLD WAYS ARE STILL THE BEST



# RELIABILITY ENGINEERING

- Notifications
- Work Order History
  - Analysis



## Display PM Notification: Maintenance request

In process again

Notification 1127821 M1 Replace east OML pump.  
Status NOCO NOPT ORAS  
Order 9251119

Notification Reference object Malfunction, breakdown Location data Scheduling overview

### Reference object

Functional loc. RES / TKFERM / TFERM1 / P... P6101 OLD MOTHER LIQUOR PUMP (EAST)  
Equipment 1033317 PUMP  
Assembly

WHERE?

### Start/End Dates

Required Start 01.01.2008 07:30:07 Priority Break into schedule  
Required End 00:00:00  Breakdown

WHEN?

### Subject

Description Replace east OML pump.  
AS A RESULT OF OUTBOARD SEAL CATCHING FIRE WE NEED TO REPLACE THE EAST OML PUMP. THE WEST PUMP IS UNRELIABLE AS IT KEEPS TRIPPING OUT SO WE NEED TO REPLACE ASAP.

WHAT?

## Notification Header

### Responsibilities

Planner group RPP / RES PP Planner  
Main WorkCtr SHMECH / RES Mechanical  
Reported by LLF Notif date 01.01.2008 07:30:07

# Malfunction Data

## Display PM Notification: Maintenance request

In process again

Notification	1127821	M1	Replace east OML pump.
Status	NOCO NOPT ORAS		
Order	9251119		

Notification | Reference object | Malfunction, breakdown | Location data

Start date	
Malfunction start	01.01.2008
Start Malfn (T)	06:30:00

Used in MTBF calculations

End	
Malfunction end	01.01.2008
Malfnctn End (Time)	14:30:00

Used in MTTR calculations

Breakdown	
<input checked="" type="checkbox"/> Breakdown	Breakdown duration 8.00 H

Failure counted in MTBF and MTTR calculations

# What happened?

## Display PM Notification: Maintenance request

Notification 1127821 M1 Replace east OML pump.

Status NOCO NOPT ORAS


Order 9251119







Notification Reference object Malfunction, breakdown Location data Scheduling overview Items


Items Causes Activities


No.	Code gr...	Obj...	Object part	Code gr...	Da...	Damage	Text	It
1	OMPUMP01	0160	Bearing	DAM001	DM68	Sticking/Seizure/Jammed	NDE bearing siezed	
2	OMPUMP01	1180	Mechanical Seal	DAM001	DM68	Sticking/Seizure/Jammed	NDE Seal faces jammed...	
3	OMPUMP01	0160	Bearing	DAM001	DM44	Problem/Damage Fo...	DE Bearing	
4	OMPUMP01	1180	Mechanical Seal	DAM001	DM44	No Problem/Damage Fo...	DE Seal	


# Why did it happen?

 **Display PM Notification: Maintenance request**

Notification  M1  

Status  

Order  


**Notification** | Reference object | Malfunction, breakdown | Location data | Scheduling over

**Items** | Causes | Activities


For item 1

Object part   Bearing

Damage   Sticking/Seizure/Jammed

Text  

Causes for Item

No.	Code gr...	Ca...	Cause code text	Cause text	C...	Created by	Cre
1	CAU001	C40	Failure Induced by Other ...	Seal failed and washed ...		BJMUMME	16

# What was done?

**Display PM Notification: Maintenance request**

In progress again

Notification: 1127821 M1 Replace east OML pump.

Object Services can be used to attach/link to documents, photos etc.

Location, breakdown Location data Sch...

Items Causes **Activities**

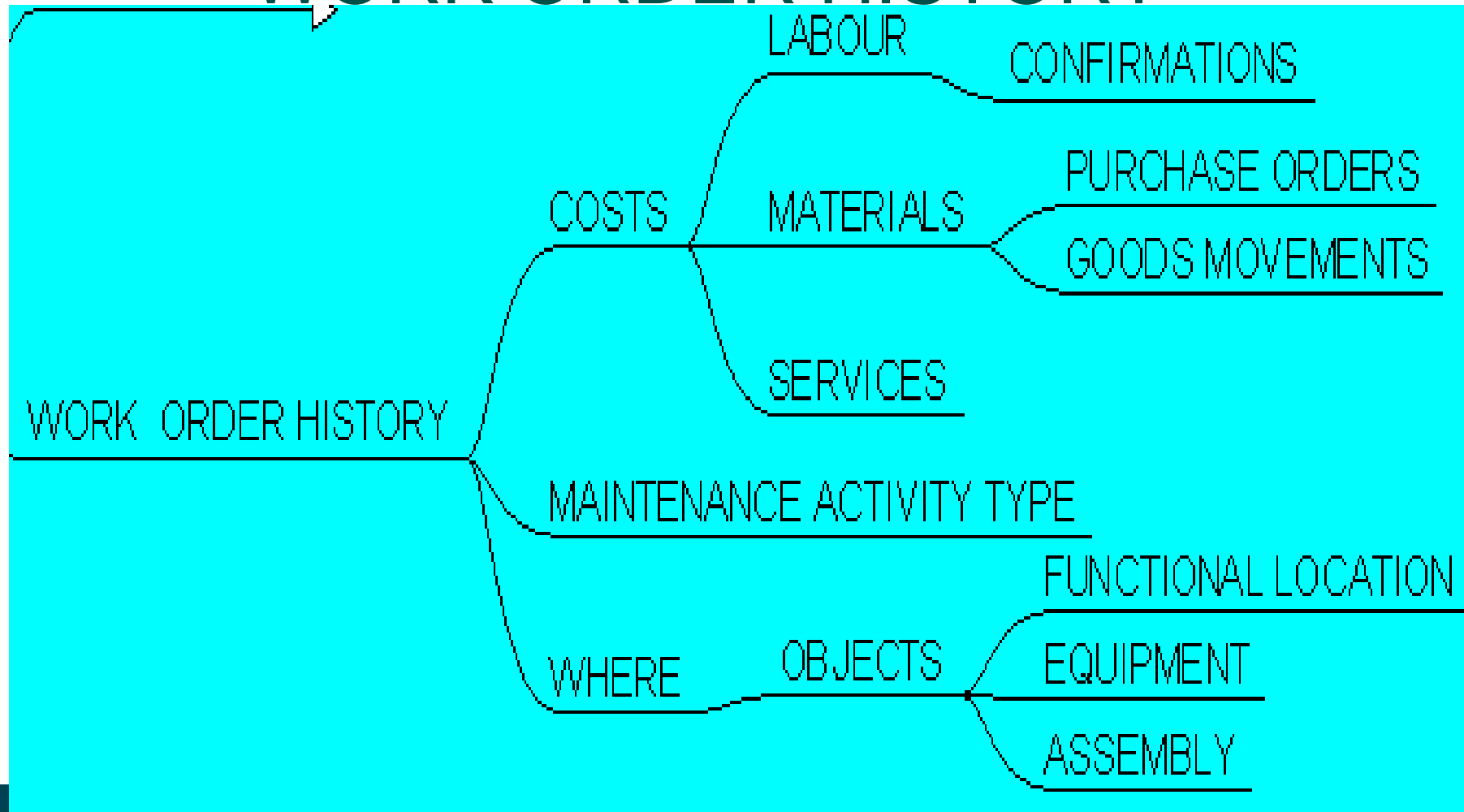
For item 1

Object part	OMPUMP01	0160	Bearing
Damage	DAM001	DM68	Sticking/Seizure/Jammed
Text	NDE bearing siezed		

Activities for Item

No.	Code gr...	Acti...	Activity code text	Activity text	Ac...	Q...	Star
1	ACT001	A80	Replaced Part			0	

# WORK ORDER HISTORY





# Change Maint.Order - Planned Work 9246198: Cost Overview

Complete (business)

Order: MOPW 9246198 R-501 piping repairs.

Sys.Status: REL PCNF ESTC GMPS MACM PRC SETC SETA PLND

HeaderData | Operations | Components | **Costs** | Objects | Addit. Data | Location | Pla

Estimated costs: 3,000.00 AUD

Val.in Object Curr. AUD

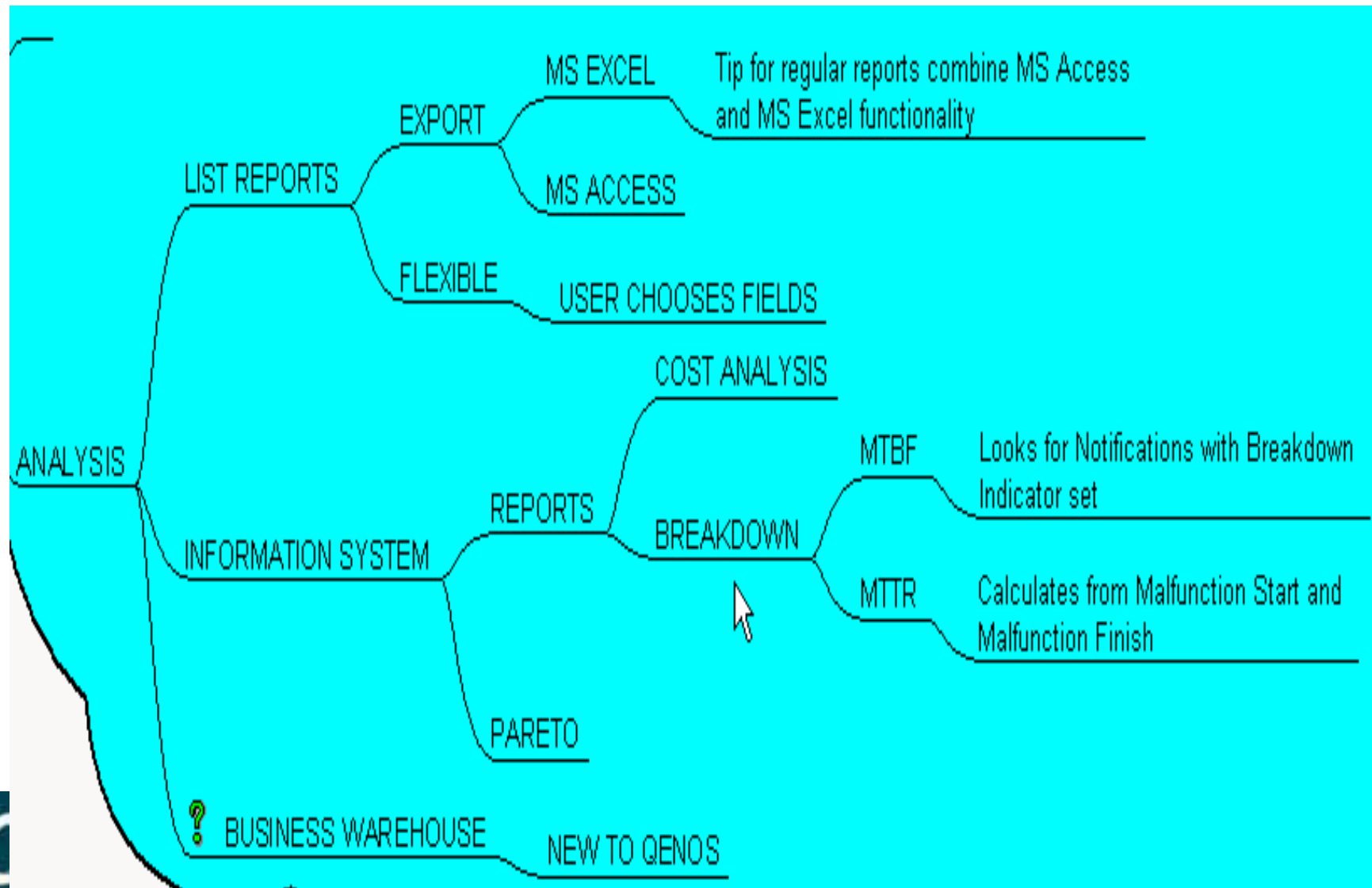
Val.in CoAreaCurr. AUD

Rep. Plan/Act. | Rep. Budget/Commit.

Overview | **Costs** | Quantities | Key figures

Group/Dscrptn	Est. costs	Plan costs	Act. costs	C...
Costs	3,000.00	2,736.73	2,520.02	A...
Internal Labour	2,700.00	2,520.02	0.00	A...
Non Stock Materials	50.00	2.00	50.81	A...
Services	0.00	0.00	2,254.58	A...
Stock Materials	250.00	214.71	214.63	A...

# ANALYSIS



# Example of Information System Report

## Cost Analysis: Basic List

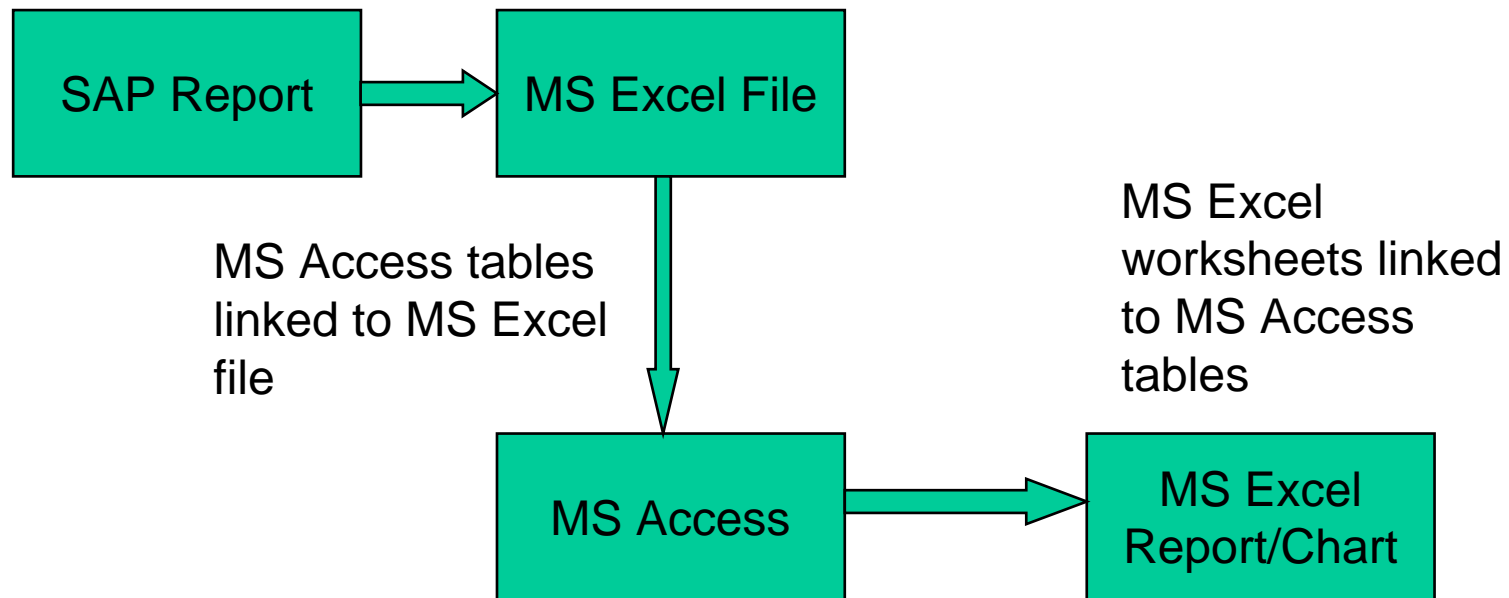
Switch drilldown... Top N...

No. of Order Type: 5

Order Type	Services costs	Int. mat. costs	ExternalMatCost	Miscell. costs	Total act.costs
Total	1,048,516.20 AUD	212,440.55 AUD	252,794.62 AUD	53,504.68 AUD	2,342,009.47 AUD
MOII Maint.Order - Integrity Inspection	96,897.15 AUD	1,496.08 AUD	1,892.74 AUD	0.00 AUD	125,836.95 AUD
MOIW Maint.Order - Injected Work	129,864.52 AUD	37,253.73 AUD	2,711.00 AUD	495.00 AUD	292,716.29 AUD
MOMP Maint.Order - Maintenance Plans	139,422.03 AUD	49,488.94 AUD	893.80 AUD	0.00 AUD	288,793.32 AUD
MOPW Maint.Order - Planned Work	569,164.89 AUD	79,155.74 AUD	244,002.68 AUD	1,892.23 AUD	1,116,105.98 AUD
MOSO Maint.Order - Standing Order	113,167.61 AUD	45,046.06 AUD	3,294.40 AUD	51,117.45 AUD	518,556.93 AUD

# Tip

- For regular reports can use combined functionality of MS Excel and MS Access to minimise set-up effort



# IN SUMMARY

- Fundamentals
  - Technical Objects
  - Work Centers
  - Failure Codes
- Planning & Scheduling
  - Notifications
  - Orders incl. Task Lists
  - Planning Board
- Reliability Engineering
  - Notifications
  - Work Order History
  - Analysis

# Conclusion

- SAP has all the features needed to support a world class maintenance and reliability program
- Take time to understand SAP – On-line help documentation is very comprehensive
- Read SAP release notes
- Most problems I have seen relate to poor process definition and implementation rather than SAP inadequacies

# QUESTIONS?

- [david.washbrook@qenos.com](mailto:david.washbrook@qenos.com)