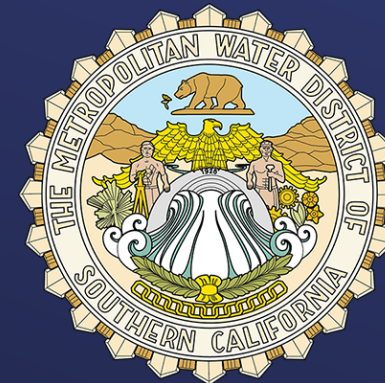
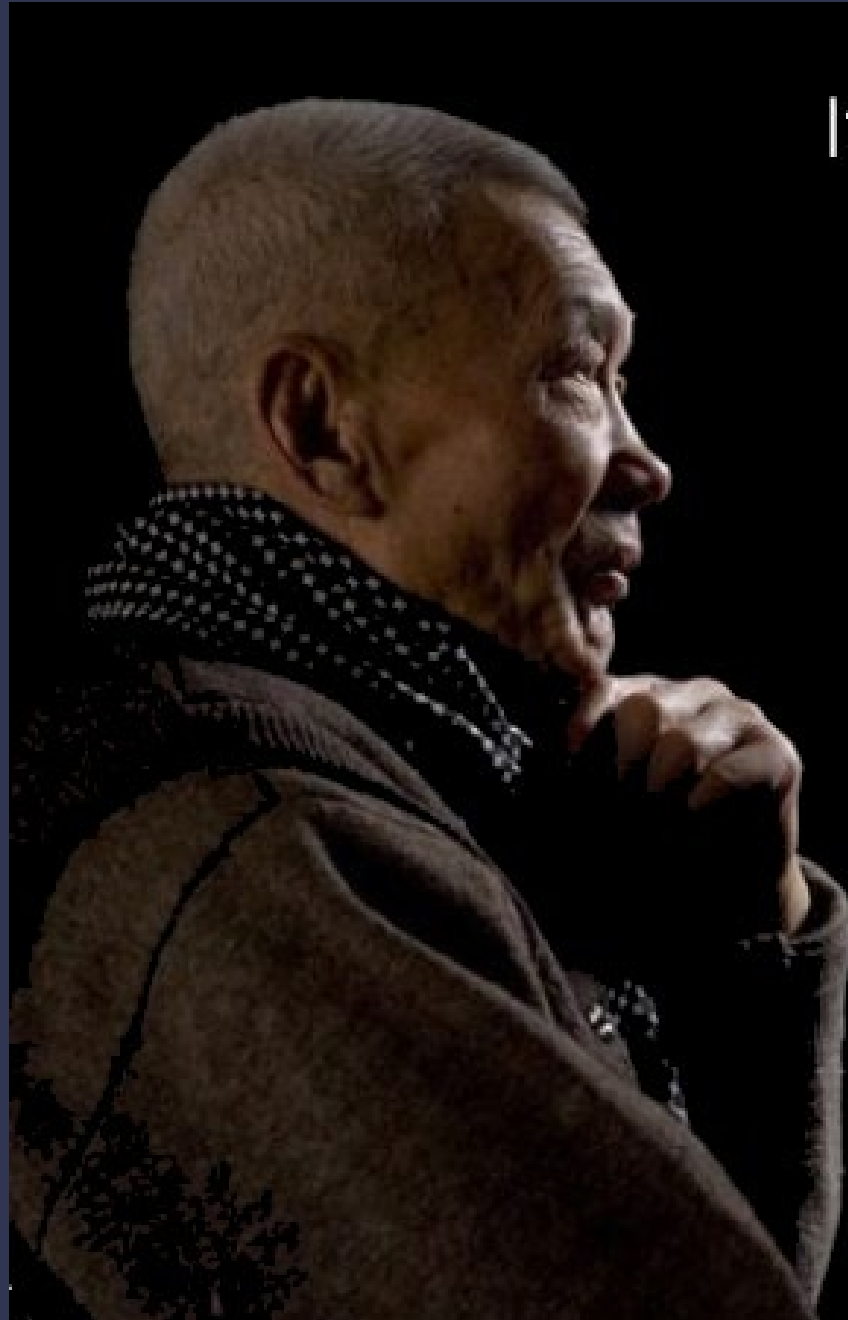




# MWD Initiatives for Data -driven Asset and Maintenance Management Decisions

Alan Villaverde





It takes a wise  
man to learn  
from his  
mistakes,  
but an even  
wiser man **to  
learn from  
others.**

zen proverb



# What's in store

- Overview of MWD
- Current state
- Our roadmap
- Key takeaway points







## Bringing Water to Southern California.

### Our Mission

The mission of the Metropolitan Water District of Southern California is to provide its service area with adequate and reliable supplies of high-quality water to meet present and future needs in an environmentally and economically responsible way.

Provide its service area with adequate and reliable supplies of high-quality water to meet present and future needs in an environmentally and economically responsible way.

26

MEMBER  
AGENCIES

19 million

PEOPLE IN  
SERVICE AREA

1.5 billion

GALLONS WATER  
DELIVERED DAILY

5

TREATMENT  
PLANTS

830

MILES OF  
PIPELINES

\$1.6 billion

INVESTED IN  
LOCAL RESOURCES



# Key Facts

- Created by state law in 1928
- Nation's largest provider of treated drinking water
- 19 million people service area across 5,200 square miles
- 26 member agencies
- 1.5 billion gallons water delivered daily
- Built and operated CRA since 1941
- Imported water from Northern CA since 1970
- \$1.6 billion invested in local areas

# Where Southern California Gets its Water



## Where do we use our Maximo?

- 5 Water Treatment Plants
- 6 Pumping Plants
- 16 Hydroelectric Power Plants
- 17 Reservoirs
- 1,072 miles of water conveyance and distribution
- 30,000 linear feet of water treatment piping
- 10 Fleet Garages
- 350 Service Connections
- 308 Miles of High Voltage Power Transmission Lines
- 5,000 motors and pumps from ½hp to 12,500hp
- 450 chemical and auxiliary storage tanks
- 500 building, shops and other structures
- 1,000 miles of unpaved road
- 100 housing units

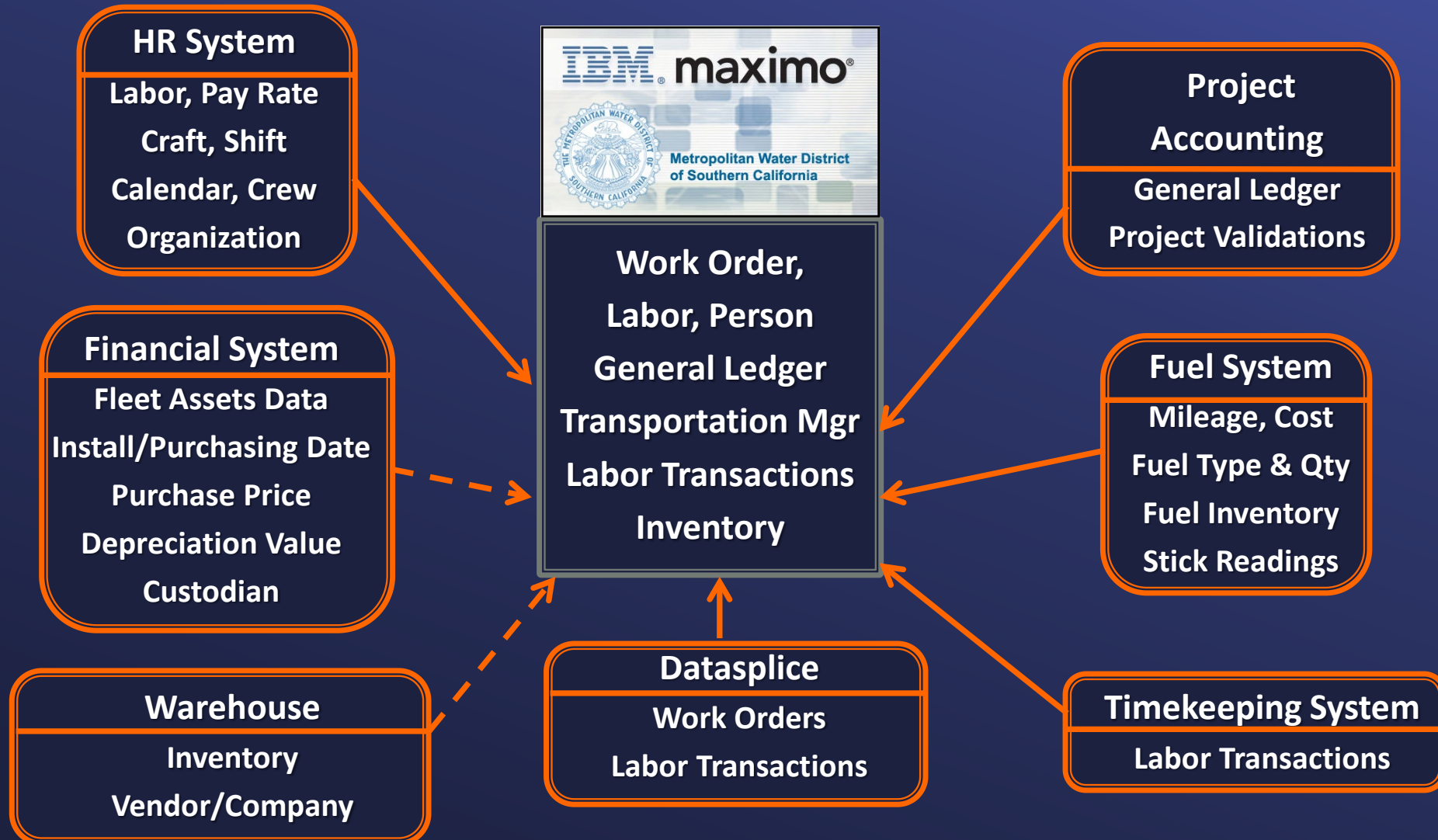


## MWD's Maximo

- Ver 7.6.1.1 (including Transportation module)
- System is integrated with different applications
- Mobile technology: Datasplice running on iPads



# Maximo Usability



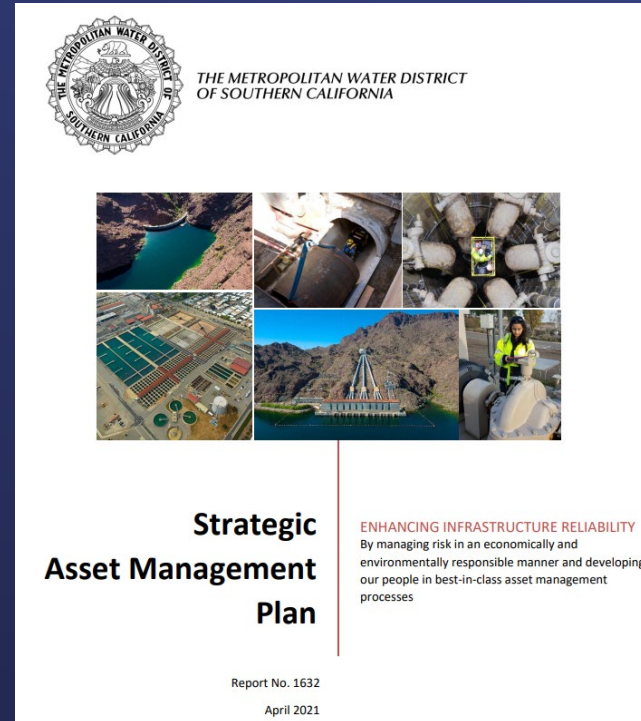
## Sounds familiar?

- Too much work and we are understaffed
- We have aging facilities and workforce
- What are our critical assets?
- What does our data tell us?
- Where do we start?




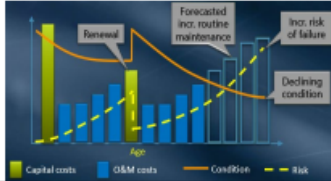



## Our roadmap

# Strategic Asset Management Plan



High-level, long-term planning document that sets forth the goals and strategy of the Asset Management (AM) Program and describes the initiatives to achieve the expected outcomes of the program.

# New Asset Management Tools

New Tool	Benefits to Metropolitan
<b>Asset Risk Management Framework</b> 	<ul style="list-style-type: none"> <li>Aligns Metropolitan with national and international industry standards</li> <li>Provides a standardized and consistent approach to risk at the organizational, project, and asset level</li> <li>Enhances the Capital Investment Plan project prioritization process</li> </ul>
<b>Comprehensive Lifecycle Analysis</b> 	<ul style="list-style-type: none"> <li>Provides a consistent approach to evaluate total cost of ownership of assets</li> <li>Significantly improves our ability to trend and forecast cost, risk, condition, and performance to renewals needs</li> </ul>
<b>AM Dashboard</b> 	<ul style="list-style-type: none"> <li>Provides a single easy-to-use interface that links asset information managed across the various data systems together</li> <li>Provides staff with a more complete picture of Metropolitan's assets and associated infrastructure reliability to facilitate decision making at strategic, tactical, and operational levels</li> </ul>
<b>Reliability-Centered Maintenance</b> 	<ul style="list-style-type: none"> <li>Provides an ability to evaluate specific asset classes and assess whether current maintenance strategies are bringing the greatest value</li> </ul>
<b>Tactical AM Plan</b> 	<ul style="list-style-type: none"> <li>Provides a long-term planning approach that facilitates open communication across groups</li> <li>Develops a comprehensive AM strategy for specific asset classes to help Metropolitan maximize asset value</li> </ul>



# Our roadmap

## Seven Initiatives

### 2022/23 ASSET MANAGEMENT AND MAINTENANCE MANAGEMENT STRATEGY

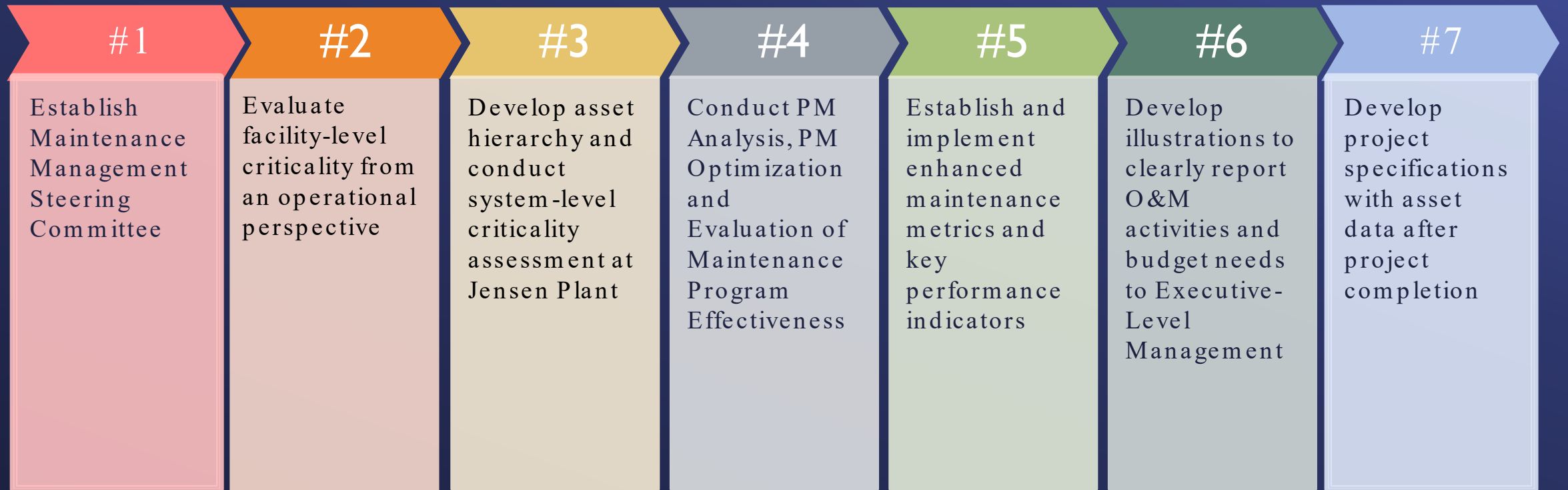
AUGUST 2, 2022



Power and Equipment Reliability Unit  
Operations Projects and Asset Management Unit

We need improved asset and maintenance management processes supported by reliable data to successfully justify additional staffing and budget while maintaining water affordability.

# 2022/2023 Initiatives





# Asset Hierarchy Benefits

---

Better work identification

---

Asset downtime / delay tracking

---

Maintenance Labor cost tracking

---

Total cost of ownership of assets

---

Enables Failure Analysis

---

Spare part / Inventory management

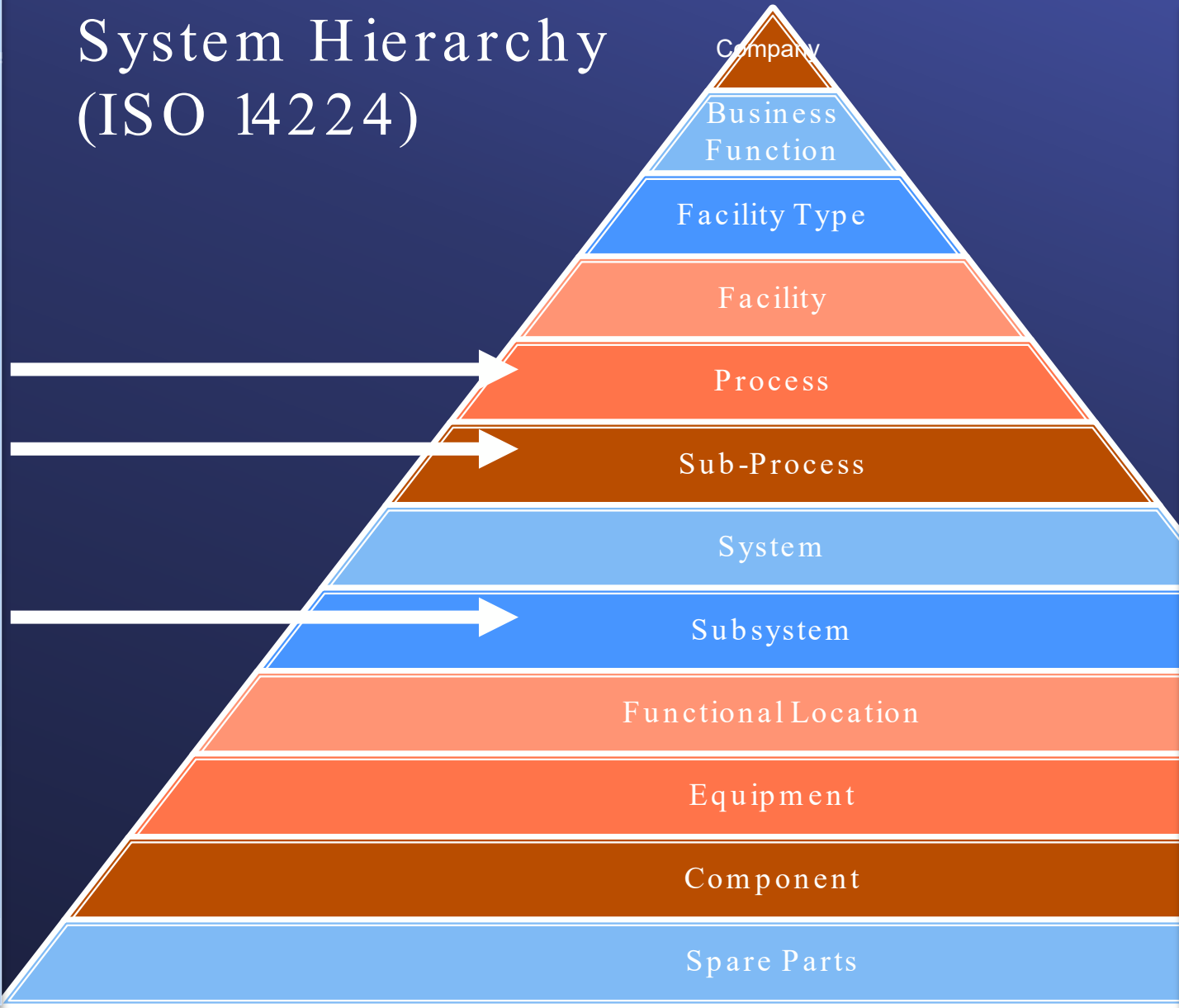
---

Failure tracking

---

- Level 1
- Level 2
- Level 3
- Level 4
- Level 5
- Level 6
- Level 7
- Level 8
- Level 9
- Level 10
- Level 11
- Level 12

# System Hierarchy (ISO 14224)



MWD (Proposed)	MWD (Current)
Water Treatment	Water Treatment
Water Treat Plants	Water Treat Plants
Jensen Plant	Jensen Plant
Treatment Processes	
Treatment Modules	
Module 1	Module 1
Basin 1	
Sedimentation Basin 1	Sedimentation Basin 1
Basin 1 Traveling Bridge	Basin 1 Traveling Bridge
Basin 1 Traveling Bridge Pump 1	Pump 1
N/A for this asset	N/A for this asset

New levels are highlighted in yellow

# Maximo System Location Hierarchy Search

More Search Fields | Current Query:

**Work Order Details**

Work Order

Work Type

WO Priority

Status

WT Status

Repair Facility

Repair Facility Site

**User Information**

Team Manager

**Asset Details**

Location

**Search Location Hierarchy**

Asset

Asset Parent

Asset Memo

Oracle Asset

Status

**Financial Information**

Project/Alias

COA Task

**Plan Details**

PM

Job Plan

**Select Value**

Filter  1 - 19 of 19

Location	Description	Type	Site
JFP-100-0400	FILTRATION SYSTEM	OPERATING	MWDSITE
JFP-100-0400-100	MODULE 1 FILTERS	OPERATING	MWDSITE
JFP-100-0400-100-100	BACKWASH ISOLATION VALVES 1-10	OPERATING	MWDSITE
JFP-100-0400-100-200	SURFACE WASH ISOLATION VALVES 1-20	OPERATING	MWDSITE
JFP-100-0400-100-300	BACKWASH ISOLATION VALVES 11-20	OPERATING	MWDSITE
JFP-100-0400-100-400	FILTER 1-5	OPERATING	MWDSITE
JFP-100-0400-100-500	FILTER 6-10	OPERATING	MWDSITE
JFP-100-0400-100-600	FILTER 11-15	OPERATING	MWDSITE
JFP-100-0400-100-700	FILTER 16-20	OPERATING	MWDSITE
JFP-100-0400-200	MODULE 2 FILTERS	OPERATING	MWDSITE
JFP-100-0400-200-100	BACKWASH ISOLATION VALVES 21-30	OPERATING	MWDSITE
JFP-100-0400-200-200	SURFACE WASH ISOLATION VALVES 21-30	OPERATING	MWDSITE
JFP-100-0400-200-300	FILTER 21-25	OPERATING	MWDSITE
JFP-100-0400-200-400	FILTER 26-30	OPERATING	MWDSITE
JFP-100-0400-300	MODULE 3 FILTERS	OPERATING	MWDSITE
JFP-100-0400-300-100	BACKWASH ISOLATION VALVES 31-40	OPERATING	MWDSITE
JFP-100-0400-300-200	SURFACE WASH ISOLATION VALVES 31-40	OPERATING	MWDSITE
JFP-100-0400-300-300	FILTER 31-35	OPERATING	MWDSITE
JFP-100-0400-300-400	FILTER 36-40	OPERATING	MWDSITE

Parent WO

Originating WO

Mobile WO Type

Is Task?

History?

Shutdown Work Order? ☐

End Date

Setup Labor Cost

Material Cost

Item Code

Signature Class

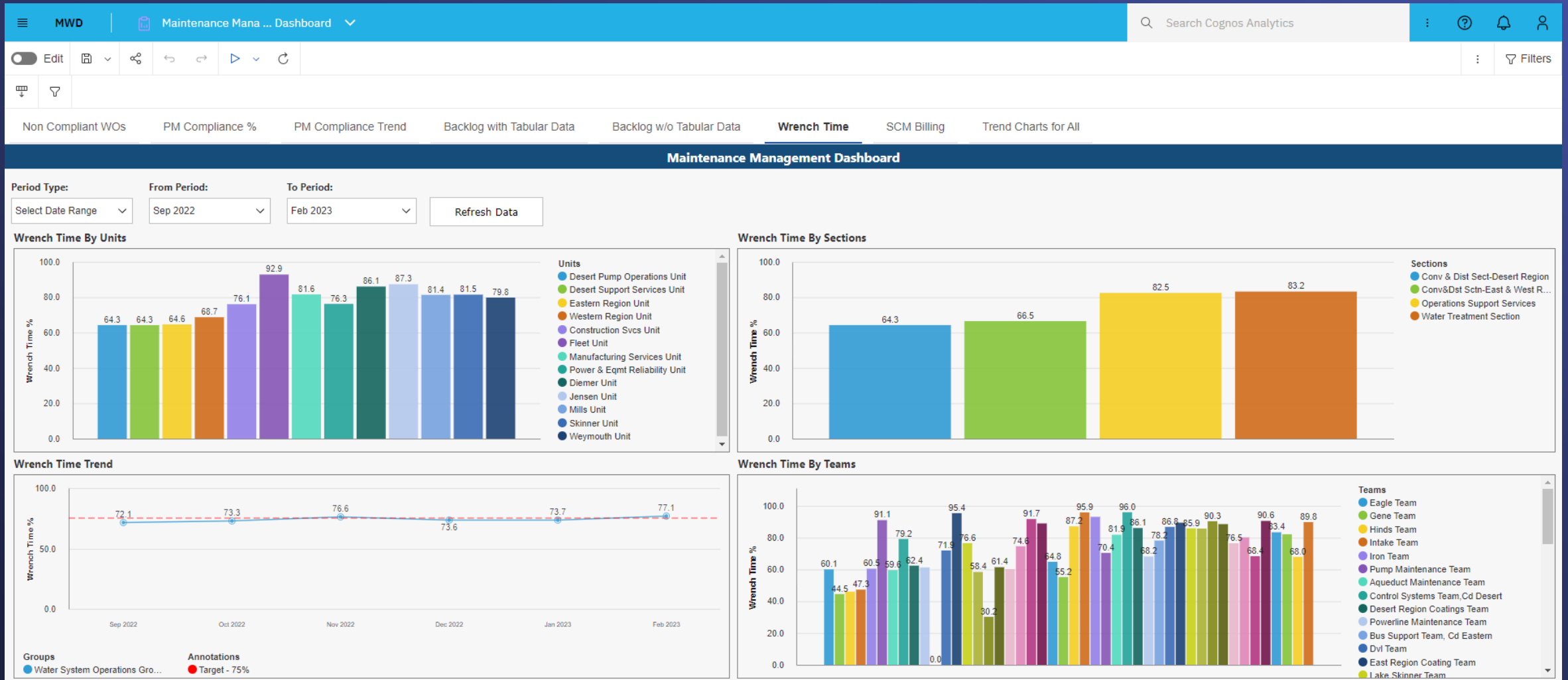
OK Cancel



## KPIs and metrics

- PM Compliance
- Backlog
- Wrench Time

# Maintenance Management Dashboard



# Start Center Enhancements

Welcome to MWD MAXIMO, ALAN S VILLAVERDE

Maximo Support StandardInitial DEFAULT Template

Bulletin Board

Filter

To filter for specific records, specify data in the filter fields and then press the Enter key.

Subject	Message	Post Date	Expiration Date	Viewed
				N

There are currently no bulletin board messages to view.

Quick Insert

Maximo Admin Support Applications

Users

Security Groups

Work Order Tracking

Assets

Work Order Tracking (Tr)

Assets (Tr)

Preventive Maintenance

Job Plans

Assignment Manager

Domains

Report Administration

KPI Graph

Last Run:

Status

Last Reading


Actual

Target

Variance

Unit Variance

OH Work with no Failure Data (%)

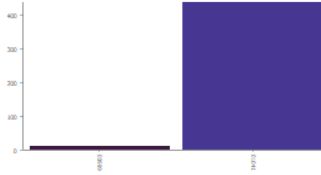


Unit Overdue Work Orders

Filter

Chart Type: Bar

Alan PERU Overdue work orders (By Team)

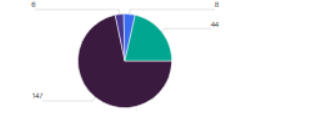


WFP Pumps Missing Model Number

Filter

Chart Type: Pie

Alan WFP Centrifugal Pumps no Model Number (By Failure Class)



Team 01275 WO Ready for Team Manager Review

Filter

Work Order	Description	Work Type	Target Start	Actual Labor Hours Roll Up
19566232	90 DAY SERVICE: 1/2 TON CHAINFALL (CR-100H-365) START 12/1/22	PM	12/1/22 12:00 AM	3.00
19566237	90 DAY SERVICE: 1/2 TON CHAINFALL (CR-100H-364) START 12/1/22	PM	12/1/22 12:00 AM	3.00
19566242	90 DAY SERVICE: 1/2 TON CHAINFALL (CR-100H-363) START 12/1/22	PM	12/1/22 12:00 AM	3.00
19566247	90 DAY SERVICE: 1/2 TON CHAINFALL (CR-100H-362) START 12/1/22	PM	12/1/22 12:00 AM	3.00
19566252	90 DAY SERVICE: 1/2 TON CHAINFALL (CR10-0H-361) START 12/1/22	PM	12/1/22 12:00 AM	3.00
19569706	WEEKLY COMPRESSOR INSPECTION: GARDNER DENVER CL2 COMP# 1 SERVICE AIR START 12/20/22	PM	12/20/22 12:00 AM	8.00
19569758	WEEKLY COMPRESSOR INSPECTION: GARDNER DENVER CL2 COMP# 2 MIDLAND VALVE AIR START 12/20/22	PM	12/20/22 12:00 AM	1.50
19566166	90 DAY SERVICE: 1/2 TON CHAINFALL (CR-100H-367) (SOUTH BAY) START 12/1/22	PM	12/1/22 12:00 AM	3.00
19566171	90 DAY SERVICE: 1/2 TON CHAINFALL (CR-100H-366) (CL2 OFFICE) START 12/1/22	PM	12/1/22 12:00 AM	3.00
19566176	90 DAY SERVICE: 1/2 TON CHAINFALL (CR-100H-366) START 12/1/22	PM	12/1/22 12:00 AM	3.00

Set Chart Options

1 - 10 of 10

Weekly Work Orders Due in 7 Days

Filter

Work Order	Description	Asset	Location	Target Finish
19699321	WEEKLY SERVICE: CONCENTRATION OZONE ANALYZER - 16-AIT-348 OZONE DESTRUCT INLET (JA)	235619	DFP-00126-0620	2/9/23 1:00 AM
19699382	WEEKLY SERVICE: AMMONIA ANALYZER (JA)	178961	DFP-00010-0840	2/9/23 5:00 AM
19699474	WEEKLY SERVICE: CONCENTRATION OZONE ANALYZER - 17-AIT-107 OZONE GENERATOR 1 (JA)	235622	DFP-00126-0030	2/11/23 1:00 AM
19699680	WEEKLY SERVICE: CONCENTRATION OZONE ANALYZER - 17-AIT-187 OZONE GENERATOR 2 (JA)	235624	DFP-00126-0030	2/11/23 1:00 AM
19699688	WEEKLY SERVICE: CONCENTRATION OZONE ANALYZER - 17-AIT-287 OZONE GENERATOR 4 (JA)	235626	DFP-00126-0030	2/12/23 1:00 AM
19699460	WEEKLY SERVICE: CONCENTRATION OZONE ANALYZER 16-AIT-400 OZONE DESTRUCT OUTLET (JA)	235620	DFP-00126-0610	2/14/23 1:00 AM
19699602	WEEKLY SERVICE: CONCENTRATION OZONE ANALYZER - 17-AIT-207 OZONE GENERATOR 3 (JA)	235623	DFP-00126-0030	2/14/23 1:00 AM

Set Chart Options

1 - 7 of 7

Team

Count

Percent (%)

00999

13

2.85

01041

440

86.44

01180

39

7.66

01294

17

3.34

Failure Class

Count

Percent (%)

PMPCTG

147

71.71

PMPMTR

6

2.95

PMPROCAV

8

3.9

PMPRTYV

44

21.46

Mobile Start Center



# Asset Data Electronic Upload

## Asset Specifications and Data

1	METER_FLOW Template (1263)																			
2	GK@Operations Application Services Team																			
3	SITEID	ASSETNUM	Parent	status	location	type	CRITICALITY	ASSET MEMO	CUSTODIAN ID	FAILURE CLASS	METER GROUP	MARK #	Manufacture	Installation Date	MODEL	SERIAL #	Asset Description	CLASSIFICATION	TAG #	
5	SITEID	ASSETNUM	PARENT	STATUS	LOCATION	ASSETTYPE	PRIORITY	EQ2	EQ3	FAILURECODE	GROUPNAME	EQ23	MANUFACTURER	INSTALLDATE	EQ16	SERIALNUM	DESCRIPTION	CLASSSTRUCTURED	SPEC ITEM_ID (A/LN)	
6	MWDSITE	"autokey"		OPERATING														1263		
7	MWDSITE	"autokey"		OPERATING														1263		
8	MWDSITE	"autokey"		OPERATING														1263		
9	MWDSITE	"autokey"		OPERATING														1263		
10	MWDSITE	"autokey"		OPERATING														1263		
11	MWDSITE	"autokey"		OPERATING														1263		
12	MWDSITE	"autokey"		OPERATING														1263		
13	MWDSITE	"autokey"		OPERATING														1263		
14	MWDSITE	"autokey"		OPERATING														1263		
15	MWDSITE	"autokey"		OPERATING														1263		
16	MWDSITE	"autokey"		OPERATING														1263		
17	MWDSITE	"autokey"		OPERATING														1263		
18	MWDSITE	"autokey"		OPERATING														1263		
19	MWDSITE	"autokey"		OPERATING														1263		
20	MWDSITE	"autokey"		OPERATING														1263		
21	MWDSITE	"autokey"		OPERATING														1263		
22	MWDSITE	"autokey"		OPERATING														1263		
23	MWDSITE	"autokey"		OPERATING														1263		
24	MWDSITE	"autokey"		OPERATING														1263		
25	MWDSITE	"autokey"		OPERATING														1263		
26	MWDSITE	"autokey"		OPERATING														1263		
27	MWDSITE	"autokey"		OPERATING														1263		
28	MWDSITE	"autokey"		OPERATING														1263		
29	MWDSITE	"autokey"		OPERATING														1263		
30	MWDSITE	"autokey"		OPERATING														1263		
31	MWDSITE	"autokey"		OPERATING														1263		
32	MWDSITE	"autokey"		OPERATING														1263		
33	MWDSITE	"autokey"		OPERATING														1263		
34	MWDSITE	"autokey"		OPERATING														1263		
35	MWDSITE	"autokey"		OPERATING														1263		
36	MWDSITE	"autokey"		OPERATING														1263		

# Asset Specifications

Assets (Tr)					
Query	Find Asset				
List View	Asset	Warranties	Condition Index	EAS / Spare Parts	Safety Meters
	Specifications	Service Address	Map	PMs	Attachments
		Measurement Points	Axle Configuration	History	Work
Asset: 50190042 TRUCK, UTILITY, DIESEL, STND CAB, CLASS 8 HEAVY TRUCK - 33001+ lbs. GVWR, [ ATTACHED CRANE ] Site: MWDSITE					
Classification: FLEET \ TRCK \ TRCK_UTLTY Status: OPERATING					
Specifications	Filter			1 - 25 of 61	
Disp Seq	Attribute	Description	Alphanumeric Value	Unit of Measure	Domain
>	1 TRCK_MFG	TRUCK MANUFACTURER	INTERNATIONAL	NA	TRCKMFG
>	2 MOD	MODEL	8100	NA	
>	3 VIN_NUM	VEHICLE IDENTIFICATION NUMBER	1HTHBADR2VH437277	NA	
>	4 YEAR	YEAR	1997	NA	
>	5 ENGN_TYPE	ENGINE FUEL TYPE	DIESEL		ENGNTYPE
>	6 CAB_CNFGRTN	CAB CONFIGURATION	STND CAB		CABCNFGRTN
>	7 FUEL_TYP	FUEL TYPE	DIESEL	NA	FUELTP
>	8 FUEL_CAP	FUEL CAPACITY	90	GALLONS	
>	9 FUEL_INT	FUEL INTERFACE	CANCEIVER	NA	FUELINT
>	10 GVWR	GROSS VEHICLE WEIGHT RATING	CLASS 8 HEAVY TRUCK - 33001+ lbs.	GVWR	GVWR
>	11 WHL_BASE	WHEEL BASE		INCHES	
>	12 LNGHT_IN	LENGHT IN INCHES		INCHES	
>	13 WDTN_IN	WIDTH IN INCHES		INCHES	
>	14 HGHT_IN	HEIGHT IN INCHES		INCHES	
>	15 BRK_TYPE	BRAKING TYPE	AIR	NA	BRAKETYPE
>	16 HP	HORSEPOWER		HP	
>	17 NUM_CYL	NUMBER OF CYLINDERS		NA	NUMCYL
>	18 DSPLMNT_IN	ENGINE DISPLACEMENT IN CUBIC INCHES		CU_IN	
>	19 DSPLMNT_LTR	ENGINE DISPLACEMENT IN CUBIC LITERS	8.3	CU_LTR	
>	20 ENGN_OIL_CAP	ENGINE OIL CAPACITY		QRT	
>	21 ENGN_MFG	ENGINE MANUFACTURER	INTERNATIONAL	NA	ENGNMFG
>	22 ENGN_MOD	ENGINE MODEL NUMBER	8.3	NA	
>	23 ENGN_SER_NUM	ENGINE SERIAL NUMBER	1825650C1	NA	
>	24 ENGN_FMLY	ENGINE FAMILY	TNV530D6DARA	NA	
>	25 ENGN_YR	ENGINE YEAR	1997	NA	
New Row					

# Failure Codes

Failure Codes

Query Find Failure Class

List View Failure Codes

Failure Class: PMPVAC Failure Class: Pump - Vacuum

Problems Filter 1 - 8 of 8

Failure Code	Description
FOUN-CRK	Foundation Cracking
KNOCKING	Knocking
LEAKING	Leaking
NO-FLOW	No Flow
OVERHEAT	Over Heat
LOW-PERF	Low Performance
SEIZED	Seized
VIB-EXCSS	Vibration Excessive

New Row

Causes for FOUN-CRK Filter 1 - 3 of 3

Failure Code	Description
CHEM-CONTAM	Chemical Contamination
MISALGN	Misalignment
ROTOR-BENT	Rotor Bent

New Row

Remedies for CHEM-CONTAM Filter 1 - 8 of 8

Failure Code	Description
CLEAN-SRVC	Cleaned/Service
MODIFIED	Modified
REPL-EQPT	Replaced Equipment
RECAL-ADJ	Re-Calibrated/Adjusted
OVERHAULED	Overhauled
FOUND-OK	Found Ok
REPLN-RCHG	Replenished/Recharged
REPLACED	Replaced Parts

New Row



Key takeaway points

**Red** can be OK



# Move in the same direction





Alignment has a big impact



