CAP Asset Management Program

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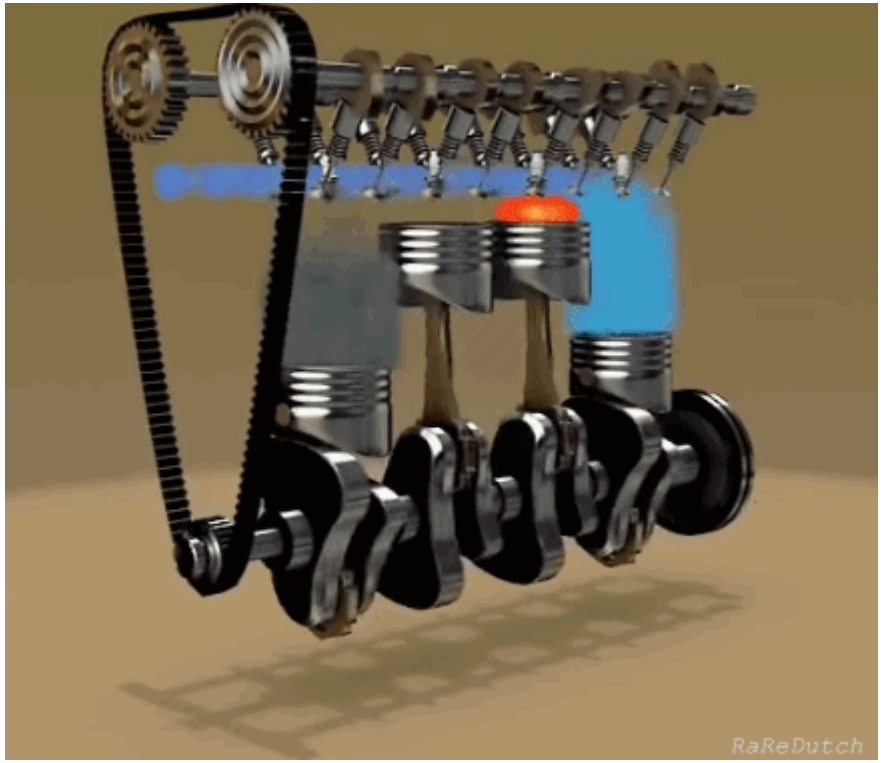
What is Asset Management ?

"The coordinated activity of an organization to derive value from its assets."

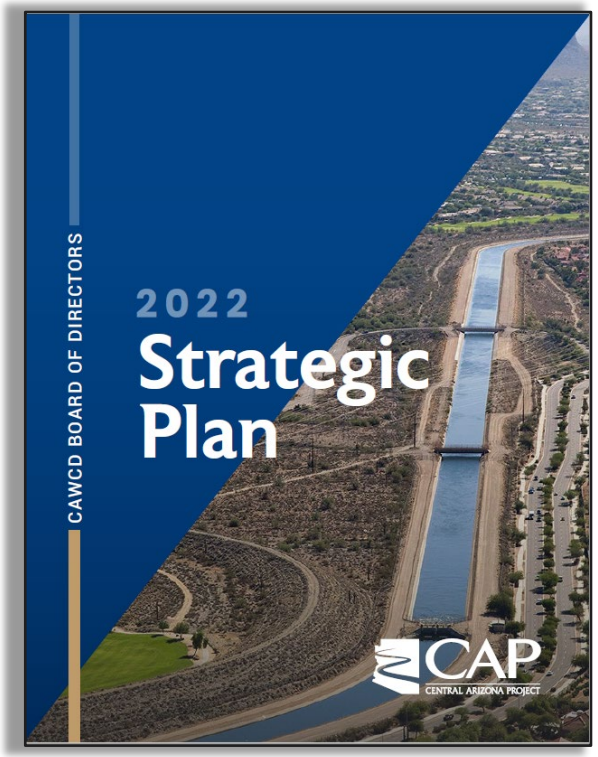
ISO 55000



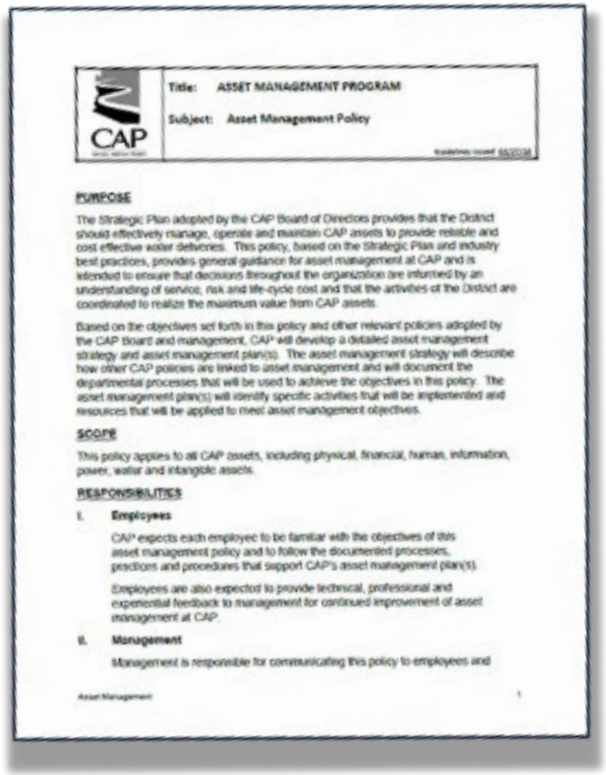
Asset Management

ISO 55000

Board Strategic Plan



Policy



CAP

Title: ASSET MANAGEMENT PROGRAM

Subject: Asset Management Policy

PURPOSE

The Strategic Plan adopted by the CAP Board of Directors provides that the District should effectively manage, operate and maintain CAP assets to provide reliable and cost effective water deliveries. This policy, based on the Strategic Plan and industry best practices, provides general guidance for asset management at CAP and is intended to ensure that decisions throughout the organization are informed by an understanding of service, risk and life-cycle cost and that the activities of the District are coordinated to realize the maximum value from CAP assets.

Based on the objectives set forth in this policy and other relevant policies adopted by the CAP Board and management, CAP will develop a detailed asset management strategy and asset management plan(s). The asset management strategy will describe how other CAP policies are linked to asset management and will document the departmental processes that will be used to achieve the objectives in this policy. The asset management plan(s) will identify specific activities that will be implemented and resources that will be applied to meet asset management objectives.

SCOPE

This policy applies to all CAP assets, including physical, financial, human, information, power, water and intangible assets.

RESPONSIBILITIES

I. Employees

CAP expects each employee to be familiar with the objectives of this asset management policy and to follow the documented processes, practices and procedures that support CAP's asset management plan(s).

Employees are also expected to provide technical, professional and experiential feedback to management for continued improvement of asset management at CAP.

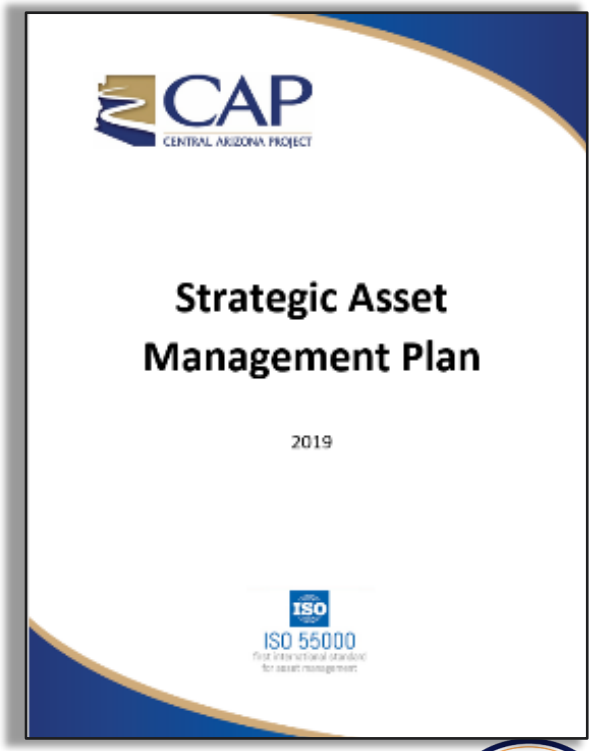
II. Management

Management is responsible for communicating this policy to employees and

Asset Management

1

AM Plan



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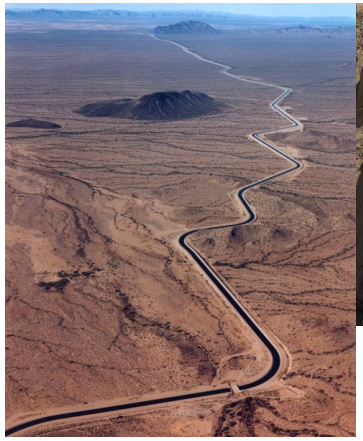
Asset Classes

- Physical
- Financial
- Power
- Water
- Human
- Information
- Intangible

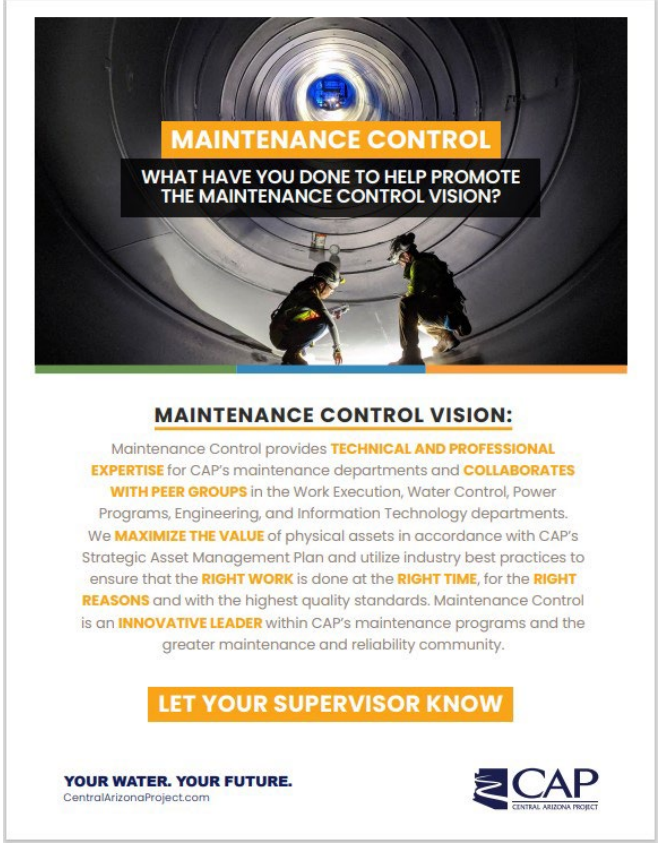
Mechanical

Electrical

Civil



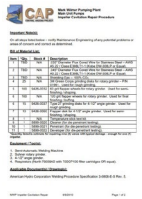
Maintenance Philosophy

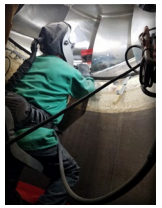


… We maximize the value of physical assets in accordance with CAP's Strategic Asset Management Plan and utilize industry best practices to ensure that **the right work is done at the right time and for the right reasons …**

Maintenance Philosophy

The right work …





The right time …

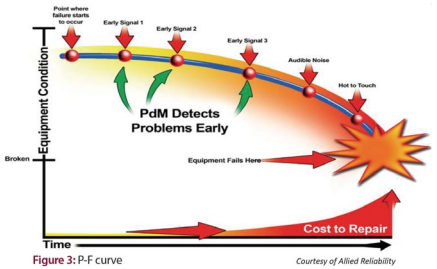
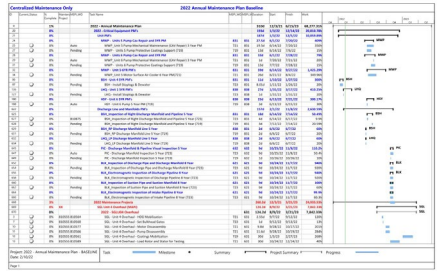


Figure 3: P-F curve

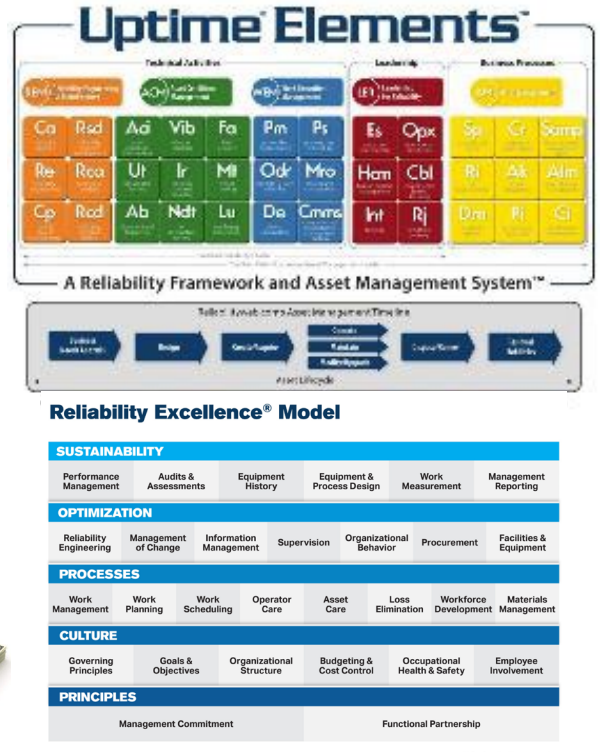
Courtesy of Allied Reliability



The right reason …

+

+



The success of the program relies on people, process, procedures, data, and technology

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People …

Reliability / Maintenance Engineering	Planning and Scheduling	Work Execution

Maintenance Professionals
- Managers and Supervisors
- Reliability Engineers
- Maintenance Engineers
- Maintenance Engineer Technicians

Maintenance Professionals
- Managers and Supervisors
- Maintenance Planners
- Maintenance Schedulers
- CMMS Administrator

Craft and Trade
- Managers and Supervisors
- Electricians
- Millwrights/Machinists
- Technicians
- Industrial Coaters
- Fire Mechanics
- Fleet Mechanics
- Equipment Operators

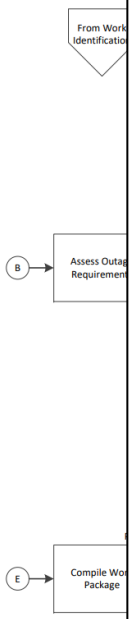
244 Employees

Process …

Major Processes

Planning and Scheduling
Work Identification
Long Range Work Identification
Work Execution
Annual Maintenance Plan
Equipment Condition Assessment
Capital Project Turnover
Risk Register

… and many more



Work Process Block Number	CAP Maintenance RACI Model (v2020_10_28) Planning Process	Buyer	Maintenance Administration Secretary	Maintenance Craftsman/Technician	Maintenance Engineering Supervisor	Maintenance Engineer	Maintenance Manager	Maintenance Supervisor	Maintenenace Planning Supervisor	Maintenance Planner	Maintenance Information Supervisor	Maintenance Information	Clearance Coordinator	Operator	Operations Supervisor	Operations Manager	Outage Scheduler	Reliability & Maint Eng Supervisor	Reliability Engineer	Safety	Vendor / Contractor	Warehouse
	Work Process Task																					
PL-1	Work Executed by my MRC?					I		C	A	R												
PL-2	Is Planning Required?			C		C		C	A	R					C				C			
PL-3	Is Job Scope Complete?			C		C		C	A	R					C				C			
PL-4	Build Preliminary Estimates			C		C		C	A	R					C				C			
PL-5	Costs Approved?						A	R		I									I			
PL-6	Engage Support to Refine Scope								A	R									I			
PL-7	Assess Outage Requirements							C	A	R					C				C			
PL-8	Assess Clearance Requirements						A	R		C			C									
PL-9	Execute work in <365 days?					I		C	A	R					C				C			
PL-10	Permits Required?							C	A	R					C				C			
PL-11	Obtain Permits Required								A	R												
PL-12	Attach Approved Permits to Work Package								A	R												
PL-13	Move to Hold Status								A	R					I				I			
PL-14	Evaluate & Acquire Manpower, Materials, Equip & Tools Needed								A	R												
PL-15	Are Job Hazards Identified?								A	R												
PL-16	Is a Pre-Job Brief Required?								A	R												
PL-17	Monitor Backlog								A	R												
PL-18	Attach JHA/Pre-Job Briefing Form								A	R												
PL-19	Compile Work Package								A	R												
PL-20	Engage Water Operations to Confirm Dates & Submit Outage Request								A	R					C							
PL-21	Release to Scheduling								A	R												
	R = Responsible "The Door"																					
	A = Accountable "The Buck Stops Here"																					
	C =Consulted "Provides Input"																					
	I = Inform "Keep in the Loop"																					

Planning Process (v2020_10_28)

PL-1 Work Executed by My MRC?

Planner reviews Infor EAM inbox query to find all work orders with a "Ready for Planning" status for the MRC s/he supports. Review the Work Order to determine if work will be executed by his/her MRC. If yes, proceed to PL-2. If no, return to Work Identification

PL-2 Is Planning Required?

Planner reviews Work Order to determine if planning is required. If yes, proceed to PL-3. If no, proceed to Scheduling Process.

PL-3 Is Job Scope Complete?

Planner assesses Job Scope as documented on the Work Order (and potentially in the Work Order comments) to determine if sufficient information was provided by the requestor for the Job Scope. If yes, proceed to PL-4. If no, proceed to PL-6.

PL-4 Build Preliminary Estimates

Planner reviews Job Scope. The Planner reviews the Work Order History to determine if a plan has been developed in the past that he can use as a basis for the requested work. He also determines if this type of work has been done to this asset (or similar asset in another location) before. Review of notes from these jobs can provide valuable insight in developing an effective job plan for the new work.

Planner assembles all information gathered to date and develops a job plan. This includes the steps in executing the work, manpower estimates for each step, and the information that the craftsmen will need to perform the job correctly.

PL-5 Costs Approved?

Upon completion on PL-4, Supervisor reviews preliminary estimates. If approved, proceed to PL-7 to evaluate outage requirements. If no, proceed to PL-13 Move to Hold Status for future review by Asset Management Team.

PL-6 Engage Support to Refine Scope

Planner plays a key role in ensuring proper planning and preparation is completed for the Work Order – this includes a clear scope of work to be executed. Planner creates a "child" Work Request to engage the appropriate support resources to facilitate refinement of scope. Examples of support resources include but not limited to Maintenance Engineering, Reliability Engineering, Engineering Services, etc. (See Reliability Engineering Scope of Work process for more details.)

Procedures …

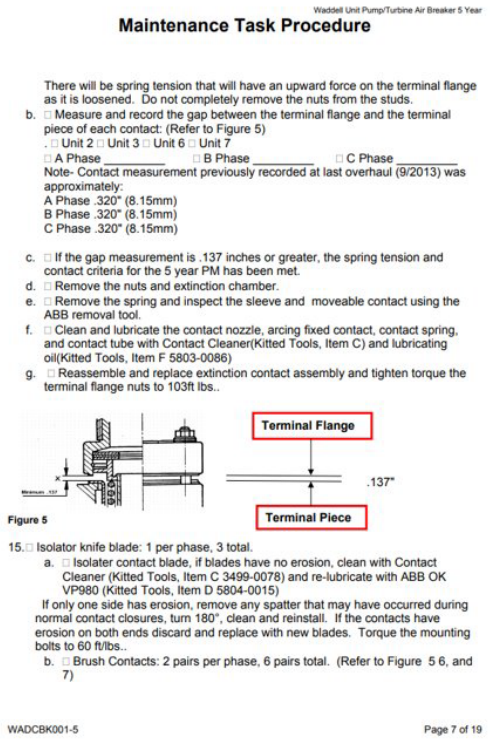
Equipment Maintenance Plans

Equipment Maintenance Plan (EMP)

PM ID / PM Schedule : %
PM MRC : 831
PM Location of Object : %
PM Description : %
PM Object / Equip ID Number : %
Parent System : %
PM Schedule Group : %

Object Parent: BSHDISCH

Asset Position System	Equipment ID	Equipment Description	Nesting Reference	PM ID	PM Description	PM Priority	PM Comp. Duration	W/O Evt Duration	PPM Document Description	Activity ID	Activity Trade	People Required	Estimate in Hours_SUM	Activity Duration		
P	BSHDISCHLT	Left Discharge Manifold/Line		BSHDSP001-5	BSH_Inspection of Left Discharge Manifold and Pipeline 5 Year - MRC 831	6	120	4	[> Bouse Hills Left Discharge Pipe Visual Inspection JHA 5 Year Procedure - 831.pdf <] [> Bouse Hills Left Discharge Pipe and Manifold Visual Inspection 5 Year Procedure <]	20	MEC	1	10	4		
						2										
	BSHDISCHOUTLT	Left Outlet Works System	BSHOUT	BSHOUT001-5	BSH_Outlet Structure 5 Year	4	120	2	[> Bouse Hills Outlet Structure 5 Year Procedure <]	10	MEC	2	20	1		
						4				20	ELE	1	10	1		
						2										
				BSHOUT001-A	BSH_Outlet Structure Annual	4	72	1	[> Bouse Hills Outlet Structure Annual Procedure <]	10	MEC	1	10			
						4				20	ELE	1		1		
						2										
	BSHDISCHOUTRT	Right Outlet Works System	BSHOUT	BSHOUT001-5	BSH_Outlet Structure 5 Year	4	120	2	[> Bouse Hills Outlet Structure 5 Year Procedure <]	10	MEC	2	20	1		
						4				20	ELE		10	1	07-Jun-2027	05-Oct-2027
						2										
				BSHOUT001-A	BSH_Outlet Structure Annual	4	72	1	[> Bouse Hills Outlet Structure Annual Procedure <]	10		1	10	1	03-Jun-2024	14-Aug-2024
						4					LE	1	4	1	03-Jun-2024	14-Aug-2024
						2										
	BSHDISCHRT	Right Discharge Manifold/Line		BSHRDP001-10	BSH_Electromagnetic Inspection of Right Discharge Pipeline 10 Year -831	6	120	4	[> Bouse Hills Right Discharge Pipe Visual Inspection JHA 10 Y Procedure - 823 <] [> Bouse Hills Right Discharge Pipe and Manifold Visual Inspection 10 Year Procedur <]	10	ELE	1	10	4	14-Jun-2027	12-Oct-2027
						1										
				BSHRDP001-5	BSH_Inspection of Right Discharge Manifold and Pipeline 5 Year - 831	6	120	4	[> Bouse Hills Right Discharge Pipe and Manifold Visual Inspection 5 Year Procedure <]	10	ELE	1	10	4	14-Jun-2027	12-Oct-2027



Waddell Unit Pump/Turbine Air Breaker 5 Year

Maintenance Task Procedure

There will be spring tension that will have an upward force on the terminal flange as it is loosened. Do not completely remove the nuts from the studs.

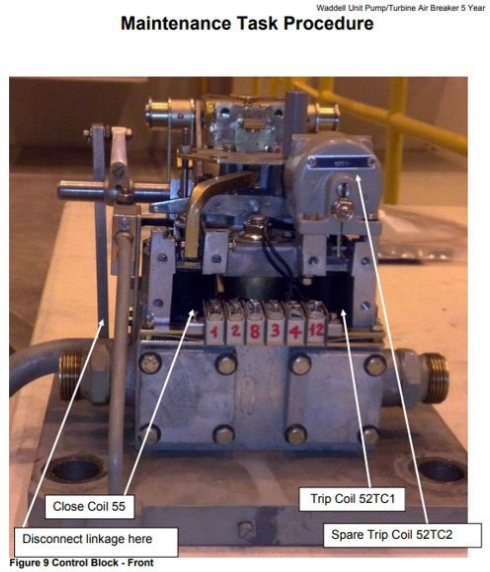
b. ☐ Measure and record the gap between the terminal flange and the terminal piece of each contact: (Refer to Figure 5)
. ☐ Unit 2 ☐ Unit 3 ☐ Unit 6 ☐ Unit 7
☐ A Phase _____ ☐ B Phase _____ ☐ C Phase _____
Note- Contact measurement previously recorded at last overhaul (9/2013) was approximately:
A Phase .320" (8.15mm)
B Phase .320" (8.15mm)
C Phase .320" (8.15mm)

c. ☐ If the gap measurement is .137 inches or greater, the spring tension and contact criteria for the 5 year PM has been met.
d. ☐ Remove the nuts and extinction chamber.
e. ☐ Remove the spring and inspect the sleeve and moveable contact using the ABB removal tool.
f. ☐ Clean and lubricate the contact nozzle, arcing fixed contact, contact spring, and contact tube with Contact Cleaner(Kitted Tools, Item C) and lubricating oil(Kitted Tools, Item F 5803-0086)
g. ☐ Reassemble and replace extinction contact assembly and tighten torque the terminal flange nuts to 103ft lbs..

Figure 5

15. ☐ Isolator knife blade: 1 per phase, 3 total.
a. ☐ Isolater contact blade, if blades have no erosion, clean with Contact Cleaner (Kitted Tools, Item C 3499-0078) and re-lubricate with ABB OK VP980 (Kitted Tools, Item D 5804-0015)
If only one side has erosion, remove any spatter that may have occurred during normal contact closures, turn 180°, clean and reinstall. If the contacts have erosion on both ends discard and replace with new blades. Torque the mounting bolts to 60 ft/lbs..
b. ☐ Brush Contacts: 2 pairs per phase, 6 pairs total. (Refer to Figure 5 6, and 7)

WADCBK001-5 Page 7 of 19



Waddell Unit Pump/Turbine Air Breaker 5 Year

Maintenance Task Procedure

Figure 9 Control Block - Front

16. Control block: (Refer to Figure 8 & 9)
a. ☐ Unbolt and remove the Kirk Key/lock
b. ☐ Remove the cover to the Control Block.
c. ☐ Measure and verify that the resistance of each coil is 115 ohms ± 10 ohms.
☐ Unit 2 ☐ Unit 3 ☐ Unit 6 ☐ Unit 7
Spare Trip Coil 52TC2 _____ ohms(Terminal 4 & 12)
Trip Coil 52TC1 _____ ohms(Terminal 8 & 3)
Close Coil 55 _____ ohms(Terminal 1 & 2)

WADCBK001-5 Page 11 of 19

- **Frequency**
- **Manpower**
- **Detailed Instructions**

Data …

Equipment Condition Data

- Failures present early warnings
- Focus on non-intrusive technology
- Based on both CAP and industry standards

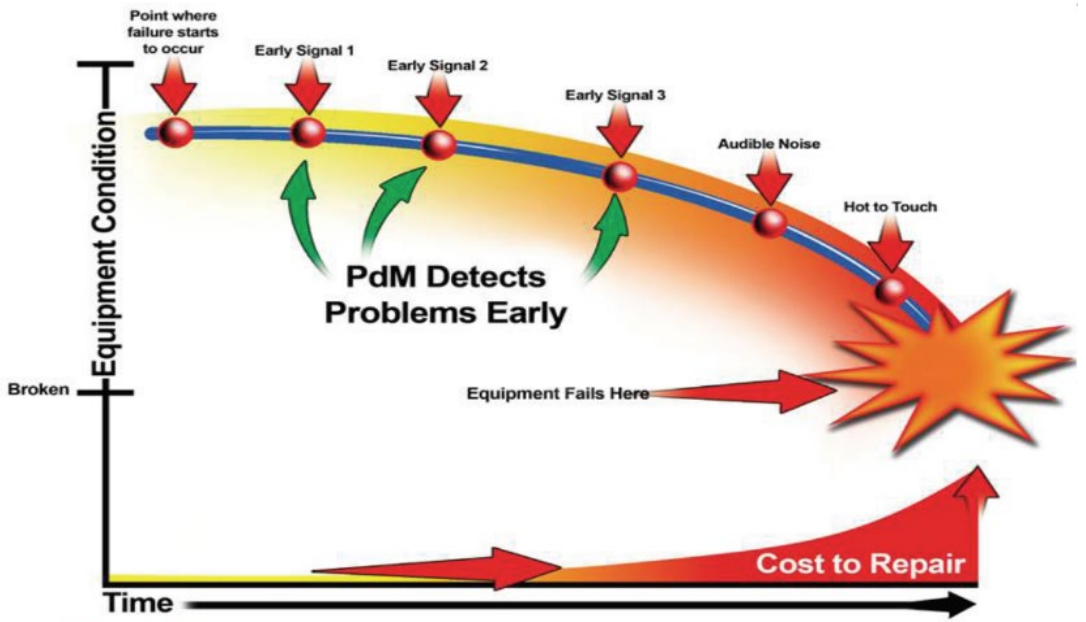
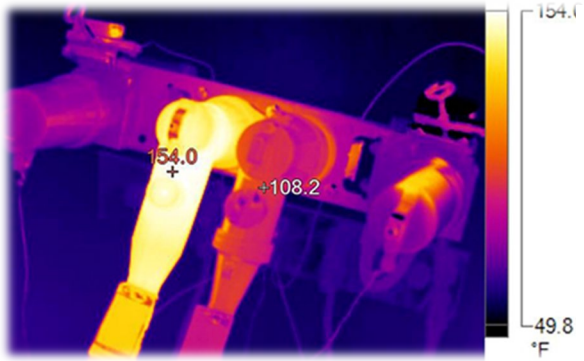


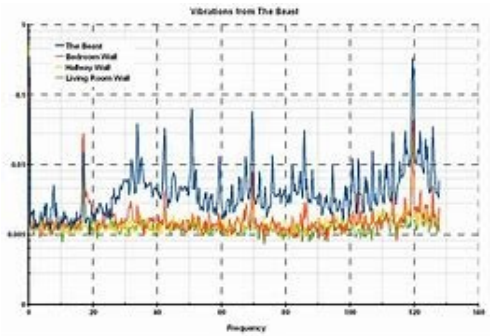
Figure 3: P-F curve

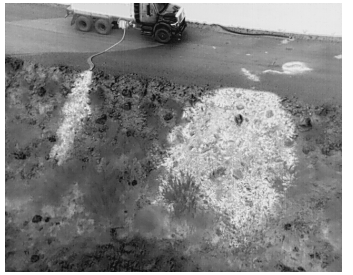
Courtesy of Allied Reliability

Technology …

- Visual Inspections
- Infrared
- Oil Analysis
- Vibration Monitoring
- Drones, ROV
- Online Monitoring
- Electrical Testing







Life Cycle Risk Management