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Asset Management for O&M



Briefing
19 September, 2007



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Agenda

- ◆ Purpose
- ◆ Background
- ◆ Progress Overview
- ◆ Future Actions

ASSET MANAGEMENT is the business and decision-making process for the operation, maintenance, repair, rehabilitation and replacement or disposal of assets that allows manager to maximize the asset productivity and manage the related risks and costs.



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Purpose

- ◆ Update Program and Progress of the LRD Asset Management for O&M Initiative
 - Status - Developing and Testing an AM Process for NAV and FRM Projects which Identifies and Quantifies Project Needs, Risks, and Impacts Status - Facility
 - Status - Condition Assessment Process and Execution
- ◆ Identify Future Program Direction



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*Background – Provide a Consistent, Unbiased,
Defendable AM Process to Prioritize Projects
and Project Needs Based Upon...*

- ◆ Greatest Need
- ◆ Greatest Risk
- ◆ Greatest Regional Impact (\$)
- ◆ Sound Investment Decision (Repair/Replace/Dispose)
- ◆ Other Priorities



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Background - Provide Management Tools to Evaluate System Health



- ◆ Graphically Tell our Story
- ◆ Overall System Health
- ◆ “Drill Down” Capability by Project in 1–3 Clicks
- ◆ Auto Update from Condition Assessment

Project – Lock and Dam 7, Allegheny River

Condition – Component: US gate machinery out of service – hydraulic

Risk – Single lock out of service

Impact – Regional loss of \$1

Estimated Cost to Repair – \$500K



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Background - Goals and Objectives

- ◆ Develop an Asset Management process that is unbiased, transportable, transparent and defensible.
- ◆ Measure and compare project needs, risks and impacts using the same process and the same relative scale for regional prioritization.
- ◆ Prioritize project budget packages on a regional basis considering needs, risks and impacts .
- ◆ Automate assessment process/analysis as much as possible.



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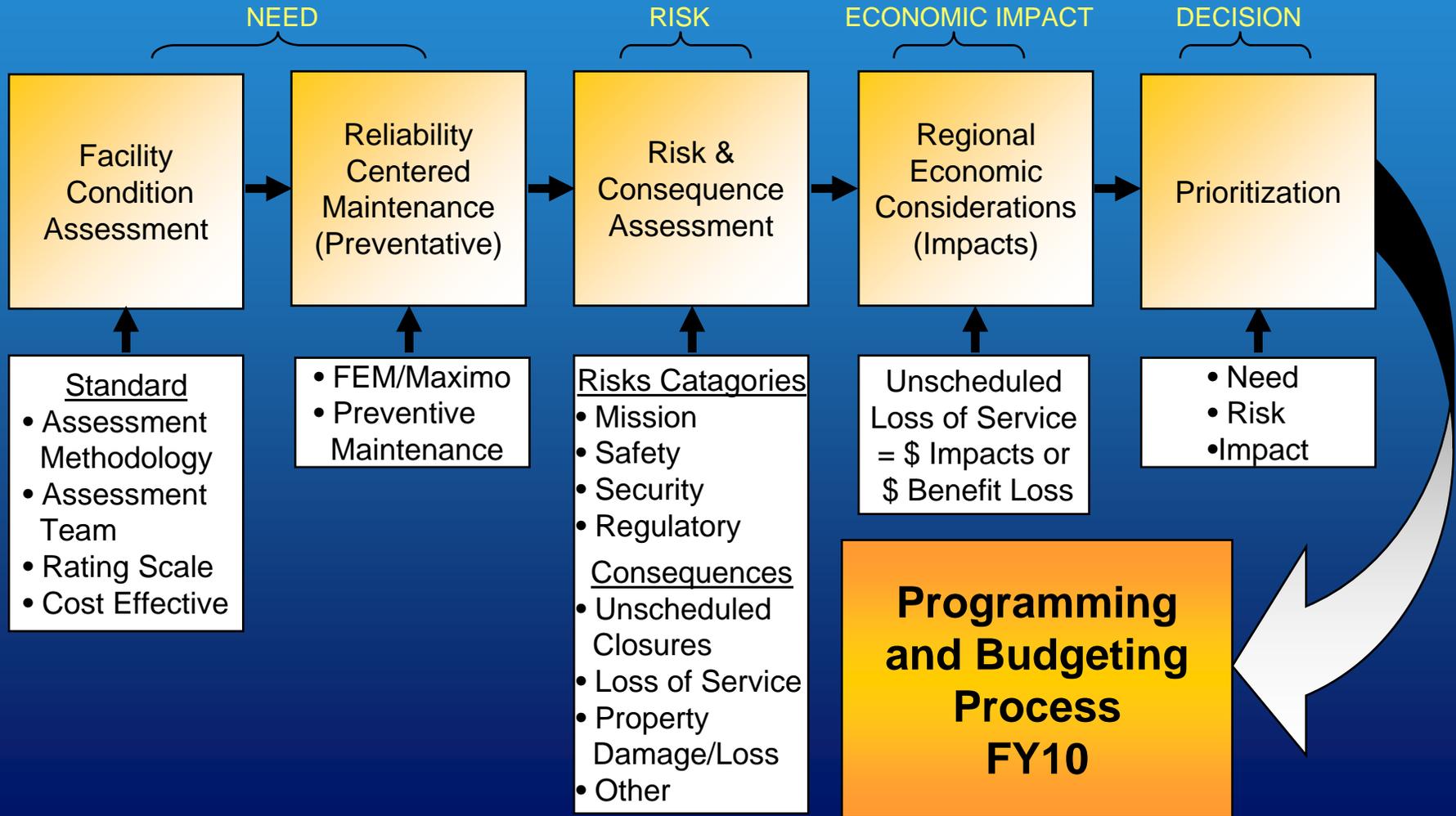
Automation Objectives

- ◆ Condition Assessment Laptop Tool
 - Consistent data format and data entry
 - User friendly/field use friendly
 - Build on past assessment data and photos
 - Judgment consistency “-10” manual

- ◆ Management and Analysis Tool
 - Automated update from laptop field tool for real time analysis and display
 - Incorporates GIS graphics in presentations
 - “Low Tech” displays w/ “drill down” capability to tell our story



LRD Asset Management for O&M - Process Framework





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Component Based Condition Assessments

- ◆ Project **condition assessments** begin at major component level

- ◆ Components are grouped as part of a **standard equipment hierarchy** for common roll up

- ◆ Component **needs** are based upon **Condition and PM**.
 - Condition assessment is an educated judgment based upon documented or observed conditions. (5 level scale)
 - Condition levels are down graded when major component PM is past due.



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Component Identification

Component - specifically identified if

- Consequences of component failure will directly affect Mission, Safety, Security, Compliance
- Cost to maintain or repair component requires separate O&M budget package and can not be addressed under normal annual routine/recurring maintenance budget (Level 2)



Condition Rating Scale

Asset Management - Performance Reliability Assessment Standards for Navigation Projects	
Condition Classification	Definitions
A Adequate	<ul style="list-style-type: none"> - There is a high level of confidence that the feature will perform well under the designed operating conditions. This confidence level is supported by data, studies or observed project characteristics which are judged to meet current engineering or industry standards. - There is a limited probability that the verified degraded conditions will cause an inefficient operation, or degradation or loss of service.
B Probably Adequate	<ul style="list-style-type: none"> - There is a low level of confidence that the feature will perform well under designed operating conditions, and may not specifically meet engineering or industry standards. The feature may require additional investigation or studies to confirm - There is a low probability that the verified degraded conditions will result in inefficient operation, or degradation or loss of service.
C Probably Inadequate	<ul style="list-style-type: none"> - There is a low level of confidence that the feature will not perform well under designed operating conditions, and may not specifically meet engineering or industry standards. The feature may require additional investigation or studies to confirm adequacy. The feature does not meet current engineering or industry standards. - There is a moderate probability that the verified degraded conditions will result in inefficient operation, or degradation or loss of service
D Inadequate	<ul style="list-style-type: none"> - There is a high level of confidence that the feature will not perform well under designed operating conditions. Physical signs of distress and deterioration are present . Analysis indicates that factors of safety are near limit state. The feature deficiencies are serious enough that the feature no longer performs at a satisfactory level of performance or service. - There is a low probability that the verified degraded conditions will result in inefficient operation, or degradation or loss of service.
F Failed	<ul style="list-style-type: none"> - The feature has FAILED - Historically the feature regularly experiences scheduled or unscheduled closures or loss of service for repairs.



Standard Equipment Hierarchy (systems) for NAV/FRM Projects

Projects by HUC Code

- ◆ Dam
 - Structure
 - Gates & Operating Machinery
- ◆ Overall Project Support
 - Utilities, Distribution & Controls
 - Maintenance & Emergency Closure System
 - Misc. Support Components
- ◆ Lock Chamber (Primary & Auxiliary)
 - Structures
 - Gates & Operating Machinery
 - Filling & Emptying System

NAV

FRM



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Component Data Base Requirements

- ◆ Component Risk Category Application-weighted consequence of component failure wrt

Mission

Safety

Security

Compliance

Catastrophic Failure(?)

- ◆ Components dependency on other components
- ◆ Components redundancy with other components



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Automated Tools - Risk Consequences Categories & Levels Set by FCAT

◆ **Mission**

- High – Unscheduled Loss of Service (only level to have impact \$)
- Medium – Unscheduled Reduction in Service
- Low – Deficiency Should Not Degrade Service Level or Efficiency

◆ **Safety**

- High – Could Cause Loss of Life or Property
- Medium – Could Increase Employee Exposure or Cause Personal Injury
- Low – Unsafe Condition Exists but Can be Controlled by Management Action which may Result in Inefficient Operation

◆ **Compliance**

- High – Violates Statute
- Medium – Violates Regulation
- Low – Violates Policy

◆ **Security**

- High – Deficiency will Compromise Mission Essential and Vulnerable Areas (MEVA) Could Affect Mission
- Medium – Deficiency has Limited Affect on MEVA
- Low – Deficiency Does Not Affect MEVA



Prioritization Metrics

◆ **Need** - Condition & PM Assessments

- Based upon ability to “perform”
- Probability of component failure which results in loss of service

◆ **Risk** – Probability of Consequence

- Components assigned consequence type and level (based component failure)

◆ **Impacts**

- Benefit or Dis-benefit Costs
- Based only on loss of service (Daily for NAV, Annual for FRM)
- Population at Risk for FRM



Relative
Condition/Risk
Indicator
(Value)



Dollars
&
People



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Automated Condition Reporting Process

- ◆ Standard Equipment Hierarchy
- ◆ Flexible at Component Level
- ◆ Mission Critical Indicator
- ◆ Condition Rating
- ◆ Comments (Standard/Unique)
- ◆ Risk Category Indicators
- ◆ Automated Version to Include Additional Information, Help Features, Logic and Auto Rollup
- ◆ Photographs

Project: Markland L&D		Asset Management - Summary of Condition Assessments and Their Affect on Performance Reliability		
Miter Gate & Operating Machinery Conditions	Condition Assessment			
	MCC (Y/N)	Condition Rating (5 Levels) A, B, C, D, F	Risk Category (5 Categories) SF,SC,M,ST,CF	Observations
	Miter Gate Structures, Seals and Contact Blocks			
Primary Lock - US Gates	Y	D	M	Primary gates have reached their fatigue life and should be replaced per the major rehab study performed by the Louisville District.
Primary Lock - DS Gates	Y	D	M	
Auxiliary Lock - US Gates	N>Y	C	M	Auxiliary gates are near the end of their fatigue life and should be replaced per the major rehab study performed by the Louisville District.
Auxiliary Lock - DS Gates	N>Y	C	M	
Miter Gate Anchorage, Pintle and Miter Device				
Primary Lock - US Gates	Y	B		
Primary Lock - DS Gates	Y	B		
Auxiliary Lock - US Gates	N>Y	B		
Auxiliary Lock - DS Gates	N>Y	B		
Miter Gate Operating Equipment				
Primary Lock - US Gates	Y	B		Strut arms need replacement when miter gates are replaced.
Primary Lock - DS Gates	Y	B		
Auxiliary Lock - US Gates	N>Y	B		
Auxiliary Lock - DS Gates	N>Y	B		
Miter Gate Controls and Position Indicators				



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Automated Assessment Tool

ACOE Data Collection

Edit Help

Navigation | Flood Damage Reduction

Project Selection

District: LRP-Pittsburgh

- Allegheny
 - L/D 2 (LRP)
 - Lock Structures
 - Lock Buildings
 - Lock Walls
 - Mooring Cells
 - Miscellaneous
 - Miter Gate & Operating Machinery
 - Filling/Emptying Valves and Operating
 - Dam Structures
 - Dam Gates and Operating Machinery
 - Bill Young L/D (LRP)
 - L/D 4 (LRP)
 - L/D 5 (LRP)
 - L/D 6 (LRP)
 - L/D 7 (LRP)
 - L/D 8 (LRP)
 - L/D 9 (LRP)
 - Clinch
 - Cumberland
 - Green
 - Kanawha
 - Monongahela
 - Tennessee
 - Chicago
 - Niagra
 - St. Marys
 - Ohio

Component Evaluation

Component	Mission Critical	Rating	View DASH-10 Help
Control Shelters	<input type="checkbox"/>	ADEQUATE	View Help
Maintenance Building	<input type="checkbox"/>		View Help
Land Wall Operations Building	<input type="checkbox"/>		View Help
Middle Wall Lock Building	<input type="checkbox"/>		View Help
River Wall Lock Building	<input type="checkbox"/>		View Help
Admin Building	<input type="checkbox"/>		View Help
Davis Building	<input type="checkbox"/>		View Help
*	<input type="checkbox"/>		

Laptop Screen Under Development and Revision

Standard Comment

Select Comment: Select predefined comment...

Predefined comments can be selected here. These are populated from the DASH-10 document.

Custom Comment

Custom comments can be entered by the evaluator here.

Images

View All Images

Add Image

Clear Form

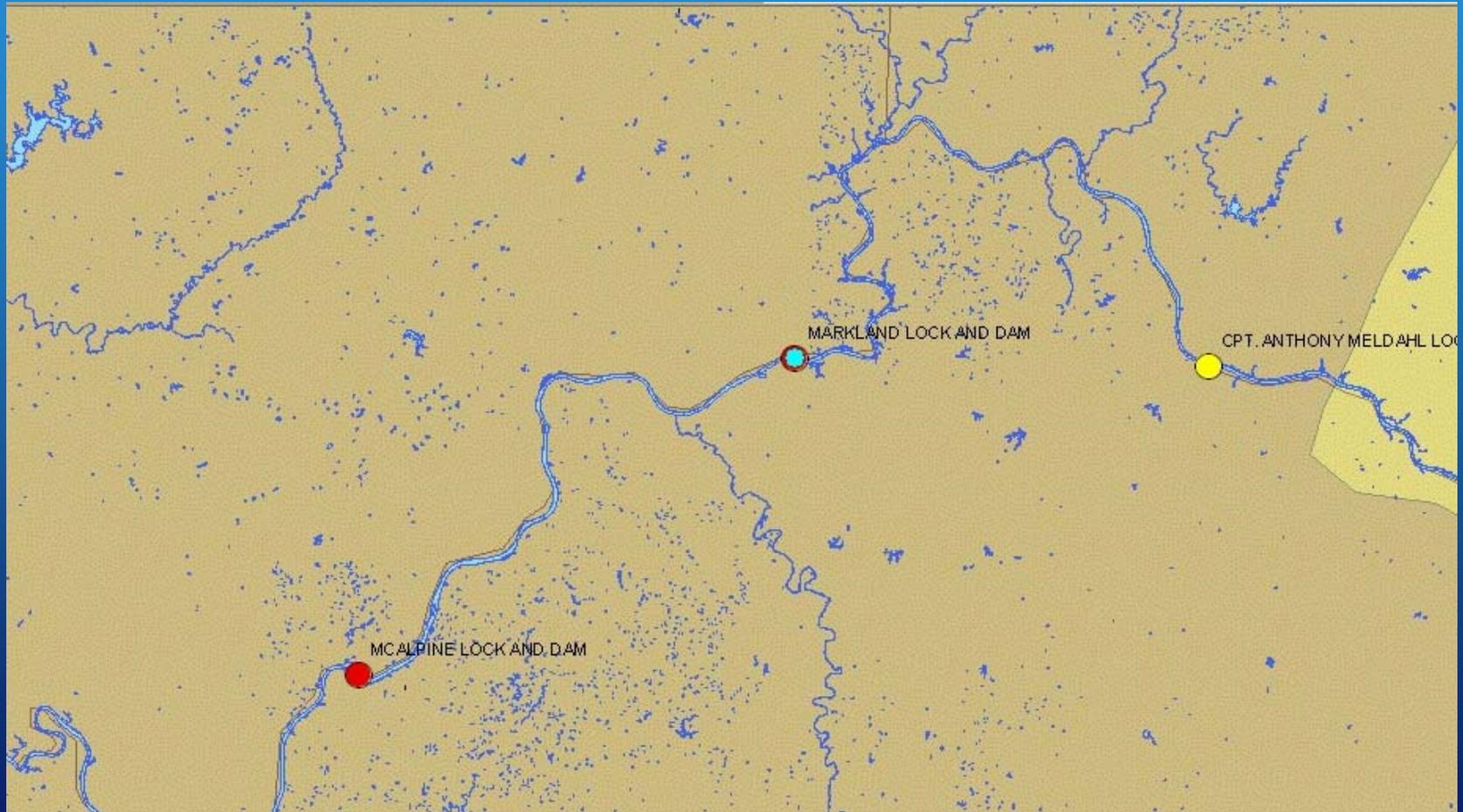
Complete Evaluation



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Automated Management Tool - GIS Presentation

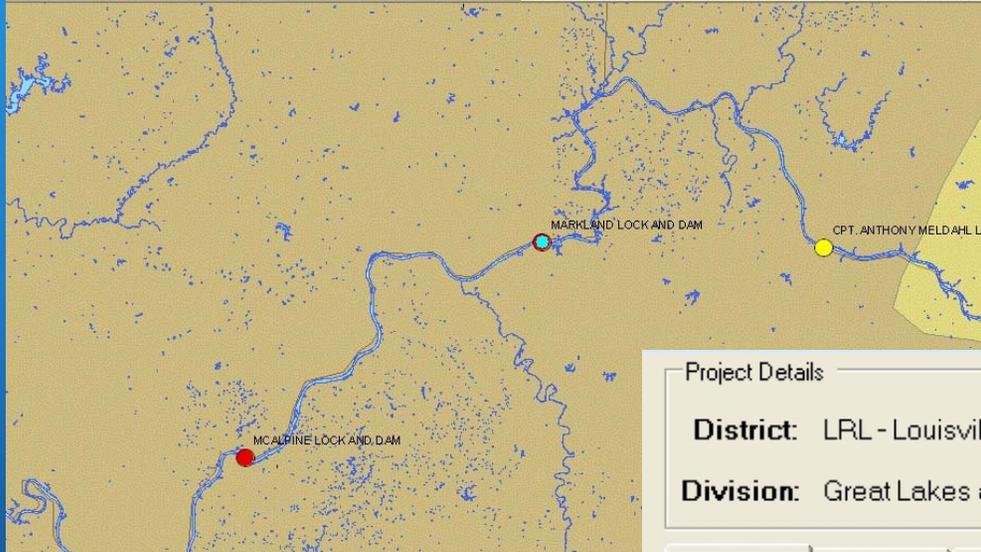




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Automated Management Tool - Analysis Presentation



Project Details

District: LRL - Louisville

Waterway: Ohio

Division: Great Lakes and Ohio River Division

Project: Markland Lock Dam

Project Risk | System Risk | Component Risk | Cost

1.35

Mission Critical Risk

1.11

Safety Risk

0.45

Security Risk

0.94

Compliance Risk

\$0.0

Failure Impact Cost



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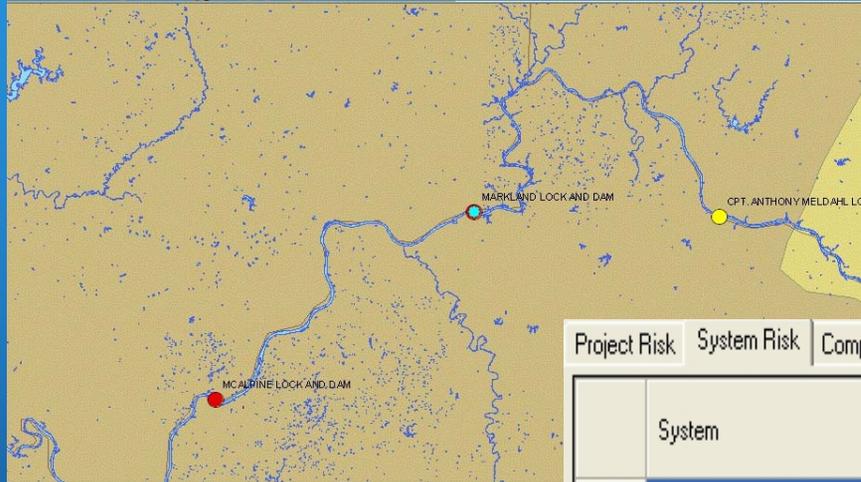
	System	Mission Criticality Average	Safety Criticality Average	Security Criticality Average	Compliance Criticality Average	Show System Components
▶	Lock and Dam Maintenanc...	3.95	4.38	0.00	0.00	<input checked="" type="checkbox"/>
	Utilities, Distribution and Co...	3.50	2.50	2.50	3.25	<input checked="" type="checkbox"/>
	Miter Gate & Operating Mac...	3.37	3.25	0.00	0.00	<input checked="" type="checkbox"/>
	Lock Structures Conditions	3.00	1.50	1.50	1.50	<input checked="" type="checkbox"/>
	Filling/Emptying System	2.76	0.00	0.00	0.00	<input checked="" type="checkbox"/>
	Dam Gates & Operating Ma...	2.53	2.50	0.00	0.00	<input checked="" type="checkbox"/>
	Dam Strcutres Conditions (Fi...	2.50	0.00	0.00	0.00	<input checked="" type="checkbox"/>
	Miscellaneous Support Syst...	2.33	2.23	2.00	2.00	<input checked="" type="checkbox"/>
*						<input type="checkbox"/>



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Project Details

District: LRL - Louisville **Waterway:** Ohio

Division: Great Lakes and Ohio River Division **Project:** Markland Lock Dam

Project Risk | System Risk | Component Risk | Cost

1.35 **Mission Critical Risk**

System	Mission Criticality Average	Safety Criticality Average	Security Criticality Average	Compliance Criticality Average	Show System Components
▶ Lock and Dam Maintenanc...	3.95	4.38	0.00	0.00	<input checked="" type="checkbox"/>

Component	Mission Criticality	Safety Criticality	Security Criticality	Compliance Criticality
Bulkhead	4.50	4.50		
Gate Structures: Primary Lock - US Gates	4.50	3.50		
Gate Structures: Primary Lock - DS Gates	4.50	3.50		
Power Cabling Load Side of Switchgear	4.50	3.50	2.50	
▶ Bulkheads	4.00	4.00		
Bulkheads	4.00	4.00		
Bulkhead Crane	3.50	4.50		
Cross-overs in Lock Chamber: Primary Lock	3.50	2.50		
Gate Anchorage: Primary Lock - DS Gates	3.50			
Gate Anchorage: Primary Lock - US Gates	3.50			



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Top Dozen Roll-Up by Risks and Impacts

Navigation Project	Risk Summary					(Prioritized by Impact Costs then Overall Condition/Risk Indicators) Components at Risk
	O	M	S	SC	C	
McAlpine	Red	Red	Orange	Orange	Orange	Dam & Miter Gates
L/D 53	Red	Red	Yellow	Yellow	Yellow	Lock Walls (Missing Section), Miter Gate, Valves
L/D 52	Red	Red	Orange	Red	Orange	Bear Traps, Miter Gates. Lock Walls, Access
Greenup	Red	Red	Orange	Green	Orange	Miter Gates, Dam/Lock Bulkheads, Crane
Markland	Red	Red	Orange	Green	Orange	Miter Gates, Valves, Bulkhead Crane
Smithland	Red	Red	Orange	Yellow	Orange	Dam Gates & Connections, Sill Damage
Emsworth	Red	Red	Red	Red	Green	Dam Gates, Bulkheads & Structure
Soo	Red	Red	Orange	Yellow	Green	Poe Lock Gates, Mac Lock Machinery & Maint. Bulkheads
Winfield	Orange	Orange	Orange	Yellow	Orange	Lock Wall Deterioration, Dam Gate Cables/Chains
Montgomery	Orange	Orange	Yellow	Green	Orange	Dam Gates, Valve Machinery, Bulkhead Lifting Beam
Dashields	Orange	Orange	Yellow	Orange	Orange	Lock Wall Movement
J.T. Meyers	Orange	Orange	Green	Yellow	Yellow	Stilling Basins, Dam Gate Cables/Conn, Switch Gear



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Status of Condition Assessments

- ◆ Navigation Projects Baseline Condition Assessments
 - 60 Projects Assessments Completed
 - Data entered into software
 - Initial prioritization output looks promising

- ◆ Flood Risk Management Projects Baseline Condition Assessments
 - Aug-Sep 07 complete baseline condition assessments for FRM, 21 projects
 - Oct – Dec 07 complete remaining 36 projects and load all field data into laptop tool



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Program Progress Summary

		NAV	FRM
Facility Condition Assessment Process – Beta Test	% Complete	100%	100%
	Target Completion	30 Jan 07	1 Mar 07
Execute Condition Assessments – 60 Navigation Sites and 83 FRM Sites		100%	37%
		11 May 07	30 Nov 07
Assessment Report Reviewed and Analyzed for Rollup (Condition Based)		100%	6%
		18 May 07	30 Dec 07
Complete Development of Automated Data Input tool for Condition and PM		70%	40%
		30 Sep 07	30 Oct 07
Complete Development of Automated Management Tools		70%	20%
		30 Nov 07	30 Dec 07
FEM/Maximo Data Input for PM		5%	5%
		30 Sep 07	30 Sep 07



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Direction for FY/CY08

- ◆ Complete baseline condition assessments for FRM, 36 projects
- ◆ Test , Refine, Further Develop
 - **Laptop Assessment Tool**
 - **Risk and Impact Data Base for FRM and NAV**
 - **Rollup Analysis for FRM**
- ◆ Implement FEM/Maximo Data Input for Major PM - Sep 07
- ◆ Incorporate PM data extraction from FEM into analysis process
- ◆ Formally define connection with PRA and PI Programs
- ◆ Incorporate latest “Value” data requirement into analysis
(What is the Value of Risk are We Buying Down?)



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Direction for FY/CY08

- ◆ Structure and staff AM to meet demands - “....provide a permanent capability in LRP for AM”....M. White
- ◆ Automation Needs
 - Move from single computer to central server concept
 - Move from central server concept to Web based system
- ◆ Analyze, Summarize and Report – Dec 07
- ◆ Internal Technical Review
- ◆ Compare output of system to FY08-09 Budget Submittals
- ◆ Apply process FY10 Budget – Jan 08
- ◆ Customize individual project component data bases (failure consequences, impacts dependencies, redundancies)



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Questions?

