Aging Facilities:
How Agencies Assess, Prioritize and Maintain Their Aging Infrastructure

SAFETY & HEALTH LEARNING ALLIANCE

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Event Logistics

- Facilitator introduction
  - Mike Lipka, Knowledge Management Officer NASA Safety Center
- To ask a question
  - Type your question in the chat box at the bottom right
- The presentation will last approximately 90 minutes
- To get a closer look at the slides, select “Full Screen”
- Turn off the speakers on your computer

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Agenda

- Goals of the Safety and Health Learning Alliance
- Today's Panel Speakers
- Discussion and key points
- Wrap-up and next event

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Goals of the SHLA: The Four C's

- **COLLABORATE** Create a forum for collaboration
  - Repeatable process with trusted advisors
- **CONCENTRATE** Accelerate learning
  - "Quick hits" on timely, topical, and new approaches
- **CONTEXT** Learn from your peers—what they do and how they do it
  - Knowledge + Experience = Wisdom
- **CONNECT** Establish networking opportunities
  - Extend beyond events for personal and professional development

Learn more at https://nsc.nasa.gov/SHLA

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Today's Panel Speakers

- **Mike Seibert**
  - Asset Management Branch Chief
  - National Park Service
- **Dr. Ramesh Gulati**
  - Asset Management & Reliability Specialist
  - Jacobs in support of Arnold AFB
- **Mr. Carmelo Melendez**
  - Senior Real Property Officer
  - Department of Energy

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National Park Service

Park Facility Management Division

NPS Asset Management Program

Using Data to Manage Aging Facilities

EXPERIENCE YOUR AMERICA™

Agenda

- Asset Management Program Overview
- Inventory Diversity
- Capital Investment Strategy
- Portfolio Requirements/Resource Balancing – Optimization
- Deferred Maintenance Reporting
- Deterioration Rates and Budget Request
- Risk Assessment Codes
- Historic Asset Resources

Asset Management Program

The NPS Asset Management Program (AMP)is guided by Director's Order 80 which has EO 13327 and PL 98-540 and the National Historic Preservation Act as its cornerstones. The public law established the computerization of the national parks service's maintenance program and a comprehensive identification of facility management requirements and practices. The Executive order refined it with the following goals:

- Promote the efficient and economical use of the National Park Service's real property assets
- Ensure management accountability for implementing federal real property management reforms.
- Increase management attention on asset management issues by establishing clear goals and objectives, improving policies and levels of accountability, and taking other appropriate actions.

NPS AMP is built on asset life cycle management

This program addresses key asset management questions:

- What assets does NPS own?
- What is the condition of the portfolio?
- What is required to bring the portfolio up to acceptable condition and properly sustain it over time?
- Which assets are the highest priority and where should parks focus resources?

By understanding the make up, condition and requirements of its constructed asset portfolio, NPS can better articulate to Congress and other decision makers the life-cycle costs for both existing assets and potential acquisitions

Facility Management Software System

Data as of September 30, 2015

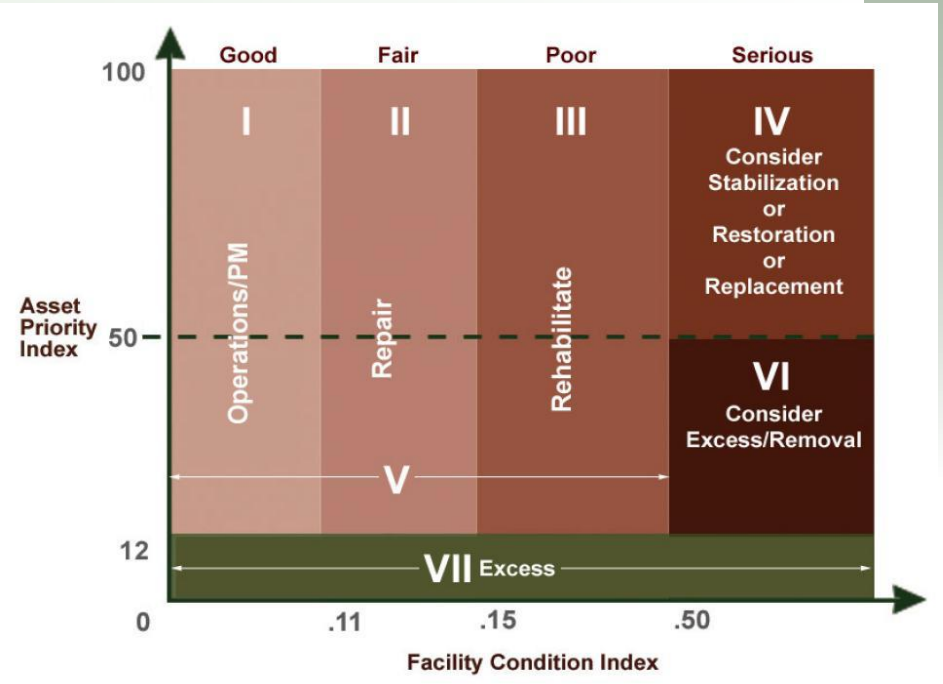
FMSS Inventory Report

Servicewide

	Number of Locations	FCI	DM	CRV	Quantity	Unit of Measure
1100 - Roads	7,769	0.232	$4,554,491,630	$19,592,808,082	13,653	MI
1300 - Parking Areas	7,911	0.402	$1,010,978,209	$2,513,172,643	152,347,447	SF
1700 - Road Bridges	1,719	0.113	$561,577,643	$4,949,572,973	7,248,380	SF
1800 - Road Tunnels	72	0.025	$45,201,233	$1,784,832,700	1,486,173	SF
2100 - Trails	6,212	0.099	$481,608,162	$4,857,127,228	95,676,259	LF
2200 - Trail Bridges	974	0.100	$40,501,509	$404,154,874	930,976	SF
2300 - Trail Tunnels	39	0.022	$5,101,946	$236,713,294	491,542	SF
3100 - Maintained Landscapes	7,547	0.025	$648,218,552	$26,441,812,295	4,441,923	AC
3800 - Boundaries	447	0.031	$33,850,003	$1,074,828,186	60,109,077	LF
4100 - Buildings	28,730	0.078	$2,142,060,017	$27,394,404,757	53,094,888	SF
5100 - Water Systems	1,548	0.110	$422,101,828	$3,852,745,811	43,306,300	GPD
5200 - Waste Water Systems	1,900	0.143	$270,506,658	$1,894,036,736	18,766,002	GPD
5300 - Heating and Cooling Plants	22	0.059	$3,513,087	$59,921,278	22	EA
5400 - Electrical Systems	548	0.133	$108,039,324	$814,623,570	6	EA
5500 - Communication Systems	855	0.062	$32,508,653	$524,895,773	847	EA
5700 - Fuel Systems	1,037	0.064	$8,050,261	$126,034,248	33	EA
5800 - Solid Waste and Recycling Systems	44	0.020	$915,297	$44,738,129	83,013,239	CY
6100 - Dams, Levees, and Dikes	409	0.008	$14,800,208	$1,823,451,494	17,014,381	CY
6200 - Constructed Waterways	569	0.019	$52,303,741	$2,722,465,776	570	MI
6300 - Marinas and Waterfront Systems	865	0.256	$832,577,698	$3,258,164,424	2,112,426	LF
6400 - Aviation Systems	57	0.010	$1,061,463	$102,728,660	151,617	LF
6500 - Railroad Systems	236	0.031	$30,107,101	$969,903,525	693,229	LF
6600 - Ships	9	0.024	$10,035,658	$414,827,969	0	TN
7100 - Outdoor Sculptures and Monuments	944	0.014	$58,399,341	$4,164,686,254	943	EA
7200 - Maintained Archeological Sites	1,806	0.019	$38,234,939	$2,041,036,805	22,751,821,367	SF
7300 - Fortifications	500	0.009	$472,470,690	$53,659,990,056	15,217,093	SF
7400 - Towers and Missile Silos	37	0.012	$690,253	$55,563,984	37	EA
7500 - Interpretive Media	2,507	0.059	$34,535,344	$583,013,407	2,502	EA
7900 - Amphitheaters	213	0.047	$12,973,528	$275,236,424	63,135	SEAT
Total:	75,526	0.072	$11,927,413,975	$166,637,491,356	-	-

Asset management is guided by Asset Priority Index (API) Facility Condition Index (FCI):

- The API is, in is simplest form, a prioritization method for each park asset.
- The API uses a 100-point scale and is based upon four criteria: resource preservation (natural and cultural), visitor use, park operations, and substitutability
- Each criterion is evaluated against an individual asset starting from the lowest to highest to determine the level that most accurately defines that asset.



FCI as defined is a simple measure of a facility's relative condition at a particular point in time. The FCI is the value of all deficiencies divided by the current replacement value. The higher the facility condition index, the worse the condition.

- FCI < .10 Good condition rating
- FCI = .11 - .14 Fair condition rating
- FCI = .15 - .49 Poor condition rating
- FCI > .50 Serious condition rating Heritage assets - Strongly consider stabilization / restoration. Non-heritage assets strongly consider replacement.

NPS has added Optimizer Bands (OB) as a refinement to the API/FCI

OBs are used to prioritize asset level funding and resource investment in the Unit Level Asset Portfolio.

- Captured in the Park Asset Management Plan (PAMP)
- API/FCI is used to generate initial OB – Optimization Refines this:
  - OB 1 - Highest = Most Important Assets: Best Condition
  - OB 2 - High = Important Assets: Best/Good Condition
  - OB 3 - Medium = Supporting Assets: Best/Good/Fair Condition
  - OB 4 - Low = Lower Priority Assets
  - OB 5 - Lowest = Minimal Investment (API<21) & Disposal balanced against unit level asset requirements ONPS FM Budget,

Capital Investment Strategy

- Departure from spreading funding across full asset portfolio.
- Mission criticality is the focus.
- Budget, requirements and resource based evaluation and reassignment of OBs.
- Balances OB commitments (based on % of PM requirements) with available budget and resources
- Capital Investment Strategy foundational business practice – Scoring is driven by OB, part of the sustainability of investments is reinforced by OB related commitment

Capital Investment Strategy (CIS)

FINANCIAL SUSTAINABILITY (FS)

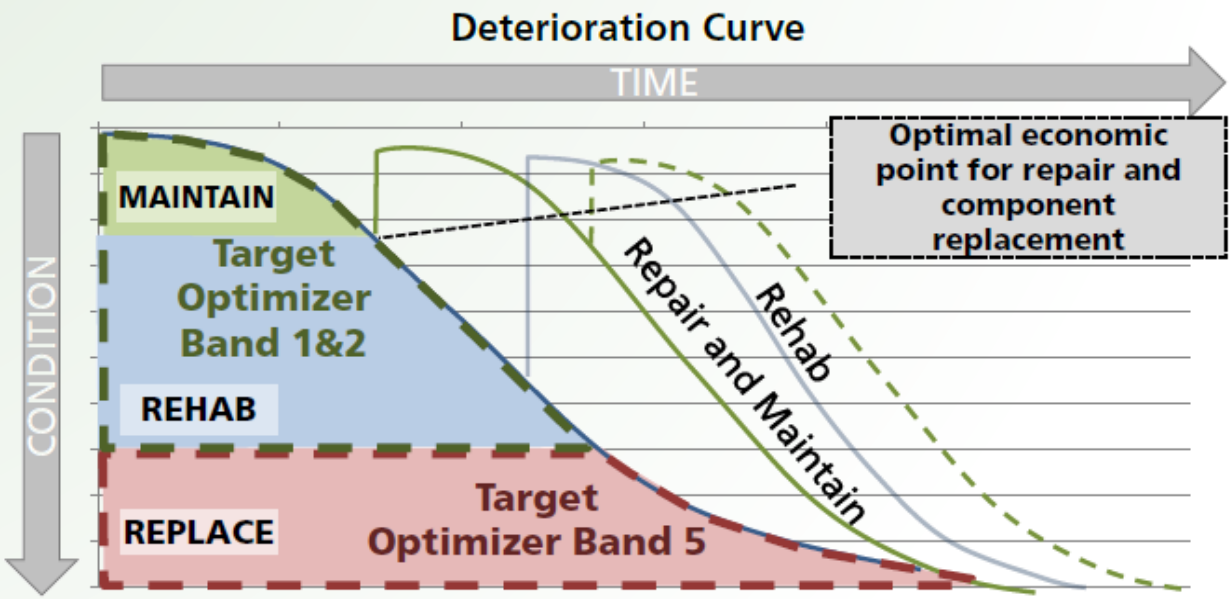
VISITOR USE (VU)

RESOURCE PROTECTION (RP)

HEALTH AND SAFETY (HS)

Four Elements

Take care of the most important assets that are in good condition to prevent them from accelerated deterioration



CIS elements defined

FINANCIAL SUSTAINABILITY (FS)	• build only what can be maintained • reduce liabilities • remove excess and unwanted assets
VISITOR USE (VU)	• invest in facilities that primarily serve visitors • invest in facilities that are primary points of recreation • invest in facilities that encourage all users to spend more time outdoors
RESOURCE PROTECTION (RP)	• preserve and protect natural resources • preserve and protect cultural resources
HEALTH AND SAFETY (HS)	• correct facility or site-related deficiencies and hazards that may cause injury or harm to the public, staff, or the environment

Optimizer Band Tool

Operation & Maintenance Optimizer Summary

Version 3.0.2, 2013.01.25

2013.04.11 Date of last file update

◄ Click to lock w

Yes ◄ Select No to H

Optimizer band		Default Limits API	Default Limits FCI	Inventory Count	%
1	Highest	88	0.150	12	
2	High	75	0.300	24	
3	Medium	50	0.750	29	
4	Low	21	1.000	7	
5	Lowest			24	
				96	

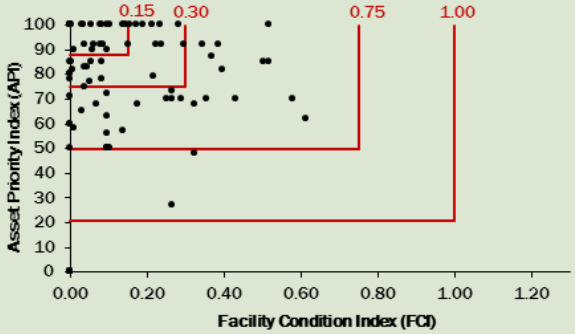
Enter Planned Funding Levels ▼ FO	RM	PM	Planned Funding Operations	Recurring	Preventive	Total O&M	% Req'd	Effective Requirements Total Eff. O&M	Operations	Recurring	Preventive
100%	100%	55%	$385,433	$146,671	$136,525	$668,629	86%	$780,332	$385,433	$146,671	$248,228
100%	100%	50%	$1,274,186	$618,636	$346,811	$2,239,633	87%	$2,586,444	$1,274,186	$618,636	$693,622
100%	100%	25%	$790,722	$493,672	$68,323	$1,352,717	87%	$1,557,687	$790,722	$493,672	$273,293
100%	100%	100%	$2,272,009	$879,993	$985,892	$4,137,893	100%	$4,137,893	$2,272,009	$879,993	$985,892
100%	100%	100%	$4,965,959	$842,323	$391,052	$6,199,333	100%	$6,199,333	$4,965,959	$842,323	$391,052
			$9,688,309	$2,981,294	$1,928,603	$14,598,206	96%	$15,261,689	$9,688,309	$2,981,294	$2,592,086
			66%	20%	13%		of				

▼Select "Effective" or "Raw"

FY13 O&M Budget Goal (less indirect costs/set asides) ► $1,800,000

Planned Funding EXCEEDS Budget Goal by $12,798,206!

Supplemental Resources Total	Operations	Recurring	Preventive
$0	$0	$0	$0
$0	$0	$0	$0
$0	$0	$0	$0
$0	$0	$0	$0
$0	$0	$0	$0
$0	$0	$0	$0



➔ Select Filters to View Subset in Graph and Tables	High	Low
API ►	100	0
Asset Code ►	All	*
Status ►	All	*
Occupant ►	All	*
Facility Type ►	All	*
Re-Optimizer Band ►	All	*
District ►	All	*

Condition Assessments

- Required to understand needs and condition of portfolio
- Try for 20% of the inventory annually
- Inspection findings are to be integrated into the Facility Management Software System (FMSS) to ensure that required corrective actions are included in budget requests
- Different types of assets require different frequencies of comprehensive assessment inspections as required by public law or regulations
- This data is used to develop models for predictive analytics

Deferred Maintenance Reporting

- NPS DM calculated annually from FMSS
- FMSS DM data is used for:
  - NPS Annual Financial Report
  - Transportation Bill Reauthorization
  - Federal Real Property Profile
  - Annual Budget Formulation / Requests investment scenario analysis
  - Public sharing of the maintenance backlog

Definition of Risk Assessment Codes

RACs are used to identify, prioritize, and correct deficiencies and hazards that can cause harm to people and/or resources.

- RACs represent the level of risk exposure associated with a hazard.
- RACs are commensurate with a work response in the NPS's maintenance management system, an IBM/Maximo® product.

Resource RACs

Vulnerability: Susceptibility of a resource to continued damage and/or degradation from social, material, or environmental factors.

Distinction: Measure of uniqueness, importance to the mission of the park to which it is aligned, and the protective regulatory basis of a natural or cultural resource.

		Vulnerability			
		Very High A	*High* B	*Moderate* C	*Low* D
Principal Distinction	I	1	1	2	3
Essential Distinction	II	1	2	3	4
Elevated Distinction	III	2	3	4	5
Important Distinction	IV	3	4	5	5

Figure 1. R-RAC Distinction/Vulnerability Matrix

R-RAC = Vulnerability x Distinction

Resource RAC Matrix

RAC Level	Description	Work Order Priority	Response Time
RAC 1 (Very High)	Immediate short-term action required to stabilize or control. Long-term action required within one year.	Critical (9)	Immediate
RAC 2 (High)	Short-term action required within 30 days to stabilize or control. Long-term action required within one year.	Critical (9)	30 days
RAC 3 (Moderate)	Resource stabilization required within one year until a long-term solution is implemented within one to three years.	Critical (9)	12 months
RAC 4 (Low)	Resource stabilization required within two years until a long-term solution is implemented within three to five years.	Serious (5)	2 years
RAC 5 (Very Low)	Resource stabilization may halt a threat, although accelerated degradation may begin to occur after five years.	Minor (1)	5 years

Data used to Calculate Deterioration Rates / Make Budget Requests

- NPS asset-specific facility deterioration rates were last calculated in a 2012 study and are expressed as a percent of CRV. It allows the calculation of annual expected deterioration in dollars for an asset. The deterioration rates are used to project facility condition given different funding scenarios.
- These are specifically used in the NPS DM Scenario Tool. This is used by NPS to project outyear FCIs at a Servicewide, Regional, or Park level.
- Used in the NPS Annual Green Book to project Regional FCIs and Critical Systems FCI for the next two fiscal years.
- Used to determine the steady state funding need for non-paved roads assets, i.e., the total funding required to just keep up with new DM and not increase it beyond existing levels.
- Used in portfolio planning scenarios such as the Centennial Initiative, OMB scenarios, or Departmental budget asks

NPS Historic Structure Resources

- NPS Technical Preservation Services
- The Secretary of the Interior's Standards
- Lighthouse Preservation

Questions?

Presented to
SHLA/NASA

Managing Aging Assets… reliability & safety perspective

Ramesh Gulati, Asset Management Group

26th July 2016

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Agenda

- Intro and Safety Minute
- Where are we (Asset/Infrastructure health)?
  - Current events
  - Issues
- Where are we heading?
- Structured Plan
- Conclusion

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Jacobs at a Glance

- One of the world's largest and most diverse providers of A&E, design/build, CM, and engineering/scientific services
- 69 years old, now employing more than 65,000 personnel
- Annual revenues of nearly $13B
- Markets
  - National Government
  - Chemicals
  - Refining (Downstream)
  - Infrastructure
  - Buildings
- Absolute commitment to **safety**

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Piper Alpha

North Sea oil production platform operated by Occidental Petroleum (Caledonia) Ltd.

- An explosion, and the resulting oil and gas fires, destroyed it on 6 July 1988, killing 167, including two crewmen of a rescue vessel; 61 survived
- The total insured loss was about £1.7 billion (US$3.4 billion).
- At the time of the disaster, the platform accounted for approximately ten percent of North Sea oil and gas production, and the accident was the worst offshore oil disaster in terms of lives lost and industry impact.

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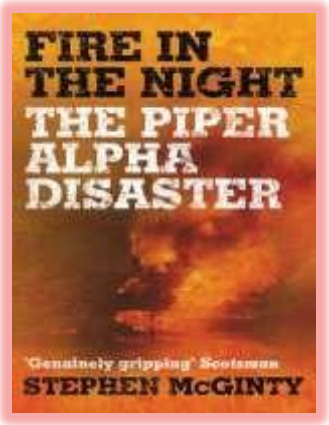
Accident Report and Learning

It concluded that the initial condensate leak was the result of maintenance work being carried out simultaneously on a pump and related safety valve. The inquiry was critical of *Piper Alpha's* operator, Occidental, which was found guilty of having inadequate maintenance and safety procedures, but no criminal charges were ever brought against the company.

- **Key Learnings:**
  - Lack of proper procedures –LOTO
  - Inadequate communication
  - Flaws in the design guidelines and practices
  - Misguided management priorities
    - tradeoffs between safety and productivity
  - Human errors - lack of training
  - Etc.



- The second part of the report made 106 recommendations for changes to North Sea safety procedures:
- 37 recommendations covered procedures for operating equipment, 32 the information of platform personnel, 25 the design of platforms and 12 the information of emergency services

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Water Infrastructure: Water Loss

- A staggering **46 Billion** liters of drinking water are lost globally **every day**.
- It's not a problem restricted only to the developing world either – **Montreal**, for example, loses **40%** of the water it produces.
- In **Ireland**, some **41 percent** of the nation's drinking water leaks out of delivery pipes
- The U.S. loses more than **1.7 trillion gallons ($ 2.6 billion)** of clean water **annually** due to the crumbling, antiquated water delivery systems in most of our cities.

(source: Failing Infrastructure.. 2030 Water Resources Group paper – www.itt.com/valueofwater)

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City Of Seattle – Infrastructure Issues

- May 2, 2007- Water Main Break Under University Bridge
  - A 24-inch main broke, causing a large sinkhole and worries about the integrity of the bridge abutment.
  - The incident also damaged an 8-inch gas main and a conduit housing Qwest trunk lines.
  - The bridge was not damaged, but water and gas service in the area had to be cut for most of a day.

- Many problems due to poor infrastructure are individually small but quickly add up, e.g., a vast number of small leaks causing some municipal water systems to lose up to 20% of their water during transmission.

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Are Our Old Infrastructure Safer?

The Baltimore and Potomac Tunnel in Maryland, opened in 1873, is among the choke points on the Northeast Corridor.

Credit Matt Roth for The New York Times (By EMMA G. FITZSIMMONS and DAVID W. CHEN, JULY 26, 2015

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The American Society of Civil Engineers (ASCE) gives the infrastructure of the United States an overall D grade and estimates it will cost $2.2 trillion to fix.

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Defining (Understanding) “Aging”

- An aging plant (equipment/ systems) which is no longer considered fully fit for purpose due to:
  - Deterioration or
  - Obsolescence

  In its <u>integrity</u> or <u>functional performance</u>.

Caution: Aging is not directly related to chronological age. There are few examples of very old equipment fully fit for purpose but showing evidence of early aging due to corrosion, fatigue or erosion failures. Many of old equipment may not be safe to operate as they may lack proper safety mechanisms to meet current standards.

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Defining Assets

- Asset: Something which has a value and creates a value
  - **Physical assets**
    - Infrastructure:
      - Buildings, roads, power distribution, water –utility systems etc.
    - Industrial equipment
      - Compressors, tanks, motors, pipelines , hydraulic systems , etc.
  - **Human assets**
  - Financial (money) assets

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Deteriorating Assets Consequences

- Increased safety risks to public and workers
  - Fires/explosion
  - Exposure to electrical shock
  - Exposure to falling parts
- Increased outages
- Increased public concerns & increased operating costs due to emergency responses
- Increased Liability
- Increased pressure for government to address these concerns
  - Increased regulatory oversight
- Loss of Revenue

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Asset Concerns / Issues

- Assets are getting older
  - Average age – over 40 + years – unfit or high cost to provide service
    - Much higher in Govt. – DoD, NASA, etc..
    - Commercial / industry facing similar challenges
  - Difficult to maintain and operate safely
    - Spares – parts are no longer available
    - Equipment designed back in 50's-60's-70's don't meet newer regulations for safer operations
    - Aging workforce (human assets) leaving the job market causing "knowledge" gap to take care of aging equipment
  - Lack of sufficient funding to upgrade – to make them safer and productively operate.

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Types of Equipment Needs Attention

- Electrical equipment
  - switchgears, sub-stations, cables, transformers, etc.
- Underground tanks, piping and pumps
  - water, hazardous material, etc.
  - gases
- Infrastructure - Major
  - bridges, roads & rail (transportation)
  - dams, water systems – waste, drinking, etc.
- Infrastructure – Minor
  - platforms, ladders, ducting, etc.

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Ladders/Platforms to Support Maintenance

New Platform to Support Maintenance

Platform being installed

After Platform Installed

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Maintainability - New approach

Suggested Approach – Have a Structured Plan

Asset Life Extension Plan (ALEP)

- Ensure there is an effective maintenance plan (don't ignore it)
- Conduct (Asset) Health Assessment
  - green (good now and near future; work 12-20 years)
  - yellow (good now but need work near future; work 5-12 years)
  - red (need work now.. safety issue; work now 0-5 years)
- Justification and Funding
  - Capability impacts
  - Safety impacts
  - O&M cost impacts
- Develop and Implement ALEP
  - Use ISO 55000 (AM standard) to make process robust

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Human Assets (People) Issues

- People are aging too…and retiring
  - Losing knowledge to operate/maintain those “old -aging” assets
  - Lack of interest of new generation of workforce in O&M field

- Assure “ Asset O&M knowledge” is available as part of ALEP

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Past, Present & Future of Assets

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Our Future Depends on Intelligent Asset (Infrastructures) – New I-35 Bridge

- State-of-the-Art Smart Bridge technology comprised of ***323 sensors embedded in the concrete***
- Continuous monitoring/collection of information collected by the sensors will assist the Transportation Dept. in managing operations by enhancing bridge inspections with structure performance data, maintaining efficient and safe traffic flow, and providing infrastructure security. Temperature, humidity and wind speed measurements also trigger the bridge's automated anti-icing system.
- Eco – conscious concrete design - When ultraviolet rays from the sun hit the surface of the concrete containing this eco-cement, a photo catalytic reaction occurs removing pollutants from the air. The cement also self-cleaning, removing contaminants from the surface of the gateway elements.
- Systems monitored the temperature of the concrete to ensure high-quality during curing.

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Conclusion

- Assets are aging .. Average 40 + years old, passed beyond its design life and their condition continue to deteriorate or obsolescence causing unsafe or very costly to operate and maintain
- Challenges in maintaining “Right Skilled” workforce to work on aging assets
- Develop and implement an Asset Life Extension Plan
  - Use ISO 55000 Standard - Asset Management process
- Ensure we have a good maintenance plan in the interim
- Design new assets with “smart- intelligent” features

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Agency Information Brief
Department of Energy
Real Property

SRPO – Carmelo Melendez

Infrastructure Overview

>10K Buildings

>119M Gross Sqft

Center for Advanced Energy Studies, INL

>7K Structures

Security fencing at LANL

>2.2M Acres

305-acre site of NREL's National Wind Technology Center

>$115B

Replacement Cost

>$2B

Operations & Maintenance

>$5B

Deferred Maintenance

>37 Yr

Average Age

>50 %

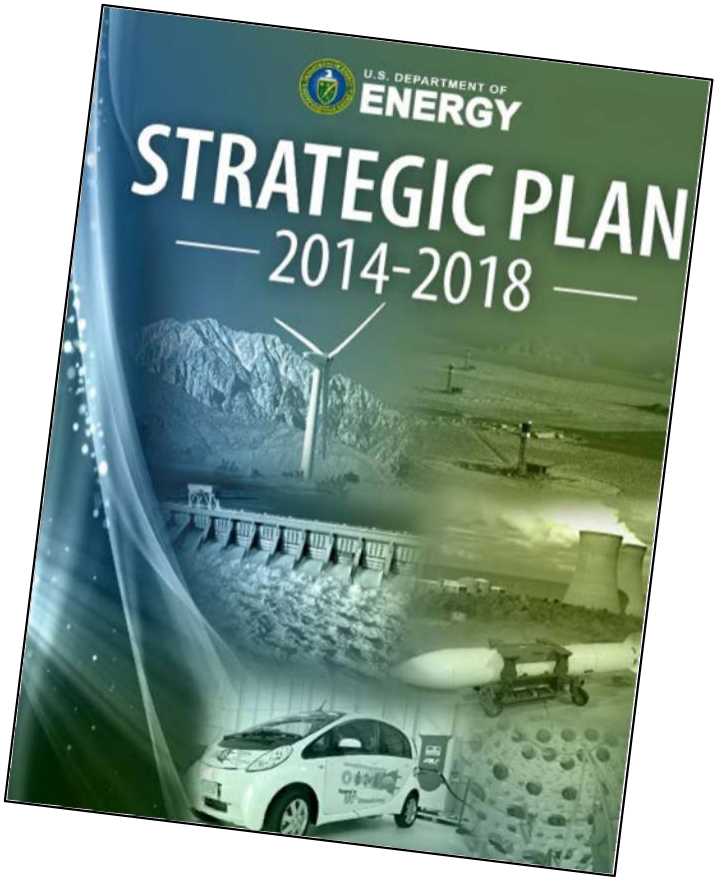
Inadequate/Substandard F&I

>99 %

Owned Assets-Labs/Sites/Plants

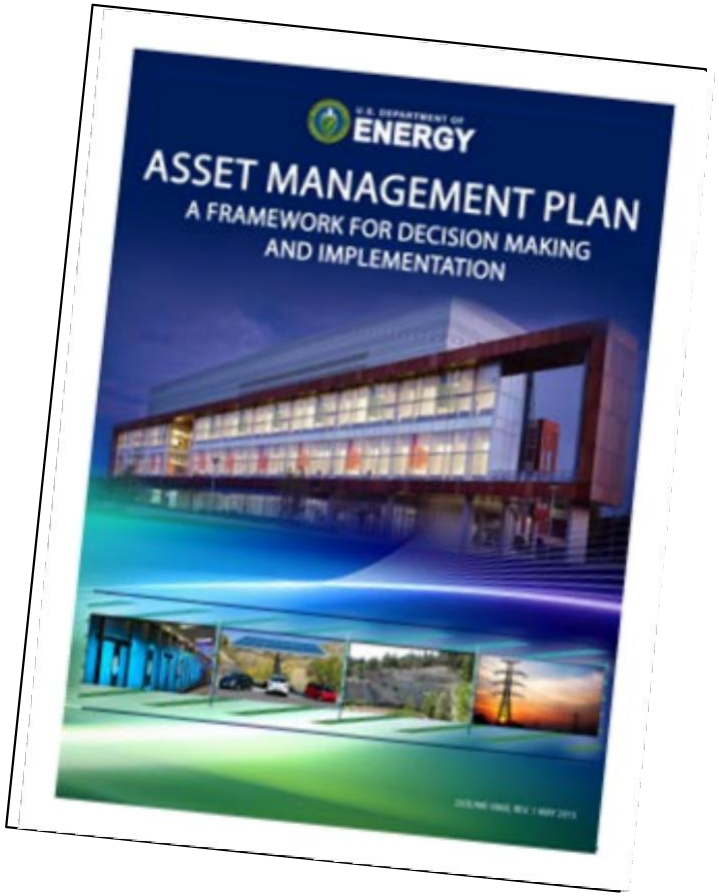
Strategic Plan - Goal 9

- Broad range of mission requirements
  - Nuclear Security, Innovation, Environmental Clean-up
- Achieving these missions requires a broad portfolio of unique specialized facilities that support both:
  - Direct mission requirements (e.g. nuclear materials processing; weapons component manufacturing; and large-scale scientific test facilities)
  - Mission support infrastructure (e.g. Installation & Land maintenance/management
- Identify the mission and core capability associated with all real property assets and assess the asset utilization for efficiency and efficacy by FY 15
- Dispose of 10 federal excess land properties by FY 16
- Eliminate 1,775,000 square feet of excess buildings and infrastructure through demolition or beneficial reuse by the end of FY 16
- Establish a list of real property available for reuse or disposal to non-federal entities by the end of FY 15



Updated Asset Management Plan

- Align with DOE Strategic Plan
  - Manage assets in a sustainable manner that support the DOE mission - DOE Strategic Objective 9
- Comply with GPRA
  - Develop strategic plans with long-term goals
- Modernize a foundational management document
  - Address current operating environment
- Promote efficient/effective use of assets and resources
- Internal & External Collaboration
- Positive Accountability of Portfolio
- RPEP FY16-20 at a Glance:
  - General Disposition ≈ 5M ft^2
  - O&W Redux ≈ 800K ft^2
  - Office Space Design Std = 200 uft^2/pp



Laboratory Operations Board

- Infrastructure Assessment WG
  "…assess how infrastructure is meeting mission…"
- Excess Contaminated Facilities WG
  "…analyze excess contaminated facilities inventory disposal options…"
- Focus on Condition Adequacy, Functionality, Utilization, Mission Readiness & Dependency within Ten Year Real Property Site Plans/Strategy
- Emphasis on end of mission Decontamination & Demolition
- Increase investment in sustainment, restoration, modernization and timely LCC decisions
- Codify Methodoly: Orders & Guidance

Increase Discretionary Appropriations Funding

Program ($K)	FY16 Budget Request		FY17 Budget Request		
	Mission Critical Infrastructure	General Purpose Infrastructure	Mission Critical Infrastructure	General Purpose Infrastructure	Excess Facilities
FE	$0	$31,989	$0	$46,514	$0
NE	$148,212	$63,614	$161,737	$65,448	$6,640
SC	$730,600	$377,653	$813,500	$407,586	$0
EM	$1,262,158	$464,832	$1,162,218	$627,532	$0
NNSA	$1,182,209	$967,934	$1,334,223	$1,354,900	$51,000
Total	**$3,323,179**	**$1,906,022**	**$3,471,678**	**$2,501,980**	**$57,640**

- The FY2017 budget request to OMB includes total discretionary funding of $6B for infrastructure, an increase of $800M over the FY2016 President's budget.
  - $150M of the increase is for direct mission infrastructure.
  - $600M of the increase is for general purpose mission support infrastructure, guided by Lab Operations Board-led assessment and prioritization process based on reducing deferred maintenance; increasing reliability; reducing footprint; and reducing risk to safety and to mission.

- The FY2017 budget also includes $58M specifically allocated for removal of excess facilities.

About 20% of DOE budget supports infrastructure; FY 2017 budget request proposes 13% increase with constrained caps.

Collaboration & Initiatives

- Underwent Customer Portfolio Plan Analysis
- Conducted Targeted Asset Reviews
- Increase in Declarations & Reports of Excess
- Partnered with Leasing & Utilization/Disposal for Alternative Financed Projects' Opportunities
- Continual Improvement in Internal Facilities Information Management System and Data Analysis & Field/Program Office Validation
- Measures of Performance for Portfolio Optimization
- Headquarters' Future

Backups/Expanded Information

Infrastructure Initiative Map

Current State

- No DOE enterprise-wide approach to infrastructure
- Mission need is not always the primary factor in driving decisions on infrastructure repair and replacement.
- Inconsistent data across laboratories and programs

Actions

- **Establish consistent definition and inventory of mission unique facilities**
- **Assess the condition of assets to support program capabilities**
- **Consider functionality of space and link to capabilities**
- **Link strategic plan, core capabilities and the assets that underpin them**
- **Report status aligned to core capability and DOE strategic objectives**

Desired Outcomes

- Consistent approach
- Uniform assessment of all assets
- Credible, data-driven infrastructure decisions aligned with program capabilities
  - Lab level
  - Program level
  - Enterprise level
- Supports DOE's mission and budget process

Infrastructure Initiative Methodology

Site Level Inventory of facilities

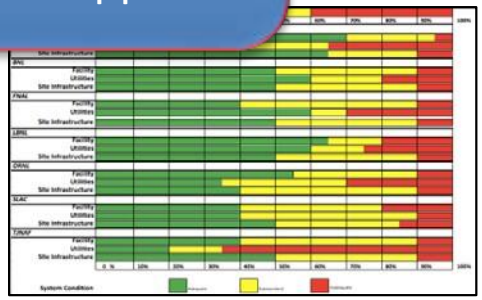
Current asset condition and cost of operations

Mission Readiness

Utilization

Gaps and surpluses

Visual assessment of infrastructure adequacy for mission support



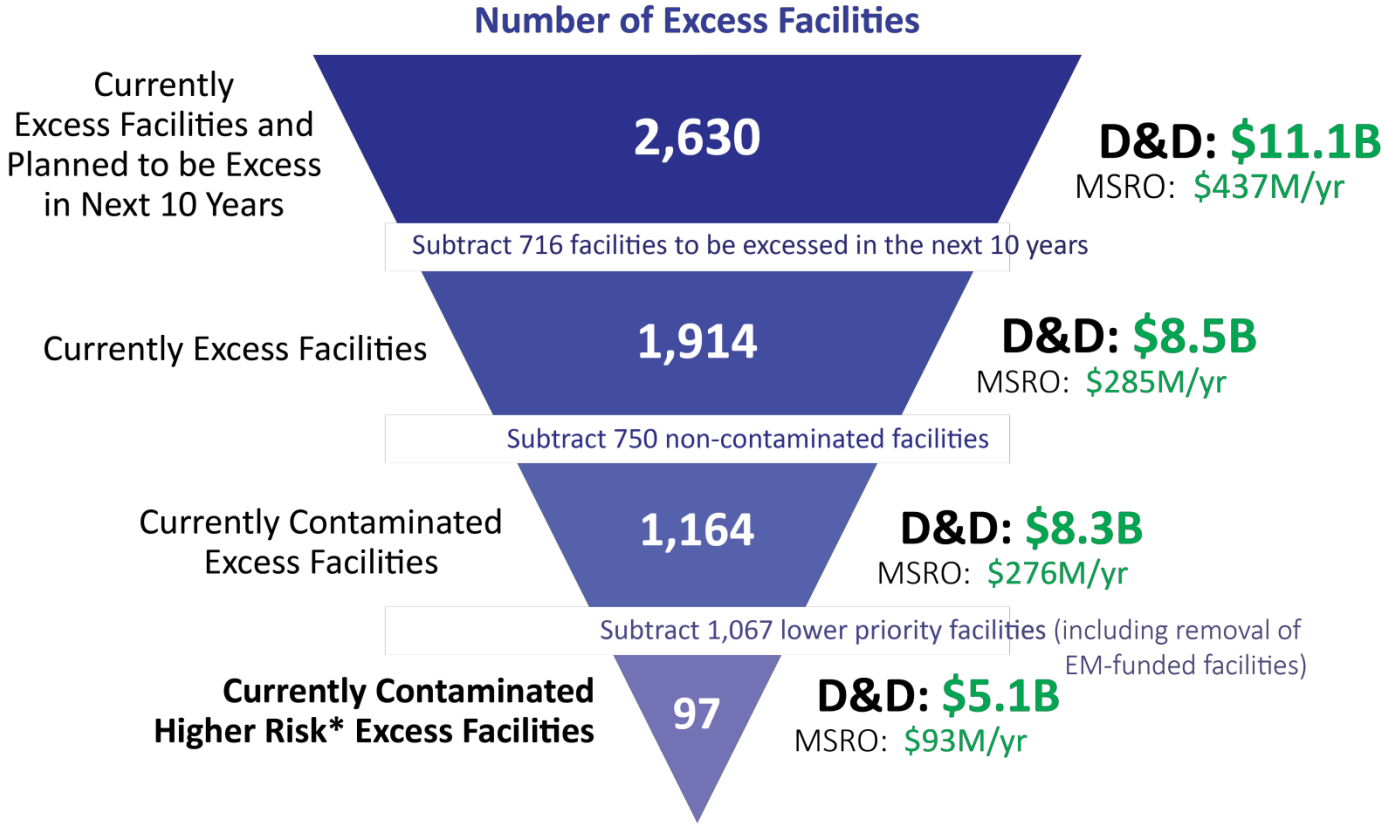
Managing risk through a structured Risk Registry

Risk Registry

Nr.	Core Capabilities	Statement	Consequences	Probability of Occurrence High / Mod / Low	Plan/Steps for Mitigation	Funding Required to Effectively Mitigate	Level at which Risk is Mitigated	Responsible for Mitigation Plans / Actions
1	Accelerator Science	JLab Electrical Distribution System is not adequate to support current and future mission requirements due to age and capacity	• The Lab will not be able to fully support experimental operations at 12 GeV.	High	• Replace Accelerator site primary and secondary electrical feeders (SLI) • Utilize GPP to fund most critical components if SLI funding is delayed	$29M	Office of Science	-----
2								
3								
4								
5								

Management Tools

Excess Facilities Initiative Scope



*Based on site and program prioritization of higher risk related to safety, public health, and environmental impacts.

MSRO - maintenance, surveillance, repair, operation

**Note: The estimates of excess facility D&D costs are subject to uncertainty in terms of both the number of facilities included in the estimate and the cost to complete each facility. The Department is working to improve the completeness of excess facility designations in the Facility Information Management System, which is expected to result in an increase in the estimated number of excess facilities requiring D&D. Additionally, for those facilities that were included in this estimate, the cost estimate is preliminary and is subject to uncertainty of -50%/+100%.

Goals & Objectives for Real Property

Property Alignment

- Assess real property assets against program requirements
- Improve real property asset condition and utilization survey methods
- Implement and improve a knowledge-based approach to conduct facility condition assessments

Portfolio Management

- Plan, construct, sustain, and recapitalize facilities and infrastructure to support mission execution
- Evaluate acquisition methods in the planning process when analyzing alternatives
- Increase sustainment investments in real property
- Dispose of excess and unneeded property safely, efficiently, and in a timely manner
- Provide for safe, secure, and healthy workplaces

Performance Management

- Improve real property lifecycle cost identification, collection, and management
- Use performance measures to improve real property management
- Improve real property data to ensure it is complete and accurate
- Manage, integrate, and prioritize real property capital investment requirements enterprise-wide
- Implement real property benchmarking

Property Organization

- Establish Federal Real Property Officers responsible for plan implementation
- Implement a real property management professional development program
- Improve communications with sponsors and customers
- Develop and implement a recognition program for real property management excellence

SAFETY & HEALTH LEARNING ALLIANCE

Wrap Up and Next Event

- Visit the SHLA Web site at nsc.nasa.gov/SHLA
  - Video of this presentation, slides, event summary
  - Submit ideas for events
- SHLA Event Survey: We'd like to hear your feedback

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