

CAS/CAIS Users Group Meeting

Lawrence Livermore National Laboratory (LLNL)

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LLNL is a Multidisciplinary National Security Laboratory



- Established in 1952
- Approximately 6,000 employees
- 7 million gross square feet, 688 assets
- Annual federal budget: ~ \$1.5B

Although we are an NNSA site, we also have EM and SC facilities

LLNL Program History at LLNL

- Began in the early-1990s
- Established a dedicated “CAS Inspection Group”
- Integrated CAS/CAIS into facilities operations and maintenance systems
- Developed, created, and standardized a deficiency identification, ranking and prioritization processes

We are constantly self-evaluating our processes for efficiencies and improve data quality



At LLNL, we have integrated CAIS into our CMMS system to generate inspections

When generated, each inspection provides useful information to each **discipline**-based inspector:

Current facility contacts

Tailored inspection requirements

Latest MEL information

Current active deficiencies

MECHANICAL EQUIPMENT INSPECTION SHEET

Facility #: 123 Date: 10/12/2016
 Fac Name: Auditorium
 Fac Sq Ft: 7,742
 C-Date / Age: 01/01/1958 / 58

Inspector:

(MECHANICAL WORK BREAKDOWN STRUCTURE) = W

1. Mech.Cooling/Absorb Chillers	11. Mech.Cooling/Terminal Units	21. Mech.Heat/Vent/Terminal Units	Action Needed = A 1. Replace 2. Repair/Restore 3. Repair 4. Clean 5. Review Condition = C 1. Adequate 2. Poor 3. Fail
2. Mech.Cooling/Carefree Chillers	12. Mech.Cooling/Fan/Compressors	22. Mech.Plumbing/Compressed Air	
3. Mech.Cooling/Chemical Treatment	13. Mech.Cooling/Chilled Water Distrib	23. Mech.Plumbing/Domestic Water	
4. Mech.Cooling/Chilled Water Distrib	14. Mech.Heat/Vent/Air Handlers/Fans	24. Mech.Plumbing/Clean Waste Vent	
5. Mech.Cooling/Condenser Water Sys	15. Mech.Heat/Vent/Boilers	25. Mech.Plumbing/Natural Gas	
6. Mech.Cooling/Condensers	16. Mech.Heat/Vent/Chimney Treatment	26. Mech.Plumbing/Vacuum	
7. Mech.Cooling/Cooling Towers	17. Mech.Heat/Vent/Fuel Oil	27. Mech.Plumbing/Drinking Water Sys	
8. Mech.Cooling/Package/Condensing	18. Mech.Heat/Vent/Ductwork		
9. Mech.Cooling/Package/HVAC	19. Mech.Heat/Vent/Heating Hot Water Distr		
10. Mech.Cooling/Package/Reop Chillers	20. Mech.Heat/Vent/Clr Distr, Cond, Return		

Equipment Number	Stat	Run	Room No.	Location Description	Manufacturer	Model Number	Size/Capacity	Deficiency Info		Year Inst	Opt Year	Year Repl	Cost Addrs	Insp Type
								W	C					
123FE03	R			016 R. HALL OF Rm 202	Penn Ventilator	91CRABA	500 CFM	2	2	1975	1999			
123HMD-1	R			OUTSIDE SOUTHWEST ON 123HMD-1	Opten Mfg Co.	KX1T1005MXX1	1 KILOW							
123MFD-1	R			OUTSIDE SOUTHWEST ON 123MFD-1	Opten Mfg Co.	KX1T1005MXX1	1 KILOW							
123PRND-1	R			OUTSIDE SOUTHWEST CORNER	Nibco	BUTTERFLY TYPE								
123VFPD-1	R			THROUGHOUT	Carroll	BUTTERFLY TYPE								
123VNGD-1	R			OUTSIDE SOUTHWEST ADJ4	Fabco	825V-TYPE RP	2 IN							
123PCHD-1	R			OUTSIDE WEST NEAR WEST ENTRANCE	Koo									

INTERIOR ARCHITECTURAL INSPECTION SHEET

Facility #: 123 Date: 10/12/2016
 Fac Name: Auditorium
 Fac Sq Ft: 7,742
 C-Date / Age: 01/01/1958 / 58

Inspector:

(ARCHITECTURAL WORK BREAKDOWN STRUCTURE) = W

1. Int.Floor Finishes, Carpet	10. Int.Paint Finishes+Coatings, Conventional	18. Int.Wallcoverings, Paneling	Condition = C 1. Excellent 2. Good 3. Adequate 4. Poor 5. Fail Action Needed = A 1. Replacement 2. Repair/Restore 3. Repair 4. Clean 5. Review
2. Int.Floor Finishes, Resilient	11. Int.Paint Finishes+Coatings, Specialty	19. Int.Wallcoverings, Tile	
3. Int.Floor Finishes, Concrete	12. Int.Paint Finishes+Coatings, Finishes	20. Int.Ceilings, Acoustical	
4. Int.Floor Finishes, Cork Tile	13. Int.Partitions-Corner, Concrete/Masonry	21. Int.Ceilings, Drywall/Plaster	
5. Int.Floor Finishes, Tile	14. Int.Partitions-Corner, Drywall/Plaster	22. Int.Ceilings, Concrete	
6. Int.Floor Finishes, Wood	15. Int.Partitions-Corner, Stud/Tie	23. Int.Ceilings, Metal	
7. Int.Floor Finishes, Terrazo	16. Int.Partitions-Specialty	24. Int.Ceilings, Wood	
8. Int.Doors	17. Int.Toilet Partitions-Accessories	25. Spolly Sys/Integrated Ceiling	

ROOM #	TYPE OF ROOM	TOTAL Sq.Ft.	CEILING				FLOOR				WALLS													
			W	C	A	P	U	OPT	W	C	A	P	U	OPT	W	C	A	P	U	OPT				
100	1	Installation/Other	243																					
101	1	Conference	244																					
102	1	Telnet	103																					
104	1	Mechanical Utility Room	353																					
106	1	Telnet	103																					
107	1	Conference	830																					
108	1	Mechanical Utility Room	350																					
CLO.	1	Janitor's Closet	28																					
CORR1	1	Corridor	486																					
STAIR1	1	Stairs	157																					
205	2	Mechanical Utility Room	305																					
206	2	Auditorium	74																					
207	2	Conference	1,128																					
CORR1	2	Corridor (OP)	486																					
CORR2	2	Corridor (OP)	527																					
STAIR1	2	Stairs	91																					

DEFICIENCY REINSPECTION SHEET BY DISCIPLINE

Asset ID / Suite: 123

Defic No: 4043

Architectural

WBS Vol: C30 Interior Finishes WBS Desc: Int. Floor Finishes, Resilient Repair Urgency: Replace in 1-2 Years
 Comp Desc: INT.FLOOR,COMP.RESIL.SHEET,TLUSQFT
 Type: AVG ALL TYP,FLUR,RESILIENT
 Comp Service: CONTINUOUS/ONLINE
 Area: ARCH
 City at Loc: 26 SQFT
 Location: ROOM 102
 Equip ID: Condition: Poor Opt Year: 2015 Repl Qty: 26 SQFT Backlog: Y
 Comments: Purpose Desc: SEVERE DETERIORATION

Defic No: 82744

WBS Vol: C30 Interior Finishes WBS Desc: Int. Part/Finishes+Coatings: Conventional Repair Urgency: Repair in 3-5 Years
 Comp Desc: INT.PARTITION/SQFT
 Type: PAINT, MEDIUM PRESS WORK (INT)
 Comp Service: CONTINUOUS/ONLINE
 Area: ARCH
 City at Loc: 368 SQFT
 Location: ROOM 102
 Equip ID: Condition: Adequate Opt Year: 1999 Repl Qty: 368 SQFT Backlog: Y
 Comments: Purpose Desc: LIGHT DETERIORATION

Asset 123 Total: \$ 1,301

Comments:

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In August, LLNL migrated to DOE-CAIS



For the first time, LLNL is now with the rest of the DOE sites using CAIS

Facility component deficiencies are annually ranked and prioritized

Provided by client (by component)

Programs determine the Priority Risk Level (PRL) rank

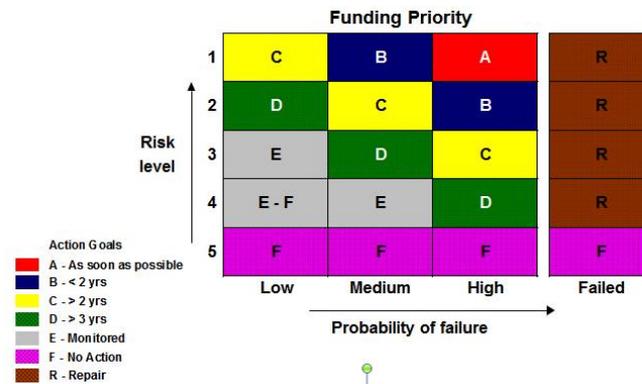
- 1 Mission shutdown – Failure of system and/or component will shut down program until system/component reactivated or failure will result in serious ES&H or Security issues. Ex: Shut down would result in significant financial or programmatic damage.
- 2 Significant Mission delay – Failure of system and/or component will significantly reduce program's ability to perform mission or failure may result in serious ES&H or Security issues. Ex: Limited shut down of major function or any condition that has a high probability of leading to a serious personal injury.
- 3 Moderate Mission delay – Failure of system and/or component may reduce program's efficiency in performing mission or may result in a minor ES&H or Security issue and may be deferred for a limited time. Ex: Equipment needed to maintain acceptable working conditions.
- 4 Minor Mission delay – Failure of system and/or component will have minor impact on the ability of the program to perform mission, and deferrable within current mission requirements. Ex: Flooring, interior painting, creature comforts.
- 5 No Mission delay – No corrective action required. Items are ranked here only if abandoned in place, no longer needed and/or inoperable. No maintenance or replacement would be done if it fails.



CAIS data elements: used: Condition, Urgency, and Purpose

Algorithm is used for POF validation

Probability of Failure	Probability of Failure Description	Algorithm
H	High	-condition is fail -condition is poor and the urgency is repair immediately or repair within 1 year or replace within 1 year -condition is poor and the purpose is severe deterioration or parts not available -any service description other than not in service or not connected or missing/not located
M	Medium	-condition is poor and the urgency is repair in 1-2 years or replace in 1-2 years -condition is poor and the urgency is repair in 3-5 years or replace in 3-5 years and the purpose is light deterioration or moderate deterioration -condition is adequate and urgency is repair in 3-5 years or replace in 3-5 years and purpose is moderate deterioration or severe deterioration -condition is adequate and the urgency is repair in 1-2 years or replace in 1-2 years -any service description other than not in service or not connected or missing/not located
L	Low	-condition is good -condition is adequate and the urgency is repair in 3-5 years or replace in 3-5 years -condition is poor and the urgency is repair in 3-5 years or replace in 3-5 years and the purpose is code violation or exceeded design life or functional improvement or maintenance or efficiency -purpose is functional improvement or maintenance or code compliance and condition is adequate -purpose is functional improvement or maintenance or code compliance and condition is poor and urgency is repair in 3-5 years or replace in 3-5 years or repair in 1-2 years or replace in 1-2 years -urgency is no replacement and purpose is legacy -urgency is replace in 5-7 years -urgency is no repairs necessary -service description is either not in service or not connected or missing/not located



Ranking results are critical to make wise investment decisions

LLNL – CAIS Status Update

In CAIS, we currently have:

- ~ 18k Active Deficiencies in CAIS
- \$541M Total Deferred Maintenance *
- \$783M – Total Repair Needs in CAIS *

* as reported in FIMS , Sept 2016







**Lawrence Livermore
National Laboratory**