

OSF Cost Modeling

DOE Facility Cost Planning Workshop

May 25, 2011

Sheraton Fisherman's Wharf Hotel
San Francisco, CA

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OSFs are a Large Part of DOE Inventory

Other Structures and Facilities (OSFs) are a significant portion of the DOE portfolio but life-cycle costs are relatively unknown

Table 1. Replacement Value of Selected NNSA Assets, FY11 FIMS ^A				
Site	Buildings	Trailers	OSFs	Total
Kansas City Plant	\$1,362,799,463	\$0	\$397,363,915	\$1,760,163,378
Lawrence Livermore National Laboratory	\$4,027,021,320	\$13,108,628	\$1,770,690,427	\$5,810,820,375
Los Alamos National Laboratory	\$9,822,743,382	\$111,810,422	\$1,851,228,528	\$11,785,782,332
Nevada Test Site	\$1,098,424,044	\$16,982,557	\$1,466,494,387	\$2,581,900,988
Pantex Plant	\$3,014,412,870	\$8,906,998	\$632,276,260	\$3,655,596,128
Sandia National Laboratory, California	\$334,018,432	\$8,694,857	\$67,951,719	\$410,665,008
Sandia National Laboratory, New Mexico	\$2,645,581,719	\$85,391,487	\$916,158,254	\$3,647,131,460
Savannah River Site	\$1,759,457,607	\$1,981,897	\$17,485,150	\$1,778,924,654
Y-12 Plant	\$5,686,768,291	\$8,682,997	\$2,524,249,317	\$8,219,700,605
Total	\$29,751,227,128	\$255,559,843	\$9,643,897,957	\$39,650,684,928

^A All costs expressed in \$2010. Includes deactivated and excessed assets.

For NNSA, OSFs account for 24 percent of total RPV

Limited models but available methods

Existing LCC forecasting methodologies can be employed to estimate OSF requirements.

Recent Whitestone projects demonstrate the capability to estimate:

- Piers & wharves
- Heavy launch facilities
- Pavements & grounds
- Central utilities
- Water & sewer treatment



What is an OSF?

OSFs are often loosely defined and vary widely in function, construction, and scale

- FIMS contains 201 OSF types (and 129 building types)
- Different Units of Measure (GPM, BTUH, Gal, KVA, etc.)
- Ad hoc rules of thumb are difficult to apply



Electrical Substation
FIM Usage Code: 8979



Paved Roads
FIMS Usage Code: 1729



Water Treatment Plant
FIMS Usage Code: 5129

RPV Cost Modeling

FIMS does not provide RPV models for OSFs and other specialized facilities



Whitestone and Jacobs Engineering are currently estimating RPVs for 71 OSFs (and four nuclear facilities) at Idaho National Laboratory:



- Collect available drawings and equipment inventories including an on-site inspection
- Calculate an order of magnitude estimate of direct costs by building system
- Estimate various indirect costs for general support of construction activities, and mark-ups and fees on direct costs
- Provide a detailed MARS component inventory consistent with the building system definition

Estimate formats are consistent with other FIMS RPV models

RPV Examples

Table 2. Replacement Value of Selected OSF Models, Idaho National Laboratory^A						
Prop ID	Name	Usage Code	Quantity	UOM	RPV	
IF-715	Electrical Enclosure	5009 Structures, Industrial, Other	1	EACH	\$155,776	
MFC-764	200 Ft Suspect Stack	2009 Catchall	1	EACH	\$2,864,030	
MFC-785A	HFEF Cooling Tower	6008 Other, Service Structures	120	GPD	\$67,457	
TRA-710	MTR Stack	6009 Other, Other, Service Structures	1	EACH	\$1,532,809	
TRA-754	Deminerized Water Storage Tank	4121 Tanks, Gravity (Potable)	150,000	GAL	\$420,986	
TRA-770	ATR Vent Stack	5009 Structures, Industrial, Other	1	EACH	\$2,711,544	
TRA-771	ATR Cooling Tower	3261 Research Reactors (related structures)	1	EACH	\$3,785,084	
TRA-774	ATR Transformer Yard	8909 Other, Electrical Distribution System	1	EACH	\$3,801,430	
TRA-781	Firewater Tank	4109 Other, Water Storage	1,000,000	GAL	\$3,544,680	
TRA-786	Heat Deep Well Elec. Equip. Pad	8909 Other, Electrical Distribution System	1	EACH	\$710,870	

^A Costs expressed in \$2010. RPV estimates are draft and subject to change.

M&R Cost Modeling

MARS provides detail to estimate a wide range of OSF models

- Estimates are built up from individual components and associated M&R tasks
- Mix-and-match of components allows modeling of all OSF types
- Unique components can be created to supplement MARS library

The screenshot shows the 'Building' window in the MARS software. It displays various building parameters and a table of building assets.

Building Details:

- Building: ATR Vent Stack
- Facility: RTC NucOps
- Building Type: Other Structure & Facility
- GSFT: 910
- Built Date: 1966
- Original Cost: \$1
- PRV: \$1
- Depreciation Rate: 2.07%
- Note:
- Building Number: TRA-770
- City: Pocatello, ID
- Building Use: Other
- Number of Floors: 1
- Mission Template: Other
- Last Inspection (m/d/yy):
- Average FTE: 1
- Prior Recap Investment: \$0

Building Assets Table:

Uniformat	Component Name	Year Replaced	Quantity	UM	MARS RSL	Forecast Replace
A1030	Concrete Slab	1966	910 Sq Ft	30		2041
B1010	Metal Decking	1966	45 Sq Ft	-15		1996
B1020	Steel Roof Access Ladder	1966	250 Ln Ft	-5		2006
C2010	Metal, Painted, Exterior Railing	1966	30 Ln Ft	-15		1996
D2020	Ball Valve, 2"	1966	2 Each	-28		1983
D2020	Pipe & Fittings, 2" Steel	1966	0.1 K Ln Ft	30		2041
D2020	Pipe Insulation, Fiberglass, Cold Water	1966	0.075 K Ln Ft	-20		1991
D2030	Pipe & Fittings, 4" Cast Iron	1966	0.04 K Ln Ft	30		2041
D3040	Ductwork, Stainless Steel	1982	1850 Lbs	-4		2007
D3040	Steel Damper, Motorized, w/ Actuator	1982	2 Each	-9		2002
D5010	Disconnect Switch, 30 Amp.	1977	2 Each	16		2027
D5020	Grounded Fault Circuit Interruptor, 15 Amp.	1966	3 Each	-25		1986
D5020	Low Pressure Sodium Lighting Fixture, 250 w	1966	2 Each	-25		1986
D5030	Emergency Horn & Strobe	1995	6 Each	4		2015
D5090	Grounding System	1966	0.75 K Ln Ft	5		2016
D5090	Lightning Protection System	1966	1 Each	-20		1991
G3090	Underground Structure, Concrete, 5000 Gal.	1966	1 Each	-15		1996
G3090	Concrete Exterior, Silo	1966	9880 Sq Ft	55		2066

Operations Cost Modeling

Some operations costs may not apply but utilities can be significant

- Energy costs for Street Lighting is ~\$3.20/ft (height) annually (in Idaho Falls)
- Water/sewer consumption is typically limited to central utility plants but can be considerable
- Generally low or no costs for custodial, grounds, refuse, pest control, road clearance and telecom
- Management and security costs are contracted at the site level and difficult to assign to individual assets

Recapitalization Cost Modeling

Recapitalization requirements vary significantly with the expected life of the OSF

- Low: Storage, Open Pavement (75 years) has a recap rate of 0.80% of RPV annually
- High: Refrigeration and AC Source (14 years) has a recap rate of 4.47% of RPV
- Office Building: 1.08% of RPV

Note: recap rate is applied to the remaining value of the asset each year.

Summary

- OSFs make up a large portion of DOE inventory
- Ad hoc assumptions are being replaced with verifiable models
- LCC enables provides forecasts for infrastructure planning with increased precision and less error
- Substantial knowledge transfer to other agencies and commercial practice

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