SAFEGUARDS FIRST PRINCIPLE INITIATIVE (SFPI) COST MODEL

ABSTRACT

The Nevada Test Site (NTS) began operating Material Control and Accountability (MC&A) under the Safeguards First Principle Initiative (SFPI), a risk-based and cost-effective program, in December 2006. The NTS SFPI Comprehensive Assessment of Safeguards Systems (COMPASS) Model is made up of specific elements (MC&A plan, graded safeguards, accounting systems, measurements, containment, surveillance, physical inventories, shipper/receiver differences, assessments/performance tests) and various sub-elements, which are each assigned effectiveness and contribution factors that when weighted and rated reflect the health of the MC&A program. The MC&A Cost Model, using an Excel workbook, calculates budget and/or actual costs using these same elements/sub-elements resulting in total costs and effectiveness costs per element/sub-element. These calculations allow management to identify how costs are distributed for each element/sub-element. The Cost Model, as part of the SFPI program review process, enables management to determine if spending is appropriate for each element/sub-element.

INTRODUCTION

What is important for a Material Control and Accountability Program to provide? Detection of theft or diversion of Category I and II nuclear material, verification material received/shipped is correct, and assurance material is being protected according to its strategic importance. SFPI accomplishes this in a cost effective and site specific manner. A deviation to the order was put into place since this is a risk based approach to MC&A.

SFPI COMPASS

The SFPI COMPASS Model weighs specific elements/sub-elements based on contribution and rates them based on the results of performance tests and assessments. The COMPASS Model is a tool to demonstrate the health of the program.

SFPI Model Nevada Test Site							28-Jan-08
(1)	(2)	(3)	(4)	(5) = (3) * (4)	Sum(3x4)	(6)	(7) = (6) * (5)
Requirement	MC&A Element	Effectiveness	Contribution	Wgt. Avg.	Sum (4)	Contribution	Element Rating
Element	Sub-Element	Effectiveness	Contribution Factor	Eff x CF	Element Rating	Average Contribution	ER x AC
MC&A Plan	Integrate reqs into other docs	8	4	32			
	Review Frequency	8	2	16			
	Change Control	8	2	16			
	Independent Assessments	9	4	36			
	TAP	9	4	36			
	Sub-Element Rating		**16**	**136**	**8.50**	**3.20**	**27.2**
Graded Safeguards	Determine Category	8	4	32			
	Rollup Evaluation	8	4	32			
	Safeguards Termination	8	2	16			
	Training	8	4	32			
	Sub-Element Rating		**14**	**112.00**	**8.00**	**3.50**	**28.0**

SFPI COST MODEL

The SFPI Cost Model shows budget or actual cost spending per element/sub-element to assist management in deciding if funds are spent in the most cost effective manner. This is done using an Excel workbook with three spreadsheets, one for budget or actual costs, one for labor distribution, and one for the SFPI Cost Model. Examples of each spreadsheet are shown below:

Budget or Actual Costs

Project Title:	MC&A																							
Work Element Title:				4	4	5	4	4	4	5	4	4	5	4	5									
ON-SITE 1				Q1			Q2			Q3			Q4											
		Fin	Loc	FY08												FTE's		Prime Labor Cost					
Resource	Resource Description	Org	ID	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Jbhrs	Prime	Rate	Oct-	Apr-	Multi	Total	
		Code	NMNL	148	133	148	156	141	148	186	148	141	178	148	193	1868	$		Mar	Sep		Price	
Labor			FTE =	11.8	11.9	12.0	11.8	11.9	11.8	11.8	11.8	11.9	11.8	11.8	11.8	11.8							
			Ttl Hrs =	1748	1583	1778	1836	1671	1748	2196	1748	1671	2108	1748	2273	22108							
25	Administration			148	133	148	156	141	148	186	148	141	178	148	193	1,868	46,700	25	21,850	24,850	1.500	70,050	
50	Management			148	133	148	156	141	148	186	148	141	178	148	193	1,868	93,400	50	43,700	49,700	1.500	140,100	
25	LANMAS			148	133	148	156	141	148	186	148	141	178	148	193	1,868	46,700	25	21,850	24,850	1.500	70,050	
25	Measurement Control			296	266	296	312	282	296	372	296	282	356	296	386	3,736	93,400	25	43,700	49,700	1.500	140,100	
50	Performance Assurance			148	133	148	156	141	148	186	148	141	178	148	193	1,868	93,400	50	43,700	49,700	1.500	140,100	
25	Nuc Material Accounting			296	266	296	312	282	296	372	296	282	356	296	386	3,736	93,400	25	43,700	49,700	1.500	140,100	
25	Training			148	133	148	156	141	148	186	148	141	178	148	193	1,868	46,700	25	21,850	24,850	1.500	70,050	
50	Material Control			148	133	148	156	141	148	186	148	141	178	148	193	1,868	93,400	50	43,700	49,700	1.500	140,100	
25	Custodians (4 custodians 25%)			148	133	148	156	141	148	186	148	141	178	148	193	1,868	46,700	25	21,850	24,850	1.500	70,050	
25	Tech Spt			120	120	150	120	120	120	150	120	120	150	120	150	1,560	39,000	25	18,750	20,250	1.500	58,500	
31	Weighted Labor Average		Sub-total Labor	1,748	1,583	1,778	1,836	1,671	1,748	2,196	1,748	1,671	2,108	1,748	2,273	22,108	692,800	33	324,650	368,150		1,039,200	
Non Labor																							
	Recharges			20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000		240,000				1.200	288,000	
	Supplies			2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000		24,000				1.200	28,800	
	Measurment Equipment														50,000		50,000				1.200	60,000	
	Travel/Outside Training														50,000		50,000				1.200	60,000	
	Subcontracts																-				1.200	-	
	Assessments										50,000						50,000				1.200	60,000	
	LANMAS Subcontract							25000						25000			50,000				1.200	60,000	
			Sub-total Non-labor	22,000	22,000	22,000	22,000	47,000	22,000	22,000	72,000	22,000	22,000	47,000	122,000		464,000					556,800	
			Total Dollars																			1,596,000	

This is an example of a budget worksheet. This worksheet has been detailed to work with the SFPI Cost Model.

Labor Distribution

(1)	(2)	Resource Costs									
Requirement	MC&A Element	Admin	LANMAS	Mgr	Custodians	Mtl Ctrl	Techs	Measure	Accting	Perf. Assur	Trainer
Element	Sub-Element										
MC&A Plan	Requirement Integration	5.00%	5.00%	25.00%	5.00%	2.00%	25.00%	5.00%	5.00%	10.00%	25.00%
	Document Control	5.00%	5.00%	10.00%	5.00%	2.00%	25.00%				
	Independent Assessments	5.00%	5.00%	1.00%		2.00%				2.00%	
	Training	2.50%	5.00%	2.50%	2.50%	2.00%		2.50%	2.50%	4.00%	25.00%
	Sub-Element Rating										
Graded Safegua	Determine Category			1.00%		2.00%			2.50%		
	Rollup Evaluation			1.00%		2.00%			2.50%		
	Safeguards Termination			3.00%	5.00%	3.00%					
	Sub-Element Rating										
Accounting Syst	Item Accuracy - Location and ID		5.00%			3.00%			15.00%		
	TID Accuracy - Location and ID		5.00%			2.00%			5.00%		
	Equipment/Data Access		25.00%	1.00%		1.00%					
	Accounting System Structure		10.00%	1.00%		2.00%			2.50%		
	Reporting Timeframes					5.00%			10.00%		
	Records/reports		10.00%	0.50%		3.00%			7.50%		
	Sub-Element Rating										

This is an example of labor distribution. Each FTE was tasked with estimating the percentages of time spent on each sub-element. Any time balance was applied to the cost of doing business such as, general office work, training, and project support. The labor distribution is reviewed periodically.

SFPI Cost Model

(1)	(2)	(3)	(4)	(5) = (3) * (4)	Resource Costs			(16)	(17)	(18) = (17) / (5)
Requirement	MC&A Element	Effectiveness (EFF)	Contribution Factor (CF)	Element Effectivenss Wgt. Avg.	NMA1 Accting	PA11 Perf. Assur	TRN1 Trainer	Logistics	Total Costs	Cost per Element Effectiveness Wgt. Avg.
Element	Sub-Element	Effectiveness	Contribution Factor	Eff x CF						
MC&A Plan	Requirement Integration	8	3	24	7,005.00	14,010.00	17,512.50		108,492.00	4,520.50
	Document Control	8	3	24					41,944.50	1,747.69
	Independent Assessments	8	3	24		2,802.00		60,000.00	74,010.00	3,083.75
	Training	8	3	24	3,502.50	5,604.00	17,512.50		43,431.00	1,809.63
	Sub-Element Rating			96					267,877.50	2,790.39
Graded Safeguards	Determine Category	8	4	32	3,502.50				7,705.50	240.80
	Rollup Evaluation	10	4	40	3,502.50			10,000.00	17,705.50	442.64
	Safeguards Termination	8	3	24					11,908.50	496.19
	Sub-Element Rating			96					37,319.50	388.74
Accounting Systems	Item Accuracy - Location and ID	10	3	30	21,015.00				28,720.50	957.35
	TID Accuracy - Location and ID	10	3	30	7,005.00			10,000.00	23,309.50	776.98
	Equipment/Data Access	10	3	30				10,000.00	30,314.50	1,010.48
	Accounting System Structure	8	4	32	3,502.50			10,000.00	24,710.50	772.20
	Reporting Timeframes	8	3	24	14,010.00			10,000.00	31,015.00	1,292.29
	Records/reports	10	4	40	10,507.50			10,000.00	32,416.00	810.40
	Sub-Element Rating			186					170,486.00	916.59

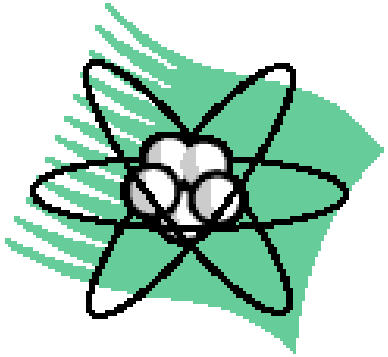
Note the first five columns (blue headings) of the SFPI Cost Model are taken directly from the COMPASS Model. Under the resource costs (purple headings) the formula is cost (budget or actual) times the labor percentage; adding in the logistics costs (goldenrod heading), these add up to a total cost (yellow heading) per element or sub-element. This is then divided by the element/sub-element effectiveness weight average to get a cost per element (yellow heading) or sub-element effectiveness weight average.

CONCLUSIONS

Management can utilize this tool when making decision (such as: is the cost per element higher or lower than expected for the effectiveness and contribution of the element; are the labor percentages as expected; is our funding being spent to support the higher rated elements). In this time of shrinking budgets we need all the tools available to ensure our programs are receive the most “bang for our bucks”!

DOE/NV/25946--1007

SAFEGUARDS FIRST PRINCIPLE INITIATIVE (SFPI) COST MODEL



Mary Alice Price
NTS MC&A Accountant

INMM Annual Meeting

July 12, 2010

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Safeguard First Principle Initiative

- SFPI is risk based
  - Cost effective
  - Works with local needs
- COMPASS
  - Based on a defined set of Elements and Sub-Elements
    - Site specific
  - Effectiveness
    - How effective is the element/sub-element?
  - Contribution
    - Based on site activities what is the value of the contribution of the element/sub-element to the overall MC&A program?

COMPASS Model

SFPI Model Nevada Test Site							28-Jan-08
(1)	(2)	(3)	(4)	(5) = (3) * (4)	Sum(3x4)	(6)	(7) = (6) * (5)
Requirement	MC&A Element	Effectiveness	Contribution	Wgt. Avg.	Sum (4)	Contribution	Element Rating
Element	Sub-Element	Effectiveness	Contribution Factor	Eff x CF	Element Rating	Average Contribution	ER x AC
MC&A Plan	Integrate reqs into other docs	8	4	32			
	Review Frequency	8	2	16			
	Change Control	8	2	16			
	Independent Assessments	9	4	36			
	TAP	9	4	36			
	Sub-Element Rating		**16**	**136**	**8.50**	**3.20**	**27.2**
Graded Safeguards	Determine Category	8	4	32			
	Rollup Evaluation	8	4	32			
	Safeguards Termination	8	2	16			
	Training	8	4	32			
	Sub-Element Rating		**14**	**112.00**	**8.00**	**3.50**	**28.0**

SFPI components

- **SFPI COMPASS**
  - Reflects the health of the MC&A Program
    - Relies heavily on PTs and assessments
  - Areas where more emphases is needed, areas where less may be needed

- **COST MODEL**
  - Reflects budget or actual cost spending
    - Labor and logistic costs
  - Costs per element x labor percentage

EXAMPLE

Project Title: MC&A

Work Element Title: 5 4 5

ON-SITE | Q4

Resourc	Resource Description	Jul	Aug	Sep	FTE's Jbhrs	Prime	Prime Labor Cost Oct-Mar	Prime Labor Cost Apr-Sep	Multi	Total Price
		178	148	193	1868	$	Mar	Sep		Price
	Labor	11.8	11.8	11.8	11.8					
		2,108	1748	2273	22108					
25	Administration	178	148	193	1,868	46,700	21,850	24,850	1.500	70,050
50	Management	178	148	193	1,868	93,400	43,700	49,700	1.500	140,100
25	LANMAS	178	148	193	1,868	46,700	21,850	24,850	1.500	70,050
25	Measurement Control	356	296	386	3,736	93,400	43,700	49,700	1.500	140,100
50	Performance Assurance	178	148	193	1,868	93,400	43,700	49,700	1.500	140,100
25	Nuc Material Accounting	356	296	386	3,736	93,400	43,700	49,700	1.500	140,100
25	Training	178	148	193	1,868	46,700	21,850	24,850	1.500	70,050
50	Material Control	178	148	193	1,868	93,400	43,700	49,700	1.500	140,100
25	Custodians (4 custodians 25%)	178	148	193	1,868	46,700	21,850	24,850	1.500	70,050
25	Tech Spt	150	120	150	1,560	39,000	18,750	20,250	1.500	58,500
31	Weighted Labor Average	2,108	1,748	2,273	22,108	692,800	324,650	368,150		1,039,200
	Non Labor									
	Recharges	20,000	20,000	20,000		240,000			1.200	288,000
	Supplies	2,000	2,000	2,000		24,000			1.200	28,800
	Measurment Equipment			50,000		50,000			1.200	60,000
	Travel/Outside Training			50,000		50,000			1.200	60,000
	Subcontracts					-			1.200	-
	Assessments					50,000			1.200	60,000
	LANMAS Subcontract		25000			50,000			1.200	60,000
		22,000	47,000	122,000		464,000				556,800
										1,596,000

EXAMPLE

Requirement	MC&A Element	Admin	LANMAS	Mgr	Custodians	Mtl Ctrl	Techs	Measure	Accting
Element	Sub-Element								
MC&A Plan	Requirement Integration	5.00%	5.00%	25.00%	5.00%	2.00%	25.00%	5.00%	5.00%
	Document Control	5.00%	5.00%	10.00%	5.00%	2.00%	25.00%		
	Independent Assessments	5.00%	5.00%	1.00%		2.00%			
	Training	2.50%	5.00%	2.50%	2.50%	2.00%		2.50%	2.50%
	Sub-Element Rating								
Graded Safeguards	Determine Category			1.00%		2.00%			2.50%
	Rollup Evaluation			1.00%		2.00%			2.50%
	Safeguards Termination			3.00%	5.00%	3.00%			
	Sub-Element Rating								
Accounting Systems	Item Accuracy - Location and ID		5.00%			3.00%			15.00%
	TID Accuracy - Location and ID		5.00%			2.00%			5.00%
	Equipment/Data Access		25.00%	1.00%		1.00%			
	Accounting System Structure		10.00%	1.00%		2.00%			2.50%
	Reporting Timeframes					5.00%			10.00%
	Records/reports		10.00%	0.50%		3.00%			7.50%
	Sub-Element Rating								

EXAMPLE

SFPI Model Nevada Test Site

(1)	(2)	(3)	(4)	(5) = (3) * (4)	Resource Costs			(16)	(17)	(18) = (17) / (5)
Requirement	MC&A Element	Effectiveness (EFF)	Contribution Factor (CF)	Element Effectivenss Wgt. Avg.	NMA1 Accting	PA11 Perf. Assur	TRN1 Trainer	Logistics	Total Costs	Cost per Element Effectiveness Wgt. Avg.
Element	Sub-Element	Effectiveness	Contribution Factor	Eff x CF						
MC&A Plan	Requirement Integration	8	3	24	7,005.00	14,010.00	17,512.50		108,492.00	4,520.50
	Document Control	8	3	24					41,944.50	1,747.69
	Independent Assessments	8	3	24		2,802.00		60,000.00	74,010.00	3,083.75
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Accounting Systems	Item Accuracy - Location and ID	10	3	30	21,015.00				28,720.50	957.35
	TID Accuracy - Location and ID	10	3	30	7,005.00			10,000.00	23,309.50	776.98
	Equipment/Data Access	10	3	30				10,000.00	30,314.50	1,010.48
	Accounting System Structure	8	4	32	3,502.50			10,000.00	24,710.50	772.20
	Reporting Timeframes	8	3	24	14,010.00			10,000.00	31,015.00	1,292.29
	Records/reports	10	4	40	10,507.50			10,000.00	32,416.00	810.40
	Sub-Element Rating			186					170,486.00	916.59

Questions?

For copies of the Excel example email pricem@nv.doe.gov.