

Chapter 3

The Officer and Enlisted Special and Incentive Pay Analysis Model

KIM DARLING

PATRICK MACKIN

JOSEPH MUNDY

Model Overview

The Special and Incentive Pays Analysis Model, developed for the Eleventh Quadrennial Review of Military Compensation, is an all-force inventory aging model that allows users to analyze the effects of changing special and incentive (S&I) pay amounts and/or timing on inventory distribution. The model allows users to adjust parameters that include:

- ❖ Economic factors
- ❖ Gains adjustment methods
- ❖ Selective Reenlistment Bonus (SRB) adjustments
- ❖ Timing and amounts of other special and incentive pays.

The model shapes inventory distribution through adjustments to baseline continuation rates. These adjustments are based on changes to special and incentive payout amounts as well as the prevailing unemployment rates. Payouts are discounted in an Annualized Cost of Leaving (ACOL)-like fashion and, along with the unemployment rate, are entered into a logit formula. The adjusted continuation rate formula is provided below.¹

$$\text{Adj CR} = (\text{Not at ETS CR}) * (\text{Perc Not at ETS}) + (\text{Adj at ETS CR}) * (\text{Perc at ETS})$$

1. Adj CR = adjusted continuation rate
Not at ETS CR = not at expiration term of service (ETS) continuation rate
Adj at ETS CR = adjusted at ETS continuation rate
Perc not at ETS = percent not at ETS
Perc at ETS = percent at ETS

The views expressed in this paper represent those of the authors and are not necessarily those of the Department of Defense.

Where:

$$Adj\ at\ ETS\ CR = \frac{1}{1 + e^{-(\ln(At\ ETS\ CR/Not\ at\ ETS\ CR) + \beta_{ACOL} * \Delta ACOL + \beta_{Urate} * \Delta Urate)}}$$

The adjusted continuation rate is applied to inventory counts to determine the projected number of individuals remaining from earlier that year. Gains, in the form of accessions and lateral transfers, are then added to the model to complete the inventory projection. Inventory gains are predicted according to the user's choice of three methods and distributed according to historical gains distributions. The model's output, which is broken down by years of service (YOS), includes:

- ❖ Baseline and projected continuation rates
- ❖ 2010 inventory end strength and projected remaining individuals for each fiscal year (FY)
- ❖ Projected inventory counts after adjustments for gains
- ❖ Inventory requirements as specified by previous military instruction

The model guides the user sequentially through three input pages before presenting the final output. The *Parameters* page (Figure 2) allows you to select the job code, adjust the gains method, and set general economic assumptions for each projection year. The *SRB Adjustments* page (enlisted personnel only, Figure 3) allows the user to view historical SRB data and adjust those figures if desired. The *Special and Incentive Pays* page (Figure 4) allows the user to view historical payout structures and create custom pays that can conform to almost any annual structure. Upon completion of these pages, the user is presented with the predicted output, after which point one can alter parameters through page navigation shortcuts. All pages contain a link that enables users to view a summary of payouts via a *Payout Summary* page (Figure 6).

Calculating Marginal Costs

In addition to predicting the effects of changes in pay on retention behavior and force manning, policy analysts are concerned with the relative efficiency of proposed changes. That is, what is the additional total cost of a change in incentive pays for each additional member who is retained? The S&I Pay Analysis model provides the information necessary to calculate these costs.

In virtually all cases, increases in S&I pays will increase total cost in two ways. First, total costs increase because a greater number of members will accept the pays

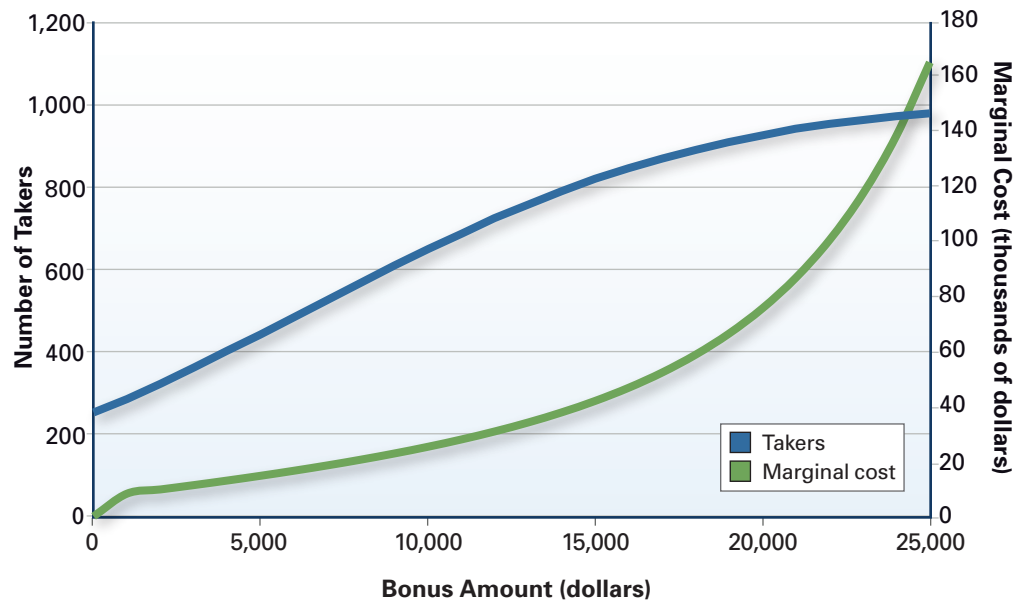


Figure 1. Marginal Cost Example

and agree to stay, accept a particular assignment or type of duty, or join the military. Second, all of the members who would have stayed, accepted the assignment, or joined without the higher level of pay will also receive the higher amount. At higher and higher levels of the pay, the marginal yield in terms of additional takers will decline relative to the change in the total cost.

The concept is illustrated in Figure 1, a hypothetical example of a bonus paid to retain members. In this example, 1,000 members are facing a stay/leave decision; in the absence of a bonus, 25 percent (250) will stay. As the bonus increases, the take rate increases, albeit at a decreasing rate. As the bonus increases above \$15,000, the red line denoting the number of takers becomes very flat (i.e., the change in the take rate is very small). Conversely, the marginal cost curve (defined as the change in total cost divided by the change in takers) becomes very steep.

For example, increasing the bonus from \$3,000 to \$4,000 increases the number of takers from 360 to 400 (40 additional takers). The total cost of the change is $\$4,000 * 40 + \$1,000 * 360 = \$519,000$. The marginal cost per additional member retained is about \$13,000. Increasing the bonus from \$14,000 to \$15,000 changes the number of takers from 787 to 816 (29 additional takers). The marginal cost per additional taker is about \$42,000.

User Guide

Adjusting Model Parameters

Special & Special and Incentive Pays Analysis Model

PARAMETERS

Fiscal Year: 2009

Military Branch: Army

Personnel Type: Enlisted

PMOS (Code): 18 B, C, D, E, F

Special Forces Sergeant

Adjust Gains Using: Equal Force Method, Inventory Requirements Method, Smooth Requirements Method

Estimation Coefficients

ACOL		Unemployment Rate	
High	0.000209	High	0.000209
Low	0.000121	Low	0.0299
Custom	.0003	Custom	.004

Unemployment Rate

	2011	2012	2013	2014	2015
Unemployment Rate	9.3%	9.3%	9.3%	9.3%	9.3%
SRB Growth Adjustments	-	-	-	-	-
Percent Change in CPI	3.1%	3.1%	3.1%	3.1%	3.1%
Military Wage Growth Rate	3.1%	3.1%	3.1%	3.1%	3.1%

Baseline Run

Figure 2. Parameters Page

The Parameters page (Figure 2) shows inputs to the model.

Fiscal Year

Select the fiscal year on which you wish to base continuation rates. Presently, 2009 is the only fiscal year available.

Military Branch

Select Army, Air Force, Marines, or Navy.

Personnel Type

Select Enlisted, Warrant, or Officer.

Primary Military Occupational Specialty (PMOS Code)

Select the unique job classifier. Note that despite use of “PMOS,” this identifier may represent a different naming convention. For example, enlisted Navy sailors will show EMC (NEC).

Gains Adjustment

Choose between Equal Force, Inventory Requirements, and Smooth Requirements methods. The Equal Force Method will determine the number of gains by keeping the 2010 end inventory constant. The Inventory Requirements Method determines the number of gains by taking the difference between pre-established inventory requirements and projected inventory. The Smooth Requirements Method adjusts the inventory to incrementally reach pre-established FY 2015 inventory levels. Gains are computed by taking the difference between these required inventory levels (calculated in previous step) and projected inventory levels. One should view the available inventory requirements information (available on the “Output” sheet) for each PMOS to determine which method is most appropriate.

Estimation Coefficients

Choose to use high- or low-end estimates relating to unemployment rate and ACOL coefficients. If not satisfied with either of these options, select “Custom” and type in the coefficient you wish to use.

General Assumptions

The model requires you to input unemployment rates, percentage change in CPI, and military wage growth rates for all fiscal years. Please note that the latter two inputs are used exclusively for the estimation of Air Force and Navy SRB payments whose payout amounts are dependent upon the basic pay of the eligible members.

Alterations to SRB Payouts

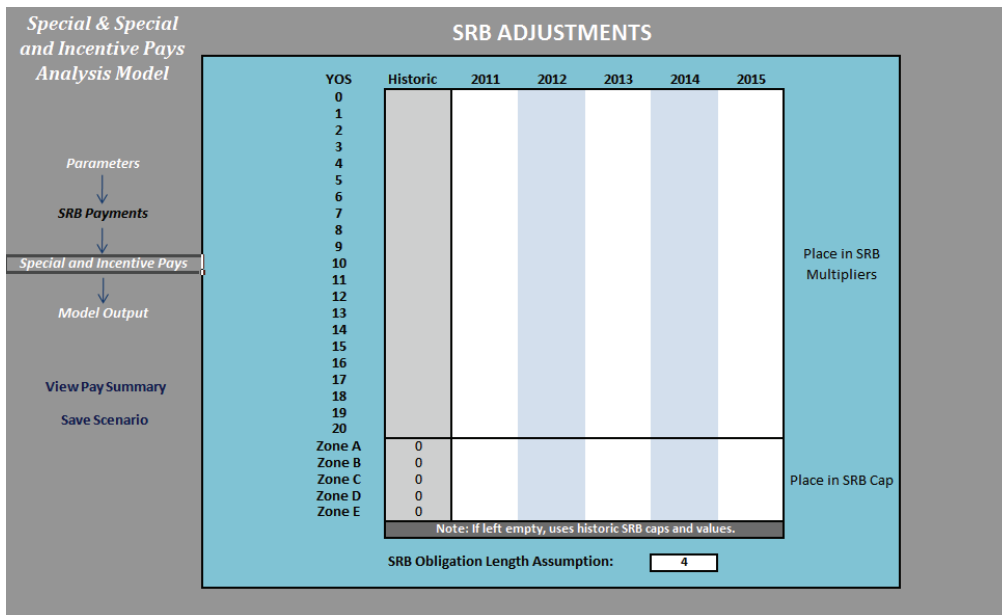


Figure 3. SRB Page

In Figure 3, the gray, left-most column shows historic SRB amounts and caps. For the Army and Marine Corps, the fields will show actual SRB amounts, whereas the Navy and Air Force will show SRB multipliers. All forces will show a dollar value for the SRB caps. To alter the SRB caps or amounts (dollar values or multipliers), enter values into the white space. *If you leave the white space unaltered, the SRB amounts and caps will remain unchanged for all fiscal years.* To alter the duration of the assumed obligation for the SRB (denoted in years), enter a value in the field provided.

Adjustments to Special and Incentive Pays

Special & Special and Incentive Pays Analysis Model

Parameters
↓
SRB Payments
↓
Special and Incentive Pays
↓
Model Output
↓
View Pay Summary
Save Scenario

SPECIAL AND INCENTIVE PAY ADJUSTMENTS

Show data for Fiscal Year:

Obligation Bearing Pays	Make Eligible?	Payout Beg YOS	# Anniv PMTS	Down PMT (\$)	Anniv PMT (\$)	Obligation
CSRB	No					
ACP	No					
OCB	No					
ECB	No					
NIP	Yes	4	3	20000	20000	4
USER ADDED	No					

Equal Annual Pays	Make Eligible?	Payout Beg YOS	Payout End YOS	PMT (\$)
AIP	No			
FLPB A	No			
SDAP	No			
HazDP	No			
ASP	No			
ISP	No			
MSP	No			
GRB	No			
USER ADDED	No			

AutoPays	Make Eligible?
BCP	No
NPHP BCP	Yes
VSP	No
ACIP	No
RPAIP	No
RPSOIP	No

Figure 4. Special and Incentive Pays Page

The Special and Incentive Pays page (Figure 4) contains three distinct input tables, each of which relate to different types of payout structures: Obligation Bearing Pays, Equal Annual Payouts, and AutoPays. Obligation Bearing Pays carry an obligation for which the member must agree to a contract. Payouts are discounted back to the first YOS they receive the initial payment. Equal Annual Pays are designed to account for pays that carry equal (assumed annual) payments between given years of service. Autopays have variable payouts for each YOS and are predetermined. The page also contains a link to a Variable Pay input table, which allows you to create a custom variable payout schedule. Each input table is designed to account for these differences and provide instruction for filling in vital information.

Obligation Bearing Pays

The Obligation Bearing Pay input table requires you to specify eligibility, the first year in which an individual receives payment, the number of anniversary payments, the down payment amount, anniversary payment amount, and obligation duration (in years). For modeling purposes, pays conforming to this schedule are discounted back to the year of service for which they receive their first payment.

Equal Annual Payouts

The Equal Annual Payouts input table assumes individuals in a PMOS receive equal annual payouts over a specified period in a career cycle. This table requires the user to specify eligibility, the first and last years in which individuals receive the pay, and the annual payment amount.

Autopays Input Table

The Autopays input table requires the user to specify eligibility. The pays in this table have predefined and variable payout schedules that are programmed into the model. In many cases, special or incentive pays can vary among PMOSs; it is impractical to automatically assign values to a PMOS that has never received that pay. *Therefore, if a PMOS is not historically eligible for a specific pay, changing the eligibility to “Yes” will not yield a payout. If you wish to add an autopay, enter the payout schedule using the Variable Pay input table.*

Variable Pay

To access the Variable Pay input table, click the “Add Variable Pay” near the bottom right of the window. You will be directed to a table dimensioned by YOS and fiscal year. Amounts placed in this table will be added to the existing payout amounts that are defined in other tables and will assign the values to the individuals in the PMOS for the years you define. When you are finished, click “Back” to return to the Special and Incentive Pays page.

Built-in Functions

At the bottom of the Special and Incentive Pays page, built-in function buttons have been provided to expedite the process of setting payout conditions for each year.

Showing Data for Selected Year

The model allows you to have different payout schedules for each fiscal year from 2011 to 2015. Changing the value in the drop-down box will retrieve pay information for the selected fiscal year. If you made changes to the payout schedule in a fiscal year, be sure to click the “Save Changes” button before switching fiscal years or those changes will not be saved.

Set FY to Historic

This function allows the user to set the payout schedule (for the selected fiscal year) equal to historic conditions. Using this function alone will result in no change between 2010 payouts and the fiscal year selected. This tool is designed for setting up baseline runs or making minor tweaks to payout schedules.

Set all FY to Historic

This function is identical to *Set FY to Historic*, except it will complete the task for all fiscal years. This functionality was designed to allow users to quickly and with minimal effort complete baseline runs.

Copy Forward

This function allows you to copy and save the pay conditions in the selected fiscal year to all future years through 2015. This functionality was designed to allow users to adopt a pay change beginning in a fiscal year and copy that change forward without having to enter the information by hand for each fiscal year. Please note that this function will not affect the values of the Variable Pay input table; you must make changes to this table by hand.

Save Changes

Use this feature to save changes to pays listed on the Special and Incentive Pay page *prior to altering the selected fiscal year*.

Clear All S&I Data

This function allows you to clear all special and incentive pay data (other than SRB) for all fiscal years. Please note that historical pay information will be preserved by the model and the *Set FY to Historic* and *Set All FY to Historic* features will still work.

Add Variable Pay

This function will guide you to the Variable Pay input table (Figure 5).

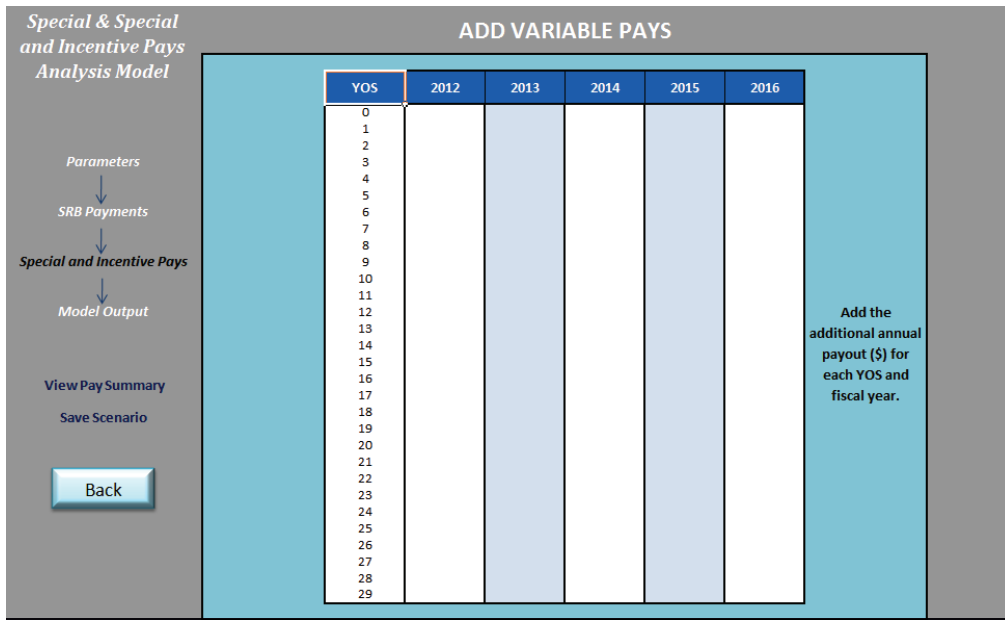


Figure 5. Add Variable Pays Page

Payout Summary

Each page contains a link to a summary of pay information page (Figure 6). This summary page allows one to view the sum of all special and incentive pays (including the SRB) for each “taker” of the pay. The page also displays the number of individuals receiving the pay. All fields are dimensioned by YOS and fiscal year.

Model Output: Inventory Profiles and Continuation Rate Adjustments

The model’s output is displayed on two pages (Figures 7 and 8) and shows base-line and projected continuation rates, those projected to stay from the previous year, ending inventory when gains are added to the model, and end inventory requirements for each fiscal year. When finished, you can use the *Save Scenario* feature, which summarizes vital input and output data in a new worksheet.

Special & Special and Incentive Pays Analysis Model		SUMMARY OF COSTS										
		YOS	PV of Total Costs (S&I + SRB) Per Taker						NUMBER OF S&I PAY TAKERS			
		Historic	2011	2012	2013	2014	2015	2011	2012	2013	2014	2015
Parameters ↓ SRB Payments ↓ Special and Incentive Pays ↓ Model Output ↓ View Pay Summary ↓ Save Scenario	0	2,530	2,530	2,530	2,530	2,530	2,530	-	-	-	-	-
	1	51,135	51,135	51,135	51,135	51,135	51,135	0	0	0	0	0
	2	57,633	57,633	57,633	57,633	57,633	57,633	0	0	0	0	0
	3	63,772	63,772	63,772	63,772	63,772	63,772	0	0	0	0	0
	4	66,832	66,832	66,832	66,832	66,832	66,832	0	0	0	0	0
	5	71,373	71,373	71,373	71,373	71,373	71,373	9	12	13	16	14
	6	83,566	83,566	83,566	83,566	83,566	83,566	17	16	21	22	27
	7	83,566	83,566	83,566	83,566	83,566	83,566	30	30	29	36	38
	8	83,566	83,566	83,566	83,566	83,566	83,566	28	32	32	30	38
	9	83,566	83,566	83,566	83,566	83,566	83,566	12	15	17	17	16
	10	83,566	83,566	83,566	83,566	83,566	83,566	9	10	13	14	14
	11	86,688	86,688	86,688	86,688	86,688	86,688	9	9	11	13	15
	12	86,089	86,089	86,089	86,089	86,089	86,089	14	12	13	15	19
	13	85,383	85,383	85,383	85,383	85,383	85,383	7	9	8	9	10
	14	9,286	9,286	9,286	9,286	9,286	9,286	5	5	7	6	7
	15	8,303	8,303	8,303	8,303	8,303	8,303	12	12	12	16	15
	16	7,142	7,142	7,142	7,142	7,142	7,142	15	15	16	16	20
	17	5,773	5,773	5,773	5,773	5,773	5,773	7	8	8	8	8
	18	4,157	4,157	4,157	4,157	4,157	4,157	43	31	37	35	37
	19	4,157	4,157	4,157	4,157	4,157	4,157	5	4	3	4	3
	20	8,303	8,303	8,303	8,303	8,303	8,303	0	0	0	0	0
	21	144,987	144,987	144,987	144,987	144,987	144,987	0	0	0	0	0
	22	174,232	174,232	174,232	174,232	174,232	174,232	0	0	0	0	0
	23	208,741	208,741	208,741	208,741	208,741	208,741	0	0	0	0	0
	24	249,462	249,462	249,462	249,462	249,462	249,462	9	16	14	20	15
	25	297,513	297,513	297,513	297,513	297,513	297,513	5	7	12	11	15
	26	35,711	35,711	35,711	35,711	35,711	35,711	6	9	10	18	16
	27	28,863	28,863	28,863	28,863	28,863	28,863	2	2	2	3	5
	28	20,784	20,784	20,784	20,784	20,784	20,784	0	0	0	0	0
29	11,250	11,250	11,250	11,250	11,250	11,250	0	0	0	0	0	

Figure 6. Pay Summary Page

Special & Special and Incentive Pays Analysis Model		MODEL OUTPUT (Page 1 of 2)												
		YOS	Baseline CR	Proj. CR 2011	Proj. CR 2012	Proj. CR 2013	Proj. CR 2014	Proj. CR 2015	End Strength	Proj. Stayers	Proj. Stayers	Proj. Stayers	Proj. Stayers	Proj. Stayers
Parameters ↓ SRB Payments ↓ Special and Incentive Pays ↓ Model Output ↓ View Pay Summary ↓ Save Scenario ↓ This simulation projects future Air Force 46YXP force using FY 2009 aggregate continuation rates. Inventory Requirements Method Go to Page 2	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	3	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	4	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	6	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	8	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	9	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	10	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	11	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	12	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	13	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	14	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	15	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	16	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	17	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	18	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	19	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	20	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	21	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	22	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	23	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	24	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	25	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	26	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	27	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
	28	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0	
29	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0	0	0	0	0	0		
Total								0	0	0	0	0		
								ADD GAINS =>		24	24	24	24	68

Figure 7. Output (Page 1)

<i>Special & Special and Incentive Pays Analysis Model</i>		MODEL OUTPUT (Page 2 of 2)									
		YOS	Proj. Inv. 2011	Proj. Inv. 2012	Proj. Inv. 2013	Proj. Inv. 2014	Proj. Inv. 2015	Inv. Reqts. 2011	Inv. Reqts. 2012	Inv. Reqts. 2013	Inv. Reqts. 2014
0		0	0	0	0	0	0	0	0	0	0
1		0	0	0	0	0	0	0	0	0	0
2		0	0	0	0	0	0	0	0	0	0
3		0	0	0	0	0	0	0	0	0	0
4	Parameters	0	0	0	0	0	0	0	0	0	0
5	↓	0	0	0	0	0	0	0	0	0	0
6	SRB Payments	0	0	0	0	0	0	0	0	0	0
7	↓	0	0	0	0	0	0	0	0	0	0
8	Special and Incentive Pays	0	0	0	0	0	0	0	0	0	0
9	↓	0	0	0	0	0	0	0	0	0	0
10	Model Output	0	0	0	0	0	0	0	0	0	0
11		0	0	0	0	0	0	0	0	0	0
12		0	0	0	0	0	0	0	0	0	0
13		0	0	0	0	0	0	0	0	0	0
14		0	0	0	0	0	0	0	0	0	0
15	View Pay Summary	0	0	0	0	0	0	0	0	0	0
16	Save Scenario	0	0	0	0	0	0	0	0	0	0
17		0	0	0	0	0	0	0	0	0	0
18		0	0	0	0	0	0	0	0	0	0
19	This simulation projects future Air Force 46VXP force using FY 2009 aggregate continuation rates.	0	0	0	0	0	0	0	0	0	0
20		0	0	0	0	0	0	0	0	0	0
21		0	0	0	0	0	0	0	0	0	0
22		0	0	0	0	0	0	0	0	0	0
23		0	0	0	0	0	0	0	0	0	0
24		0	0	0	0	0	0	0	0	0	0
25	Inventory Requirements Method	0	0	0	0	0	0	0	0	0	0
26		0	0	0	0	0	0	0	0	0	0
27		0	0	0	0	0	0	0	0	0	0
28		0	0	0	0	0	0	0	0	0	0
29		0	0	0	0	0	0	0	0	0	0
Return to Page 1		0	0	0	0	0	24	24	24	24	68

Figure 8. Output (Page 2)

General Navigation Tools

Each page contains navigation links on the left of the screen as well as options to view a summary of the scenario pay data and save the scenario.