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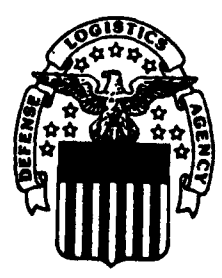
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# Integrated Materiel Complex (IMC) Personnel Savings Allocation Analysis

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OPERATIONS RESEARCH AND ECONOMIC ANALYSIS OFFICE



DEPARTMENT OF DEFENSE

DEFENSE LOGISTICS AGENCY

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**Integrated Materiel Complex (IMC)  
Personnel Savings Allocation Analysis**

**Capt David E. Bertrand, USAF**

**DEPARTMENT OF DEFENSE  
DEFENSE LOGISTICS AGENCY  
OPERATIONS RESEARCH AND ECONOMIC ANALYSIS OFFICE  
CAMERON STATION  
ALEXANDRIA, VA 22304-6100**

**July 1990**



DEFENSE LOGISTICS AGENCY  
 HEADQUARTERS  
 CAMERON STATION  
 ALEXANDRIA, VIRGINIA 22304-6100

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FOREWORD

This report presents the results of analysis of personnel savings due to operation of the Integrated Materiel Complex (IMC) at Defense Depot Mechanicsburg, Pennsylvania. The effects of four bin stockage policies were analyzed to determine how the IMC savings should be distributed among Defense Logistics Agency depots in the eastern United States. Unit costs were used to translate expected workload changes due to these policies into changes in personnel levels at each depot. A net savings of 367 personnel equivalents due to IMC operation were identified, and the most equitable distribution of the savings among the depots was calculated.

*Christine R. Gallo.*  
 CHRISTINE GALLO  
 Deputy Assistant Director  
 Office of Policy and Plans

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## I. INTRODUCTION

A. Background. At Defense Depot Mechanicsburg, Pennsylvania (DDMP), a project is underway to consolidate and automate bin operations into one facility, called the Integrated Materiel Complex (IMC). As the IMC nears completion and initial operation, it is appropriate to refine earlier estimates of personnel savings that accrue due to the increased efficiency of operations at the new facility.

At the same time, stockage policies have been implemented that affect the distribution of bin-related workload among Defense Logistics Agency (DLA) depots. Since this will in large part determine how much IMC-related savings will occur at each depot, the effects of these policies are an important factor in the analysis. The four policies are as follows. First, the "binnable item" policy causes small, high popularity items meeting certain criteria to be stored at either DDMP (for the east coast) or Defense Depot Ogden, Utah (DDOU) (for the west coast). The second policy is the DDMP ("six hit") qualified items policy, which causes all items with at least six requisitions per year in the DDMP service area to be stored at DDMP. Third, the grade eight bolt policy states all grade eight bolts will be stored at Defense Depot Memphis, Tennessee (DDMT). The last policy is the threaded fastener policy, under which all threaded fasteners (except grade 8 bolts) will be stored at Defense Depot Columbus, Ohio (DDCO) (for the east coast) and DDOU (for the west coast).

B. Problem Statement. Quantify expected personnel impacts at DLA depots in response to policy-driven changes in workload and more efficient operations at the DDMP Integrated Materiel Complex (IMC).

### C. Objectives.

1. Determine expected workload changes.
2. Categorize transferred workload as bin or bulk.
3. Calculate cost per unit of transferred workload.
4. Convert labor costs to number of employees attributable to the net amount of workload transferred from each depot.

### D. Scope.

1. Since the IMC affects only east coast operations, only the east coast depots (DDCO, DDMP, DDMT, and Defense Depot Richmond, Virginia (DDRV)) are included in the analysis.

2. Only realignment of current depot workload related to the four bin stockage policies is considered in the analysis. Growth or reduction in the total DLA workload due to other factors is not considered.

## II. CONCLUSIONS

Based on the anticipated staffing level of the IMC compared to the number of personnel currently attributable to its workload, a total savings of 367 positions should be possible due to IMC operations. Transfers of workload between depots due to stockage policies imply the following distribution of these savings among the depots:

- 75 full time positions saved at DDCO
- 102 full time positions saved at DDMT
- 97 full time positions saved at DDRV
- 393 full time positions saved at DDMP, 300 of which are required to staff the IMC, leaving a net savings of 93 positions.

## III. RECOMMENDATIONS

The results should be used as a planning tool to anticipate changes in workload and staffing at the east coast depots. At depots other than DDMP, unit costing should drive personnel changes automatically as the workload shifts. At DDMP, however, unit costs should drop due to higher efficiency in the IMC.

## IV. BENEFITS

Results of this study will allow DLA-OW and depot staffs to anticipate workload and staffing changes due to IMC operation and related policies, and enable them to plan for these changes more effectively.

## V. METHODOLOGY

### A. Assumptions.

1. Overhead functions not closely related to workload ("General" labor) will not be immediately reduced.
2. All changes in receipt workload occur in bin receiving for depots other than DDMP.
3. For DDMP, all personnel in building 207 directly involved in receiving under current operations are assumed to move to the IMC.
4. FY 89 Material Release Order (MRO) and receipt workload which was used as a basis for analysis is representative of future demands on east coast depots.

B. Procedure. Calculation of personnel savings followed the five step procedure described below. For the first two steps, the procedure used for DDMP differs from that used at the other depots. This was necessary because, while workload changes at the other depots are due solely to stockage

policies, the changes at DDMP are further affected by criteria restricting the size, weight, and handling requirements of items stored in the IMC. Since the procedure for DDMP is more involved, it is further described in Figure 1 (for material issued at DDMP) and Figure 2 (for material transferred to DDMP from other depots). In the calculations, the IMC is considered separate from DDMP, so material transferred to the IMC is considered a loss to DDMP.

1. Step 1: Determine workload changes at each depot.

a. DDCO/DDMT/DDRV: The Five Year Depot Workload Forecast Model was used to determine the changes in Material Release Orders (MROs) per year between 1989 and 1996 due to stockage policy implementation. After identifying the items gained/lost at each depot, they were matched to FY 89 receipt files to estimate changes in bin receipts.

b. DDMP: Items currently stocked at DDMP are screened for IMC qualified items, threaded fasteners, and grade 8 bolts. FY 89 issues of threaded fasteners and grade 8 bolts are counted as lost workload to DDMP. IMC qualified items are further screened by size of issue; issues over 6 cube or 70 pounds remain at DDMP, the rest are DDMP "losses" into the IMC. In addition, items transferred to DDMP due to the binnable and DDMP-qualified policies were screened for IMC eligibility. Those items not IMC qualified are add-ons to DDMP's normal workload; IMC qualified items were further screened for issue size, and issues over 6 cube/70 lbs were considered add-ons to DDMP as well. Since we assumed a given number of DDMP receiving personnel to transfer to the IMC, receipt workload calculations were not necessary.

2. Step 2: Split lost MRO workload into bin and bulk amounts.

a. DDCO/DDMT/DDRV: The MROs identified in step 1 as being a "loss" to each depot were matched against that depot's locator file. Each depot provided the means to identify locations on the file as "bin" or "bulk". MROs of items stored only in bulk locations were considered lost bulk workload; those with any bin locations were counted as bin. Gains at DDCO/DDMT due to threaded fastener/grade 8 bolt policies were assumed to be bin.

b. DDMP: MROs identified in step 1 as a loss to DDMP's workload were matched against DDMP's locator file. MROs lost into the IMC were characterized as bulk workload if all locations for that item are bulk locations, otherwise the workload was identified as bin. For workload lost due to threaded fasteners or grade eight bolt policies, issues of items with only bulk locations or issues over 6 cube/70 lbs were considered bulk, and the rest considered bin workload. MROs transferred to DDMP that were gains to DDMP's normal workload (not IMC) were categorized based on issue size; issues larger than 6 cube/70 lbs were additions to bulk workload, smaller issues were add-ons to bin workload.

3. Step 3: Determine cost per MRO and receipt. Each depot has a unit cost spreadsheet which details labor and non-labor costs, broken into

FOR EACH MRO DDMP ISSUED IN FY89

Figure 1

METHODOLOGY FOR MROs ISSUED AT DDMP

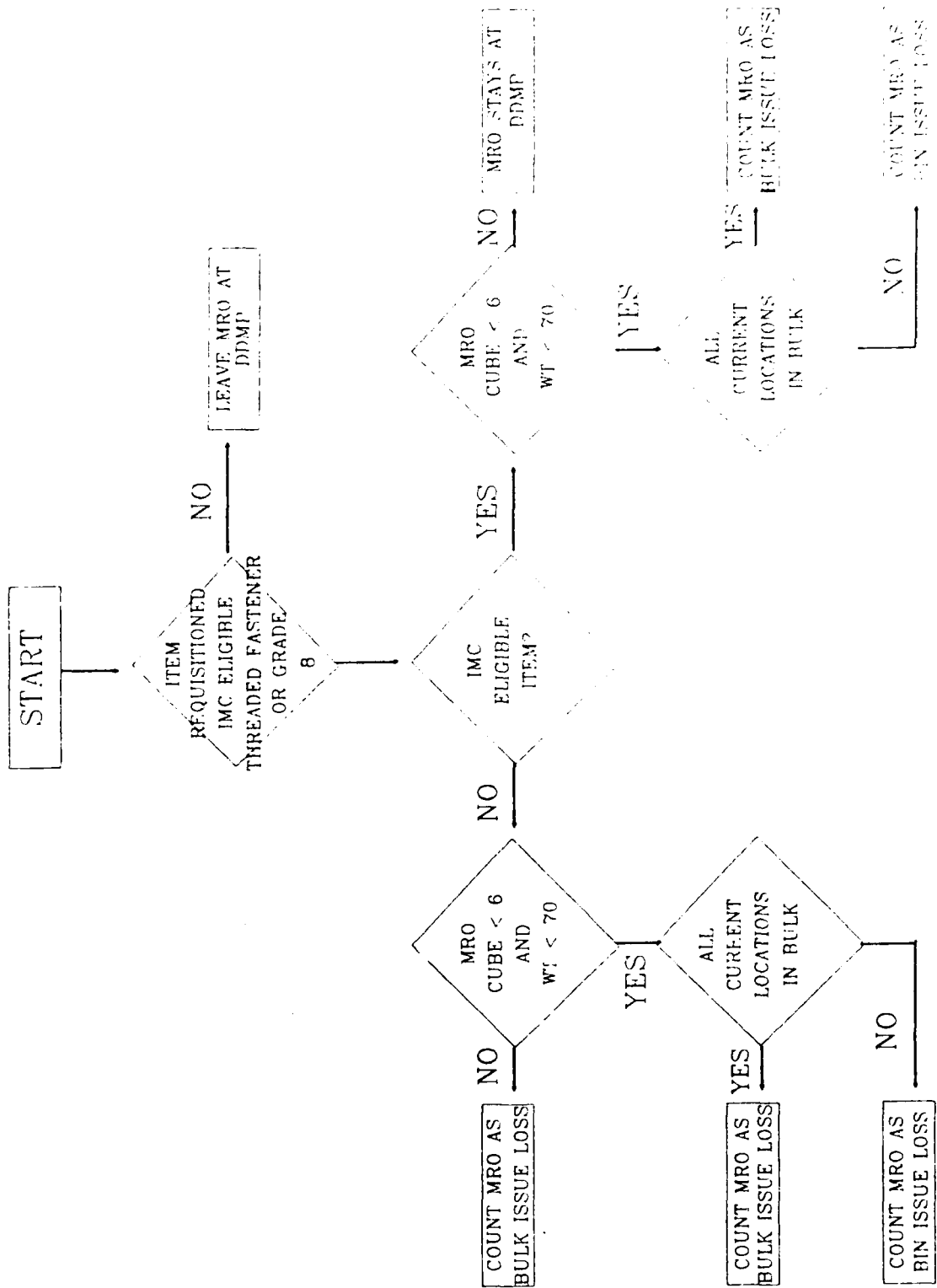
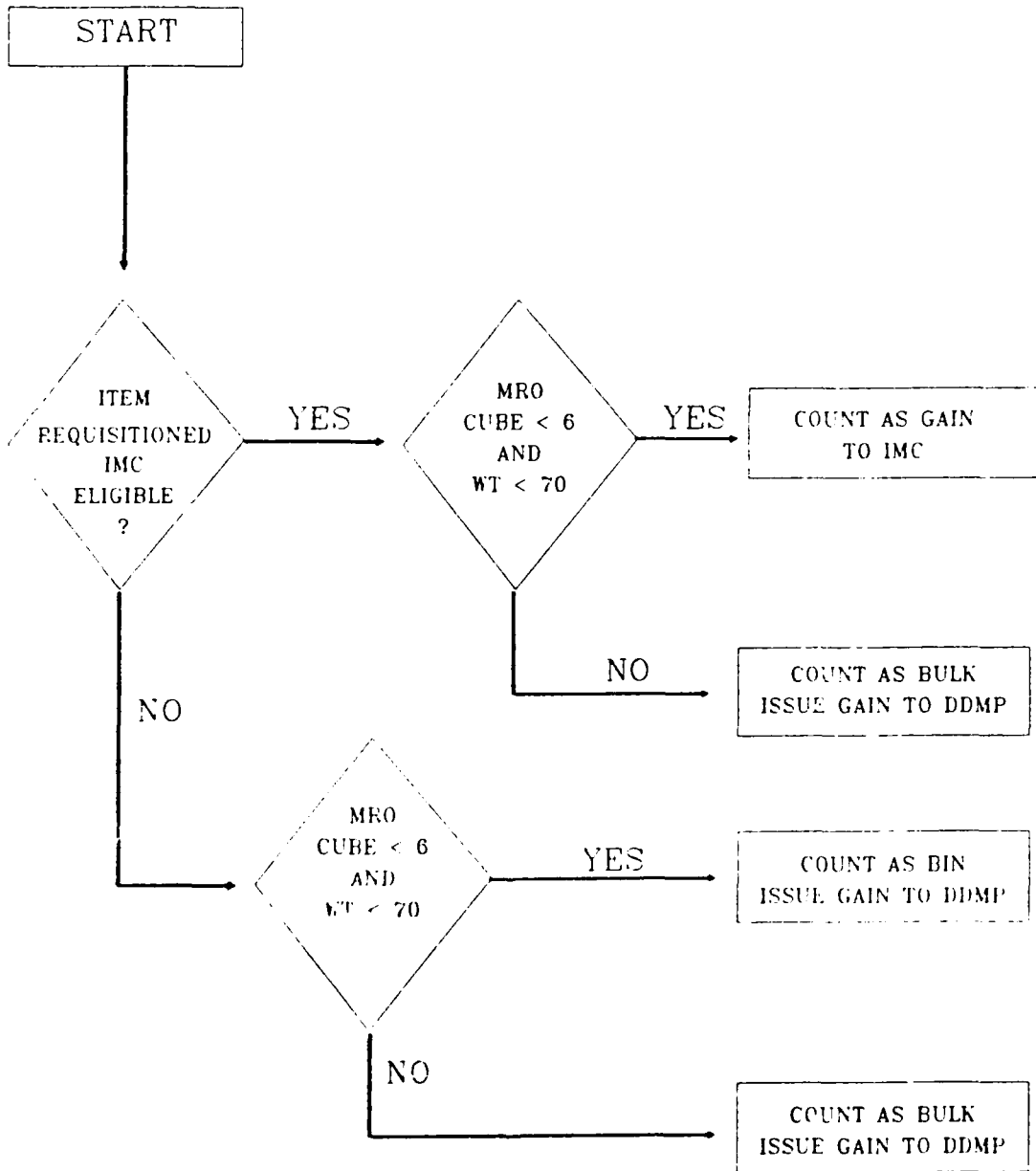


Figure 2

METHODOLOGY FOR MROs TRANSFERRED TO DDMP

FOR EACH MRO TRANSFERRED TO DDMP



NOTE IMC CONSIDERED AS SEPARATE FROM DDMP

general, indirect, and direct categories, for various functions within the depot. Number of work units processed by each function is also listed. For bin shipping, bulk shipping, and bin receiving, total direct and indirect labor costs for FY 89 were divided by total FY 89 work units (MRO or receipt) to calculate labor cost per work unit for each function in each depot.

4. Step 4: Calculate labor cost of workload lost. At each depot, the amount of workload lost in bin shipping, bulk shipping, and bin receiving were multiplied by the appropriate cost per unit from step 3. The sum of these products gave the total labor cost of the workload lost at that depot.

5. Step 5: Calculate number of personnel. Each depot has an average annual rate (AAR), which is the average labor cost of one employee at that depot (Depot AARs were provided by DLA-CB). Dividing the total labor cost of the workload lost at each depot (from Step 4) by that depot's AAR gave the number of employees that equates to the amount of workload lost. At DDMP, this figure was subtracted from the expected IMC staff size to give the net gain or loss at DDMP.

## VI. ANALYSIS

The chart at Figure 3 compares the workload lost at each of the four east coast depots due to the combined effect of the four stockage policies being analyzed and IMC operation. This clearly shows that DDMP, as host of the IMC, has the most workload transferred from their current operation.

Tables 1 through 4 give the results of the calculations described in the methodology. Table 1 gives results for bin shipping, Table 2 bulk shipping, Table 3 bin receiving, and Table 4 the combined results for each depot. Individual results for each policy are shown in Appendix A (binnables and DDMP qualified are grouped as "IMC related").

The IMC-related policies are the primary factor, causing the largest shift in workload. The threaded fastener policy causes workload to shift to DDCO from the other depots, so that their personnel reduction is less than the IMC workload shifts would have caused alone. The same is true of DDMT due to grade 8 bolts, although the amount of workload is relatively small.

Figure 3

# MROS REDUCED AT EACH DEPOT DUE TO BIN POLICIES AND IMC OPERATION

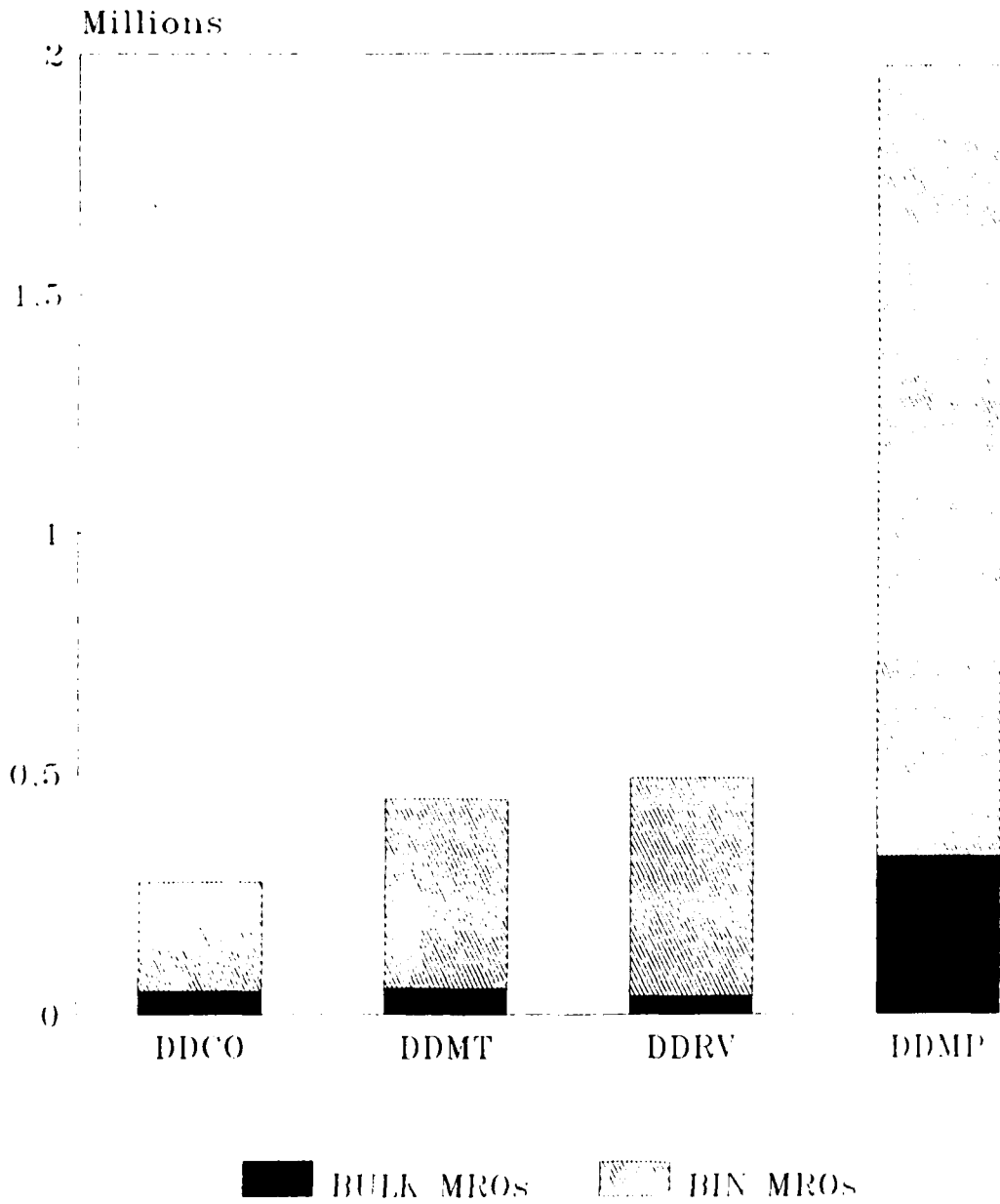


Table 1

## PERSONNEL SAVINGS: BIN SHIPPING

	DDCO	DDMT	DDRV	DDMP
BIN MROs REDUCED	-227,897	-393,625	-454,195	-1,646,011
BIN LABOR \$/MRO	\$ 3.89	\$ 4.42	\$ 3.16	\$ 3.48
TOTAL BIN LABOR \$	-\$886,519	-\$1,739,823	-\$1,435,256	-\$5,728,118
\$ / PERSON	\$25,011	\$24,940	\$24,712	\$26,386
PERSONNEL SAVED	-35	-70	-58	-217

NOTE: \$/MRO INCLUDES DIRECT & INDIRECT LABOR COSTS ONLY

Table 2

## PERSONNEL SAVINGS: BULK SHIPPING

	DDCO	DDMT	DDRV	DDMP
BULK MROs REDUCED	-48,697	-55,487	-38,370	-329,483
BULK LABOR \$/MRO	\$17.67	\$10.85	\$21.04	\$10.50
TOTAL BULK LABOR \$	-\$860,476	-\$602,034	-\$807,305	-\$3,459,572
\$ / PERSON	\$25,011	\$24,940	\$24,712	\$26,386
PERSONNEL SAVED	-34	-24	-33	-131

NOTE: \$/MRO INCLUDES DIRECT & INDIRECT LABOR COSTS ONLY

Table 3

## PERSONNEL SAVINGS: BIN RECEIVING

	DDCO	DDMT	DDRV	DDMP
BIN RECEIPTS REDUCED	-13,038	-17,048	-24,018	
BIN LABOR \$/RECEIPT	\$10.84	\$11.35	\$ 6.21	
TOTAL BIN LABOR \$	-\$141,332	-\$193,495	-\$149,152	
\$ / PERSON	\$25,011	\$24,940	\$24,712	
PERSONNEL SAVED	-6	-8	-6	-45*

\* DDMP SAVINGS EQUALS NUMBER OF BIN RCVG PERSONNEL IN BLDG 207

NOTE: \$/RECEIPT INCLUDES DIRECT AND INDIRECT LABOR COSTS ONLY

Table 4

# PERSONNEL SAVINGS : TOTAL

	DDCO	DDMT	DDRV	DDMP	TOTAL
BIN SHIPPING	-35	-70	-58	-217	-380
BULK SHIPPING	-34	-24	-33	-131	-222
BIN RECEIVING	-6	-8	-6	-45	-65
TOTAL	-75	-102	-97	-393	-667
IMC STAFF				+300	+300
NET TOTAL	-75	-102	-97	-93	-367

APPENDIX A

Personnel Savings Calculations by Policy

Table A-1

PERSONNEL SAVINGS ALLOCATION FOR IMC RELATED POLICIES  
(BINNABLES AND DDMP QUALIFIED)

USING DIRECT & INDIRECT LABOR COSTS ONLY

	DDCO	DDMT	DDRV	DDMP
SHIPPING:				
MROs REDUCED:	-444434	-375715	-481335	-1926550
BIN %	89%	85%	92%	83%
BIN MROs REDUCED:	-394599	-321039	-443759	-1598537
BIN LABOR \$/MRO:	3.89	4.42	3.16	3.48
TOTAL \$ (BIN)	-1534990	-1418992	-1402278	-5562909
\$/PERSON	25011	24940	24712	26386
PEOPLE SAVED (BIN):	-61	-57	-57	-211
BULK %	11%	15%	8%	17%
BULK MROs REDUCED:	-49835	-54676	-37576	-328013
BULK LABOR \$/MRO:	17.67	10.85	21.04	10.50
TOTAL \$ (BULK)	-880584	-593235	-790599	-3444137
\$/PERSON	25011	24940	24712	26386
PEOPLE SAVED (BULK):	-35	-24	-32	-131
PEOPLE SAVED (SHIPPING):	-97	-81	-89	-341
RECEIVING:				
BIN RECEIPTS REDUCED:	-12734	-15665	-23947	
BIN LABOR \$/RECEIPT:	10.84	11.35	6.21	
TOTAL \$ (BIN)	-138037	-177798	-148711	
\$/PERSON	25011	24940	24712	
PEOPLE SAVED (RECEIVING)	-6	-7	-6	-45
TOTAL PEOPLE SAVED:	-102	-88	-95	-386

Table A-2

## PERSONNEL SAVINGS ALLOCATION FOR THREADED FASTENER POLICY

## USING DIRECT &amp; INDIRECT LABOR COSTS ONLY

	DDCO	DDMT	DDRV	DDMP
SHIPPING:				
MROs REDUCED:	184831	-120091	-11032	-44718
BIN %	96%	84%	94%	97%
BIN MROs REDUCED:	177432	-100459	-10360	-43551
BIN LABOR \$/MRO:	3.89	4.42	3.16	3.48
TOTAL \$ (BIN)	690210	-444029	-32738	-151557
\$/PERSON	25011	24940	24712	26386
PEOPLE SAVED (BIN):	28	-18	-1	-6
BULK %				
BULK MROs REDUCED:	7399	-19632	-672	-1167
BULK LABOR \$/MRO:	17.67	10.85	21.04	10.50
TOTAL \$ (BULK)	130740	-213007	-14139	-12254
\$/PERSON	25011	24940	24712	26386
PEOPLE SAVED (BULK):	5	-9	-1	0
PEOPLE SAVED (SHIPPING):	33	-26	-2	-6
RECEIVING:				
BIN RECEIPTS REDUCED:	0	-1383	-68	0
BIN LABOR \$/RECEIPT:	10.84	11.35	6.21	0.00
TOTAL \$ (BIN)	0	-15697	-422	0
\$/PERSON	25011	24940	24712	26386
PEOPLE SAVED (RECEIVING)	0	-1	0	0
TOTAL PEOPLE SAVED:	33	-27	-2	-6

Table A-3

## PERSONNEL SAVINGS ALLOCATION FOR GRADE 8 BOLT POLICY

## USING DIRECT &amp; INDIRECT LABOR COSTS ONLY

	DDCO	DDMT	DDRV	DDMP
SHIPPING:				
MROs REDUCED:	-16991	46694	-198	-4226
BIN %	63%	60%	38%	93%
BIN MROs REDUCED:	-10730	27873	-76	-3923
BIN LABOR \$/MRO:	3.89	4.42	3.16	3.48
TOTAL \$ (BIN)	-41740	123199	-240	-13652
\$/PERSON	25011	24940	24712	26386
PEOPLE SAVED (BIN):	-2	5	0	-1
BULK %				
BULK MROs REDUCED:	-6261	18821	-122	-303
BULK LABOR \$/MRO:	17.67	10.85	21.04	10.50
TOTAL \$ (BULK)	-110632	204208	-2567	-3182
\$/PERSON	25011	24940	24712	26386
PEOPLE SAVED (BULK):	-4	8	0	0
PEOPLE SAVED (SHIPPING):	-6	13	0	-1
RECEIVING:				
BIN RECEIPTS REDUCED:	-304	0	-3	0
BIN LABOR \$/RECEIPT:	10.84	11.35	6.21	0.00
TOTAL \$ (BIN)	-3295	0	-19	0
\$/PERSON	25011	24940	24712	26386
PEOPLE SAVED	0	0	0	0
TOTAL PEOPLE SAVED:	-6	13	0	-1

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