

AD-A059 863

ARMY TROOP SUPPORT AND AVIATION MATERIEL READINESS CO--ETC F/G 10/2
HISTORICAL ESCALATION OF OPERATION AND MAINTENANCE COSTS FOR FI--ETC(U)
JUL 78 W H GILLE
TSARCOM-TR-78-7.

UNCLASSIFIED

NL

| OF |

AD
A059863



END
DATE
FILMED
12-78

DDC

12

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER Technical Report 78-7V	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Historical Escalation of Operation and Maintenance Costs for Field Generator Sets		5. TYPE OF REPORT & PERIOD COVERED FY75 to FY78 Final Report
7. AUTHOR(s) Warren H. Gille, Jr.		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS US Army Troop Support and Aviation Materiel Readiness Command, 4300 Goodfellow Blvd. St. Louis, MO 63120 Cost Analysis Division		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE July 1978
<p style="text-align: center; font-size: 2em; font-weight: bold;">LEVEL II</p>		13. NUMBER OF PAGES 32
		15. SECURITY CLASS. (of this report) Unclassified
15a. DECLASSIFICATION/DOWNGRADING SCHEDULE		

15. DISTRIBUTION STATEMENT (of this Report)
Approved for Public Release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

DDC
RECEIVED
SEP 18 1978
RESULTS

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)
Cost Analysis, Cost Estimates, Cost Tracking, Escalation Factor, Generator, Indexes, Methodology, Models, Operating and Maintenance Cost (OMA), Historical Cost, Prices, Tracking

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)
This report updates the costs developed for Operating and Maintaining Generator Sets established by the Cost Estimating Relationships (CER'S) in TROSCOM Technical Report 74-12. The methodology employed is based on ratio and proportion analysis, wherein each individual component of Operating and Maintenance (O&M) Cost is updated using a specialized index. Then, the cost components are re-aggregated into a revised O&M Cost, which more accurately reflects the actual cost than would escalation by a single gross factor. The report covers full load and half load operating costs for most common 60 HZ and 400 HZ Gasoline Engine

DDC FILE COPY AD A059863

9 05 104

over

20. Driven (GED) Generator Sets, and also those for common 60 HZ Diesel Engine Driven (DED) Generator Sets. The escalation factor for 400 HZ DED Generator Sets is assumed to be the same as that for corresponding 60 HZ DED Generator Sets, using the previous TROSCOM Tech Report 74-12. The complete statement of methodology is included which allows the analysis to be adapted by the user to fit the specific time period desired. The Generator Sets referenced in this Tech Report are used to support various types of equipment, which means that the cost escalation factors provided should be of value in determining O&M Cost for generators used in a variety of applications.

ACCESSION for	
NTIS	White Section <input checked="" type="checkbox"/>
DDC	Buff Section <input type="checkbox"/>
UNANNOUNCED JUSTIFICATION	
BY	
DISTRIBUTION/AVAILABILITY CODES	
Dist.	SPECIAL
A	

78 08 05 104

14
USATSARCOM - TECHNICAL REPORT - 78 - 7

9 Final rept. FY75 - FY78,

6 HISTORICAL ESCALATION OF OPERATION AND MAINTENANCE.

COSTS FOR FIELD GENERATOR SETS.

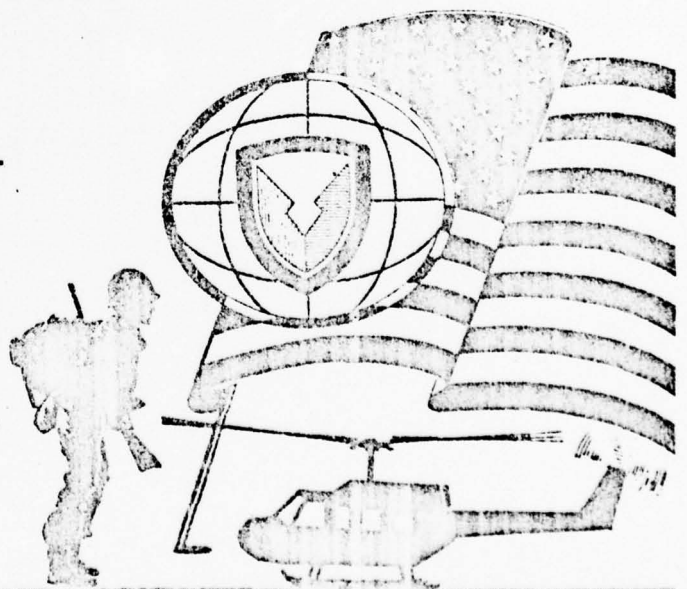
(REFERENCE TROSCOM TECHNICAL REPORT 74-12)

10 WARREN H. GILLE, JR

11 JULY 1978

12 36p.

U.S. ARMY TROOP SUPPORT
AND AVIATION MATERIEL
READINESS COMMAND
COMPTROLLER
COST ANALYSIS DIVISION
4300 GOODFELLOW BLVD.
ST. LOUIS, MISSOURI 63120



410 399
78 08 18 029 mt

DISCLAIMER STATEMENT

The findings of this report are not to be construed as an official Department of the Army position unless so designated by other authorized documents.

78 08 18 029

TABLE OF CONTENTS :

Table of Contents	i-ii
<u>Methodology for Indices:</u>	(1-10)
Operating Cost Index Equation	2-3
Relative Contribution to Cost (Weighting Factors)	4-5
Cost Indexes for Cost Components	6-8
*Guidance in Using Wholesale Price Indices for Generators	9
*Wholesale Price Factors for Code 11-7, Electrical Machinery and Equipt.	10
<u>Computation of Operating Cost Indices for Generators:</u>	
<u>Computation of Operating Cost Indices (11-19) for Gasoline Generators FY 75 - FY 78</u>	
Half Load Operating Cost Values	12
*Half Load Operating Cost Calculations	13
Cost per Kilowatt Hour Values	14
*Cost per Kilowatt Hour Calculations	15
Computation of Operating Cost Indexes(16-18) for Gasoline Generators(FY 75- FY 78)	
Calculation of Subindices for Cost Components (POL, Parts, Maintenance, and Overhaul)	19

TABLE OF CONTENTS(cont.)

Computation of Operating Cost Indices for Diesel Generators:

Computation of Operating Cost Indices (20-28)
for Diesel Generators FY 75 - FY 78

Half Load Operating Cost Values 21

*Half Load Operating Cost Calculations 22

Cost per Kilowatt Hour Values 23

*Cost per Kilowatt Hour Calculations 24

Computation of Operating Cost Indexes 25-27
for Diesel Generators(FY '75- FY 78)

Calculation of Subindices for Cost
Components (POL, Parts, Maintenance, and
Overhaul)

APPENDIX A

Sample Calculation: A1-A2
Weighting Factors for Contribution
to Cost.

OPERATING COST INDEX FOR GENERATORS

Inclosed are the essentials for computing Operating Cost Indices for particular gasoline and diesel powered generators. Computation of the appropriate index involves three steps: (The Operating Cost Equation is specified in Part One).

1. Obtain the proper relative weighting factors for the generator of interest in Part Two.
2. Obtain the appropriate values for the relevant cost indices in Part Three.
3. Put values into the Operating Cost Equation and compute the Operating Cost Index.

TSARCOM CONTROLLER VALIDATION	
COST ANALYSIS DIVISION	
C3C0C	REVIEW No. <i>KV/3128-78</i>
VALIDATED	
Validation Level: <input checked="" type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> III	Phone No. <i>2357</i>
Analyst <i>[Signature]</i>	
Date <i>15 9/28/78</i>	

Warren Gille

Warren Gille
Economist - DRSTS-CCA
TSARCOM Inflation
Focal Point

PART ONE:

OPERATING COST INDEX EQUATION

COMPUTATION OF OPERATING COST INDEX FOR GENERATORS:

$$\begin{aligned} \text{OPERATING COST INDEX} = & \\ & (\% \text{ OF OPERATING COST ATTRIBUTABLE TO POL}) \times (\text{POL INDEX}) + \\ & (\% \text{ OF COST ATTRIBUTABLE TO PARTS}) \times (\text{PARTS INDEX}) + \\ & (\% \text{ OF COST ATTRIBUTABLE TO MAINTENANCE}) \times (\text{MAINTENANCE INDEX}) + \\ & (\% \text{ OF COST ATTRIBUTABLE TO OVERHAUL}) \times (\text{OVERHAUL INDEX}) \end{aligned}$$

THAT IS, THE OPERATING COST INDEX IS A WEIGHTED SUM OF THE INDEXES FOR THE FOUR

COMPONENTS OF OPERATING COST:

- 1) POL Index
- 2) Parts Index
- 3) Maint. Index
- 4) Overhaul Index

PART TWO:

RELATIVE CONTRIBUTION TO OPERATING COST: (RELATIVE WEIGHTS.)

GASOLINE DRIVEN
RELATIVE WEIGHTING FACTORS FOR OPERATING COST ELEMENTS

	<u>60 HZ</u>			<u>400 HZ</u>				
	$\frac{1.5}{1000}$	$\frac{3}{1000}$	$\frac{5}{1000}$	$\frac{10}{1000}$	$\frac{KW}{HR/YR}$	$\frac{3}{1000}$	$\frac{5}{1000}$	$\frac{10}{1000}$
POL	23.4%	32.1%	36.5%	49.3%		33.9%	36.6%	52.2%
PARTS	25.1%	21.3%	16.1%	12.4%		20.6%	16.4%	11.1%
MAINT	30.4%	25.8%	28.9%	21.5%		24.9%	28.4%	21.6%
OVERHAUL	21.1%	20.8%	18.5%	16.8%		20.6%	18.6%	15.1%
	100%	100%	100%	100%		100%	100%	100%

DIESEL DRIVEN
RELATIVE WEIGHTING FACTORS FOR OPERATING COST ELEMENTS

	<u>60 HERTZ DIESEL</u>								
	$\frac{5}{1000}$	$\frac{10}{1000}$	$\frac{15}{1200}$	$\frac{30}{1300}$	$\frac{KW}{HR/YR}$	$\frac{60}{1500}$	$\frac{100}{2000}$	$\frac{150}{1000}$	$\frac{200}{1000}$
POL	18.8%	27.1%	25.8%	39.8%		54.6%	61.9%	73.0%	74.8%
PARTS	21.3%	20.2%	23.2%	18.6%		14.2%	11.4%	8.5%	6.6%
MAINT	28.5%	22.6%	15.8%	12.0%		10.5%	7.1%	5.6%	4.4%
OVERHAUL	31.4%	30.1%	35.2%	29.6%		20.7%	19.6%	12.9%	14.2%
	100%	100%	100%	100%		100%	100%	100%	100%

PART THREE:

COST INDEXES FOR OPERATING COST COMPONENTS

COMPUTATION OF INDICES

POL Index
(Gasoline)
= (Fuel Cost */gal) Ref. Year
(.381 /gal) FY 1975

POL Index
(Diesel)
= (Fuel Cost */gal) Ref. Year
(.339 /gal) FY 1975

* Bulk Prices, as listed in DFSC Bulletin, FY 1975: (Bulletin 74-4 dated 25 October 1974)
(1.08 Factor for Oils/Lubricants cancels up on Division)

Maintenance
Cost Escalation
Factor
= (E4 Yearly Salary) Ref. Year
(\$6,875) FY 1975

(Other factors cancel see Formula p.20 of TROSCOM Tech Report 74-12, January 1975)

OVERHAUL AND PARTS COST INDEXES:

Overhaul cost is a percentage of acquisition cost:

Therefore:

Overhaul Cost Index (Elect. Machinery Factor 11-7) FY 1975

=

(Elect. Machinery Factor 11-7) Ref Year

Also:

Parts Cost Index (Electrical Machinery Factor 11-7) FY 1975

=

(Electrical Machinery Factor 11-7) Ref Year

= See list of factors (11-7) Attached. =

FY 1975 is the basis for the cost figures listed in the referenced report:

TROSCOM Tech. Report 74-12, Cost Estimating Relationships for Operating Costs

of Mobile Electric Power Generating Sets, January 1975.

Reference Year is the FY to which the

original FY75 cost is to be updated.

WHOLESALE PRICE INDICES

The following Wholesale Price Indices should be used for the TROSCOM

PEMA items to update prices from past contract prices:

Wholesale Price Index
Title

TROSCOM PEMA Item

Rubber and Plastics Products 07
 Heating Equipment 18
 Fabricated Structural Metal Products 10-7

Collapsible Tanks
 Air Conditioners
 Heaters
 AVL Bridge (Not including
 Tank chasis)
 Tanks
 Other Bridges

Machinery and Equipment 11

Power Plant (MUST)
 Firefighting Equipment
 Forklift Trucks

Construction Machinery and Equipment 11-2

Pumps
 Compressors

General Purpose Machinery and Equipment 11-4

Watercraft

Special Industry Machinery and Equipment 11-6

Theodolites
 Tape Equipment
 Surveying Instruments

Electrical Machinery and Equipment 11-7	Generators Light Sets Utility Elements
---	--

Railroad Equipment 14-4

Railroad Equipment

Industrial Commodities

All other items not listed
 above.

DO NOT REMOVE
 FILE COPY

Guaranteed

TROOP SUPPORT ITEMS

WHOLESALE PRICE INDICES
HISTORICAL MULTIPLE FACTORS **

FY	(11-6) Special Industrial Mach & Equip	(11-7) Electrical Machinery & Equipment	(14) Transportation Equipment	(14-1) Moto Vehicles & Equip	(14-4) Railroad Equipment
1967	2.021	1.537	-	1.023	2.238
1968	1.937	1.516	-	1.586	2.268
1969	1.847	1.492	-	1.549	2.152
1970	1.758	1.458	1.545	1.514	2.038
1971	1.577	1.404	1.468	1.434	1.948
1972	1.620	1.385	1.411	1.378	1.840
1973	1.577	1.370	1.387	1.359	1.741
1974	1.443	1.315	1.345	1.320	1.611
1975	1.198	1.123	1.173	1.162	1.218
1976/7T	1.082	1.056	1.076	1.072	1.090
1977	1.000	1.000	1.000	1.000	1.000

To move from FY77 to FY78, multiply FY77 cost figure by 1.07. This figure is an estimate based on current Wholesale Price Index data. This estimate will be superceded by fact when the complete data series is available for FY78.

SAMPLE COMPUTATIONS

COMPUTATION OF OPERATING COST
INDEX FOR GASOLINE GENERATORS.
INDEX: 1975 to 1978

GASOLINE GENERATORS

60 Hertz

400 Hertz

1.5Kw
1000

3Kw
1000

5Kw
1000

10Kw
1000

3Kw
1000

5Kw
1000

10Kw
1000

Half Load Operating
Cost/1000 Hours
FY 1975

FY 1978 COST SUMMARY

FY 1978 Cost

1442

1668

2195

2863

1723

2239

2805

Half Load Operating
Cost per year FY 1975

FY 1978 COST SUMMARY

FY 1978 Cost

1442

1668

2195

2863

1723

2239

2805

400 Hertz

60 Hertz

GASOLINE GENERATORS

	<u>1.5Kw</u> <u>1000</u>	<u>3Kw</u> <u>1000</u>	<u>5Kw</u> <u>1000</u>	<u>10Kw</u> <u>1000</u>	<u>3Kw</u> <u>1000</u>	<u>5Kw</u> <u>1000</u>	<u>10Kw</u> <u>1000</u>
Half Load Operating Cost/1000 Hours FY 1975	\$1112	\$1275	\$1659	\$2133	\$1313	\$1692	\$2081
Inflation Index X	<u>1.297</u>	<u>1.308</u>	<u>1.323</u>	<u>1.342</u>	<u>1.312</u>	<u>1.323</u>	<u>1.348</u>
FY 1978 Cost	<u>1442</u>	<u>1668</u>	<u>2195</u>	<u>2863</u>	<u>1723</u>	<u>2239</u>	<u>2805</u>
Half Load Operating Cost per year FY 1975	\$1112	\$1275	\$1659	\$2133	\$1313	\$1692	\$2081
Inflation Index X	<u>1.297</u>	<u>1.308</u>	<u>1.323</u>	<u>1.342</u>	<u>1.312</u>	<u>1.323</u>	<u>1.348</u>
FY 1978 Cost	<u>1442</u>	<u>1668</u>	<u>2195</u>	<u>2863</u>	<u>1723</u>	<u>2239</u>	<u>2805</u>

Half Load Operating Cost/1000 Hours FY 1975

Inflation Index X

FY 1978 Cost

Half Load Operating Cost per year FY 1975

Inflation Index X

FY 1978 Cost

GASOLINE GENERATORS

60 Hertz

400 Hertz

1.5Kw
1000

3Kw
1000

5Kw
1000

10Kw
1000

3Kw
1000

5Kw
1000

10Kw
1000

Full Load Operating
Cost, \$ Per Kw-Hour

FY 1978 COST SUMMARY

1.034

.615

.493

.336

.639

.503

.332

FY 1978 Cost

Half Load Operating
Cost, \$ Per Kw-Hour

FY 1978 COST SUMMARY

2.062

1.112

.879

.573

1.145

.896

.562

FY 1978 Cost

GASOLINE GENERATORS

57

60 Hertz

400 Hertz

1.5Kw
1000

3Kw
1000

5Kw
1000

10Kw
1000

3Kw
1000

5Kw
1000

10Kw
1000

Full Load Operating
Cost, \$ Per Kw-Hour

.797

.470

.373

.250

.487

.380

.246

Inflation Index X

1.297

1.308

1.323

1.342

1.312

1.323

1.348

FY 1978 Cost

1.034

.615

.493

.336

.639

.503

.332

Half Load Operating
Cost, \$ Per Kw-Hour

1.59

.850

.664

.427

.873

.677

.417

Inflation Index X

1.297

1.308

1.323

1.342

1.312

1.323

1.348

FY 1978 Cost

2.062

1.112

.879

.573

1.145

.896

.562

COMPUTATION OF OPERATING COST
INDEX FOR GASOLINE GENERATORS
INDEX: 1975 to 1978

1.5KW 60Hz Generator

	Weight		Index		
POL	23.4%	x	1.425	=	.334
Parts	25.1%	x	1.202	=	.302
Maint.	30.4%	x	1.338	=	.407
Overhaul	21.1%	x	1.202	=	.254
	100%				1.297

3KW 60Hz Generator

POL	32.1%	x	1.425	=	.457
Parts	21.3%	x	1.202	=	.256
Maint.	25.8%	x	1.338	=	.345
Overhaul	20.8%	x	1.202	=	.250
	100%				1.308

5KW 60Hz Generator

POL	36.5%	x	1.425	=	.520
Parts	16.1%	x	1.202	=	.194
Maint.	28.9%	x	1.338	=	.387
Overhaul	18.5%	x	1.202	=	.222
	100%				1.323

COMPUTATION OF OPERATING COST
INDEX FOR GASOLINE GENERATORS
INDEX: 1975 to 1978

10KW	60Hz	Generator			
	Weight		Index		
POL	49.3%	x	1.425	=	.703
Parts	12.4%	x	1.202	=	.149
Maint.	21.5%	x	1.338	=	.288
Overhaul	16.8%	x	1.202	=	.202
	<u>100%</u>				<u>1.342</u>

3KW	400Hz	Generator			
POL	33.9%	x	1.425	=	.483
Parts	20.6%	x	1.202	=	.248
Maint.	24.9%	x	1.338	=	.333
Overhaul	20.6%	x	1.202	=	.248
	<u>100%</u>				<u>1.312</u>

5KW	400Hz	Generator			
POL	36.6%	x	1.425	=	.522
Parts	16.4%	x	1.202	=	.197
Maint.	28.4%	x	1.338	=	.380
Overhaul	18.6%	x	1.202	=	.224
	<u>100%</u>				<u>1.323</u>

COMPUTATION OF OPERATING COST
INDEX FOR GASOLINE GENERATORS
INDEX: 1975 to 1978

10KW	400Hz	Generator			
	Weight		Index		
POL	52.2%	x	1.425	=	.744
Parts	11.1%	x	1.202	=	.133
Maint.	21.6%	x	1.338	=	.289
Overhaul	15.1%	x	1.202	=	.182
	100%				1.348

INDICES FOR FY 75 - FY 78 GENERATOR O&MA INDEX CALCULATION

1. POL Index

✓ a. <u>Gasoline Generator</u>	=	<u>.543/gal</u>
(Bulk: FSN 9130-00-264-6218)		<u>.381/gal</u>
	=	1.425
b. <u>Diesel Generator</u>	=	<u>.441/gal</u>
(Bulk: FSN 9140-00-286-5294)		<u>.338/gal</u>
	=	1.305

Source DFSC Fuel Supply Bulletin 77-1 verified as accurate with Cameron Station, DFSC Depot, 11 July 1978.

2. Parts Index = $\frac{1.123}{1.000} \times (1.07)$

(1975 to 1977 based on Wholesale Price Index Code 11-7 Electrical Machinery)	1977 to 1978 (OSD Indices 28 Dec 77 O&MA)
---	--

= 1.202

3. Maintenance Index = $\frac{E4\ 1978}{E4\ 1975}$

= $\frac{9,199}{6,875} =$ 1.338

4. Overhaul Index = $\frac{(1.123)}{(1.000)} \times (1.07)$

(1975 to 1977 based on Wholesale Price (Now called Producer Price) Index, Dept of Labor, Code 11-7 Electrical Machinery)	OSD Factor (1977 to 1978 28 Dec 77 Indices O&MA)
--	---

= 1.202

SAMPLE COMPUTATIONS

COMPUTATION OF OPERATING COST
INDEX FOR DIESEL GENERATORS.
INDEX: 1975 to 1978

60 HERTZ DIESEL

DIESEL GENERATORS

<u>5Kw</u>	<u>10Kw</u>	<u>15Kw</u>	<u>30Kw</u>	<u>60Kw</u>	<u>100Kw</u>	<u>150Kw</u>	<u>200Kw</u>
1000	1000	1200	1300	1500	2000	1000	1000

Half Load Operating
Cost per 1000 Hours
FY 1975

FY 1978 COST SUMMARY

<u>1398</u>	<u>1740</u>	<u>2456</u>	<u>3072</u>	<u>4278</u>	<u>6147</u>	<u>7551</u>	<u>9747</u>
-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------

FY 1978 Cost

Half Load Operating
Cost per year

FY 1978 COST SUMMARY

<u>1398</u>	<u>1740</u>	<u>2935</u>	<u>3993</u>	<u>6417</u>	<u>12293</u>	<u>7551</u>	<u>9747</u>
-------------	-------------	-------------	-------------	-------------	--------------	-------------	-------------

FY 1978 Cost

DIESEL GENERATORS

60 HERTZ DIESEL

2

	<u>5Kw</u> 1000	<u>10Kw</u> 1000	<u>15Kw</u> 1200	<u>30Kw</u> 1300	<u>60Kw</u> 1500	<u>100Kw</u> 2000	<u>150Kw</u> 1000	<u>200Kw</u> 1000
	\$1110	\$1380	\$1965	\$2438	\$3358	\$4817	\$5876	\$7585
	<u>1.259</u>	<u>1.261</u>	<u>1.250</u>	<u>1.260</u>	<u>1.274</u>	<u>1.276</u>	<u>1.285</u>	<u>1.285</u>
	<u>1398</u>	<u>1740</u>	<u>2456</u>	<u>3072</u>	<u>4278</u>	<u>6147</u>	<u>7551</u>	<u>9747</u>
	\$1110	\$1380	\$2348	\$3169	\$5037	\$9634	\$5876	\$7585
	<u>1.259</u>	<u>1.261</u>	<u>1.250</u>	<u>1.260</u>	<u>1.274</u>	<u>1.276</u>	<u>1.285</u>	<u>1.285</u>
	<u>1398</u>	<u>1740</u>	<u>2935</u>	<u>3993</u>	<u>6417</u>	<u>12293</u>	<u>7551</u>	<u>9747</u>

Half Load Operating
Cost per 1000 Hours
FY 1975

Inflation Index X

FY 1978 Cost

Half Load Operating
Cost per year

Inflation Index X

FY 1978 Cost

60 HERTZ DIESEL

DIESEL GENERATORS

<u>5Kw</u>	<u>10Kw</u>	<u>15Kw</u>	<u>30Kw</u>	<u>60Kw</u>	<u>100Kw</u>	<u>150Kw</u>	<u>200Kw</u>
1000	1000	1200	1300	1500	2000	1000	1000

Full Load Operating
Cost, \$ Per Kw-Hour

FY 1978 COST SUMMARY

FY 1978 Cost	<u>.296</u>	<u>.189</u>	<u>.178</u>	<u>.116</u>	<u>.085</u>	<u>.075</u>	<u>.064</u>	<u>.063</u>
--------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------

Half Load Operating
Cost, \$ Per Kw-Hour

FY 1978 COST SUMMARY

FY 1978 Cost	<u>.559</u>	<u>.348</u>	<u>.328</u>	<u>.205</u>	<u>.143</u>	<u>.123</u>	<u>.100</u>	<u>.098</u>
--------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------	-------------

DIESEL GENERATORS

60 HERTZ DIESEL

<u>5Kw</u> 1000	<u>10Kw</u> 1000	<u>15Kw</u> 1200	<u>30Kw</u> 1300	<u>60Kw</u> 1500	<u>100Kw</u> 2000	<u>150Kw</u> 1000	<u>200Kw</u> 1000
.235	.150	.142	.092	.067	.059	.050	.049
<u>1.259</u>	<u>1.261</u>	<u>1.250</u>	<u>1.260</u>	<u>1.274</u>	<u>1.276</u>	<u>1.285</u>	<u>1.285</u>
<u>.296</u>	<u>.189</u>	<u>.178</u>	<u>.116</u>	<u>.085</u>	<u>.075</u>	<u>.064</u>	<u>.063</u>
.444	.276	.262	.163	.112	.096	.078	.076
<u>1.259</u>	<u>1.261</u>	<u>1.250</u>	<u>1.260</u>	<u>1.274</u>	<u>1.276</u>	<u>1.285</u>	<u>1.285</u>
<u>.559</u>	<u>.348</u>	<u>.328</u>	<u>.205</u>	<u>.143</u>	<u>.123</u>	<u>.100</u>	<u>.098</u>

Full Load Operating Cost, \$ Per Kw-Hour X
 Inflation Index X
 FY 1978 Cost

Half Load Operating Cost, \$ Per Kw-Hour X
 Inflation Index X
 FY 1978 Cost

COMPUTATION OF OPERATING COST
INDEX FOR DIESEL GENERATORS
INDEX: 1975 to 1978

<u>5KW</u>	<u>Diesel</u>		<u>Generator</u>		
	Weight			Index	
POL	18.8%	x	1.305	=	.245
Parts	21.3%	x	1.202	=	.256
Maint.	28.5%	x	1.338	=	.381
Overhaul	31.4%	x	1.202	=	.377
	<u>100%</u>				<u><u>1.259</u></u>

<u>10KW</u>	<u>Diesel</u>		<u>Generator</u>		
POL	27.1%	x	1.305	=	.354
Parts	20.2%	x	1.202	=	.243
Maint.	22.6%	x	1.338	=	.302
Overhaul	30.1%	x	1.202	=	.362
	<u>100%</u>				<u><u>1.261</u></u>

<u>15KW</u>	<u>Diesel</u>		<u>Generator</u>		
POL	25.8%	x	1.305	=	.337
Parts	23.2%	x	1.202	=	.279
Maint.	15.8%	x	1.338	=	.211
Overhaul	35.2%	x	1.202	=	.423
	<u>100%</u>				<u><u>1.250</u></u>

COMPUTATION OF OPERATING COST
INDEX FOR DIESEL GENERATORS
INDEX: 1975 to 1978

<u>30KW</u>	<u>Diesel</u>		<u>Generator</u>		
	Weight		Index		
POL	39.8%	x	1.305	=	.519
Parts	18.6%	x	1.202	=	.224
Maint.	12.0%	x	1.338	=	.161
Overhaul	29.6%	x	1.202	=	.356
	<u>100%</u>				<u><u>1.260</u></u>

<u>60KW</u>	<u>Diesel</u>		<u>Generator</u>		
POL	54.6%	x	1.305	=	.713
Parts	14.2%	x	1.202	=	.171
Maint.	10.5%	x	1.338	=	.141
Overhaul	20.7%	x	1.202	=	.249
	<u>100%</u>				<u><u>1.274</u></u>

<u>100KW</u>	<u>Diesel</u>		<u>Generator</u>		
POL	61.9%	x	1.305	=	.808
Parts	11.4%	x	1.202	=	.137
Maint.	7.1%	x	1.338	=	.095
Overhaul	19.6%	x	1.202	=	.236
	<u>100%</u>				<u><u>1.276</u></u>

COMPUTATION OF OPERATING COST
 INDEX FOR DIESEL GENERATORS
 INDEX: 1975 to 1978

<u>150KW</u>	<u>Diesel</u>		<u>Generator</u>			
	Weight			Index		
POL	73.0%	x		1.305	=	.953
Parts	8.5%	x		1.202	=	.102
Maint.	5.6%	x		1.338	=	.075
Overhaul	12.9%	x		1.202	=	.155
	<u>100.0%</u>					<u><u>1.285</u></u>

<u>200KW</u>	<u>Diesel</u>		<u>Generator</u>			
POL	74.8%	x		1.305	=	.976
Parts	6.6%	x		1.202	=	.079
Maint.	4.4%	x		1.338	=	.059
Overhaul	14.2%	x		1.202	=	.171
	<u>100.0%</u>					<u><u>1.285</u></u>

INDICES FOR FY 75 - FY 78 GENERATOR O&MA INDEX CALCULATION

1. POL Index

a. Gasoline Generator = $\frac{.543/\text{gal}}{.331/\text{gal}}$
 (Bulk: FSN 9130-00-264-6218)

= 1.425

✓ b. Diesel Generator = $\frac{.441/\text{gal}}{.338/\text{gal}}$
 (Bulk: FSN 9140-00-286-5294)

= 1.305

Source DFSC Fuel Supply Bulletin 77-1 verified as accurate with Cameron Station, DFSC Depot, 11 July 1978.

2. Parts Index = $\frac{1.123}{1.000} \times (1.07)$

(1975 to 1977 based on Wholesale Price Index Code 11-7 Electrical Machinery)

1977 to 1978 (OSD Indices 28 Dec 77 O&MA)

= 1.202

3. Maintenance Index = $\frac{E4\ 1978}{E4\ 1975}$

= $\frac{9,199}{6,875} = 1.338$

4. Overhaul Index = $\frac{(1.123)}{(1.000)} \times (1.07)$

(1975 to 1977 based on Wholesale Price (Now called Producer Price) Index, Dept of Labor, Code 11-7 Electrical Machinery)

OSD Factor (1977 to 1978 28 Dec 77 Indices O&MA)

= 1.202

APPENDIX A

CALCULATION OF WEIGHTING FACTORS
(PERCENT OF COST ATTRIBUTABLE TO A COST ITEM, SUCH AS POL)

EXAMPLE: GASOLINE GENERATOR
 1.5 KW 1000 HOUR YEAR

(REFERENCE COL. 1, P. 17, TROSCOM TECH REPORT 74-12)

POL, AS A PERCENTAGE OF ACQUISITION COST (FUEL, OIL, AND LUBRICANT COST)	16.7%
PARTS, AS A PERCENTAGE OF ACQUISITION COST	17.9%
MAINTENANCE, AS A PERCENTAGE OF ACQUISITION COST	21.7%
OVERHAUL COST, AS A PERCENTAGE OF ACQUISITION COST	15.0%
	<hr/>
	71.3%
	<hr/> <hr/>

BECAUSE ORIGINAL ACQUISITION COST IS FIXED (A CONSTANT),
CALCULATION OF PERCENTAGE CONTRIBUTION TO COST (WEIGHTS)
IS A SIMPLE RATIO AND PROPORTION PROBLEM:

$$\text{PERCENT CONTRIBUTION OF POL} = (16.7)/(71.3) = 23.4 \%$$

$$\text{PERCENT CONTRIBUTION OF PARTS} = (17.9)/(71.3) = 25.1 \%$$

$$\text{PERCENT CONTRIBUTION OF MAINT.} = (21.7)/(71.3) = 30.4 \%$$

$$\text{PERCENT CONTRIBUTION OF OVRHL.} = (15.0)/(71.3) = 21.1 \%$$

100.0 %

THESE FACTORS, AND THE OTHER WEIGHTING FACTORS, ARE DISPLAYED
IN THE TABLES ON PAGE (5) .