USACERL Special Report P-91/20
May 1991

US Army Corps
of Engineers
Construction Engineering
Research Laboratory

Building Maintenance and Repair Data for Life-Cycle Cost Analyses: Heating, Ventilating, and Air Conditioning (HVAC) Systems

by
Edgar S. Neely
Robert D. Neathammer
James R. Stirn
Robert P. Winkler

This research project has provided improved maintenance resource data for use during facility planning, design, and maintenance activities. Data bases and computer systems have been developed to assist planners in preparing DD Form 1391 documentation, designers in life-cycle cost component selection, and maintainers in resource planning. The data bases and computer systems are being used by U.S. Army Corps of Engineers (USACE) designers at the District and installation levels and by resource programmers at USACE Headquarters, and Army Major Commands and installations. These research products may also be useful to other Government agencies and the private sector.

This report describes the building task maintenance and repair data base development and gives examples of its application. It is one of a series of special reports on the maintenance and repair data base. While this report describes HVAC systems, other reports in the series cover architectural, plumbing, and electrical systems.

The contents of this report are not to be used for advertising, publication, or promotional purposes. Citation of trade names does not constitute an official indorsement or approval of the use of such commercial products. 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.

DESTROY THIS REPORT WHEN IT IS NO LONGER NEEDED

DO NOT RETURN IT TO THE ORIGINATOR

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave Blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	May 1991	Final

4. TITLE AND SUBTITLE

Building Maintenance and Repair Data for Life-Cycle Cost Analyses: Heating, Ventilating, and Air Conditioning (HVAC) Systems

5. FUNDING NUMBERS

RDTE dated 1980
REIMB 1984-1989

6. AUTHOR(S)

Edgar S. Neely, Robert D. Neathammer, James R. Stirn and Robert P. Winkler

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

U.S. Army Construction Engineering Research Laboratory (USACERL)
P. O. Box 9005
Champaign, IL 61826-9005

8. PERFORMING ORGANIZATION REPORT NUMBER

SR P-91/20

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

HQUSACE
ATTN: CEMP-EC
20 Massachusetts Avenue, NW
Washington DC 20001

Office of the Chief of Engineers
ATTN: DAEN-ZCF-R
Pentagon
Washington DC 20310

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

Copies are available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161

12a. DISTRIBUTION/AVAILABILITY STATEMENT

Approved for public release; distribution is unlimited.

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

This research project has provided improved maintenance resource data for use during facility planning, design and maintenance activities. Data bases and computer systems have been developed to assist planners in preparing DD Form 1391 documentation, designers in life-cycle cost component selection, and maintainers in resource planning. The data bases and computer systems are being used by U.S. Army Corps of Engineers (USACE) designers at the District and installation levels and by resource programmers at USACE Headquarters, and Army Major Commands and installations. These research products may also be useful to other Government agencies and the private sector.

This report describes the building task maintenance and repair data base development and gives examples of its application. It is one of a series of special reports on the maintenance and repair data base. While this report describes HVAC systems, other reports in the series cover architectural, plumbing and electrical systems.

14. SUBJECT TERMS			15. NUMBER OF PAGES
data bases	facilities	maintenance	174
life-cycle costs	cost analysis		16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	SAR

FOREWORD

This research was conducted for the Directorate of Military Programs, Headquarters, U.S. Army Corps of Engineers and the Office of the Assistant Chief of Engineers under various research, development, testing, and evaluation (RDTE) and reimbursable funding documents. Work began under RDTE in 1980 and continued in reimbursable projects during 1984 through 1989. The technical monitor for the RDTE part was Dr. Larry Schindler (CEMP-EC) and for the reimbursable part was Ms. Val Corbridge (DAEN-ZCF-R).

The work was performed by the Facility Systems Division (FS), U.S. Army Construction Engineering Research Laboratory (USACERL). The Principal Investigators were Dr. Edgar Neely and Mr. Robert Neathammer (USACERL-FS). The primary contractor for much of the data development was the Department of Architectural Engineering, Pennsylvania State University. Dr. Michael O'Connor is Chief of USACERL-FS.

COL Everett R. Thomas is Commander and Director of USACERL, and Dr. L.R. Shaffer is Technical Director.

CONTENTS

TABLES

FIGURES

BUILDING MAINTENANCE AND REPAIR DATA FOR LIFE-CYCLE COST ANALYSES: HEATING, VENTILATION, AND AIR CONDITIONING (HVAC) SYSTEMS

1 INTRODUCTION

Background

Maintenance* and repair (M&R) cost estimates are needed during planning, design, and operations/maintenance of Army facilities. During planning, life-cycle costs are needed to evaluate alternative ways of meeting requirements (e.g., lease, new construction, renovate existing facilities). During design, M&R requirements for various types of components, such as built-up or shingle roofs, are needed so that the total life-cycle cost of different designs can be minimized. Finally, once the facility has been constructed, outyear predictions of maintenance and repair costs are needed so that enough funds can be programmed to ensure that Army facilities are maintained properly and do not deteriorate due to lack of maintenance.

The Directorate of Engineering and Construction (EC), Headquarters, U.S. Army Corps of Engineers (HQUSACE),** asked the U.S. Army Construction Engineering Research Laboratory (USACERL) to coordinate the assembly of a single centralized maintenance and repair data base for use by Corps designers. This research was required because designers were not able to obtain reliable maintenance and repair data to support their life-cycle cost (LCC) analysis from installations or from the technical literature. One of the first tasks in the research effort was to determine if reliable data bases, which could be adapted for Corps use, existed in government or private industry. Comprehensive data bases of maintenance costs for government and private sector facilities did not exist. The little data available always depended on widely varying standards of maintenance used to maintain the facilities for which the data was collected and thus was unreliable for prediction purposes. Recognizing this, HQUSACE asked USACERL to develop a maintenance and repair cost data base. This data is for use by U.S. Army Corps of Engineers (USACE) designers in performing life-cycle cost analyses during the design of new facilities. Initial results were presented in several USACERL reports.[1]

Soon after this request, the Facilities Programming and Budgeting Branch of the Facilities Engineering Directorate asked USACERL to develop prediction models for outyear maintenance requirements of the Army facility inventory. The Programming Office of EC, responsible for Military Construction, Army (MCA) planning, also requested that USACERL provide methods and automated tools to help installations perform economic analyses. Part of the objective was to allow analysts to obtain future maintenance cost data.

---

*Maintenance in this report means all work required to keep a facility in good operating condition; it includes all maintenance, repair, and replacement of components required over the life of a facility.

**At the time of this request, EC was part of the Office of the Chief of Engineers, which has since reorganized. In addition, EC has now become the Directorate of Military Programs.

[1] R D Neathammer, *Life-Cycle Cost Database Design and Sample Cost Data Development*, Interim Report P-120/ADA0997222 (U.S. Army Construction Engineering Research Laboratory [USACERL], February 1981); R.D. Neathammer, *Life-Cycle Cost Database: Vol I, Design*, and *Vol II, Sample Data Development*, Technical Report P-139/ADA126644 and ADA126645 (USACERL, January 1983), Appendices E through G.

In response to these requests, USACERL began a multiyear effort to develop a comprehensive maintenance and repair cost research program for buildings. This coordinated program is the key to all detailed estimation of future maintenance costs for Army facilities.

Research Performed and Reports Published

This is one of several interrelated reports addressing maintenance resource prediction in the facility life-cycle process. The total research effort is described in a USACERL Technical Report.[2]

The first research product was a data base containing maintenance tasks related to every building construction component. This data base provides labor, material, and equipment resource information. The frequency of task occurrence is also included. This information is published in a series of four USACERL Special Reports by engineering systems: (1) architectural, (2) heating, ventilating, and air-conditioning (HVAC), (3) plumbing, and (4) electrical. The title for the series is *Maintenance Task Data Base for Buildings.*[3] Table 1 shows an example from this data base. This data is also available in electronic form. The data base is used in a personal computer (PC) system under the Disk Operating System (DOS). This computer program allows a facility to be defined by entering the components and component quantities comprising the facility. The tasks are used to determine the resources required annually to keep the facility maintained.

The second research product was a component resource summary for the first 25 years of a facility. The tasks for the component were scheduled and combined into one set of annual resource requirements. This annual resource information is published in a series of four USACERL Special Reports titled *Building Component Maintenance and Repair Data Base.*[4] An example from this data base is shown in Table 2. The data base is also available in electronic form. This data can be used to perform special economic analyses such as one for a 20-year life using a 10 percent discount rate.

The third research product was a set of 25-year present worth factor tables for use by designers in selecting components for discount rates of 7 and 10 percent. The annual component resource values were multiplied by the appropriate present worth factor and added for the 25 years to produce one set of resource values. This information is published in a series of four USACERL Special Reports titled

---

[2] E.S. Neely, R.D Neathammer, J.R. Stirn, and R.P. Winkler, *Maintenance Resource Prediction in the Facility Life-Cycle Process*, Technical Report P-91/10 (USACERL, March 1991).

[3] E S Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Maintenance Task Data Base for Buildings. Heating, Ventilation, and Air-Conditioning Systems*, Special Report P-91/21 (USACERL, May 1991), E.S. Neely, R.D. Neathammer, J.R. Stirn, and R P Winkler, *Maintenance Task Data Base for Buildings. Plumbing Systems*, Special Report P-91/18 (USACERL, May 1991); E.S Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Maintenance Task Data Base for Buildings. Electrical Systems*, Special Report P-91/25 (USACERL, May 1991).

[4] E.S Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Building Component Maintenance and Repair Data Base for Buildings Architectural Systems*, Special Report P-91/27 (USACERL, May 1991); E. S. Neely, R. D. Neathammer, J.R. Stirn, and R P Winkler, *Building Component Maintenance Data Base for Buildings. Heating, Ventilation, and Air-Conditioning Systems*, Special Report P 10/22 (USACERL, May 1991); E.S. Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Building Component Maintenance and Repair Data Base for Buildings. Plumbing Systems*, Special Report P-91/30 (USACERL, May 1991); E.S Neely, R.D. Neathammer, J.R. Stirn, and R.P. Winkler, *Building Component Maintenance and Repair Data Base for Buildings: Electrical Systems*, Special Report P-91/19 (USACERL, May 1991).

Table 1

Typical Task Data Form

Task Code: 0991551

Component: CHILLER WAT.COOL REC.200T System: COOLING GENERATION Subsystem: EQUIPMENT

Task Desription: M/R REPAIR HERMETIC CHILLER

Unit of Measure: COUNT

Persons per Team: 4 **Task Duration:** 4.5175 hours

Trade: REFRIG./AIR COND. Task Classification: 1

Labor Resources

Subtask Description	Labor Hours
1. REPAIR CONTROLS	0.500000
2. REMOVE/REPLACE COMPRESSOR(2)	11.600000
3. REMOVE/REPL. EVAPORATOR TUBE	0.900000
4. REMOVE/REPLACE CONDENSER TUBE	0.900000

Material Resources

Description	Quantity	Unit Cost
COMPRESS	2	20700.0000
EVAP. TUBE	1	100.0000
COND. TUBE	1	100.0000
		41600.0000

FREQUENCY OF OCCURRENCE

ZONE	HIGH	AVERAGE	LOW
1	4.400	8.800	13.200
2	4.800	9.600	14.400
3	7.600	15.200	22.800
4	7.400	14.800	22.200
5	9.800	19.600	29.400
6	5.000	10.000	15.000
7	16.050	32.100	48.150
8	23.200	46.400	69.600
9	22.800	45.600	68.400
10	29.250	58.500	87.750
11	96.150	192.300	288.450

SUMMARY

Resources UOM	Direct	Indirect	Total
Labor Hours	13.900000	4.170000	18.070000
Material Cost $	41600.000000		41600.000000
Equipment Hours			4.517500

Components in This Task: 0991550

Table 2

Typical Component Summary

CACES No.: 099155 -Chiller Wat.Cool Rec-200T 099161-Chill. Hermetic Cent. 100T

Labor Hours	Materials $	Equipment Hours	YR	Labor Hours	Materials $	Equipment Hours
22.7500	0.0000	11.3750	1	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	2	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	3	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	4	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	5	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	6	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	7	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	8	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	9	33.1500	0.0000	16.5750
40.8200	44096.0000	15.8925	10	49.9200	22331.0200	24.9600
22.7500	0.0000	11.3750	11	33.1500	0.0000	16.5757
22.7500	0.0000	11.3750	12	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	13	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	14	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	15	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	16	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	17	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	18	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	19	33.1500	0.0000	16.5750
74.1000	53000.0000	18.5250	20	62.4000	37789.0000	15.6000
22.7500	0.0000	11.3750	21	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	22	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	23	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	24	33.1500	0.0000	16.5750
22.7500	0.0000	11.3750	25	33.1500	0.0000	16.5750

All data is per unit.

Building Maintenance and Repair Data for Life-Cycle Cost Analyses.[5] Table 3 shows an example from this data base. The data base is also available in electronic form. The first three resource columns provide data to allow designers to calculate the life-cycle costs at any location by multiplying by the correct labor rate, equipment rate, and material geographic factor. The multiplication and addition have been performed for the Military District of Washington, DC, and results are given in the fourth column of the table. The right section of the table is information that can be entered into computer systems that perform life-cycle cost analysis.

[5] E.S Neely, R D. Neathammer, J.R. Stim, and R.P. Winkler, *Building Maintenance and Repair Data for Life-Cycle Cost Analyses Architectural Systems*, Special Report P-91/17 (USACERL, May 1991), E.S. Neely, R.D. Neathammer, J.R. Stim, and R P Winkler, *Building Maintenance and Repair Data for Life-Cycle Cost Analyses. Plumbing Systems*, Special Report P-91/24 (USACERL, May 1991); E.S. Neely, R.D. Neathammer, J.R. Stim, R.P. Winkler, *Building Maintenance and Repair Data for Life-Cycle Cost Analyses. Electrical Systems*, Special Report P-91/26 (USACERL, May 1991).

Table 3

Life-Cycle Cost Analysis

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE — PAGE 15

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d = 10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington D.C. Total	Annual Maintenance and Repair			Replacement and High Costs Tasks		
	um	labor	material	equipment		labor	material	equipment	Yr	labor	material	equipment
CHILLER WAT. COOL REC. 50T	CT	171.17960	5275.38680	83.25683	8878.42	22.37754	0.00000	11.1877	20	48.10000	15900.00000	12.02500
REPAIR HERMETIC CHILLER									10	18.07000	11236.00000	6.02333
CHILLER WAT COOL REC. 100T	CT	174.22440	11968.78020	83.57051	15650.10	22.37754	0.00000	11.18877	20	74.10000	27030.00000	18.52500
REPAIR HERMETIC CHILLER									10	18.07000	29044.00000	4.51750
CHILLER WAT. COOL REC. 10T	CT	147.40002	1651.11960	73.09109	4756.36	19.82011	0.00000	9.91006	20	20.80000	5300.00000	5.20000
REPAIR HERMETIC CHILLER									10	10.53000	3392.00000	5.26500
CHILLER WAT. COLL REC. 200T	CT	174.22440	19602.66480	83.57051	22263.96	22.37754	0.00000	11.18877	20	74.10000	53000.00000	18.52500
REPAIR HERMETIC CHILLER									10	18.07000	44096.00000	4.51750
CHILL HERMETIC CENT. 100T	CT	11209.25578	245.62959	120.98754	16381.26	32.6078	0.00000	16.30364	20	62.40000	37789.00000	15.60000
REPAIR CHILLER									10	18.77000	22331.02000	9.38500
CHILL HERMETIC CENT. 300T	CT	249.5803	27457.12308	121.93610	32709.15	32.60728	0.00000	16.30364	20	97.50000	61771.50000	24.37500
REPAIR CHILLER									10	18.25000	66569.06000	8.12500
CHILL HERMETIC CENT. 900T	CT	257.35000	75437.35008	123.91796	80647.07	32.60728	0.00000	16.30364	20	162.50000	127200.00000	40.62500
REPAIR CHILLER									10	18.77000	199283.19000	9.38500
CHILL OPEN CENT. 300T	CT	628.20642	27457.12308	311.24890	40690.58	85.03467	0.00000	42.51733	20	97.50000	61771.50000	24.37500
REPAIR CHILLER									10	28.21000	66569.06000	14.10500
CHILL OPEN CENT. 900T	CT	257.35000	75437.35008	123.91796	80647.07	32.60728	0.00000	16.30364	20	162.50000	127200.00000	40.62500
REPAIR CHILLER									10	18.77000	199283.19000	9.38500

See NOTES on the last page of this table for Explanation of Column Headings

A fourth research product was a PC system that allows facilities to be modeled by entering the components that comprise the facility. Future years resource predictions are produced by applying the individual tasks and then forming resource summaries by subsystems, systems, facilities, installations, reporting installations, Major Commands (MACOMS) and Army. A summary level computer system was also developed for use by the Department of the Army (DA) and MACOMS. The summary level system applies the most basic data contained in the current facility real property inventory files: (1) current facility use, (2) floor area, and (3) construction date. User's and system's manuals will be published as USACERL ADP Reports.

Objective

The objective of this report is to describe the task development process for HVAC systems and give examples for using these tasks.

Approach

The first activity in the research was to survey the literature for available maintenance data. No comprehensive task resource data base was located. The Navy has developed a series of manuals dealing with labor hours required to perform several basic maintenance tasks. This work has been adopted by the Department of Defense (DOD) for triservice use. A series of Technical Bulletins (TBs) under the general title *Engineered Performance Standards* has been published.

The next activity was to survey USACE District offices to solicit their input for a data base. A guiding committee composed of District personnel, installation representatives, and private sector consultants met and agreed upon a general data base design. More importantly, they recommended that the data base be developed using the Engineered Performance Standards rather than historical data.

Once the data base was developed, component summaries were created by summing all tasks for a component. These summaries were then input into a program that computed present worth values for each component.

The calculation procedures described in this report were performed and summarized for standard Army life-cycle analysis of 25 years with a 7 or 10 percent present worth factor. Final results are published in the USACERL Special report series, *Building Maintenance and Repair Data Base for Life-Cycle Analyses.*

Scope

The task data base is for DOD designers and can also be used by those in the private sector.

Mode of Technology Transfer

The tables pertinent to designer use will be issued as a supplement to Technical Manual (TM) 5-802-1, *Economic Studies for Military Construction Design—Applications.*

2 PROBLEM DEFINITION

In the facility life-cycle process, costs are incurred in construction, operation, maintenance, ar disposal of a facility. Past emphasis during the planning, design, and construction phases has been on estimating initial construction costs. The impact of operating and maintaining facilities has always been a secondary consideration. In many cases, the operation and maintenance (O&M) costs are far greater than initial construction costs. Building owners are concerned with the total ownership costs of facilities rather than just the initial construction costs.

The Army has realized the importance of performing total life-cycle cost analyses for facilities at the design stage of accurately forecasting these costs for funds programming. HQUSACE asked USACERL in 1980 to develop a method of estimating future maintenance costs for buildings. In 1982, the programming branch of the former Facilities Engineering Directorate asked USACERL to develop effective models for forecasting facility maintenance resource requirements based on the actual facility.

Life-cycle cost economic studies are an integral part of facility design in the MCA program. Requirements for performing these studies are given in:

- Statutes, Code of Federal Regulations, and Executive Orders for performing analyses when energy is a key cost and for wastewater treatment plants
- USACE *Architectural and Engineering Instructions: Design Criteria*
- Army Regulation (AR) 11-28, *Economic Analysis and Program Evaluation for Resource Management* for general economic analyses
- TM 5-802-1, *Economic Studies for Military Construction Design—Applications.*

The main purpose of these studies is to minimize the life-cycle costs of Army facilities.

To perform life-cycle cost analyses on facility designs, three categories of costs are needed. initial, operating, and maintenance. Initial costs are usually easy to estimate through existing cost estimating systems such as the Corps of Engineers Computer Assisted Cost Estimating System (CACES) and standard publications such as Means or Dodge. Operating costs can be estimated by using energy consumption models such as the Corps of Engineers Building Loads Analysis and System Thermodynamics (BLAST) program or the Trane Company's Trace program. However, accurate estimates of maintenance costs are not available.

There are no comprehensive data bases of maintenance costs for building components either in the private sector or State/Federal Governments. Some historical data is available from the Building Owners' and Managers' Association reports. Within the Army, the Integrated Facilities System (IFS) contains some historical data; however, it does not have a feature for retaining several types of a building component (e.g., having brick and wood exteriors or three types of floor covering). Moreover, the data in IFS has not been kept current. For example, at one installation several family housing units were shown as having wood siding when, in fact, they had been covered with aluminum siding several years earlier.

3 DATA BASE DEVELOPMENT

Introduction

Historical data within the Army and other agencies was reviewed to determine the availability of accurate resource data. The best source of labor resource data was the Engineered Performance Standards[6] adopted by DOD for use by all DOD agencies. The advisory committee decided to develop a maintenance task data base using the Engineered Performance Standards as the basis for the labor resources.

A typical building was subdivided into systems, sub-systems, and components. All maintenance, repair and replacement tasks were listed for each component. The resources required to perform each task were identified and the significance of the task resources discussed. Component summary tables listing resources by component age were developed by combining all tasks that were scheduled to be performed during each year. A summary of labor, material, and equipment requirements was given by component age. Life-cycle costs analysis tables were created by applying discount factors to the resources given in the component summary tables. The resulting tables can be used to perform life-cycle cost analysis.

Historical Data Review

Extensive research was performed during a 3-year period of reviewing the available historical data at several installations. This research revealed that a large portion of the component replacement tasks was not performed when replacement was required, due to lack of available funding, but was completed several years later. Most replacements performed by contract were not entered into the corporate data base. Most installations maintained few historical records because there was no Army regulation requiring such records to be kept. When component replacement dates were available, the comparable component installation or previous replacement dates were unknown, thus, accurate frequencies could not be established.

The task description fields given for the tasks performed were often blank or the descriptions given were very vague. Often several tasks were reported on one entry. Most entries gave a dollar cost but provided very little information about labor hours, materials, and equipment hours. Discussions with service personnel revealed that the data recorded on the forms may not actually relate to the resources required to perform the work.

In conclusion, all maintenance personnel interviewed stated clearly and emphatically that the current historical data cannot be used to develop accurate resource predictions. This data is erroneous, incomplete, and inaccurate.

Engineered Performance Standards

In 1955 the new use of maintenance management for public works and public utilities required that a greater portion of the maintenance work be planned and estimated. The general absence, however, of

[6] Army Technical Bulletin 420-1 through 420-51.

adequate and reliable maintenance estimating data severely handicapped any increase in the number of estimates, and, more seriously, the production of accurate estimates. About this time, the Department of Defense directed that standards for work should be developed to the maximum feasible extent and applied throughout the military establishment. As a result of that directive, Engineered Performance Standards were developed.

The Navy undertook a large research program to perform time and motion studies of maintenance personnel as they performed their maintenance tasks. After several manyears of effort, the Navy published the results under the title *Engineered Performance Standards*. Both Army and Air Force maintenance personnel reviewed this set of manuals and adopted it for official use. Today, the Engineered Performance Standards are used by all DOD agencies and are published as one set of reports carrying three different publication numbers for the Army, Navy, and Air Force.

Committee Reviews

At the beginning of this research project HQUSACE and USACERL formed an advisory committee composed of representatives from all offices involved in performing life-cycle cost analysis. The basic objective of the advisory committee was to involve as many appropriate and knowledgeable people as possible in deciding how to solve the M&R data base problem. The advisory committee reviewed the historical information research results and the Engineered Performance Standards research program and reports. After lengthy discussion of all possible alternatives, the advisory committee decided to develop a maintenance task data base using the Engineered Performance Standards as the basis for the labor resources. The advisory committee was active for the first two years of the project.

A second maintenance steering committee was formed that was composed of one representative from each HQDA office involved in maintenance resource programming and planning, six major commands, and 10 installations. This maintenance steering committee had the same basic objective as the first advisory committee. In addition, the steering committee wanted to use the data developed to predict actual maintenance resource requirements at installations.

Building Subdivision

The UNIFORMAT method of dividing a building into systems, subsystems, and components was adopted because it is used by all Federal construction agencies and many private organizations. Systems requiring little maintenance such as foundations and superstructure were not considered.

The level of component detail was determined by the members of the maintenance steering committee. This level varied, depending on the facility classification and the costs versus the benefit of collecting and maintaining data. For example, in the typical building the steering committee voted to stop at the door level and not define hardware requirements because the hardware was not a costly item, but for historical family housing, where one hinge could cost $200, all door hardware had to be defined.

Task Data Development

HVAC resources vary with the climatic zones shown in Figure 1. Resource information by zone is given for HVAC components in Appendices A and B. For all examples climatic zone 6 was used.

A task is defined as the work performed by a single trade. Each task is divided into the labor, material, and equipment resources required to perform the work. By separating the tasks in this manner the data can also be used to determine manpower staffing requirements and equipment requirements. The following procedures have been used to develop the tasks for this research project. Identical procedures can be applied to develop new tasks not currently covered in the task data base.

The task development procedures can be demonstrated by using the existing task number 0991551, "Repair Hermetic Chiller," as shown in Table 1. This task involves repairing the controls, and replacing the compressor, evaporation tube, and the condenser tube.

The first step is to obtain a copy of DA Pamphlet 25-30, *Consolidated Index of Army Publications and Blank Forms*. A list of the current TBs covering Engineered Performance Standards (EPS) is given in Appendix C. Review this list to determine which TBs seem to address the task to be developed. The TBs can be obtained from your library or from:

Naval Publications and Forms Center
5801 Tabor Ave.
Philadelphia, PA 19120

Once the TBs are available, the second step is to review the Table of Contents of each to determine if tasks related to the component are covered in the bulletin. If the tasks to be developed are covered by the bulletin, review the tasks to determine if the data given can be applied to the task under development. When tasks related to the new component tasks under development are not covered by EPS, other sources such as estimating books and manuals, national standards, trade publications, and manufacturer data must be researched. It is important to provide a complete list of such materials. A reference librarian can provide resources addressing a specific component.

The first step of repairing a hermetic chiller is to repair the controls. A review of EPS subtasks enabled us to estimate the labor rate from TB 420-6 GT-190, page 153 shown in Table 4. The table gave the labor rate as .51121 hr/job, or .50000 hr/job.

The task of removing the old compressor and replacing it was found in TB 420-8, Table VT-6, page 41 shown in Table 5 and is 5.82358 hr/system. The hermetic chiller has 2 compressors so the labor rate was doubled to 11.64716 hr/job, or 11.60000 hr/job.

There was no specific listing in the EPS subtasks for the removal and replacement of either the evaporation tube or the condenser tube. The labor rate was estimated by using TB 420-8, Table VT-270, page 98 shown in Table 6. It was .89400 hr/job, or .90000 hr/job, for each of the tubes.

The total direct labor hours to perform the entire job would be the sum of all subtasks, or 13.9000 hr/job. The indirect time or the time to plan the work, load the truck at the beginning of the day, unload the truck at the end of the day, personal time, delay time, and material handling time must be included to obtain the total onsite labor time. In EPS, this value is expressed as a percentage of the direct labor. When all factors have been considered, the direct labor should be increased by 30 percent or 4.17000 hr/job.

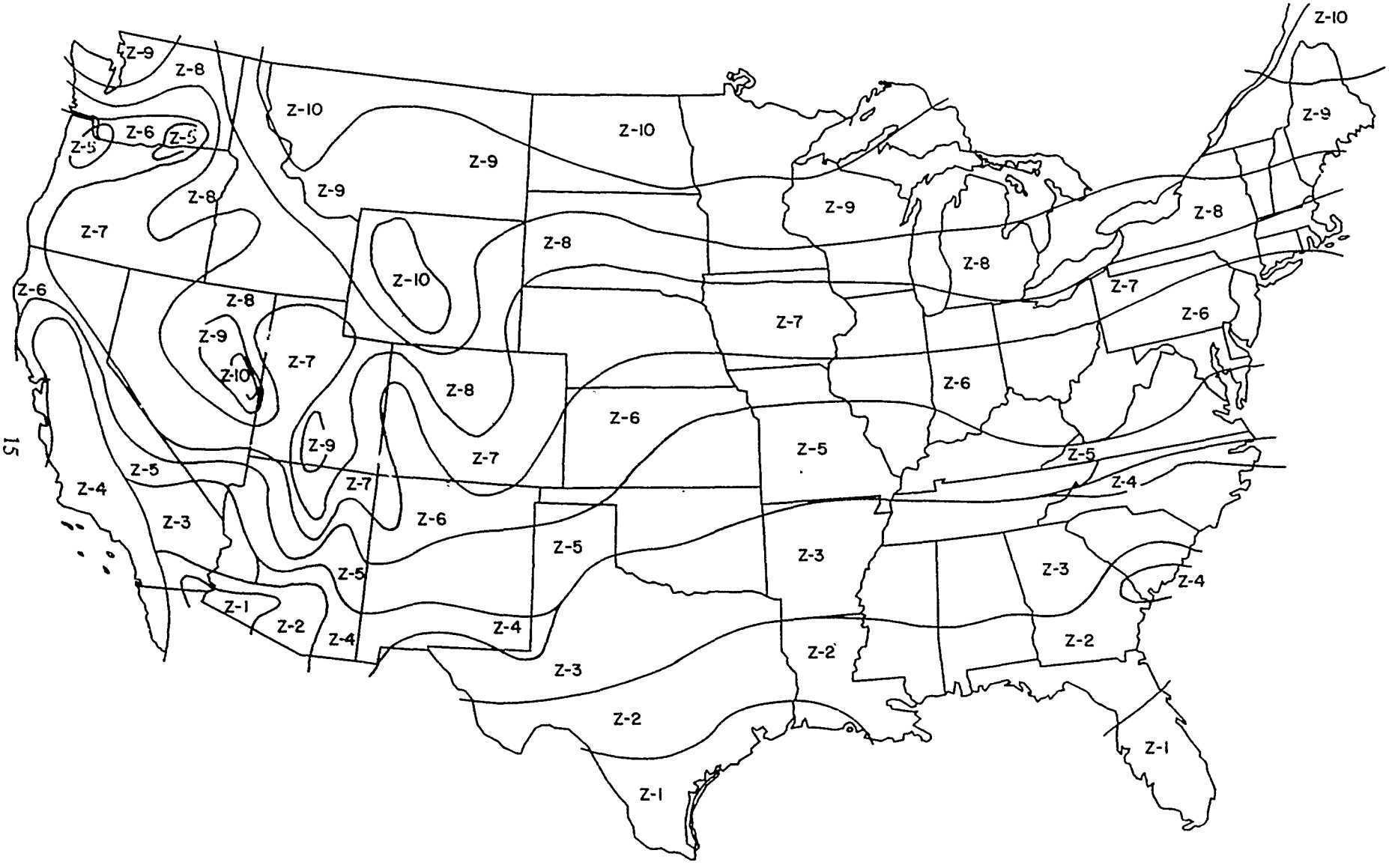

Figure 1. HVAC zone map.

Table 4

Task GT-190*

No.	Reference	Work Unit Description	Hours	Units
1	PWG-4-XXII	Cut, form and align 10 wires,	.00132	Box
		10 wire ends per box.	.09156	Box
2	PWG-4-X	Splice, solder and insulate 5 pairs of wire ends.	.07859	Box
		5 splices per box.	.3950Q	Box

*GT-190 = .51121 hr/box.

The steering committee wanted to apply the same material costs for all planning, programming, design, construction, and operations activities. For this research project, all material costs were developed using prices in the Washington, DC area. Material prices for exact locations throughout the world can be obtained by multiplying the Washington, DC area costs by the appropriate location adjustment factor published in a Programming, Administration, and Execution System (PAX) Newsletter under the title "Area Cost Factor Indexes." A copy of the 22 September 1988 indexes are given in Appendix D, Geographical Location Adjustment Factors. The *CACES Unit Price Book* for Region II dated July 1, 1985 has been used for all costs and can be obtained from the Corps District Cost Estimating Section.

In reviewing material prices, there will usually be many grades listed for the component in question. Since only one entry for the component task will be made for the maintenance data base, it is important to use the middle grade for pricing. This will produce an average material cost.

When materials are not given in the CACES manuals, other material pricing manuals, such as Means, should be used to determine the cost. The material costs for the compressors in this example were taken from CACES *Unit Price Book* for Region 2. Two 100 ton compressors at $20,700 were used. The CACES number is 15655-2209. The cost for the evaporation and condensing tubing was $100 each in the CACES *Unit Price Book* for Region 2. The total material cost would be 20700 x 2 compressors plus 100 x 2 tubes or $41,600.

The normal equipment cost is for a maintenance truck with all required tools such as ladders and hand tools. The cost for the truck and equipment is usually based on task duration.

Task frequency determination is the most subjective area in the data base. Most frequencies must be determined by the judgment of professional maintenance personnel with many years of experience in performing the maintenance tasks. Some task frequencies are suggested by the manufacturer or professional organizations. Some frequencies, such as for interior wall painting, are set by regulations. There is very little published information in this area.

Table 5

Task VT-6*

No.	Reference	Work Unit Description	Hours	Units
1	VT-2	Pump down compressor	.38220	System
2	PWMU-1-8552	Remove and install bolts in intake and discharge valves	.17440	System
3	PWQ-1-8011	Remove and install intake and discharge valves	.14640	System
4	PWQ-4-I	Remove and install oil line and gages	.21918	System
5	PWMU-1-8552	Remove and install bolts in valve fittings	.17440	System
6	PWMU-1-8011	Remove and install valve fittings	.14640	System
7	PWMU-1-8010	Plug and unplug port openings	.10480	System
8	PWMU-1-8010	Pull away and push valve to compressor	.05240	System
9	PWMU-1-8000	Remove and install bolts for belt guard	.07120	System
10	PWMU-1-8021	Remove and install belt guard	.04900	System
11	PWMU 1-8553	Loosen and tighten motor base bolts	.06960	System
12	PWMU-1-8010	Remove and install belts	.10480	System
13	PWMU-1-8552	Remove and install compressor base bolts	.08720	System
14	[illegible]-10-XVI	Remove and install compressor	1.10240	System
15	PWMU-1-8011	Remove and install flywheel	.07320	System
16	VT-1	Charge open (central compression) air conditioning system	.62145 .37890	System System
17	PWV-1-II	Put compressor into operation	.95211	System
18	4211	Check operation of system	.29200	System
19	PWA-5-II	Material handling	.62154	System

* VT-190 = 5.82358 hrs/system.

Table 6

Task VT-270*

No.	Reference	Work Unit Description	Hours	Units
1	PWV-15-IV	Remove Boiler Tube up to 20' long and 4" O.D. through manhole/handhole [illegible] tube into sections	.28186	Tube
2	PWV-15-V	Install boiler tube up to 20' long and 4" O.D. 5 splices per box.	.61214	Tube

* VT-270 = .89400 hrs/tube.

The data base has been reviewed by ten installation Directorates of Engineering and Housing (DEHs) and has been determined to accurately represent the resources required to perform the tasks. This data base serves as the foundation for the tables published in this report. The complete data base is too large to be duplicated in this report, but is available in the USACERL Special Report series titled *Maintenance Task Data Base for Buildings.*

The maintenance steering committee asked Forts Leonard Wood and Bragg to use the tasks to produce resource estimates for the past 3 years and then compare the predictions with their actual expenditures on a facility-by-facility basis. After this comparison was performed by both installations, the results were presented to the steering committee. Both installations stated that they were not performing all the tasks that they should, such as annual gutter cleaning and annual roof inspection. For the total installation, the tasks predicted an 8 to 10 percent higher total expenditure than the actual expenditure. This difference was due to the difference between the tasks predicted and actually performed. When comparisons were made at the task level, the task resource predictions were found to be accurate.

Two additional reviews were performed by two independent organizations that had related research work in the Army. The first review was for a research project to determine the maintenance requirements for historical family housing within the Military District of Washington, DC. The second review was a research project which needed an estimate of all resource requirements for the entire Army. This effort is known as the RPLANS research project. Both organizations reviewed the data base in detail and approved the resource requirements stated in the tasks. In addition, both used the data base within their research projects.

Significance of the Task Data

The task data presented in the previous section is based on average resources. Actual resource values for a particular project will vary as discussed below.

The labor hours reported will vary, depending on factors such as the actual productivity of the workers, the weather conditions, and the working space available. The labor hours given in this report are based on the average obtained from performing time and motion studies as tasks were performed.

The Washington, DC, material costs will vary, depending on factors such as the grade of material actually used, the manufacturer, and the quantity of material actually purchased. The figures given are the averages for all material prices found in the unit price books.

Task frequencies are the most subjective feature in the data base. High, average, and low frequency values are given to emphasize the variances. Average frequencies are used in developing the life-cycle analysis tables presented in the following sections.

Component Summary Tables

A typical component summary is shown in Table 2 (Chapter 1). The development process is illustrated by using the labor resource for the hermetic chiller component.

All tasks related to the hermetic chiller component are listed individually in Table 7, with a task summary in Table 8. The task average frequency is used to project times of occurrence of M&R tasks for the first 25-year period as shown in Table 9.

Table 7

Tasks for a 200T Water Cooled Chiller

TASK DATA FORM

Task Code: 0991511

Component: CHILLER WAT.COOL REC.20T System: COOLING GENERATION Subsystem: EQUIPMENT
Task Description: M/R REPAIR HERMETIC CHILLER
Unit of Measure: COUNT
Persons per Team: 2 Task Duration: 5.2650 hc
Trade: REFRIG./AIR COND. Task Classification: 1

Labor Resources

Subtask Description	Labor Hrs
1.REPAIR CONTROLS	0.500000
2.REMOVE/REPLACE COMPRESSOR	5.800000
3.REM./REPLACE EVAPORATOR TUBE	0.900000
4.REMOVE/REPLACE CONDENSER TUBE	0.900000

Material Resources

Description	Quantity	Unit Cost
COMPRESSOR	1	4308.0000
EVAP. TUBE	1	100.0000
COND. TUBE	1	100.0000
		4508.0000

Zone	FREQUENCY OF OCCURRENCE High	Average	Low
1	4.400	8.800	13.200
2	4.800	9.600	14.400
3	7.600	15.200	22.800
4	7.400	14.800	22.200
5	9.800	19.600	29.400
6	5.000	10.000	15.000
7	16.050	32.100	48.150
8	23.200	46.400	69.600
9	22.800	45.600	68.400
10	29.250	58.500	87.750
11	96.150	192.300	288.450

SUMMARY

Resources	UOM	Direct	Indirect	Total
Labor	Hours	8.100000	2.430000	10.530000
Material	Cost $	4508.000000		4508.000000
Equipment	Hours			5.265000

Components In This Task: 0991510

Table 7 (Cont'd)

TASK DATA FORM

Task Code: 0991512

Component: CHILLER WAT.COOL REC.20T System: COOLING GENERATION Subsystem: EQUIPMENT
Task Description: PM PREVENTIVE MAINTENANCE
Unit of Measure: COUNT
Persons per Team: 2 Task Duration: 11.3750 hours
Trade: REFRIG./AIR COND. Task Classification: 0

Labor Resources

Subtask Description	Labor Hrs
1.ANNUAL MAINTENANCE	16.000000
2.RECURRING MAINTENANCE	1.000000
3.SEASONAL SHUTDOWN	0.500000

Material Resources

Description	Quantity	Unit Cost
		0.0000

FREQUENCY OF OCCURRENCE

Zone	High	Average	Low
1	1.000	1.000	1.000
2	1.000	1.000	1.000
3	1.000	1.000	1.000
4	1.000	1.000	1.000
5	1.000	1.000	1.000
6	1.000	1.000	1.000
7	1.000	1.000	1.000
8	1.000	1.000	1.000
9	1.000	1.000	1.000
10	1.000	1.000	1.000
11	1.000	1.000	1.000

SUMMARY

Resources	UOM	Direct	Indirect	Total
Labor	Hours	17.500000	5.250000	22.750000
Material	Cost $	0.000000		0.000000
Equipment	Hours			11.375000

Components In This Task: 0991510

TASK DATA FORM

Task Code: 0991513

Component: CHILLER WAT.COOL REC.20T System: COOLING GENERATION Subsystem: EQUIPMENT
Task Description: REPLACE REPLACE CHILLER
Unit of Measure: COUNT
Persons per Team: 4 Task Duration: 7.4750 hours
Trade: REFRIG./AIR COND. Task Classification: 1

Labor Resources

Subtask Description	Labor Hrs
1.REMOVE/REPLACE CHILLER	23.000000

Material Resources

Description	Quantity	Unit Cost
CHILLER	1	9000.0000
		9000.0000

FREQUENCY OF OCCURRENCE

Zone	High	Average	Low
1	8.800	17.600	26.400
2	9.600	19.200	28.800
3	15.200	30.400	45.600
4	14.800	29.600	44.400
5	19.600	39.200	58.800
6	10.000	20.000	30.000
7	32.100	64.200	96.300
8	46.400	92.800	139.200
9	45.600	91.200	136.800
10	58.500	117.000	175.500
11	192.300	384.600	576.900

SUMMARY

Resources	UOM	Direct	Indirect	Total
Labor	Hours	23.000000	6.900000	29.900000
Material	Cost $	9000.000000		9000.000000
Equipment	Hours			7.475000

Components In This Task: 0991510

Table 8

Task Summary Data for a 200T Water Cooled Chiller

Army Wide Task/Basic Task Structure List Tree id: BF Group id: B5

UM = Unit of Measure TRD = Trade Index Class = Task Classification TWPMTH = Task Work Performance Method

CACES	DESCRIPTION	UM	TRD	CLASS	HIGH FREQ	AVE FREQ	LOW FREQ	LABOR HOURS	MATERIAL COSTS	EQUIPMENT HOURS
	0991550 CHILLER WATER COOLER RECP. 200T									
0991551	REPAIR HERMET. CHILLER	1	6	1	9.80	19.60	29.40	18.070000	41600.000000	4.517500
0991552	PREVENTATIVE MAINTENANCE	1	6	0	1.00	1.00	1.00	22.750000	.000000	11.375000
0991553	REPLACE CHILLER	1	6	1	19.60	39.20	58.80	74.100000	50000.000000	18.525000

Table 9

200T Chiller Spreadsheet - Labor Hours

Year	Task 1	Task 2	Task 3	Total	10% P.W.F.	P.W. LABOR HOURS
1		22.750000		22.750000	0.7164	16.298100
2		22.750000		22.750000	0.6512	14.814800
3		22.750000		22.750000	0.5920	13.468000
4		22.750000		22.750000	0.5382	12.244050
5		22.750000		22.750000	0.4893	11.131575
6		22.750000		22.750000	0.4448	10.119200
7		22.750000		22.750000	0.4044	9.200100
8		22.750000		22.750000	0.3676	8.362900
9		22.750000		22.750000	0.3342	7.603050
10	18.070000	22.750000		40.820000	0.3038	12.401116
11		22.750000		22.750000	0.2762	6.283550
12		22.750000		22.750000	0.2511	5.712525
13		22.750000		22.750000	0.2283	5.193825
14		22.750000		22.750000	0.2075	4.720625
15		22.750000		22.750000	0.1886	4.290650
16		22.750000		22.750000	0.1715	3.901625
17		22.750000		22.750000	0.1559	3.546725
18		22.750000		22.750000	0.1417	3.223675
19		22.750000		22.750000	0.1288	2.930200
20	0.000000	0.000000	74.100000	74.100000	0.1171	8.677110
21		22.750000		22.750000	0.1065	2.422875
22		22.750000		22.750000	0.0968	2.202200
23		22.750000		22.750000	0.0880	2.002000
24		22.750000		22.750000	0.0800	1.820000
25		22.750000		22.750000	0.0727	1.653925
				TOTAL		174.224401

The first task (Task 1 - 091551 - Repair Hermetic Chiller) has an average frequency in Zone 6 (AVE FREQ in Table 7) of 10 years; thus, it would be performed every ten years. The labor hours (18.0700 in Table 7) are listed for every ten years in the second column of Table 9.

The second task (Task 2 - 091552 - Preventative Maintenance) has an average frequency from Table 6 of 1.00 years; thus, it would be performed once each year. The labor hours (22.75000 in Table 7) are listed for each of the twenty-five years in the third column of Table 9.

The third task (Task 3 - 091553 - Replace Chiller) has an average frequency of twenty years; thus it would be performed every twenty years. The labor hours (74.1000 in Table 7) are listed for each of the 20 years in the fourth column of Table 9.

The total column in Table 9 is formed by adding the labor hours for tasks one through seven on a year-by-year basis. For example, during the tenth year, Tasks 1 and 2 are performed. The total labor hours would be 18.0700 + 22.7500 which equals 40.82.

The total column in Table 9 is shown in Table 2, Typical Component Summary for Chiller Water Coolers 0991550. The material costs and equipment hours have been developed in the same manner as explained for the labor hours.

The component data base is not printed in this report because of its size. Component summary data tables are published in the USACERL Special Report series titled *Maintenance Component Data Base for Buildings.*

Life-Cycle Cost Analysis Tables

The main purpose of this report is to provide the designer with easy-to-use tables for the most common life-cycle cost analysis. USACE designers frequently perform life-cycle cost analysis for a 25-year period using a 7 or 10 percent discount rate shown in Tables 9 and 10. Two sets of summary tables have been generated for these cases and are given in Appendices A and B. Table 3 shows typical life-cycle cost analysis data.

Present Worth. The left four columns of Table 3, labeled "Present Worth of All 25-Year Maintenance and Repair Costs," were developed by multiplying the resources in Table 2 by the 7 or 10 percent present worth factors shown in Tables 10 and 11. The 25 individual year resource figures are totaled as shown for labor in Table 9.

The 1988 Washington, DC area labor and equipment rates were applied to this data to produce the totals shown in the column so titled. This column is given to provide one comparative cost figure for easy computation This column can be used to quickly assess the ranking of various components' total 25-year LCC.

Annual and High Cost The right section of Table 3 is provided as input data for current life-cycle cost analysis computer programs. Two types of input are usually required. (1) a uniform or annual maintenance figure and (2) high cost and replacement tasks that occur in specific years.

The data listed under the heading "Annual Maintenance and Repair" was generated by subtracting the present worth of the replacement task, if its occurrence is 25 years or less, and any high-cost tasks

Table 10

7 Percent Discount Factors From Date of Study*

Years from BOD		End of Year	Accumulated End of Year
1		0.9346	0.9346
2		0.8734	1.8080
3		0.8163	2.6243
4		0.7629	3.3872
5		0.7130	4.1002
6		0.6663	4.7665
7		0.6227	5.3893
8		0.5820	5.9713
9		0.5439	6.5152
10		0.5083	7.0236
11		0.4751	7.4987
12		0.4440	7.9427
13		0.4150	8.3576
14		0.3878	8.7455
15		0.3624	9.1079
16		0.3387	9.4466
17		0.3166	9.7632
18		0.2959	10.0591
19		0.2765	10.3356
20		0.2584	10.5940
21		0.2415	10.8355
22		0.2257	11.0612
23		0.2109	11.2722
24		0.1971	11.4693
25	(Retention value at end of 25th year)	0.1842	11.6536

*Date of Study (DOS) is the Beneficial Occupancy Date (BOD)

Table 11

10 Percent Discount Factors From Date of Study*

Year from BOD	Factors		Accumulated
	Mid-Year	End of Year	Mid-Year
-3	0.9535		0.0
-2	0.8668		0.0
-1	0.7880		0.0
BOD			
1	0.7164		0.7164
2	0.6512		1.3676
3	0.5920		1.9596
4	0.5382		2.4978
5	0.4893		2.9871
6	0.4448		3.4319
7	0.4044		3.8362
8	0.3676		4.2038
9	0.3342		4.5380
10	0.3038		4.8418
11	0.2762		5.1180
12	0.2511		5.3691
13	0.2283		5.5973
14	0.2075		5.8048
15	0.1886		5.9935
16	0.1715		6.1650
17	0.1559		6.3209
18	0.1417		6.4626
19	0.1288		6.5914
20	0.1171		6.7086
21	0.1065		6.8150
22	0.0968		6.9118
23	0.0880		6.9998
24	0.0800		7.0799
25	0.0727		7.1526
Retention Value at End of 25th Year		0.0693	

*Date of Study (DOS) is exactly 3 years before the Beneficial Occupancy Data (BOD).

from the present worth values given in the "Present Worth" section of the table. The remaining present worth figures for the low-cost task resources are divided by the cumulative 25-year present worth figure to arrive at the "uniform" or "annual" maint- ıce figures shown under the "Annual Maintenance and Repair" heading.

There are two types of tasks listed under the heading "Replacement and High-Cost Tasks." The first is the replacement task. The replacement task is shown on the same line as the component description. For example, the replacement task for 200T Chiller shown in Table 3 would occur when the chiller is 20 years old. Replacement would require the expenditure of 74.1 hours of labor, $53,000 of material and 18.525 hours of equipment (maintenance truck). The second type of task is the high-cost task. Each high-cost task is listed on a separate line below the component description line. For example, there is one high-cost task for CW shown in Table 3. The high-cost task "Repair Hermetic Chiller" would occur when the chiller is ten years old. Replacement would require the expenditure of 18.07 hours of labor, $44,096 of material, and 4.5175 hours of equipment (maintenance truck).

4 DATA BASE APPLICATION EXAMPLES

Introduction

This chapter is divided into two sections. The first section defines the terminology used in the report and information needed to apply the labor hour, material cost and equipment hour resource data in this report. The second section gives specific examples using both the 10 percent present worth tables given in Appendix B and the 7 percent present worth tables given in Appendix A.

Terminology

Economic Studies

Two basic types of economic studies are covered in this report: (1) general economic studies and (2) special energy-conservation studies.

General economic studies are conducted routinely as part of the design process for all military facilities. Such studies are normally performed for a 25-year period using a 10 percent discount rate and considering tasks to be performed mid-year. The Beneficial Occupancy Date (BOD) occurs approximately 3 years after the Date of Study (DOS) for most MILCON projects, and that is what is assumed in the example provided herein.

Special economic studies for the design of energy-consuming portions of a building are required by statute Such studies analyze the use of extraordinary energy-saving design initiatives to conserve energy in new Federal facilities. The studies are normally performed for a 25-year period using a 7 percent discount rate considering all tasks to be performed at the end of the year. The BOD is normally assumed to occur on the DOS, in accordance with the provisions of the design criteria.

Installation Labor Rates

To perform an accurate cost analysis, the current shop effective labor rates and equipment rates per hour must be obtained from the installation. This information can be obtained from the DEH. Telephone numbers for the DEH are listed in the "Director of Engineering and Housing/Facilities, Engineer Assignments Roster" published yearly by the Office of the Chief of Engineers. Most installations maintain this information within their IFS data base; it can be obtained from the IFS data base administrator within the Management Engineering and Systems Branch.

Initial Costs

The initial construction costs can be obtained from the CACES Regional Unit Cost Manuals. The manuals are available from the district cost estimating section. When this manual is not available the cost estimates can be taken from other publications such as Means and Dodge.

Geographical Location Adjustment Factors

The Washington, DC-based material costs in the summary tables can be adjusted to a specific installation through the application of a geographical location adjustment factor. The factors are published in AR 415-17 and updates are available through the PAX computer system (Area Cost Factor Newsletter) and through the Engineering Improvement Recommendation System (EIRS) Bulletin The 1988 set of factors is given in Appendix D.

Inflation Factors

The material costs and Washington, DC, total costs presented in Appendices A and B are in July 1988 dollars. The costs need to be adjusted to the date of study by applying an approved inflation factor obtained from the District cost estimating office.

Timing of Costs

Figure 2 shows the relationship of DOS, BOD, and the end of the study (EOS) which is assumed to be a 25-year comparison period:

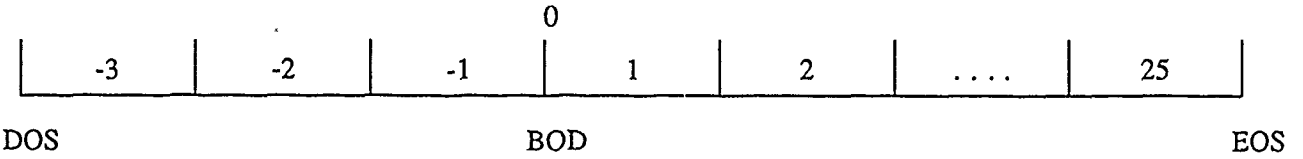

Figure 2. DOS, BOD, EOS relationship.

In Appendix B, costs are discounted 3 years from time of occurrence to DOS. M&R costs occur throughout a year and are costed at mid-year in accordance with established criteria for MILCON design. The basic present worth factor formula is:

$$PWF(BA) = \frac{1}{(1 + DR)^{(B + BA - C)}} \qquad \text{[Eq 1]}$$

where PWF = present worth factor
BA = building age
DR = discount rate
B = years from DOS to BOD
C = task placement, either .5 for mid-year, or 0 for end of year

The 10 percent present worth factor to bring costs from the mid-year of first year of occupancy to the DOS is $1/(1.1)^{3.5} = 0.7164$ which is the first value in Table 10. If the DOS is not 3 years before BOD, Appendix B data can be adjusted. For example, if there is only 1 year between BOD and DOS (two less than the 3 years in the appendices), multiply this data by $(1.1)^2$. If there are 5 years (2 years more than the 3 years in the appendices), divide by $(1.1)^2$.

In Appendix A, the DOS and BOD are identical. M&R costs are assumed to occur at the end of the year as stipulated by regulations. The basic formula is:

$$PWF(BA) = \frac{1}{(1 + DR)^{(BA)}} \qquad \text{[Eq 2]}$$

where PWF = present worth factor
BA = building age
DR = discount rate

Disposal Costs/Retention Value

When disposal costs/retention value, is considered, it should be expressed as a percentage of the initial cost occurring at the end of the study period. The present worth of this value can be subtracted from the final net present worth.

Examples

Introduction

This section contains one example for each of the basic uses for this life-cycle cost data. The first example demonstrates the procedures for calculating LCC for construction and maintenance and repair when the DOS is exactly 3 years before the BOD, the building is 25 years old at the end of the study, and installation resource costs are available from the installation. The second example demonstrates the procedures for calculating LCC for construction and maintenance and repair when resource costs are not available from the installation and Washington, DC, cost data is to be applied. Examples 3 and 4 show how to adjust data to cover the case for which BOD is not 3 years after DOS. Example 5 shows how to use the data to generate input for other computer programs. Example 6 demonstrates the use for a project containing an extraordinary energy-saving design initiative to conserve energy.

Each example is presented in five sections:

1. Statement of the problem
2. Identification of all installation-related information
3. Identification of all component-related information
4. Description of the present worth calculations
5. A typical calculation worksheet.

Example 1: BOD 3 Years After DOS--200T Chiller

Problem Statement. This example demonstrates all steps using a chiller water cooled Rec. 200T capacity. An apartment building for family housing is under design at OFFUTT AFB, NE. The DOS is July 1989. The projected BOD is July 19 A 25-year life-cycle cost analysis using a 10 percent discount rate is required.

Installation-Related Data.

Geographic Location Adjustment Factor. The geographic location adjustment factor (LAF) can be obtained from the latest EIRS bulletin or from the Area Cost Factor Newsletter on the PAX computer system, as shown in Appendix D. The factors are indexed by state and then by location within the state. From Appendix D, for Nebraska and OFFUTT AFB, the geographic LAF (or Area Cost Factor [ACF] Index) is 1.05.

Inflation. The cost data in Appendix B is expressed in July 1988 dollars. Since the date of the study is July 1989, all cost figures must be adjusted. A telephone conversation with a District cost estimator has revealed that the costs have risen 2 percent from July 1988 to July 1989. This means that all costs need to be multiplied by a 1.02 cost adjustment factor.

Resource Rates. The labor and equipment resources in Appendix B are expressed in hours per unit measure. To obtain accurate cost figures the designer called the OFFUTT AFB DEH-ME branch. The July 1989 rates of $13.50 per hour for a technician and $3.00 per hour for a maintenance truck were obtained. HVAC Zone: The HVAC zone of OFFUTT, NE is Zone 6, see Figure 1.

Component Information.

Size. The designer is considering a chiller, water cooled Rec. 200T capacity.

Initial Costs. The designer obtained a CACES unit price manual from the cost estimator. For the chiller, water cooled Rec. 200T capacity, a cost of $53000.00 was obtained. (Note: if the component is not found in the *CACES Unit Price Manual*, other books such as Means and Dodge can be used.)

Disposal Costs/Retention Value. The average life of the chiller is 20 years, as shown for the replacement task in Appendix B. At the end of the 25-year analysis period, it would still have 15 years of life remaining or 15/20 = 75 percent of its useful life. The retention value can be considered to be 75 percent of the initial cost of $53000.00, or $39750.00.

Present Worth Calculations. Three factors must be considered when performing a present worth calculation: initial cost, maintenance costs, and retention value. Each factor is discussed below.

Initial Costs. The average construction project would normally be completed in one year. The contractor normally receives progress payments for work completed throughout the construction period. The initial cost of $53000 is assumed to occur at the midpoint of construction during the year before BOD. The present worth factor at the midpoint for the year before BOD is given in the second column of Table 10 as 0.7880. The present worth of the initial cost would be the initial cost multiplied by the present worth factor 1 year before BOD or $53000.00 x 0.7880 = $41764.00

25-Year Maintenance Cost. The total 25-year maintenance cost is composed of three parts: labor, material, and equipment. Labor costs are equal to the labor hours obtained from Appendix B, multiplied by the installation labor hourly rate. This would be 174.22440 multiplied by a labor rate of $13.50/hr, which is equal to $2352.03.

$$\text{Labor} = 174.22440 \times \$13.50/\text{hr} = \$2352.03 \qquad \text{[Eq 3]}$$

Material costs are equal to the material dollars in Washington, DC, obtained from Appendix B, multiplied by the geographic LAF from Appendix D and then multiplied by the inflation factor. This would be $19602.66480 DC-based dollars multiplied by a geographic LAF of 1.05 and a cost escalation factor (CEF) of 1.02 which is equal to $20994.45.

$$\text{Material} = \$1960.66480 \times 1.05 \times 1.02 = \$20994.45 \qquad \text{[Eq 4]}$$

Equipment costs are equal to the equipment hours obtained from Appendix B, multiplied by the installation equipment hourly rate. This would be 83.57051 multiplied by an equipment rate of $3.00/hr which is equal to $250.72.

$$\text{Equipment} = 83.57051 \times \$3.00/\text{hr} = \$250.72 \qquad \text{[Eq 5]}$$

The total maintenance cost would be the labor cost ($2352.03) plus the material cost ($20994.45) plus the equipment cost ($250.72) or $23597.19.

$$\text{Total} = \$2352.03 + \$20994.45 + \$250.72 = \$23597.20 \qquad \text{[Eq 6]}$$

This total has already been discounted to the DOS since all figures on the left side of the table in Appendix B are expressed in terms of the DOS.

Disposal Costs/Retention Value. The DOS present worth for the retention value would be the expected retention value of $39750.00 multiplied by the end-of-year present worth factor for the end of study year (EOS) obtained from Table 11, 0.06930, which produces a cost of $2754.68.

Total Life Cycle Cost for Construction and Maintenance and Repair. The total life-cycle cost (LCC) per square foot for the DOS is the sum of the present worth costs for the initial cost of $41764.00 plus the 25-year maintenance cost of $23597.19 minus the retention value of $2754.68.

$$\text{Total LCC} = \$41764.00 + \$23597.19 - \$2754.68 = \$62606.51 \qquad \text{[Eq 7]}$$

The total dollar cost would be $62606.51.

Calculation Sheet. A typical calculation sheet is shown in Table 12.

Example 2: BOD 3 Years After DOS -- Washington, DC Rate Applied

Problem Statement. This example demonstrates all steps using a chiller, water cooled Rec. 200T capacity. An apartment building for family housing is under design at OFFUTT AFB, NE. The DOS is July 1989. The projected BOD is July 1992, three years after DOS. A 25-year life-cycle cost analysis using a 10 percent discount rate is required.

The designer wishes to perform a rough cost estimate without calling the installation to obtain cost information. It should be understood that the installation's costs may vary significantly from the Washington, DC, costs and the rough calculations may be misleading. However, if the designer is going to compare several types of components such as water cool, hermetic, air cooled--all of which involve the identical trade such as an HVAC technician--the comparisons may be quite accurate.

Installation-Related Data.

Geographic Location Adjustment Factor. The geographic LAF can be obtained from the latest EIRS bulletin or from the Area Cost Factor Newsletter on the PAX computer system as shown in Appendix D. The factors are indexed by state and then by location within the state. From Appendix D, for Nebraska and OFFUTT AFB, the geographic LAF (or ACF Index) is 1.05.

Table 12

Calculation Sheet - Example 1

	Calculation Column	Subfactor Cost	Factor Cost	Total Cost
Initial Cost				
Initial Cost	$53000.00			
PWF for BOD-1	x .7880			
Initial cost			$41764.00	
25-Year Maintenance Cost				
PW - Labor	174.2244			
Labor Rate	x $13.50/hr			
Labor cost		$2352.03		
PW - Material	$19602.6648			
LAF	x 1.05			
CEF	x 1.02			
Material cost		$20994.45		
PW - Equipment	83.57051			
Equipment Rate	x $3.00/hr			
Equipment cost		$250.72		
Maintenance cost			$23597.20	
Disposal Costs/Retention Value				
Initial Cost	$53000.00			
Remaining Life	x .75			
PWF for EOS	x .06930			
Retention cost			- $2754.68	
TOTAL Life Cycle Cost				$62606.51

Inflation. The cost data in Appendix B is expressed in July 1988 dollars. Since the DOS is July 1989, all cost figures must be adjusted. A telephone conversation with a District cost estimator has revealed that the costs have risen 2 percent from July 1988 to July 1989. This means that all costs need to be multiplied by a 1.02 cost adjustment factor.

Resource Rates. The designer wishes to perform a rough calculation using the Washington, DC, labor and equipment rates rather than calling the installation. HVAC Zone: The HVAC Zone of OFFUTT AFB, NE is Zone 6, see Figure 1.

Component Information.

Size. The designer is considering a chiller, water cooled Rec. 200T capacity.

Initial Costs. The designer obtained a *CACES Unit Price Manual* from the cost estimator. For the chiller, water cooled Rec. 200T capacity component, a cost figure of $53000.00 was obtained. (Note: if the component is not found in the *CACES Unit Price Manual*, other books such as Means and Dodge can be used.)

Disposal Costs/Retention Value. The average life of the chiller is 20 years, as shown for the replacement task in Appendix B. At the end of the 25-year analysis period, it would still have 15 years of life remaining or 15/20 = 75 percent of its useful life. The retention value can be considered to be 75 percent of the initial cost of $53000.00 or $39750.00.

Present Worth Calculations. Three factors need to be considered when performing a present worth calculation. initial cost, maintenance costs, and retention value. Each factor is discussed below.

Initial Costs. The average construction project would normally be completed in one year. The contractor normally receives progress payments for work completed throughout the construction period. The initial cost of $53000 is assumed to occur at the midpoint of construction during the year before BOD. The present worth factor at the midpoint for the year before BOD is given in the second column of Table 10 as 0.7880. The present worth of the initial cost would be the initial cost multiplied by the present worth factor 1 year before BOD or $53000.00 x 0.7880 = $41764.00

25-Year Maintenance Cost. The total 25-year maintenance cost for Fort Eustis can be calculated by taking the Washington, DC, total cost, $23263.98, and multiplying by the location adjustment factor (1.05) producing a cost of $24427.18.

Disposal Costs/Retention Value. The DOS present worth for the retention value would be the expected retention value of $39750.00 multiplied by the end of year present worth factor for the EOD obtained from Table 11, 0.06930, which produces a cost of $2754.67.

Total LCC for Construction and Maintenance and Repair. The total LCC per square foot for the DOS is the sum of the present worth costs for the initial cost of $41764.00 plus the 25-year maintenance cost of $24427.18 minus the retention value of $2754.67.

$$\text{Total LCC} = \$41764.00 + \$24427.179 - \$2754.67 = \$63436.51 \qquad \text{[Eq 13]}$$

The total dollar cost would be the LCC $63436.51

Calculation Sheet. A typical calculation sheet is shown in Table 13.

Example 3: DOS Less Than 3 Years Before BOD

Perform the calculations as shown in Examples 1 through 3. The answers are lower than the actual DOS answers. The calculated values must be adjusted by multiplying by:

$$(1 + DR)^{(3-A)} \qquad \text{[Eq 14]}$$

where DR = discount rate
3 = years between DOS and BOD given in the tables
A = actual years between DOS and BOD

For example, using the answer of $62606.51 in Example 1 and assuming 1 year between BOD and DOS with discount rate = 10% (0.10), the formula would be $(1.10)^{(3-1)} = (1.1)^{(2)} = 1.21$. The correct answer would be $62606.51 x 1.21 = $75753.88.

Example 4: DOS Greater Than 3 Years Before BOD

Perform the calculation as shown in Examples 1 and 2. The answers are larger than the actual DOS answers. The calculated values must be adjusted by dividing by:

$$(1 + DR)^{(A-3)} \qquad \text{[Eq 15]}$$

where DR = discount rate
3 = years between DOS and BOD given in the tables
A = actual years between DOS and BOD

For example, using the answer of $62606.51 in Example 1 and assuming 5 years between BOD and DOS with d = 10% (0.10), the formula would be $(1.10)^{(5-3)} = (1.10)^{(2)} = 1.21$. The correct answer would be $62606.51 ÷ 1.21 = $51740.92.

Example 5: Computer Input--BOD 3 Years After DOS (chiller, water cooled rec., 200T capacity)

Problem Statement. This example demonstrates all steps using a chiller, water cooled Rec. 200T capacity. An apartment building for family housing is under design at OFFUTT AFB NE. The BOD is July 1992. The DOS is 3 years before BOD or July 1989. A 25-year LCC analysis using a 10 percent discount rate is required. A computer program, such as the Corps' LCCID, that requires an annual maintenance figure and high cost tasks will be used.

Table 13

Calculation Sheet - Example 2

	Calculation Column	Subfactor Cost	Factor Cost	Total Cost
Initial Cost				
Initial Cost	$53,000.00			
PWF for BOD	x .7880			
Initial Cost			$41,764.00	
25-Year Maintenance Cost				
PW Total	$23,263.98			
LAF	x 1.05			
Maintenance Cost			$24,427.18	
Disposal Costs/Retention Value				
Initial Cost	$53,000.00			
Remaining Life				
PWF for EOS	x .06930			
Retention value			- $3672.90	
Life Cycle cost				
TOTAL Life Cycle Cost				$66,191.18

Installation Related Data.

Geographic Location Adjustment Factor. The LAF can be obtained from the latest EIRS bulletin or from the Area Cost Factor Newsletter on the PAX computer system as shown in Appendix D. The factors are indexed by state and then by location within the state. From Appendix D, for Nebraska and OFFUTT AFB, the geographic LAF (or ACF Index) is 1.05.

Inflation. The cost data in Appendix B is expressed in July 1988 dollars. Since the DOS is July 1989, all cost figures must be adjusted. A telephone conversation with a District cost estimator has revealed that the costs have risen 2 percent from July 1988 to July 1989. This means that all costs need to be multiplied by a 1.02 cost adjustment factor.

Resource Rates. The labor and equipment resources in Appendix B are expressed in hours per unit measure. To obtain accurate cost figures the designer called the OFFUTT AFB DEH-MES branch. The July 1989 rates of $13.50/hr for a HVAC Technician and $3.00/hr for a roofing maintenance truck were obtained. HVAC Zone: The HVAC Zone of OFFUTT AFB, NE is Zone 6, see Figure 1.

Component Information.

Size. The designer is considering a chiller, water cooled Rec. 200T capacity.

Initial Costs. The designer obtained a *CACES Unit Price Manual* from the cost estimator. By looking up the chiller, water cooled Rec. 200T capacity component, a cost of $53000.00 was obtained. (Note: if the component is not found in the *CACES Unit Price Manual*, other books such as Means and Dodge can be used.)

Disposal Costs/Retention Value. The average life of the chiller is 20 years, as shown for the replacement table in Appendix B. At the end of the 25-year analysis period, the roof covering would still have 15 years of life remaining or 15/20 = 75 percent of its useful life. The retention value can be considered to be 75 percent of the initial cost of $53000.00, or $39750.00.

Data Entry Calculations. Four factors need to be considered when performing a present worth calculation: initial cost, annual maintenance costs, high costs, and retention value. Each factor is discussed below.

Initial Costs. The initial cost of $53,000 is estimated from CACES as discussed above.

25-Year Maintenance Cost. The total annual 25-year maintenance cost is composed of three parts: labor, material, and equipment. Annual labor costs are equal to the labor hours obtained from Appendix B, multiplied by the installation labor hourly rate. This would be 22.37754 multiplied by a labor rate of $13.50/hr, which is equal to 302.10.

$$\text{Labor} = 22.37754 \times \$13.50/\text{hr} = \$302.10 \qquad \text{[Eq 16]}$$

Annual material costs are equal to the material dollars in Washington, DC, obtained from Appendix B, multiplied by the geographic LAF from Appendix D, and then multiplied by the inflation factor. This would be $0.000 DC-based dollars multiplied by a geographic LAF of 1.05 and a CEF of 1.02, or $0. There is no annual material costs.

$$\text{Material} = 0 \qquad \text{[Eq 17]}$$

Annual equipment costs are equal to the equipment hours obtained from Appendix B, multiplied by the installation equipment hourly rate. This would be 11.18877 multiplied by an equipment rate of $3.00/hr, which is equal to $33.57.

Equipment = 11.18877hr/yr x $3.00/hr = $33.57/yr [Eq 18]

The total annual maintenance cost would be the labor cost ($302.10) plus the material cost ($0), plus the equipment cost ($33.57) or $335.67.

Total: $302.10 + $0. + 33.57 = $335.67 [Eq 19]

High Cost Task. There is one high-cost task for chiller water cool Rec. 200T capacity. This task occurs in the 10th year. The resources required to perform this task are given below.

The labor resources are obtained by multiplying the labor hours, 18.07000, by the labor rate, $13.50/hr, resulting in $243.94.

Labor = 18.07000/hr x $13.50/hr = $243.94 [Eq 20]

The material resources are obtained by multiplying the material cost in DC base, $44096, by the cost escalation factor, 1.02, and the location adjustment factor, 1.05, resulting in $47226.82.

Material = $44096 x 1.02 x 1.05 = $47226.82 [Eq 21]

Equipment resources are obtained by multiplying the equipment resources of 4.51750 by the equipment rate of $3.00/hr resulting in $13.55.

Equipment = 4.51750 x $3.00/hr = $13.55 [Eq 22]

Total cost for this one task would be the sum of the labor, material, and equipment costs.

Total = $243.94 + $47226.82 + $13.55 = $47484.31 [Eq 23]

The total cost figure for computer entry is 4784.31 occurring in year 10.

Replacement Task. There is one replacement occurring in the 20th year. The resources required to perform this task are given below.

The labor resources are obtained by multiplying the labor hours 74.10000, by the labor rate, $13.50/hr, resulting in $1000.35.

Labor = 74.10000 x $13.50/hr = $1000.35 [Eq 24]

The material resources are obtained by multiplying the material cost in DC base, $53000, by the cost escalation factor, 1.02, and the location adjustment factor, 1.05, resulting in $56,763.00.

Material = $53,000 x 1.02 x 1.05 = $56,763.00 [Eq 25]

Equipment resources are obtained by multiplying the equipment resources of 18.52500 by the equipment rate of $3.00/hr resulting in $55.58.

$$\text{Equipment} = 18.52 \times \$3.00/\text{hr} = \$55.58 \qquad \text{[Eq 26]}$$

Total cost for this one task would be the sum of the labor, material, and equipment costs.

$$\text{Total} = \$1000.35 + \$56{,}763.00 + \$55.58 = \$57{,}818.93 \qquad \text{[Eq 27]}$$

The total cost figure for computer entry is $57,818.93 occurring in year 20.

Disposal Costs/Retention Value. The expected retention value is calculated as follows: at the end of the 25-year analysis period, the chiller would still have 15 years of life remaining or 15/20 = 75 percent of its useful life. The value is then 75 percent of the initial cost of $53,000 or $39,750.

The calculated values are entered into the computer and the computer performs the appropriate discounting.

Calculation Sheet A typical calculation sheet is shown in Table 14.

Example 6: Extraordinary Energy-Saving Design Initiatives—200T Chiller

Problem Statement. This example demonstrates all steps involved in using the summary tables in Appendix A for the conventional chiller, water cooled Rec. 200T capacity alternative. An apartment building for family housing is under design at Offutt AFB, NE. The designers are considering the use of a new-technology energy conserving, low maintenance cooler, in place of a conventional cooler, and will determine which is more cost effective on the basis of a life-cycle cost analysis. The DOS is July 1989. The analysis period is 25 years. In accordance with established criteria for energy-conservation studies, the BOD is assumed to occur on the DOS (July 1989); all costs are assumed to be occur at the end of the year in which they are projected to occur; and the discount rate for the present worth calculations is seven percent.

Installation Related Data.

Geographic Location Adjustment Factor. The geographic LAF can be obtained from the latest EIRS bulletin or from the Area Cost Factor Newsletter on the PAX computer system as shown in Appendix D. The factors are indexed by state and then by location within the state. From Appendix D, for Nebraska and OFFUTT AFB, the geographic LAF (or ACF Index) is 1.05.

Inflation. The cost data in Appendix A is expressed in July 1988 dollars. Since the DOS is July 1989, all cost figures must be adjusted. A telephone conversation with a District cost estimator has revealed that the costs have risen 2 percent from July 1988 to July 1989. This means that all costs need to be multiplied by a 1.02 cost adjustment factor.

Table 14

Calculation Sheet - Example 5

ANNUAL MAINTENANCE

	Calculation Column	Subfactor Cost	Factor Cost	Total Cost
Initial Cost			$53,000.00	
25-Year Annual Maintenance				
Labor hours	22.37754			
Labor Rate	x $13.50/hr			
Labor cost			$302.10	
Material	$0			
AF	x 1.05			
CEF	x 1.02			
Material cost			0	
Equipment	11.18877			
Equipment Rate	x $3.00/hr			
Equipment cost			$33.57	
TOTAL Annual Maintenance				$335.67
HIGH COST TASK				
Labor	18.07			
Labor Rate	x $13.50/hr			
Labor cost			$243.94	
Material	$44096.00			
LAF	x 1.05			
CEF	x 1.02			
Materials cost			$47226.52	
Equipment	4.51750			
Equipment Rate	$3.00/hr			
Equipment			13.55	
TOTAL Cost for High Cost Task				$47484.32
REPLACEMENT Task				
Labor	74.10000			
Labor Rate	x $13.50/hr			
Labor cost			$1000.35	
Material	$53000			
LAF	x 1.05			
CEF	x 1.02			
Materials cost			$56,763.00	
Equipment	18.52500			
Equipment Rate	$3.00/hr			
Equipment			$55.58	
TOTAL Maintenance Cost for Replacement Task				$57,818.92
Disposal Costs/Retention Value				
Initial Cost	$53,000.00			
Remaining Life	x .75			
Total/sq ft				
Square Feet				
Retention Value			$39750.00	

Resource Rates. The labor and equipment resources in Appendix B are expressed in hours per unit measure. To obtain accurate cost figures, the designer called the OFFUTT AFB DEH-MES branch. The July 1989 rates of $13.50 per hour for a HVAC Technician and $3.00 per hour for a maintenance truck were obtained.

Component Information.

Size. The designer is considering a chiller, water cooled Rec. 200T capacity.

Initie' Costs. The designer obtained a *CACES Unit Price Manual* from the cost estimator. For the chiller, a cost figure of $53000.00 was obtained. (Note. if the component is not found in the *CACES Unit Price Manual,* other books such as Means and Dodge can be used.)

Disposal Costs/Retention Value. The average life is 20 years as shown for the replacement task in Appendix B. At the end of the 25-year analysis period, the chiller would still have 15 years of life remaining or 15/20 = 75 percent of its useful life. The retention value can be considered to be 75 percent of the initial cost of $53000.00 or $39750.00.

Present Worth Calculations. The following factors are considered in performing the present worth calculation: initial cost, maintenance costs, and retention value. Each factor is discussed below.

Initial Costs. The initial cost of $53000.00 is assumed to occur on the BOD/DOS in accordance with established criteria for energy conservation studies.

25-Year Maintenance Cost. The total 25-year maintenance cost is composed of three parts: labor, material, and equipment. Labor costs are equal to the labor hours obtained from Appendix A multiplied by the installation labor hourly rate. This would be 287.56412 multiplied by a labor rate of $13.50/hr which is equal to $3,882.12.

$$\text{Labor} = 287.56412 \times \$13.50/\text{hour} = \$3,882.12 \qquad \text{[Eq 24]}$$

Material costs are equal to the material dollars in Washington, DC, obtained from Appendix A multiplied by the geographic LAF from Appendix D and then multiplied by the inflation factor. This would be $36,109.19680 based dollars multiplied by a geographic LAF of 1.05 and a CEF of 1.02, which is equal to $38,672.94977

$$\text{Material} = \$36,109.19680 \times 1.05 \times 1.02 \quad \$38,672.95 \qquad \text{[Eq 25]}$$

Equipment costs are equal to the equipment hours obtained from Appendix A multiplied by the installation equipment hourly rate. This would be 136.69896 multiplied by an equipment rate of $3.00/hr, which is equal to $410.10.

$$\text{Equipment} = 136.69896 \times \$3.00/\text{hr} = \$410.10 \qquad \text{[Eq 26]}$$

The total maintenance cost would be the labor cost ($3,882.12) plus the material cost ($38,672.95) plus the equipment cost ($410.10), or $42,965.17.

$$\text{Total} = \$3,882.12 + \$38,672.95 + \$410.10 = \$42,965.17 \qquad \text{[Eq 27]}$$

Resource Rates. The labor and equipment resources in Appendix B are expressed in hours per unit measure. To obtain accurate cost figures, the designer called the OFFUTT AFB DEH-MES branch. The July 1989 rates of $13.50 per hour for a HVAC Technician and $3.00 per hour for a maintenance truck were obtained.

Component Information.

Size. The designer is considering a chiller, water cooled Rec. 200T capacity.

Initial Costs. The designer obtained a *CACES Unit Price Manual* from the cost estimator. For the chiller, a cost figure of $53000.00 was obtained. (Note. if the component is not found in the *CACES Unit Price Manual*, other books such as Means and Dodge can be used.)

Disposal Costs/Retention Value. The average life is 20 years as shown for the replacement task in Appendix B. At the end of the 25-year analysis period, the chiller would still have 15 years of life remaining or 15/20 = 75 percent of its useful life. The retention value can be considered to be 75 percent of the initial cost of $53000.00 or $39750.00.

Present Worth Calculations. The following factors are considered in performing the present worth calculation: initial cost, maintenance costs, and retention value. Each factor is discussed below.

Initial Costs. The initial cost of $53000.00 is assumed to occur on the BOD/DOS in accordance with established criteria for energy conservation studies.

25-Year Maintenance Cost. The total 25-year maintenance cost is composed of three parts: labor, material, and equipment. Labor costs are equal to the labor hours obtained from Appendix A multiplied by the installation labor hourly rate. This would be 287.56412 multiplied by a labor rate of $13.50/hr which is equal to $3,882.12.

$$\text{Labor} = 287.56412 \times \$13.50/\text{hour} = \$3,882.12 \qquad \text{[Eq 24]}$$

Material costs are equal to the material dollars in Washington, DC, obtained from Appendix A multiplied by the geographic LAF from Appendix D and then multiplied by the inflation factor. This would be $36,109.19680 based dollars multiplied by a geographic LAF of 1.05 and a CEF of 1.02, which is equal to $38,672.94977

$$\text{Material} = \$36,109.19680 \times 1.05 \times 1.02 \quad \$38,672.95 \qquad \text{[Eq 25]}$$

Equipment costs are equal to the equipment hours obtained from Appendix A multiplied by the installation equipment hourly rate. This would be 136.69896 multiplied by an equipment rate of $3.00/hr, which is equal to $410.10.

$$\text{Equipment} = 136.69896 \times \$3.00/\text{hr} = \$410.10 \qquad \text{[Eq 26]}$$

The total maintenance cost would be the labor cost ($3,882.12) plus the material cost ($38,672.95) plus the equipment cost ($410.10), or $42,965.17.

$$\text{Total} = \$3,882.12 + \$38,672.95 + \$410.10 = \$42,965.17 \qquad \text{[Eq 27]}$$

This total has already been discounted to the date of study since all figures on the left side of the table in the Appendix are expressed in terms of the DOS.

Disposal Costs/Retention Value. The DOS present worth for the retention value would be the expected retention value of $39750.00 multiplied by the end of year present worth factor for the EOS of 0.1842 obtained from Table 10 which produces a value of $7321.95.

Total Life Cycle Cost for Construction and Maintenace and Repair. The total LCC for the DOS is the sum of the present worth costs for the initial cost of $53000.00 plus the 25-year maintenance cost of $42,965.17 minus the retention value of $7321.95.

$$\text{Total LCC} = \$53000.00 + \$42{,}965.17 - \$7321.95 = \$88{,}643.22 \qquad \text{[Eq 28]}$$

The total dollar cost would be $88,643.22.

Calculation Sheet. A typical calculation sheet is shown in Table 15.

Table 15

Calculation Sheet - Example 6

	Calculation Column	Subfactor Cost	Factor Cost	Total Cost
Initial Cost				
Initial Cost			$53000.00	
25 Year Maintenance Cost				
PW - Labor	287.56412			
Labor Rate	x $13.50/hr			
Labor cost		$3882.12		
PW - Material	$36,109.19680			
LAF	x 1.05			
CEF	x 1.02			
Material cost		$38672.12		
PW - Equipment	136.69896			
Equipment Rate	x $3.00/hr			
Equipment cost		$410.10		
Maintenance cost			$42,965.17	
Disposal Costs/Retention Value				
Initial Cost	$53000.00			
Remaining Life	x .75			
PWF for EOS	x .1842			
Retention value			- $7321.95	
TOTAL Life Cycle Cost				$88,643.22

REFERENCES

Army Regulation (AR) 11-18, *The Cost and Economic Analysis Program* (Headquarters, Department of the Army [HQDA], 7 May 1990).

AR 11-28, *Economic Analysis and Program Evaluation for Resource Management* (HQDA, December 1975).

Military Handbook (MIL-HDBK) 1190, *Facility Planning and Design Guide* (Department of Defense, 1 September, 1987).

Neathammer, R.D., *Life-Cycle Cost Database Design and Sample Cost Data Development*, Interim Report P-120/-ADA0997222 (U.S. Army Construction Engineering Research Laboratory [USACERL], February 1981).

Neathammer, R.D., *Life-Cycle cost database. Vol I, Design, and Vol II, Sample Data Development*, Technical Report P-139/ADA126644 and ADA126645 (USACERL, January 1983), Appendices E through G.

Neely, E.S., et al., *Building Component Maintenance and Repair Data Base. Architectural Systems*, Special Report P-91/27 (USACERL, May 1991).

Neely, E.S., et al., *Building Component Maintenance and Repair Data Base. Electrical Systems*, Special Report P-91/19 (USACERL, May 1991).

Neely, E.S., et al., *Building Component Maintenance and Repair Data Base. Heating, Ventilation, and Air-Conditioning Systems*, Special Report P-91/22, (USACERL, May 1991).

Neely, E.S, et al., *Building Component Maintenance and Repair Data Base. Plumbing Systems*, Special Report P-91/30 (USACERL, May 1991).

Neely, E.S., et al., *Building Maintenance and Repair for Life-Cycle Cost Analysis. Architectural Systems*, Special Report P-91/017 (USACERL, May 1991).

Neely, E.S., et al., *Building Maintenance and Repair Data for Life-Cycle Cost Analyses. Electrical Systems*, Special Report P-91/26 (USACERL, May 1991).

Neely, E.S., et al., *Building Maintenance and Repair Data for Life-Cycle Cost Analyses. Plumbing Systems*, Special Report P-91/24 (USACERL, May 1991)

Neely, E.S., et al., *Maintenance Resource Prediction in the Facility Life-Cycle Process*, Technical Report P-91-10 (USACERL, March 1991).

Neely, E.S., et al., *Maintenance Task Data Base for Buildings. Architectural Systems*, Special Report P-91/23 (USACERL, May 1991).

Neely, E.S., et al., *Maintenance Task Data Base for Buildings. Electrical Systems*, Special Report P-91/25 (USACERL, May 1991).

Neely, E S , et al., *Maintenance Task Data Base for Buildings. Heating Ventilation, and Air-Conditioning Systems*, Special Report P-91/21 (USACERL, May 1991).

Neely, E.S., et al., *Maintenance Task Data Base for Buildings. Plumbing Systems*, Special Report P-91/18 (USACERL, May 1991).

Technical Manual (TM) 5-802-1, *Economic Studies for Military Construction--Applications* (HQDA, 31 December 1986).

LIST OF ACRONYMS

ACE	Assistant Chief of Engineers
AMS	Army Management System
APC	Account Processing Code
AR	Army Regulation
ARR	Annual Requirements Report
ASTM	American Society for Testing and Materials
BLAST	Building Loads Analysis and System Thermodynamics
BMAR	Backlog of Maintenance and Repair
BOD	Beneficial Occupancy Date
CA	Commercial Activities
CACES	Computer-Assisted Cost Estimating System
CONUS	Continental United States
DA	Department of the Army
DEH	Directorate of Engineering and Housing
DOD	Department of Defense
DOS	Date of Study
EA	Economic Analysis
EC	Engineering and Construction
EIRS	Engineering Improvement Recommendation System
EOS	End of Study
EPS	Engineered Performance Standards
HQ-IFS	Headquarters - Integrated Facilities
HQDA	Headquarters Department of the Army

LIST OF ACRONYMS (Cont'd)

HVAC	Heating, Ventilating, and Air-Conditioning
IFS	Integrated Facilities System
IJO	Individual Job Order
LCC	Life-Cycle Cost
LCCID	Life-Cycle Cost in Design
M&R	Maintenance and Repair
MACOM	Major Command
MCA	Military Construction, Army
MRPM	Maintenance Resource Prediction Model
OCE	Office of the Chief of Engineers
PAX	Programming, Administration, and Execution System
PC	Personal Computer
PM	Preventive Maintenance
R&D	Research and Development
RAM	Random Access Memory
RMF	Recurring Maintenance Factor
RPI	Real Property Inventory
RPLANS	Real Property Planning System
RPMS	Real Property Management System
SO	Service Order
STANFINS	Standard Army Financial System
TB	Technical Bulletin
USACE	U.S. Army Corps of Engineers
USACERL	U.S. Army Construction Engineering Research Laboratory
USAEHSC	U.S. Army Engineering and Housing Support Center

APPENDIX A:

LIFE-CYCLE COST ANALYSIS (7 PERCENT)

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
Zone: 1	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.13209	33.38905	0.13209	36.38	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	316	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.26342	0.00000	0.26342	5.97	0.02260	0.00000	0.02260	59	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.26342	0.00000	0.26342	5.97	0.02260	0.00000	0.02260	59	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	126	2.60000	164.30000	1.30000
OIL FILTER	CT	1.21193	39.52765	1.21193	67.01	0.10400	3.39188	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.72663	160.23384	0.72663	176.71	0.03353	0.00000	0.03353	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	105	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	126	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITNGS,STEEL/IRON	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	316	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	1.74713	1.62958	1.74713	41.25	0.14992	0.13983	0.14992	113	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	2.09716	1.62958	2.09716	49.19	0.17996	0.13983	0.17996	57	6.50000	147.34000	3.25000
STEAM REG. VALVE 2"	CT	1.64502	52.83699	0.82251	87.51	0.00000	0.00000	0.00000	23	7.80000	250.53100	3.90000
COND. METER,<300 #/HR.	CT	7.20265	0.00000	7.20265	163.36	0.61806	0.00000	0.61806	126	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	189	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	189	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	5.20000	262.35000	2.60000
SOLAR												
EQUIPMENT												
SOLAR PANEL, 3' X 8'	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	63	3.90000	349.80000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	84	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.36443	2.01396	0.30273	10.08	0.03127	0.17282	0.02598	26	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	441.09294	0.00000	441.09294	10003.99	37.85036	0.00000	37.85036	113	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	496.34005	0.00000	496.34005	11256.99	42.59114	0.00000	42.59114	113	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	510.96443	0.00000	510.96443	11588.67	43.84606	0.00000	43.84606	113	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR	CT	1211.8368	0.00000	814.17140	26211.93	103.98820	0.00000	69.86437	113	20800.000	636000.00000	4160.0000
BOILER COAL 100,000 KBTU/H	CT	1458.7681	0.00000	937.63705	31417.24	125.17747	0.00000	80.45900	113	41600.000	1590000.00000	8320.0000
BOILER OIL 250 KBTU/HR	CT	493.76666	0.00000	493.76666	11198.63	42.37031	0.00000	42.37031	113	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	560.42297	0.00000	560.42297	12710.39	48.09012	0.00000	48.09012	113	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	617.98978	0.00000	617.98978	14016.01	53.02995	0.00000	53.02995	113	248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	508.91582	0.00000	508.91582	11542.21	43.67027	0.00000	43.67027	113	184.60000	18689.92000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	531.63956	0.00000	531.63956	12057.59	45.62020	0.00000	45.62020	113	651.30000	71020.00000	162.82500
BOILR.PNEUMAT.COAL SPREAD.	CT	2362.1559	0.00000	2362.1559	53573.70	202.69753	0.00000	202.69753	45	182.00000	5618.00000	45.50000
ASH HANDLING SYSTEM	CT	3761.9786	0.00000	3761.9786	85321.67	322.81686	0.00000	322.81686	75	10400.000	212000.00000	2600.0000
FUEL OIL EQUIPMENT	CT	6.05966	0.00000	3.02983	127.74	0.51998	0.00000	0.25999	57	2.60000	302.10000	1.30000
CHEMICAL FEED SYSTEM	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64998	57	3.25000	389.02000	1.62500
FEED-WATER SUPPLY	CT	227.23740	0.00000	227.23740	5153.74	19.49933	0.00000	19.49933	57	28.60000	2756.00000	9.53333
DEAERATOR	CT	227.23740	0.00000	113.61870	4790.16	19.49933	0.00000	9.74967	75	260.00000	21200.00000	65.00000
BLOWOFF SYSTEM	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	57	2.60000	147.34000	1.30000
HOUSE FURN.GAS 25KBTU/HR	CT	46.96240	0.00000	46.96240	1065.11	4.02986	0.00000	4.02986	57	10.40000	355.10000	5.20000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 1	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
HOUSE FURN.GAS 100KBTU/HR	CT	46.96240	0.00000	46.96240	1065.11	4.02986	0.00000	4.02986	57	20.80000	471.70000	10.40000
HOUSE FURN.GAS 200KBTU/HR	CT	46.96240	0.00000	46.96240	1065.11	4.02986	0.00000	4.02986	57	20.80000	1786.10000	10.40000
HOUSE FURN.OIL 25KBTU/HR	CT	62.11156	0.00000	62.11156	1408.69	5.32982	0.00000	5.32982	57	10.40000	848.00000	5.20000
HOUSE FURN.OIL 100KBTU/HR	CT	62.11156	0.00000	62.11156	1408.69	5.32982	0.00000	5.32982	57	20.80000	1358.49600	10.40000
HOUSE FURN.OIL 200KBTU/HR	CT	62.11156	0.00000	62.11156	1408.69	5.32982	0.00000	5.32982	57	20.80000	1595.30000	10.40000
HOUSE FURN.ELECT 25KBTU/HR	CT	22.72374	0.00000	22.72374	515.37	1.94993	0.00000	1.94993	57	10.40000	601.02000	5.20000
HOUSE FURN.ELECT.100KBTU	CT	22.72374	0.00000	22.72374	515.37	1.94993	0.00000	1.94993	57	20.80000	751.27500	10.40000
HOUSE FURN.ELECT.200KBTU/H	CT	22.72374	0.00000	22.72374	515.37	1.94993	0.00000	1.94993	57	20.80000	954.00000	10.40000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	189	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	5.20000	262.35000	2.60000
EXPANSION TANK	CT	0.01078	0.00000	0.01078	0.24	0.00093	0.00000	0.00093	189	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	2.15407	1.62958	2.15407	50.48	0.18484	0.13983	0.18484	113	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	2.09716	1.62958	2.09716	49.19	0.17996	0.13983	0.17996	57	6.50000	147.34000	3.25000
STORAGE TANK, DHW	CT	3.21221	4.56065	3.21221	77.41	0.27564	0.39135	0.27564	211	3.59395	346.62000	1.79698
IND. FUR., GAS/OIL 500 MBU	CT	42.76598	0.00000	38.80453	957.26	3.66977	0.00000	3.32983	126	65.00000	6784.00000	16.25000
IND.FURN.GAS/OIL 2000 MBTU	CT	76.93958	0.00000	76.93958	1744.99	6.60222	0.00000	6.60222	126	184.60000	13780.00000	46.15000
SURGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	63	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	189	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	113	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	105	241.80000	8034.80000	120.90000
PIPE INSULATION	TF	0.07629	0.46891	0.07629	2.20	0.00655	0.04024	0.00655	126	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	0.57200	94.05380	0.57200
DRAIN VALVE	CT	0.23242	0.21867	0.23242	5.49	0.01994	0.01876	0.01994	75	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	57	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	1.64502	52.83699	0.82251	87.51	0.00000	0.00000	0.00000	23	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	7.93811	11.19041	7.93811	191.23	0.68117	0.96025	0.68117	38	1.30000	75.70520	1.30000
PIPE INSULATION	TF	0.09346	0.57446	0.09346	2.69	0.00802	0.04929	0.00802	113	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	1.43931	3.62195	1.43931	36.27	0.12351	0.31080	0.12351	57	4.19900	371.00000	4.19900
CIRCULATION PUMP 5 HP	CT	1.43931	12.83084	1.43931	45.47	0.12351	1.10102	0.12351	57	4.19900	1272.00000	2.09950
COND. RCVR., 10 - 15 GAL.	CT	16.66943	21.09382	16.66943	399.16	1.43041	1.81007	1.43041	75	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T	CT	55.13481	1958.80840	53.89425	3205.30	3.54745	0.00000	3.54745	18	8.38500	1855.00000	4.19250
REPAIR AIR CONDITIONER									9	20.80000	2592.23000	20.80000
A/C DX PACKAGE 20T	CT	122.18032	7257.58510	118.15411	10015.75	8.99532	0.00000	8.99532	18	20.41000	7950.00000	6.80333
REPAIR AIR CONDITIONER									9	20.80000	9018.53300	20.80000
A/C DX PACKAGE 50T	CT	161.20151	21097.15859	150.61347	24719.33	11.52921	0.00000	11.52921	18	47.71000	21200.00000	11.92750
REPAIR AIR CONDITIONER									9	23.40000	27255.15460	23.40000
A/C WINDOW 1T	CT	24.46483	446.68470	24.46483	1001.55	0.10024	0.13650	0.10024	9	11.96000	1060.00000	11.96000
A/C WINDOW 2T	CT	24.90153	624.72230	24.90153	1189.49	0.10024	0.13650	0.10024	9	13.00000	1484.00000	13.00000
A/C PAD MTD. 4T	CT	60.04508	1254.21671	57.31573	2607.31	0.10024	0.68249	0.10024	9	13.00000	2968.00000	6.50000
A/C PAD MOUNTED 20 TON	CT	125.02688	7573.76401	125.02688	10409.37	9.22968	0.00000	9.22968	75	20.41000	7950.00000	6.80333
REPAIR AIR CONDITIONER									9	20.80000	9018.53300	20.80000
CHILLER-AIR COOL RECIP.20T	CT	274.70659	5968.24732	135.23761	11752.29	21.91818	0.00000	10.95909	18	28.60000	10759.00000	7.15000
REPAIR HERMETIC CHILLER									9	19.89000	5119.80000	9.94500
CHILLER AIR COOL REC.50T	CT	342.72493	11843.51250	166.15400	19051.49	28.38609	531.83055	14.00192	18	40.30000	19080.00000	10.07500
CHILLER AIR COOL REC.100T	CT	352.34168	27860.01710	167.44455	35259.46	27.23935	0.00000	13.61968	18	72.80000	40280.00000	18.20000
REPAIR HERMETIC CHILLER									9	24.57000	29309.00000	6.14250
CHILLER-AIR COOL RECIP. 5T	CT	152.74397	2187.43826	149.66661	5641.82	11.78260	0.00000	11.78260	18	15.60000	3710.00000	5.20000
REPAIR HERMETIC CHILLER									9	19.89000	2003.40000	19.89000
CHILLER AIR COOL REC. 10T	CT	218.83896	3992.03844	108.39369	8601.88	17.10378	0.00000	8.55189	18	20.80000	6360.00000	6.93333
REPAIR HERMETIC CHILLER									9	24.57000	3879.60000	12.28500
CHILLER AIR COOL REC. 15T	CT	280.20494	7378.74957	137.98678	13278.70	22.17157	0.00000	11.08578	18	28.60000	8268.00000	7.15000
REPAIR HERMETIC CHILLER									9	24.57000	9068.30000	12.28500
CHILLER WAT.COOL REC.20T	CT	272.95325	5421.90127	134.26477	11168.68	22.17157	0.00000	11.08578	18	29.90000	9540.00000	7.47500

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks			
Zone: 1	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
REPAIR HERMETIC CHILLER									9	10.53000	4778.48000	5.26500
CHILLER WAT.COOL REC.50T	CT	282.43964	10816.07040	136.02358	16753.27	22.17157	0.00000	11.08578	18	48.10000	15900.00000	12.02500
REPAIR HERMETIC CHILLER									9	18.07000	11236.00000	6.02333
CHILLER WAT.COOL REC.100T	CT	290.13304	23795.20860	137.12790	29885.81	22.17157	0.00000	11.08578	18	74.10000	27030.00000	18.52500
REPAIR HERMETIC CHILLER									9	18.07000	29044.00000	4.51750
CHILLER WAT. COOL REC. 10T	CT	240.73158	3413.17880	118.82711	8482.88	19.63767	0.00000	9.81884	18	20.80000	5300.00000	5.20000
REPAIR HERMETIC CHILLER									9	10.53000	3392.00000	5.26500
CHILLER WAT.COOL REC.200T	CT	290.13304	39666.51440	137.12790	45757.12	22.17157	0.00000	11.08578	18	74.10000	53000.00000	18.52500
REPAIR HERMETIC CHILLER									9	18.07000	44096.00000	4.51750
CHILL. HERMETIC CENT. 100T	CT	404.07986	23327.60688	197.42389	31830.84	32.30714	0.00000	16.15357	18	62.40000	37789.00000	15.60000
REPAIR CHILLER									9	16.77000	22331.02000	8.38500
CHILL. HERMETIC CENT. 300T	CT	414.18312	54485.09858	199.87900	63193.00	32.30714	0.00000	16.15357	18	97.50000	61771.50000	24.37500
REPAIR CHILLER									9	16.25000	66569.06000	8.12500
CHILL. HERMETIC CENT. 900T	CT	433.69945	146028.60160	204.82879	155132.52	32.30714	0.00000	16.15357	18	162.50000	127200.00000	40.62500
REPAIR CHILLER									9	16.77000	199283.18000	8.38500
CHILL. OPEN CENT. 300T	CT	1026.0322	54485.09858	505.80356	76090.78	84.25196	0.00000	42.12598	18	97.50000	61771.50000	24.37500
REPAIR CHILLER									9	28.21000	66569.06000	14.10500
CHILL. OPEN CENT. 900T	CT	433.69945	146028.60160	204.82879	155132.52	32.30714	0.00000	16.15357	18	162.50000	127200.00000	40.62500
REPAIR CHILLER									9	16.77000	199283.18000	8.38500
CHILL.DBL.BNDL. HERM.100T	CT	465.06117	24522.40128	227.63371	34309.66	37.37493	0.00000	18.68746	18	68.90000	41340.00000	17.22500
REPAIR CHILLER									9	16.77000	22596.02000	8.38500
CHILL.DBL.BNDL. HERM.300T	CT	485.65176	72106.62603	234.84398	82318.62	37.37493	0.00000	18.68746	18	107.90000	67840.00000	26.97500
REPAIR CHILLER									9	33.41000	95666.06000	16.70500
CHILL.DBL.BNDL. HERM.900T	CT	524.02999	150051.88990	248.84005	161056.28	37.37493	0.00000	18.68746	18	178.10000	139920.00000	44.52500
REPAIR CHILLER									9	65.78000	199760.18000	32.89000
CHILL. ONE STG. ABS. 100T	CT	1315.7930	15128.93480	653.08814	42650.47	110.85784	0.00000	55.42892	18	65.00000	37100.00000	16.25000
REPAIR CHILLER									9	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 300T	CT	225.90218	22342.97650	105.25769	27080.38	16.34361	0.00000	8.17181	18	104.00000	61480.00000	26.00000
REPAIR CHILLER									9	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 900T	CT	244.75101	37712.02280	109.96990	42831.68	16.34361	0.00000	8.17181	18	167.70000	113420.00000	41.92500
REPAIR CHILLER									9	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 300T	CT	228.97954	24224.90080	106.02703	29024.71	16.34361	0.00000	8.17181	18	114.40000	67840.00000	28.60000
REPAIR CHILLER									9	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 900T	CT	236.46368	41381.77460	104.57606	46322.73	15.60381	356.20279	7.80190	18	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 5T	CT	34.79622	669.01624	33.03173	1452.55	2.68305	30.07127	2.68305	13	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 20T	CT	39.33348	1366.30269	18.32236	2191.15	2.68305	36.11299	1.34153	13	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 50T	CT	63.86962	2544.53869	28.90997	3881.23	4.44243	42.15470	2.22121	13	31.20000	5294.70000	7.80000
AIR COOLED CONDENSER 100T	CT	69.91930	6062.67424	30.42239	7522.05	4.44243	168.20687	2.22121	13	46.80000	10578.80000	11.70000
COOLING TOWER 50T	CT	73.33157	2649.66271	32.12853	4180.97	4.73523	78.33634	2.36762	13	46.80000	4478.50000	11.70000
COOLING TOWER 100T	CT	183.72128	4818.04641	86.81924	8674.76	14.03478	78.33634	7.01739	13	52.00000	10070.00000	13.00000
COOLING TOWER 300T	CT	220.16511	8248.00925	102.52046	12864.89	16.29683	162.78306	8.14841	13	78.00000	16377.00000	19.50000
COOLING TOWER 900T	CT	255.93610	18627.47625	115.49058	23982.68	17.67919	162.78306	8.83960	13	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 20T	CT	116.87146	2030.18260	54.90675	4482.54	8.81749	51.45757	4.40875	13	36.40000	3688.80000	9.10000
EVAPORATIVE CONDENSER 100T	CT	201.61890	4863.92077	91.10475	9082.99	13.96994	83.33106	6.98497	13	100.10000	10038.20000	25.02500
EVAPORATIVE CONDENSER 300T	CT	114.75506	14044.02830	39.73263	16406.60	3.79071	146.90639	1.89536	13	182.00000	31800.00000	45.50000
EXPANSION TANK	CT	0.01078	0.00000	0.01078	0.24	0.00093	0.00000	0.00093	189	3.47100	135.68000	1.73550
REFRIG. FAN COIL 1T	CT	9.50528	371.73628	9.00414	585.77	0.72939	3.43279	0.72939	13	2.60000	855.42000	1.30000
REFRIG. FAN COIL 3T	CT	9.60911	478.18720	9.05455	694.35	0.72939	6.04172	0.72939	13	2.86000	1051.52000	1.43000
REFRIG. FAN COIL 5T	CT	9.76035	628.96584	9.13017	848.31	0.72939	12.70134	0.72939	13	3.25000	1240.20000	1.62500
DIST. PIPING SYSTEM												
PIPE/FITTINGS ST.& C.I.	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	113	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	56.80074	1808.99572	29.51361	3089.92	0.19105	0.93928	0.19105	22	241.80000	8321.00000	120.90000
GATE VALVE, 3/8" - 1 1/2"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	0.57200	94.05380	0.57200
DRAIN VALVE	CT	0.23242	0.21867	0.23242	5.49	0.01994	0.01876	0.01994	75	0.68900	17.91400	0.68900
PIPE INSULATION	TF	0.09346	0.54515	0.09346	2.66	0.00802	0.04678	0.00802	113	91.00000	901.00000	91.00000
CIRCULATOR PUMP, < 1 HP	CT	1.43464	3.62195	1.43464	36.16	0.12311	0.31080	0.12311	57	4.19900	371.00000	4.19900

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 1	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks			
		labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
5 TON CHILLER ACH RECIP	CT	1.43931	12.83084	1.43931	45.47	0.12351	1.10102	0.12351	57	15.60000	1272.00000	7.80000
HEAT/COOL GENERATION EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	95.84102	3117.90095	55.37529	5162.08	7.01286	67.96854	4.44895	13	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	98.36172	4089.43830	56.00547	6184.74	7.01286	83.01099	4.44895	13	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	115.35872	7718.07981	63.35360	10168.00	7.38987	151.17256	4.80912	13	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	131.34745	12602.89849	70.64591	15387.61	7.76688	172.80384	5.18613	13	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	91.80790	2260.09627	54.36701	4222.49	7.01286	52.84412	4.44895	13	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	94.37652	3117.90095	54.64304	5131.21	6.88719	67.96854	4.38612	13	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	96.89722	4090.39361	55.27322	6154.83	6.88719	83.09296	4.38612	13	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	113.89422	7695.15247	62.62135	10114.20	7.26420	149.20515	4.74629	13	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	129.88295	12602.89849	69.91366	15356.74	7.64121	172.80384	5.12329	13	105.30000	27305.60000	26.32500
3 DK.MULTI ZONE 6500 CFM	CT	94.32880	3117.88495	54.99719	5131.40	7.01286	67.96717	4.44895	13	32.50000	5997.48000	8.12500
3 DK.MULTI ZONE 10,000 CFM	CT	98.36172	4090.39361	56.00547	6185.70	7.01286	83.09296	4.44895	13	42.90000	8050.70000	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	115.35872	7442.23523	63.54985	9892.78	7.38987	127.50222	4.82596	13	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	131.34745	12378.64042	70.84216	15163.98	7.76688	153.56017	5.20297	13	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	95.38480	3340.69901	43.91135	5339.31	6.88719	67.96854	3.44360	13	39.00000	6572.00000	9.75000
D.D. VARI.VOL.10000 CFM	CT	98.40984	4421.30335	44.66756	6481.26	6.88719	83.09296	3.44360	13	46.80000	8904.00000	11.70000
D.D. VARI.VOL.25000 CFM	CT	116.91908	8309.75249	50.39329	10740.59	7.26420	148.68062	3.63210	13	83.20000	16960.00000	20.80000
D.D. VARI.VOL.50000 CFM	CT	133.91607	13477.57374	55.74092	16264.63	7.64121	168.84651	3.82061	13	115.70000	29680.00000	28.92500
D.D. VARI.VOL. 100,000CFM	CT	154.58581	22230.15535	60.61398	25435.45	7.64121	284.97856	3.79534	13	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CFM	CT	92.86410	3117.90095	82.82273	5191.93	6.88719	67.96854	6.83667	13	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000 CFM	CT	96.89722	4090.39361	55.27322	6154.83	6.88719	83.09296	4.38612	13	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	96.32020	7088.47179	45.24358	9089.57	5.75617	95.42944	3.25509	13	75.40000	15359.40000	18.85000
VARIABLE VOLUME 50000 CFM	CT	129.88295	12602.89849	70.10991	15357.37	7.64121	172.80384	5.14013	13	105.30000	27305.60000	26.32500
TERM. REHEAT 6500 CFM	CT	81.80546	802.41138	52.26460	2563.23	7.01976	68.85524	4.48485	63	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	81.80546	984.73269	52.26460	2745.55	7.01976	84.50030	4.48485	63	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	86.35021	1757.25129	56.80935	3621.14	7.40975	150.79042	4.87483	63	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	90.89496	2000.34636	61.35410	3967.31	7.79973	171.65051	5.26482	63	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	81.80546	802.41138	52.26460	2563.23	7.01976	68.85524	4.48485	63	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	81.80546	984.73269	52.26460	2745.55	7.01976	84.50030	4.48485	63	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	86.35021	1757.25129	56.80935	3621.14	7.40975	150.79042	4.87483	63	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	90.89496	2000.34636	61.35410	3967.31	7.79973	171.65051	5.26482	63	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	91.68661	2434.71227	53.67619	4392.53	6.78615	66.52286	4.33560	13	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	94.88056	3365.68073	54.76908	5389.22	6.88719	83.09296	4.38612	13	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	112.38180	7662.26703	62.43949	10051.27	7.26420	149.20515	4.76313	13	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	132.90779	10876.41289	70.86612	13692.23	7.64121	172.80384	5.14013	13	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	13.90178	348.01644	13.39764	661.70	1.10640	9.58093	1.10640	13	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	13.90178	380.90188	13.39764	694.58	1.10640	9.58093	1.10640	13	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	14.00261	403.51062	13.44806	719.32	1.10640	9.58093	1.10640	13	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	14.15385	592.60190	13.52368	911.59	1.10640	9.58093	1.10640	13	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	14.00261	369.39198	13.44806	685.20	1.10640	9.58093	1.10640	13	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	14.00261	703.59026	13.44806	1019.39	1.10640	9.58093	1.10640	13	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	14.10344	432.69645	13.49847	750.63	1.10640	9.58093	1.10640	13	3.12000	827.86000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	14.30510	640.69686	13.59930	962.88	1.10640	9.58093	1.10640	13	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	22.29630	674.51839	21.79216	1178.59	1.82673	4.96983	1.82673	13	2.60000	1590.00000	1.30000
UNIT VENT 1200 CFM	CT	22.54037	797.83879	21.91820	1307.22	1.82673	4.96983	1.82673	13	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	92.86410	2451.55972	54.26494	4434.20	6.88719	67.96854	4.38612	13	32.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	94.88066	3365.68073	54.76908	5389.22	6.88719	83.09296	4.38612	13	37.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	112.38180	7662.26703	62.43949	10051.27	7.26420	149.20515	4.76313	13	71.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	132.90779	10876.41289	70.86612	13692.23	7.64121	172.80384	5.14013	13	113.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	83.11555	206.71075	83.11555	2091.77	7.13218	17.73793	7.13218	63	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	89.33512	2054.56227	53.38269	3965.63	6.88719	52.84412	4.38612	13	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	22.29630	179.18145	21.79216	683.25	1.82673	4.96983	1.82673	13	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	22.54837	236.73097	21.91820	746.11	1.82673	4.96983	1.82673	13	3.25000	461.10000	1.62500
UNIT HEATER 4000 CFM	CT	22.54837	435.37772	21.91820	944.76	1.82673	9.77574	1.82673	13	3.25000	828.92000	1.62500
UNIT HEATER 8000 CFM	CT	22.54837	631.20679	21.91820	1140.59	1.82673	11.83541	1.82673	13	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50MBH	CT	15.65330	172.64856	15.14916	526.05	1.25669	0.00000	1.25669	13	2.60000	445.20000	1.30000

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
Zone: 1		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks			
	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
HEAT PUMP 5T	CT	56.54895	3498.04254	55.30839	4776.60	4.63958	224.13417	4.63958	18	8.38500	2994.50000	4.19250
HEAT PUMP 10T	CT	121.78651	6715.15736	118.96560	9468.25	10.08745	424.16183	10.08745	18	14.30000	5989.00000	4.76667
HEAT PUMP 25T	CT	152.85417	10171.91158	148.52663	21624.80	12.62135	1108.51643	12.62135	18	19.50000	17755.00000	4.87500
HEAT PUMP 1T	CT	52.59542	519.37100	51.77607	1709.61	4.37262	12.26970	4.37262	18	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	30.23964	18.18239	15.11982	655.63	2.54956	0.00000	1.27478	22	2.34000	80.56000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	51.50714	255.44747	51.50714	1423.63	4.41985	21.92005	4.41985	84	26.00000	2851.40000	6.50000
IND DRAFT FAN 10000 CFM	CT	51.50714	255.44747	51.50714	1423.63	4.41985	21.92005	4.41985	84	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	0.84988	0.00000	0.84988	19.28	0.07293	0.00000	0.07293	75	3.25000	41.58380	3.25000
EXHAUST FAN, 1000 CFM	CT	16.68555	87.71693	16.01371	464.00	1.31649	0.94596	1.31649	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	51.50714	255.44747	51.50714	1423.63	4.41985	21.92005	4.41985	75	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	51.50714	784.87099	25.75357	1870.64	4.41985	67.35009	2.20992	75	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	51.50714	784.87099	51.50714	1953.05	4.41985	67.35009	4.41985	75	32.50000	5406.00000	8.12500
EXHAUST FAN, 5000 CFM	CT	20.08760	494.82305	17.42605	941.89	1.32762	1.01221	1.29728	18	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM	CT	5.25777	240.04908	5.25777	359.30	0.36865	3.10410	0.36865	18	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	63	9.10000	124.02000	4.55000
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
ROOM HUMIDIFIER,FLOOR TYPE	CT	7.68242	1.31891	7.68242	175.56	0.65923	0.11318	0.65923	38	0.13000	84.80000	0.13000
CONTROLS/INSTRUMENT.												
DEVICES												
THERMOSTATS/PNEUMATICS	CT	15.01479	48.37966	15.01479	388.92	1.27113	0.00000	1.27113	20	0.78000	187.22780	0.78000
HUMIDITY SENSOR	CT	14.71246	84.20288	14.71246	417.68	0.00000	0.00000	0.00000	9	1.56000	200.53080	1.56000
FLOW SENSOR	CT	14.94750	38.73660	14.94750	377.81	1.25669	0.00000	1.25669	13	0.78000	100.04280	0.78000
RADIATION SENSOR	CT	14.99529	22.81833	14.99529	362.91	1.26695	0.00000	1.26695	18	0.78000	77.11500	0.78000
WIND VELOCITY SENSOR	CT	14.71246	38.23357	14.71246	371.91	0.00000	0.00000	0.00000	9	1.56000	91.05400	1.56000
PRESSURE SENSOR	CT	14.99529	17.25097	14.99529	357.34	1.26695	0.00000	1.26695	18	0.78000	58.30000	0.78000
DAMPER CONTROLLER/ELECT.	CT	15.65330	111.37887	15.65330	466.40	1.25669	0.00000	1.25669	13	2.60000	287.20700	2.60000
SIMPLEX AIR COMPR., 1 HP	CT	50.51182	1427.05666	33.64941	2518.71	4.26319	4.24094	2.85184	22	3.67900	6103.82960	1.83950

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 2	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.13209	33.38905	0.13209	36.38	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	2.26602	4.06868	1.13301	51.84	0.19445	0.34914	0.09722	141	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.26342	0.00000	0.26342	5.97	0.02260	0.00000	0.02260	26	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.26342	0.00000	0.26342	5.97	0.02260	0.00000	0.02260	26	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	56	2.60000	164.30000	1.30000
OIL FILTER	CT	1.21193	39.52765	1.21193	67.01	0.10400	3.39188	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.72663	160.23384	0.72663	176.71	0.03353	0.00000	0.03353	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	0.05104	0.02345	0.05104	1.18	0.00438	0.00201	0.00438	47	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	56	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITNGS,STEEL/IRON	TF	2.26602	4.06868	1.13301	51.84	0.19445	0.34914	0.09722	141	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	6.49221	6.15704	6.49221	153.40	0.55710	0.52834	0.55710	49	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	6.75682	32.21147	6.15817	183.54	0.47706	0.43518	0.47706	24	6.50000	147.34000	3.25000
STEAM REG. VALVE 2"	CT	5.98026	192.08212	2.99013	318.15	0.00000	0.00000	0.00000	10	7.80000	250.53100	3.90000
COND. METER,<300 #/HR.	CT	7.20265	0.00000	7.20265	163.36	0.61806	0.00000	0.61806	56	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	81	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	81	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	32	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	32	5.20000	262.35000	2.60000
SOLAR												
EQUIPMENT												
SOLAR PANEL, 3' X 8'	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	28	3.90000	349.80000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	38	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.37900	2.15384	0.31298	10.54	0.03252	0.18482	0.02686	25	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	445.09438	208.97322	445.09438	10303.71	38.19372	17.93207	38.19372	49	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	500.34149	403.79877	500.34149	11751.54	42.93450	34.65013	42.93450	49	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	514.96587	2385.60462	514.96587	14065.03	44.18942	204.70967	44.18942	49	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR	CT	1211.8368	0.00000	814.17140	26211.93	103.98820	0.00000	69.86437	49	20800.000	636000.00000	4160.0000
BOILER COAL 100,000 KBTU/H	CT	1458.7681	0.00000	937.63705	31417.24	125.17747	0.00000	80.45900	49	41600.000	1590000.00000	8320.0000
BOILER OIL 250 KBTU/HR	CT	504.66420	145.71826	504.66420	11591.50	43.30543	12.50414	43.30543	49	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	565.19064	145.71826	565.19064	12964.24	48.49923	12.50414	48.49923	49	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	622.75745	162.51776	622.75745	14286.66	53.43906	13.94571	53.43906	49	248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	514.70514	250.18058	514.70514	11923.69	44.16705	21.46809	44.16705	49	184.60000	18689.92000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	537.68429	4507.42247	537.68429	16702.10	46.13890	386.78369	46.13890	49	651.30000	71020.00000	162.82500
BOILR.PNEUMAT.COAL SPREAD.	CT	2362.4212	1950.05126	2324.1656	55407.35	198.68473	42.76447	198.42868	19	182.00000	5618.00000	45.50000
ASH HANDLING SYSTEM	CT	3765.0243	569.50641	3763.5014	85955.38	323.07822	48.86957	322.94754	32	10400.000	212000.00000	2600.0000
FUEL OIL EQUIPMENT	CT	7.89568	57.32480	3.94784	223.77	0.63643	0.14399	0.31822	24	2.60000	302.10000	1.30000
CHEMICAL FEED SYSTEM	CT	8.05350	71.65748	7.75418	253.35	0.63970	0.00000	0.63970	24	3.25000	389.02000	1.62500
FEED-WATER SUPPLY	CT	228.91362	507.65520	225.40154	5688.18	19.19111	0.00000	19.19111	24	28.60000	2756.00000	9.53333
DEAERATOR	CT	227.44319	0.00000	113.72160	4794.50	19.51699	0.00000	9.75849	32	260.00000	21200.00000	65.00000
BLOWOFF SYSTEM	CT	0.47892	27.14003	0.23946	37.24	0.00000	0.00000	0.00000	24	2.60000	147.34000	1.30000
HOUSE FURN.GAS 25KBTU/HR	CT	49.18939	164.41024	48.23155	1276.96	4.05658	8.49530	4.05658	24	10.40000	355.10000	5.20000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks			
Zone: 2	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
HOUSE FURN.GAS 100KBTU/HR	CT	51.12154	205.35253	49.20586	1358.66	4.05799	10.16556	4.05799	24	20.80000	471.70000	10.40000
HOUSE FURN.GAS 200KBTU/HR	CT	51.12154	473.30590	49.20586	1626.61	4.05799	12.38298	4.05799	24	20.80000	1786.10000	10.40000
HOUSE FURN.OIL 25KBTU/HR	CT	64.11556	296.81632	63.15772	1747.89	5.33740	12.05620	5.33740	24	10.40000	848.00000	5.20000
HOUSE FURN.OIL 100KBTU/HR	CT	66.03124	403.60234	64.11556	1895.06	5.33740	13.16051	5.33740	24	20.80000	1358.49600	10.40000
HOUSE FURN.OIL 200KBTU/HR	CT	66.03124	473.39812	64.11556	1964.86	5.33740	15.40673	5.33740	24	20.80000	1595.30000	10.40000
HOUSE FURN.ELECT 25KBTU/HR	CT	25.63844	177.82708	24.68060	756.24	2.03566	5.75952	2.03566	24	10.40000	601.02000	5.20000
HOUSE FURN.ELECT.100KBTU	CT	27.55412	235.03650	25.63844	853.03	2.03566	8.29372	2.03566	24	20.80000	751.27500	10.40000
HOUSE FURN.ELECT.200KBTU/H	CT	27.55412	299.89732	25.63844	918.69	2.03566	10.65512	2.03566	24	20.80000	954.00000	10.40000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	81	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	32	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	32	5.20000	262.35000	2.60000
EXPANSION TANK	CT	0.04074	0.00000	0.04074	0.92	0.00350	0.00000	0.00350	81	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	6.71795	6.15704	6.71795	158.52	0.57647	0.52834	0.57647	49	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	6.75682	32.21147	6.15817	103.54	0.47706	0.43518	0.47706	24	6.50000	147.34000	3.25000
STORAGE TANK, DHW	CT	9.76170	13.85950	9.76170	235.25	0.83766	1.18929	0.83766	94	3.59395	346.62000	1.79698
IND. FUR., GAS/OIL 500 KBU	CT	46.04269	226.52313	40.44298	1252.86	3.95096	19.43804	3.47043	56	65.00000	6784.00000	16.25000
IND.FURN.GAS/OIL 2000 KBTU	CT	79.51069	470.95239	79.51069	2274.25	6.82284	40.41261	6.82284	56	184.60000	13780.00000	46.15000
SURGE TANK, 1000 CAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	28	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.05987	0.03124	0.05987	1.39	0.00514	0.00268	0.00514	81	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.05844	0.02685	0.05844	1.35	0.00502	0.00230	0.00502	49	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	0.22645	1.12547	0.22645	6.26	0.01943	0.09658	0.01943	47	241.80000	8034.80000	120.90000
PIPE INSULATION	TF	0.26526	1.63050	0.26526	7.65	0.02276	0.13991	0.02276	56	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	0.47867	0.14095	0.47867	11.00	0.04107	0.01210	0.04107	32	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"	CT	0.11236	0.28190	0.11236	2.83	0.00964	0.02419	0.00964	32	0.57200	94.05380	0.57200
DRAIN VALVE	CT	0.74233	3.09603	0.74233	19.93	0.06370	0.26567	0.06370	32	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	0.26341	3.72541	0.13170	9.28	0.00000	0.00000	0.00000	24	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	5.98026	192.08212	2.99013	310.15	0.00000	0.00000	0.00000	10	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	8.78477	54.88585	0.78477	254 12	0.71851	2.65305	0.71851	16	1.30000	75.70520	1.30000
PIPE INSULATION	TF	0.35311	2.17047	0.35311	10.18	0.03030	0.18625	0.03030	49	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	2.54492	72.77604	2.54492	130.49	0.15201	0.38081	0.15201	24	4.19990	371.00000	4.19990
CIRCULATION PUMP 5 HP	CT	2.54492	267.39936	2.15820	323.88	0.15201	2.84006	0.15201	24	4.19990	1272.00000	2.09950
COND. RCVR., 10 - 15 GAL.	CT	19.97571	66.87391	19.97571	519.92	1.71412	5.73848	1.71412	32	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T	CT	54.21640	1796.96251	53.13305	3023.12	3.55916	0.00000	3.55916	19	8.38500	1855.00000	4.19250
REPAIR AIR CONDITIONER									10	20.80000	2592.23000	20.80000
A/C DX PACKAGE 20T	CT	121.02059	6638.40032	117.50463	9371.90	9.02502	0.00000	9.02502	19	20.41000	7950.00000	6.80333
REPAIR AIR CONDITIONER									10	20.80000	9018.53300	20.80000
A/C DX PACKAGE 50T	CT	159.02297	19331.87508	149.77677	22908.93	11.56728	0.00000	11.56728	19	47.71000	21200.00000	11.92750
REPAIR AIR CONDITIONER									10	23.40000	27255.15460	23.40000
A/C WINDOW 1T	CT	24.12432	407.90506	24.12432	955.04	0.09793	0.13335	0.09793	10	11.96000	1060.00000	11.96000
A/C WINDOW 2T	CT	24.52301	570.44546	24.52301	1126.63	0.09793	0.13335	0.09793	10	13.00000	1484.00000	13.00000
A/C PAD MTD. 4T	CT	59.90413	1145.55309	57.41236	2496.21	0.09793	0.66677	0.09793	10	13.00000	2968.00000	6.50000
A/C PAD MOUNTED 20 TON	CT	123.50640	6914.50925	123.50640	9715.63	9.22968	0.00000	9.22968	32	20.41000	7950.00000	6.80333
REPAIR AIR CONDITIONER									10	20.80000	9018.53300	20.80000
CHILLER-AIR COOL RECIP.20T	CT	273.76938	5382.51994	135.03713	11147.67	21.99055	0.00000	10.99527	19	28.60000	10759.00000	7.15000
REPAIR HERMETIC CHILLER									10	19.89000	5119.80000	9.94500
CHILLER AIR COOL REC.50T	CT	341.38711	10722.35050	166.00869	17903.80	28.40097	497.02053	14.02187	19	40.30000	19080.00000	10.07500
CHILLER AIR COOL REC.100T	CT	349.78511	25306.11670	167.05744	32654.55	27.32929	0.00000	13.66465	19	72.80000	40280.00000	18.20000
REPAIR HERMETIC CHILLER									10	24.57000	29309.00000	6.14250
CHILLER-AIR COOL RECIP. 5T	CT	151.90426	1976.99222	149.21690	5413.58	11.82151	0.00000	11.82151	19	15.60000	3710.00000	5.20000
REPAIR HERMETIC CHILLER									10	19.89000	2003.40000	19.89000
CHILLER AIR COOL REC. 10T	CT	217.84239	3615.42468	108.02541	8204.68	17.16025	0.00000	8.58013	19	20.80000	6360.00000	6.93333
REPAIR HERMETIC CHILLER									10	24.57000	3879.60000	12.28500
CHILLER AIR COOL REC. 15T	CT	279.11087	6745.86809	137.70788	12623.61	22.24477	0.00000	11.12239	19	28.60000	8268.00000	7.15000
REPAIR HERMETIC CHILLER									10	24.57000	9068.30000	12.28500
CHILLER WAT.COOL REC.20T	CT	272.31026	4894.03738	134.22359	10628.16	22.24477	0.00000	11.12239	19	29.90000	9540.00000	7.47500

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
Zone: 2	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
REPAIR HERMETIC CHILLER									10	10.53000	4778.48000	5.26500
CHILLER WAT.COOL REC.50T	CT	280.84572	9819.81800	135.78477	15725.20	22.24477	0.00000	11.12239	19	48.10000	15930.00000	12.02500
REPAIR HERMETIC CHILLER									10	18.07000	11236.00000	6.02333
CHILLER WAT.COOL REC.100T	CT	287.56412	21747.61720	136.69896	27786.80	22.24477	0.00000	11.12239	19	74.10000	27030.00000	18.52500
REPAIR HERMETIC CHILLER									10	18.07000	29044.00000	4.51750
CHILLER WAT. COOL REC. 10T	CT	240.33234	3093.67360	118.82249	8155.50	19.70251	0.00000	9.85126	19	20.80000	5300.00000	5.20000
REPAIR HERMETIC CHILLER									10	10.53000	3392.00000	5.26500
CHILLER WAT.COOL REC.200T	CT	287.56412	36109.19680	136.69896	42148.38	22.24477	0.00000	11.12239	19	74.10000	53000.00000	18.52500
REPAIR HERMETIC CHILLER									10	18.07000	44096.00000	4.51750
CHILL. HERMETIC CENT. 100T	CT	402.38597	21115.53507	197.16195	29584.93	32.41381	0.00000	16.20691	19	62.40000	37789.00000	15.60000
REPAIR CHILLER									10	16.77000	22331.02000	8.38500
CHILL. HERMETIC CENT. 300T	CT	411.19150	47798.80880	199.29725	58446.57	32.41381	0.00000	16.20691	19	97.50000	61771.50000	24.37500
REPAIR CHILLER									10	16.25000	66569.06000	8.12500
CHILL. HERMETIC CENT. 900T	CT	428.25181	134164.12039	203.62841	143158.08	32.41381	0.00000	16.20691	19	162.50000	127200.00000	40.62500
REPAIR CHILLER									10	1 .77000	199283.18000	8.38500
CHILL. OPEN CENT. 300T	CT	1024.6136	49798.80880	506.00830	71377.51	84.53014	0.00000	42.26507	19	9 .50000	61771.50000	24.37500
REPAIR CHILLER									10	28.21000	66569.06000	14.10500
CHILL. OPEN CENT. 900T	CT	428.25181	134164.12039	203.62841	143158.08	32.41381	0.00000	16.20691	19	162.50000	127200.00000	40.62500
REPAIR CHILLER									10	16.77000	199283.18000	8.38500
CHILL.DBL.BNDL. HERM.100T	CT	463.31033	22167.81297	227.20833	31920.32	37.49833	0.00000	18.74917	19	68.90000	41340.00000	17.22500
REPAIR CHILLER									10	16.77000	22596.02000	8.38500
CHILL.DBL.BNDL. HERM.300T	CT	481.85424	66156.91430	233.95678	76292.10	37.49833	0.00000	18.74917	19	107.90000	67840.00000	26.97500
REPAIR CHILLER									10	33.41000	95666.06000	16.70500
CHILL.DBL.BND.. HERM.900T	CT	516.44759	137693.42749	246.71854	148543.33	37.49833	0.00000	18.74917	19	178.10000	139920.00000	44.52500
REPAIR CHILLER									10	65.78000	199760.18000	32.89000
CHILL. ONE STG. ABS. 100T	CT	1317.3157	13465.98560	654.45886	41221.56	111.22307	0.00000	55.61194	19	65.00000	37100.00000	16.25000
REPAIR CHILLER									10	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 300T	CT	222.32561	19765.77760	104.44441	24430.90	16.39758	0.00000	8.19879	19	104.00000	61480.00000	26.00000
REPAIR CHILLER									10	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 900T	CT	238.78569	33187.07360	108.55943	38186.01	16.39758	0.00000	8.19879	19	167.70000	113420.00000	41.92500
REPAIR CHILLER									10	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 300T	CT	225.01297	21409.20160	105.11625	26128.83	16.39758	0.00000	8.19879	19	114.40000	67840.00000	28.60000
REPAIR CHILLER									10	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 900T	CT	229.82073	36391.75040	102.98521	41198.21	15.62780	332.88817	7.81390	19	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 5T	CT	34.21956	619.22550	32.57064	1390.05	2.65341	27.58923	2.65341	14	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 20T	CT	38.45964	1269.64150	17.97350	2076.35	2.65341	33.13228	1.32670	14	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 50T	CT	62.77786	2369.50598	28.56221	3683.82	4.41674	38.67532	2.20837	14	31.20000	5294.70000	7.80000
AIR COOLED CONDENSER 100T	CT	68.43130	5632.17962	29.97557	7061.14	4.41674	154.32334	2.20837	14	46.80000	10578.80000	11.70000
COOLING TOWER 50T	CT	71.93446	2460.55945	31.72715	3963.37	4.71735	71.87059	2.35868	14	46.80000	4478.50000	11.70000
COOLING TOWER 100T	CT	182.43644	4486.91905	86.50702	8317.60	14.03786	71.87059	7.01893	14	52.00000	10070.00000	13.00000
COOLING TOWER 300T	CT	218.27931	7675.45735	102.07285	12254.17	16.30501	149.34720	8.15251	14	78.00000	16377.00000	19.50000
COOLING TOWER 900T	CT	252.79883	17375.09335	114.73920	22666.78	17.69049	149.34720	8.84525	14	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 20T	CT	115.41312	1886.99160	54.40872	4309.35	8.77169	47.21034	4.38584	14	36.40000	3688.80000	9.10000
EVAPORATIVE CONDENSER 100T	CT	198.67796	4528.79687	90.26992	8687.91	13.93576	76.45304	6.96788	14	100.10000	10038.20000	25.02500
EVAPORATIVE CONDENSER 300T	CT	109.46640	13095.00349	38.24400	15349.79	3.73358	134.78097	1.86679	14	182.00000	31800.00000	45.50000
EXPANSION TANK	CT	0.04074	0.00000	0.04074	0.92	0.00350	0.00000	0.00350	81	3.47100	135.68000	1.73550
REFRIG. FAN COIL 1T	CT	9.36156	346.70671	8.89044	557.52	0.72247	3.14946	0.72247	14	2.60000	855.42000	1.30000
REFRIG. FAN COIL 3T	CT	9.45578	445.66725	8.93755	658.47	0.72247	5.54304	0.72247	14	2.86000	1051.52000	1.43000
REFRIG. FAN COIL 5T	CT	9.59712	585.24773	9.00822	801.03	0.72247	11.65299	0.72247	14	3.25000	1240.20000	1.62500
DIST. PIPING SYSTEM												
PIPE/FITTINGS ST.& C.I.	TF	0.10290	0.05370	0.10290	2.39	0.00883	0.00461	0.00883	49	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.05844	0.02685	0.05844	1.35	0.00502	0.00230	0.00502	32	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	60.74577	2021.07838	31.54842	3305.36	0.20175	0.99170	0.20175	21	241.80000	8321.00000	120.90000
GATE VALVE, 3/8" - 1 1/2"	CT	0.11195	0.14095	0.11195	2.68	0.00961	0.01203	0.00961	32	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.11236	0.28190	0.11236	2.83	0.00964	0.02419	0.00964	32	0.57200	94.05380	0.57200
DRAIN VALVE	CT	0.74233	3.09603	0.74233	19.93	0.06370	0.26567	0.06370	32	0.68900	17.91400	0.68900
PIPE INSULATION	TF	0.35311	2.05973	0.35311	10.07	0.03030	0.17675	0.03030	49	91.00000	901.00000	91.00000
CIRCULATOR PUMP, < 1 HP	CT	2.53038	72.77604	2.53038	130.17	0.15076	0.38081	0.15076	24	4.19900	371.00000	4.19900

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
Zone: 2	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
5 TON CHILLER ACH RECIP	CT	4.64499	267.39936	3.20823	368.15	0.15201	2.84006	0.15201	24	15.60000	1272.00000	7.80000
HEAT/COOL GENERATION												
EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	96.65971	3279.48046	55.51060	5340.05	6.99816	67.83537	4.43932	13	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	99.35721	4306.44214	56.18497	6421.71	6.99816	82.84149	4.43932	13	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	117.22760	8132.48290	63.73965	10620.04	7.37425	150.88315	4.79825	13	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	134.01900	13342.51055	71.22467	16181.12	7.75035	172.53780	5.17435	13	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	91.23192	2152.40071	54.26889	4103.26	7.02011	52.84416	4.45470	14	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	95.19874	3279.48046	54.78012	5309.25	6.87279	67.83537	4.37664	13	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	97.89524	4307.39514	55.45449	6391.87	6.87279	82.92327	4.37664	13	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	115.76664	8109.61091	63.00917	10566.37	7.24889	148.92050	4.73557	13	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	132.55804	13342.51055	70.49419	16150.32	7.62499	172.53780	5.11167	13	105.30000	27305.60000	26.32500
3 DK.MULTI ZONE 6500 CFM	CT	95.04121	3279.46416	55.10597	5307.21	6.99816	67.8339.	4.43932	13	32.50000	5997.48000	8.12500
3 DK.MULTI ZONE 10,000 CFM	CT	99.35721	4307.39514	56.18497	6422.67	6.99816	82.92327	4.43932	13	42.90000	8050.70000	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	117.22760	7857.30433	63.93975	10345.51	7.37425	127.26997	4.81542	13	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	134.01900	13118.79595	71.42477	15958.04	7.75035	153.3:059	5.19152	13	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	96.27774	3517.90626	44.09262	5534.49	6.87279	67.83537	3.43639	13	39.00000	6572.00000	9.75000
D.D. VARI.VOL.10000 CFM	CT	99.51476	4661.51464	44.90187	6743.75	6.87279	82.92327	3.43639	13	46.80000	8904.00000	11.70000
D.D. VARI.VOL.25000 CFM	CT	119.00364	8767.62738	50.86982	11248.60	7.24889	148.38568	3.62444	13	83.20000	16960.00000	20.80000
D.D. VARI.VOL.50000 CFM	CT	136.87404	14220.85523	56.43314	17127.76	7.62499	168.50289	3.81249	13	115.70000	29680.00000	28.92500
D.D. VARI.VOL. 100,000CFM	CT	150.39614	20992.62642	59.61560	24113.07	7.64987	285.06233	3.80176	14	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CFM	CT	93.58024	3279.48046	82.86433	5367.59	6.87279	67.83537	6.82128	13	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000 CFM	CT	97.89624	4307.39514	55.45449	6391.87	6.87279	82.92327	4.37664	13	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	98.23505	7484.44333	45.67767	9544.23	5.74449	95.27462	3.24935	13	75.40000	15359.40000	18.85000
VARIABLE VOLUME 50000 CFM	CT	132.55804	13342.51055	70.66429	16150.96	7.62499	172.53780	5.12384	13	105.30000	27305.60000	26.32500
TERM. REHEAT 6500 CFM	CT	82.23680	808.60301	52.48027	2578.32	7.05677	69.36931	4.50335	28	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	82.23680	990.72931	52.48027	2760.64	7.05677	85.01487	4.50335	28	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	86.78155	1771.90579	57.02502	3644.89	7.44676	152.04793	4.89334	28	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	91.32630	2029.65536	61.56977	4005.71	7.83675	174.16552	5.28333	28	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	82.23680	808.60301	52.48027	2578.32	7.05677	69.36981	4.50335	28	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	82.23680	990.72931	52.48027	2760.64	7.05677	85.01487	4.50335	28	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	86.78155	1771.90579	57.02502	3644.89	7.44676	152.04793	4.89334	28	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	91.32630	2029.65536	61.56977	4005.71	7.83675	174.16552	5.28333	28	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	91.03942	2327.76799	53.58374	4272.68	6.80145	66.67284	4.34537	14	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	94.00420	3209.45520	54.59501	5215.36	6.89415	83.16120	4.39172	14	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	110.65673	7274.82050	62.06070	9629.01	7.27201	149.25049	4.76958	14	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	130.13598	10293.68772	70.23307	13053.48	7.64987	172.61130	5.14744	14	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	13.76497	329.39479	13.29385	640.08	1.10032	9.31146	1.10032	14	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	13.76497	360.12631	13.29385	670.81	1.10032	9.31146	1.10032	14	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	13.85920	381.25423	13.34096	693.92	1.10032	9.31146	1.10032	14	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	14.00053	557.98047	13.41163	873.61	1.10032	9.31146	1.10032	14	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	13.85920	349.37028	13.34096	662.04	1.10032	9.31146	1.10032	14	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	13.85920	661.67935	13.34096	974.35	1.10032	9.31146	1.10032	14	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	13.95342	403.52845	13.38808	723.18	1.10032	9.31146	1.10032	14	3.12000	827.86000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	14.14187	602.90532	13.48230	921.53	1.10032	9.31146	1.10032	14	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	22.21170	630.87087	21.74058	1133.12	1.82514	4.68996	1.82514	14	2.60000	1590.00000	1.30000
UNIT VENT 1200 CFM	CT	22.44726	746.11407	21.85836	1253.33	1.82514	4.68996	1.82514	14	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	92.11972	2343.26538	54.12389	4310.95	6.89415	68.00268	4.39172	14	2.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	94.00420	3209.45520	54.59501	5215.36	6.89415	83.16120	4.39172	14	3.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	110.65673	7274.82050	62.06070	9629.01	7.27201	149.25049	4.76958	14	.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	130.13598	10293.68772	70.23307	13053.48	7.64987	172.61130	5.14744	14	3.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	83.14784	207.15968	83.14784	2092.95	7.13495	17.77645	7.13495	28	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	88.82188	1960.32871	53.29943	3861.14	6.89415	52.84416	4.39172	14	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	22.21170	167.97735	21.74058	670.23	1.82514	4.68996	1.82514	14	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	22.44726	221.75751	21.85836	728.98	1.82514	4.68996	1.82514	14	3.25000	461.10000	1.62500
UNIT HEATER 4000 CFM	CT	22.44726	406.43898	21.85836	913.66	1.82514	9.09919	1.82514	14	3.25000	828.92000	1.62500
UNIT HEATER 8000 CFM	CT	22.44726	589.03267	21.85836	1096.25	1.82514	10.98887	1.82514	14	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50MBH	CT	15.62028	161.34048	15.14916	514.10	1.25953	0.00000	1.25953	14	2.60000	445.20000	1.30000

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION Zone: 2	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
HEAT PUMP 5T	CT	55.53798	3214.78698	54.45463	4470.92	4.57981	209.46387	4.57981	19	8.38500	2994.50000	4.19250
HEAT PUMP 10T	CT	120.76334	6167.03385	118.29993	8898.06	10.04567	396.39907	10.04567	19	14.30000	5989.00000	4.76667
HEAT PUMP 25T	CT	151.73350	16660.56098	147.95440	20089.78	12.58793	1035.96047	12.58793	19	19.50000	17755.00000	4.87500
HEAT PUMP 1T	CT	52.63471	545.70140	51.75804	1736.65	4.36615	12.26970	4.36615	17	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	30.23553	19.45524	15.11777	656.82	2.54603	0.00000	1.27302	21	2.34000	80.56000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	51.50714	255.44747	51.50714	1423.63	4.41985	21.92005	4.41985	38	26.00000	2851.40000	6.50000
IND DRAFT FAN 10000 CFM	CT	51.93848	261.44409	51.72281	1438.72	4.45686	22.43462	4.43836	38	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	2.26146	4.15496	2.26146	55.44	0.19406	0.35654	0.19406	32	3.25000	41.58380	3.25000
EXHAUST FAN, 1000 CFM	CT	16.68555	87.71693	16.01371	464.00	1.31649	0.94596	1.31649	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	52.00104	262.31376	51.75409	1440.91	4.46223	22.50925	4.44104	32	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	52.00104	801.65079	26.00052	1897.83	4.46223	68.78997	2.23111	32	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	52.00104	818.43059	51.75409	1997.02	4.46223	70.22985	4.44104	32	32.50000	5406.00000	8.12500
EXHAUST FAN, 5000 CFM	CT	20.38361	528.61373	17.56060	981.88	1.32531	1.01221	1.29497	17	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM	CT	5.10845	211.84227	5.10845	327.70	0.36629	2.90079	0.36629	19	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	28	9.10000	124.02000	4.55000
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
ROOM HUMIDIFIER,FLOOR TYPE	CT	7.62207	29.44208	7.62207	202.31	0.65052	0.22263	0.65052	16	0.13000	84.80000	0.13000
CONTROLS/INSTRUMENT.												
DEVICES												
THERMOSTATS/PNEUMATICS	CT	15.01479	48.37966	15.01479	388.92	1.27113	0.00000	1.27113	20	0.78000	187.22780	0.78000
HUMIDITY SENSOR	CT	14.75048	76.87348	14.75048	411.41	0.00000	0.00000	0.00000	10	1.56000	200.53080	1.56000
FLOW SENSOR	CT	14.96071	36.25551	14.96071	375.56	1.25953	0.00000	1.25953	14	0.78000	100.04280	0.78000
RADIATION SENSOR	CT	14.98453	24.41461	14.98453	364.26	1.26464	0.00000	1.26464	17	0.78000	77.11500	0.78000
WIND VELOCITY SENSOR	CT	14.70170	39.17598	14.70170	372.61	0.00000	0.00000	0.00000	8	1.56000	91.05400	1.56000
PRESSURE SENSOR	CT	14.98453	18.45778	14.98453	358.31	1.26464	0.00000	1.26464	17	0.78000	58.30000	0.78000
DAMPER CONTROLLER/ELECT.	CT	15.68866	119.19091	15.68866	475.01	1.25366	0.00000	1.25366	13	2.60000	287.20700	2.60000
SIMPLEX AIR COMPR.,1 HP	CT	54.14372	1527.05044	35.45376	2695.22	4.56985	4.54585	3.00418	21	3.67900	6103.82980	1.83950

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION Zone: 3	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
		labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.13209	33.38905	0.13209	36.38	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	3.63916	6.53420	1.81958	83.25	0.31228	0.56070	0.15614	99	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.30339	5.27562	0.30339	12.16	0.01987	0.00000	0.01987	18	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.40404	89.39245	0.31777	98.28	0.01987	0.00000	0.01987	18	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	40	2.60000	164.30000	1.30000
OIL FILTER	CT	1.21193	39.52765	1.21193	67.01	0.10400	3.39188	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.72663	160.23384	0.72663	176.71	0.03353	0.00000	0.03353	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	0.07159	0.03289	0.07159	1.66	0.00614	0.00282	0.00614	33	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	40	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITNGS,STEEL/IRON	TF	3.63916	6.53420	1.81958	83.25	0.31228	0.56070	0.15614	99	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	9.93352	9.46921	9.93352	234.74	0.85240	0.81084	0.85240	36	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	10.13355	51.30320	9.17187	278.05	0.70452	0.66119	0.70452	18	6.50000	147.34000	3.25000
STEAM REG. VALVE 2"	CT	9.12678	293.14632	4.56339	485.54	0.00000	0.00000	0.00000	7	7.80000	250.53100	3.90000
COND. METER,<300 #/HR.	CT	7.70653	162.01422	7.70653	336.80	0.66130	13.90250	0.66130	40	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	60	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	60	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	1.02492	45.75479	0.51246	67.36	0.00000	0.00000	0.00000	24	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	1.02492	51.70919	0.51246	73.31	0.00000	0.00000	0.00000	24	5.20000	262.35000	2.60000
SOLAR												
EQUIPMENT												
SOLAR PANEL, 3' X 8'	CT	1.00776	90.38832	0.50388	111.63	0.00000	0.00000	0.00000	20	3.90000	349.80000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	26	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.36443	2.01396	0.30273	10.08	0.03127	0.17282	0.02598	27	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	446.35059	274.57849	446.35059	10397.81	38.30152	23.56169	38.30152	36	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	501.59771	530.56778	501.59771	11906.80	43.04230	45.52823	43.04230	36	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	516.22208	3134.54387	516.22208	14842.46	44.29722	268.97644	44.29722	36	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR REPAIR BOILER	CT	1418.8706	29249.64000	865.92986	59660.22	103.98820	0.00000	69.06437	36	20800.000	636000.00000	4160.0000
									24	1050.4000	148400.00000	262.60000
BOILER COAL 100,000 KBTU/H REPAIR BOILER	CT	1717.7141	54550.57860	1002.3735	91219.25	125.17747	0.00000	80.45900	36	41600.000	1590000.00000	8320.0000
									24	1313.7800	276766.00000	328.44500
BOILER OIL 250 KBTU/HR	CT	508.08538	191.46521	508.08538	11714.84	43.59901	16.42970	43.59901	36	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	566.68741	191.46521	566.68741	13043.94	48.62767	16.42970	48.62767	36	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	624.25422	213.53875	624.25422	14371.62	53.56750	18.32384	53.56750	36	248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	516.52264	328.72253	516.52264	12043.46	44.32301	28.20781	44.32301	36	184.60000	18689.92000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	539.58198	5922.48745	539.58198	18160.21	46.30174	508.21098	46.30174	36	651.30000	71020.00000	162.82500
BOILR.PNEUMAT.COAL SPREAD.	CT	2362.3258	2734.86360	2308.6735	56140.73	197.05233	59.97292	196.69324	14	182.00000	5618.00000	45.50000
ASH HANDLING SYSTEM	CT	5752.3398	42583.87608	4212.8242	160120.49	317.71297	68.53471	317.52971	24	10400.000	212000.00000	2600.0000
FUEL OIL EQUIPMENT	CT	8.71265	91.74459	4.35633	275.41	0.68162	0.20193	0.34081	18	2.60000	302.10000	1.30000
CHEMICAL FEED SYSTEM	CT	8.34392	115.11102	7.86308	302.81	0.63347	0.00000	0.63347	18	3.25000	389.02000	1.62500
FEED-WATER SUPPLY	CT	229.93009	815.50040	224.28826	6012.26	19.00420	0.00000	19.00420	18	28.60000	2756.00000	9.53333
DEAERATOR	CT	274.92855	4178.52000	124.65278	9933.02	19.19429	0.00000	9.59714	24	260.00000	21200.00000	65.00000

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION Zone: 3	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks			
		labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
BLOWOFF SYSTEM	CT	0.76934	43.59791	0.38467	59.82	0.00000	0.00000	0.00000	18	2.60000	147.34000	1.30000
HOUSE FURN.GAS 25KBTU/HR	CT	50.32491	243.91289	48.78623	1380.36	4.05433	11.91381	4.05433	18	10.40000	355.10000	5.20000
HOUSE FURN.GAS 100KBTU/HR	CT	53.42536	305.71195	50.34800	1507.55	4.05631	14.25619	4.05631	18	20.80000	471.70000	10.40000
HOUSE FURN.GAS 200KBTU/HR	CT	53.42536	730.88219	50.34800	1932.72	4.05631	17.36590	4.05631	18	20.80000	1786.10000	10.40000
HOUSE FURN.OIL 25KBTU/HR	CT	65.11249	448.12136	63.57381	1919.95	5.32326	16.92165	5.32326	18	10.40000	848.00000	5.20000
HOUSE FURN.OIL 100KBTU/HR	CT	68.18985	617.06145	65.11249	2153.76	5.32326	18.45631	5.32326	18	20.80000	1358.49600	10.40000
HOUSE FURN.OIL 200KBTU/HR	CT	68.18985	723.84167	65.11249	2260.54	5.32326	21.60640	5.32326	18	20.80000	1595.30000	10.40000
HOUSE FURN.ELECT 25KBTU/HR	CT	27.12886	271.96982	25.59018	882.33	2.06387	8.07716	2.06387	18	10.40000	601.02000	5.20000
HOUSE FURN.ELECT.100KBTU	CT	30.20622	357.84659	27.12886	1033.08	2.06387	11.63111	2.06387	18	20.80000	751.27500	10.40000
HOUSE FURN.ELECT.200KBTU/H	CT	30.20622	456.42540	27.12886	1131.65	2.06387	14.94275	2.06387	18	20.80000	954.00000	10.40000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	60	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	1.02492	45.75479	0.51246	67.36	0.00000	0.00000	0.00000	24	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	1.02492	51.70919	0.51246	73.31	0.00000	0.00000	0.00000	24	5.20000	262.35000	2.60000
EXPANSION TANK	CT	0.06253	0.00000	0.06253	1.42	0.00537	0.00000	0.00537	60	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	10.03659	9.44921	10.03659	237.08	0.86124	0.81084	0.86124	36	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	10.13355	51.30320	9.17187	278.05	0.70452	0.66119	0.70452	18	6.50000	147.34000	3.25000
STORAGE TANK, DHW	CT	14.80306	21.01715	14.80306	356.75	1.27026	1.80349	1.27026	66	3.59395	346.62000	1.79698
IND. FUR., GAS/OIL 500 MBU	CT	49.39754	458.42020	42.12031	1555.47	4.23882	39.33722	3.61436	40	65.00000	6784.00000	16.25000
IND.FURN.GAS/OIL 2000 MBTU	CT	82.14280	953.07744	82.14280	2816.08	7.04871	81.78395	7.04871	40	184.60000	13780.00000	46.15000
SURGE TANK, 1000 GAL	CT	1.34368	406.74744	0.67184	435.07	0.00000	0.00000	0.00000	20	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.09617	0.05018	0.09617	2.23	0.00825	0.00431	0.00825	60	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.11835	0.05437	0.11835	2.74	0.01016	0.00467	0.01016	36	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	0.31761	1.57850	0.31761	8.78	0.02725	0.13545	0.02725	33	241.80000	8034.80000	120.90000
PIPE INSULATION	TF	0.42889	2.63627	0.42889	12.36	0.03680	0.22622	0.03680	40	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	0.72253	3.72852	0.72253	20.12	0.05760	0.01696	0.05760	24	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"	CT	0.27032	18.93334	0.27032	25.06	0.01352	0.03392	0.01352	24	0.57200	94.05380	0.57200
DRAIN VALVE	CT	1.13142	8.89710	1.13142	34.56	0.08543	0.46048	0.08543	24	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	0.42314	5.98452	0.21157	14.90	0.00000	0.00000	0.00000	18	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	9.12678	293.14632	4.56339	485.54	0.00000	0.00000	0.00000	7	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	9.45010	93.43977	9.45010	307.77	0.73940	3.85333	0.73940	12	1.30000	75.70520	1.30000
PIPE INSULATION	TF	0.54192	3.33102	0.54192	15.62	0.04650	0.28584	0.04650	36	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	3.27132	114.84915	3.27132	189.04	0.17410	0.43508	0.17410	18	4.19900	371.00000	4.19900
CIRCULATION PUMP 5 HP	CT	3.27132	424.99827	2.65008	497.20	0.17410	4.17154	0.17410	18	4.19900	1272.00000	2.09950
COND. RCVR., 10 - 15 GAL.	CT	24.37661	464.85444	22.83923	1012.80	1.82792	7.61890	1.82792	24	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T	CT	49.46261	877.98830	49.46261	1999.80	3.63988	0.00000	3.63988	30	8.38500	1855.00000	4.19250
REPAIR AIR CONDITIONER									15	20.80000	2592.23000	20.80000
A/C DX PACKAGE 20T	CT	114.60400	3054.57713	114.60400	5653.80	9.22968	0.00000	9.22968	30	20.41000	7950.00000	6.80333
REPAIR AIR CONDITIONER									15	20.80000	9018.53300	20.80000
A/C DX PACKAGE 50T	CT	145.78294	9231.32086	145.78294	12537.68	11.82959	0.00000	11.82959	30	47.71000	21200.00000	11.92750
REPAIR AIR CONDITIONER									15	23.40000	27255.15460	23.40000
A/C WINDOW 1T	CT	21.68643	180.24563	21.68643	672.09	1.68712	0.06304	1.68712	15	5.98000	530.00000	5.98000
A/C WINDOW 2T	CT	21.86256	252.05003	21.86256	747.89	1.68712	0.06304	1.68712	15	6.50000	742.00000	6.50000
A/C PAD MTD. 4T	CT	58.63468	506.30397	57.53391	1832.62	4.84255	0.31520	4.84255	15	6.50000	1484.00000	3.25000
A/C PAD MOUNTED 20 TON	CT	116.80757	4621.52213	114.12570	7262.14	9.07357	0.00000	9.07357	24	20.41000	7950.00000	6.80333
REPAIR AIR CONDITIONER									15	20.80000	9018.53300	20.80000
CHILLER-AIR COOL RECIP.20T	CT	268.81721	1734.07626	134.40861	7400.74	22.48923	0.00000	11.24461	30	28.60000	10759.00000	7.15000
REPAIR HERMETIC CHILLER									15	19.89000	5119.80000	9.94500
CHILLER AIR COOL REC.50T	CT	334.02880	3859.48650	165.62742	10896.38	28.66314	331.18405	14.21255	30	40.30000	19080.00000	10.07500
CHILLER AIR COOL REC.100T	CT	334.02880	9926.95830	164.93393	16961.63	27.94904	0.00000	13.97452	30	72.80000	40280.00000	18.20000
REPAIR HERMETIC CHILLER									15	24.57000	29309.00000	6.14250
CHILLER-AIR COOL RECIP. 5T	CT	147.62393	678.55158	147.62393	4026.66	12.08959	0.00000	12.08959	30	15.60000	3710.00000	5.20000
REPAIR HERMETIC CHILLER									15	19.89000	2003.40000	19.89000
CHILLER AIR COOL REC. 10T	CT	212.83552	1314.02052	106.41776	5800.59	17.54940	0.00000	8.77470	30	20.80000	6360.00000	6.93333
REPAIR HERMETIC CHILLER									15	24.57000	3879.60000	12.28500
CHILLER AIR COOL REC. 15T	CT	273.43216	3071.43321	136.71608	8835.38	22.74922	0.00000	11.37461	30	28.60000	8268.00000	7.15000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 3	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
REPAIR HERMETIC CHILLER									15	24.57000	9068.30000	12.28500
CHILLER MAT.COOL REC.20T	CT	268.67681	1618.47118	134.33841	7282.18	22.74922	0.00000	11.37461	30	29.90000	9540.00000	7.47500
REPAIR HERMETIC CHILLER									15	10.53000	4778.48000	5.26500
CHILLER MAT.COOL REC.50T	CT	271.23061	3805.63320	134.59525	9519.91	22.74922	0.00000	11.37461	30	48.10000	15900.00000	12.02500
REPAIR HERMETIC CHILLER									15	18.07000	11236.00000	6.02333
CHILLER MAT.COOL REC.100T	CT	271.23061	9837.20280	134.08523	15549.85	22.74922	0.00000	11.37461	30	74.10000	27030.00000	18.52500
REPAIR HERMETIC CHILLER									15	18.07000	29044.00000	4.51750
CHILLER MAT. COOL REC. 10T	CT	238.37849	1148.87040	119.18925	6173.89	20.14931	0.00000	10.07465	30	20.80000	5300.00000	5.20000
REPAIR HERMETIC CHILLER									15	10.53000	3392.00000	5.26500
CHILLER MAT.COOL REC.200T	CT	271.23061	14935.31520	134.08523	20647.96	22.74922	0.00000	11.37461	30	74.10000	53000.00000	18.52500
REPAIR HERMETIC CHILLER									15	18.07000	44096.00000	4.51750
CHILL. HERMETIC CENT. 100T	CT	391.98358	7563.51647	195.99179	15826.53	33.14886	0.00000	16.57443	30	62.40000	37789.00000	15.60000
REPAIR CHILLER									15	16.77000	22331.02000	8.38500
CHILL. HERMETIC CENT. 300T	CT	391.80746	22546.94062	195.90373	30306.24	33.14886	0.00000	16.57443	30	97.50000	61771.50000	24.37500
REPAIR CHILLER									15	16.25000	66569.06000	8.12500
CHILL. HERMETIC CENT. 900T	CT	391.98358	67497.21307	195.99179	75760.23	33.14886	0.00000	16.57443	30	162.50000	127200.00000	40.62500
REPAIR CHILLER									15	16.77000	199283.18000	8.38500
CHILL. OPEN CENT. 300T	CT	1016.9738	22546.94062	508.48693	43984.75	86.44703	0.00000	43.22352	30	97.50000	61771.50000	24.37500
REPAIR CHILLER									15	28.21000	66569.06000	14.10500
CHILL. OPEN CENT. 900T	CT	391.98358	67497.21307	195.99179	75760.23	33.14886	0.00000	16.57443	30	162.50000	127200.00000	40.62500
REPAIR CHILLER									15	16.77000	199283.18000	8.38500
CHILL.DBL.BNDL. HERM.100T	CT	452.58022	7653.27197	226.29011	17193.66	38.34868	0.00000	19.17434	30	68.90000	41340.00000	17.22500
REPAIR CHILLER									15	16.77000	22596.02000	8.38500
CHILL.DBL.BNDL. HERM.300T	CT	458.21619	32402.09452	229.10809	42061.29	38.34868	0.00000	19.17434	30	107.90000	67840.00000	26.97500
REPAIR CHILLER									15	33.41000	95666.06000	16.70500
CHILL.DBL.BNDL. HERM.900T	CT	469.17991	67658.77297	234.58995	77549.09	38.34868	0.00000	19.17434	30	178.10000	139920.00000	44.52500
REPAIR CHILLER									15	65.78000	199760.18000	32.89000
CHILL. ONE STG. ABS. 100T	CT	1328.4575	7584.95840	664.22877	30588.84	113.74610	0.00000	56.87305	30	65.00000	37100.00000	16.25000
REPAIR CHILLER									15	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 300T	CT	198.33021	2584.95840	99.16511	6765.76	16.76942	0.00000	8.38471	30	104.00000	61480.00000	26.00000
REPAIR CHILLER									15	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 900T	CT	198.33021	2584.95840	99.16511	6765.76	16.76942	0.00000	8.38471	30	167.70000	113420.00000	41.92500
REPAIR CHILLER									15	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 300T	CT	198.33021	2584.95840	99.16511	6765.76	16.76942	0.00000	8.38471	30	114.40000	67840.00000	28.60000
REPAIR CHILLER									15	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 900T	CT	184.69597	2584.95840	92.34798	6478.35	15.84883	221.81630	7.92442	30	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 5T	CT	30.89572	330.50599	29.93613	1028.15	2.48649	13.49382	2.48649	23	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 20T	CT	33.36325	703.01977	15.95051	1403.98	2.48649	16.20491	1.24324	23	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 50T	CT	56.38160	1337.09174	26.54578	2520.35	4.27349	18.91600	2.13674	23	31.20000	5294.70000	7.80000
AIR COOLED CONDENSER 100T	CT	59.67164	3110.67282	27.36829	4360.65	4.27349	75.47916	2.13674	23	46.80000	10578.80000	11.70000
COOLING TOWER 50T	CT	63.69383	1354.15975	29.37938	2688.93	4.61863	35.15172	2.30932	23	46.80000	4478.50000	11.70000
COOLING TOWER 100T	CT	174.86543	2533.40710	84.69102	6210.80	14.06421	35.15172	7.03210	23	52.00000	10070.00000	13.00000
COOLING TOWER 300T	CT	207.12381	4305.15046	99.44936	8658.16	16.36178	73.04534	8.18089	23	78.00000	16377.00000	19.50000
COOLING TOWER 900T	CT	234.17893	9949.88896	110.30376	14864.67	17.76585	73.04534	8.88292	23	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 20T	CT	106.92755	1047.05491	51.54458	3294.95	8.51075	23.09046	4.25837	23	36.40000	3688.80000	9.10000
EVAPORATIVE CONDENSER 100T	CT	181.34934	2552.81933	85.39690	6358.77	13.75011	37.39299	6.87505	23	100.10000	10038.20000	25.02500
EVAPORATIVE CONDENSER 300T	CT	78.13463	7474.83732	29.47136	9091.21	3.41103	65.92103	1.70552	23	182.00000	31800.00000	45.50000
EXPANSION TANK	CT	0.06253	0.00000	0.06253	1.42	0.00537	0.00000	0.00537	60	3.47100	135.68000	1.73550
REFRIG. FAN COIL 1T	CT	8.51421	198.35918	8.24004	390.58	0.68355	1.54039	0.68355	23	2.60000	855.42000	1.30000
REFRIG. FAN COIL 3T	CT	8.56904	253.35950	8.26745	446.74	0.68355	2.71109	0.68355	23	2.86000	1051.52000	1.43000
REFRIG. FAN COIL 5T	CT	8.65129	327.97725	8.30858	523.09	0.68355	5.69945	0.68355	23	3.25000	1240.20000	1.62500
DIST. PIPING SYSTEM												
PIPE/FITTINGS ST.& C.I.	TF	0.20836	0.10873	0.20836	4.83	0.01788	0.00933	0.01788	36	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	1.17606	10.09117	0.62901	35.01	0.00703	0.00323	0.00703	24	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	53.22210	1765.84492	27.72429	2891.33	0.19105	0.93928	0.19105	22	241.60000	8321.00000	120.90000
GATE VALVE, 3/8" - 1 1/2"	CT	0.29280	3.72852	0.29280	10.37	0.01347	0.01696	0.01347	24	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.27032	18.93334	0.27032	25.06	0.01352	0.03392	0.01352	24	0.57200	94.05380	0.57200
DRAIN VALVE	CT	1.13142	8.89710	1.13142	34.56	0.08543	0.46048	0.08543	24	0.68900	17.91400	0.68900

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 3	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources			Washington	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair			Replacement and High Costs Tasks			
		labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
PIPE INSULATION	TF	0.54192	3.16107	0.54192	15.45	0.04650	0.27125	0.04650	36	91.00000	901.00000	91.00000
CIRCULATOR PUMP, < 1 HP	CT	3.24923	114.84915	3.24923	188.54	0.17220	0.43508	0.17220	18	4.19900	371.00000	4.19900
5 TON CHILLER ACH RECIP	CT	6.64488	424.99827	4.33686	568.32	0.17410	4.17154	0.17410	18	15.60000	1272.00000	7.80000
HEAT/COOL GENERATION EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	95.84102	3117.90095	55.37529	5162.08	7.01286	67.96854	4.44895	13	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	98.36172	4089.43830	56.00547	6184.74	7.01286	83.01099	4.44895	13	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	115.35872	7718.07981	63.35360	10168.00	7.38987	151.17256	4.80912	13	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	131.34745	12602.89849	70.64591	15387.61	7.76688	172.80384	5.18613	13	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	87.82422	1510.42926	53.69750	3393.08	7.06570	52.87750	4.49017	23	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	94.37652	3117.90095	54.64304	5131.21	6.88719	67.96854	4.38612	13	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	96.89722	4090.39361	55.27322	6154.83	6.88719	83.09296	4.38612	13	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	113.89422	7695.15247	62.62135	10114.20	7.26420	149.20515	4.74629	13	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	129.88295	12602.89849	69.91366	15356.74	7.64121	172.80384	5.12329	13	105.30000	27305.60000	26.32500
3 DK.MULTI ZONE 6500 CFM	CT	94.32860	3117.88495	54.99719	5131.40	7.01286	67.96717	4.44895	13	32.50000	5997.48000	8.12500
3 DK.MULTI ZONE 10,000 CFM	CT	98.36172	4090.39361	56.00547	6185.70	7.01286	83.09296	4.44895	13	42.90000	8050.70000	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	115.35872	7442.23523	63.54985	9892.78	7.38987	127.50222	4.82596	13	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	131.34745	12378.64042	70.84216	15163.98	7.76688	153.56017	5.20297	13	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	95.38480	3340.69981	43.91135	5339.31	6.88719	67.96854	3.44360	13	39.00000	6572.00000	9.75000
D.D. VARI.VOL.10000 CFM	CT	98.40954	4421.30335	44.66756	6481.26	6.88719	83.09296	3.44360	13	46.80000	8904.00000	11.70000
D.D. VARI.VOL.25000 CFM	CT	116.91906	8309.75248	50.39329	10748.59	7.26420	148.68062	3.63210	13	83.20000	16960.00000	20.80000
D.D. VARI.VOL.50000 CFM	CT	133.91607	13477.57374	55.74092	16264.63	7.64121	168.84651	3.82061	13	115.70000	29680.00000	28.92500
D.D. VARI.VOL. 100,000CFM	CT	125.42041	13613.11282	53.66759	16228.04	7.70391	285.71676	3.84062	23	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CFM	CT	92.86410	3117.90095	82.82273	5191.93	6.88719	67.96854	6.83667	13	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000 CFM	CT	96.89722	4090.39361	55.27322	6154.83	6.88719	83.09296	4.38612	13	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	96.32020	7068.47179	45.24358	9089.57	5.75617	95.42944	3.25509	13	75.40000	15359.40000	18.85000
VARIABLE VOLUME 50000 CFM	CT	129.88295	12602.89849	70.10991	15357.37	7.64121	172.80384	5.14013	13	105.30000	27305.60000	26.32500
TERM. REHEAT 6500 CFM	CT	88.99446	1898.77948	53.50766	3803.62	6.91601	68.05013	4.41135	20	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	90.33814	2568.71564	53.84358	4500.80	6.91601	83.34828	4.41135	20	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	103.51604	5685.79574	60.47103	7895.80	7.29735	149.21047	4.79269	20	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	118.70945	7902.46739	67.60237	10431.26	7.67869	171.37169	5.17403	20	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	88.99446	1898.77948	53.50766	3803.62	6.91601	68.05013	4.41135	20	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	90.33814	2568.71564	53.84358	4500.80	6.91601	83.34828	4.41135	20	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	103.51604	5685.79574	60.47103	7895.80	7.29735	149.21047	4.79269	20	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	118.70945	7902.46739	67.60237	10431.26	7.67869	171.37169	5.17403	20	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	87.87184	1699.52096	53.37860	3582.08	6.95215	68.39375	4.43340	23	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	88.80425	2278.02348	53.57063	4179.36	6.93806	83.60134	4.42635	23	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	100.39517	4964.81273	59.81524	7111.92	7.32098	149.60180	4.80928	23	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	113.63110	6819.87047	66.47109	9246.11	7.70391	171.62475	5.19221	23	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	12.97670	219.26768	12.70253	512.70	1.06648	7.78507	1.06648	23	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	12.97670	237.15200	12.70253	530.59	1.06648	7.78507	1.06648	23	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	13.03154	249.44747	12.72995	544.04	1.06648	7.78507	1.06648	23	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	13.11379	352.28231	12.77108	648.61	1.06648	7.78507	1.06648	23	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	13.03154	230.89249	12.72995	525.48	1.06648	7.78507	1.06648	23	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	13.03154	412.64189	12.72995	707.23	1.06648	7.78507	1.06648	23	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	13.08637	265.31980	12.75737	561.07	1.06648	7.78507	1.06648	23	3.12000	827.86000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	13.19604	378.43813	12.81220	676.50	1.06648	7.78507	1.06648	23	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	21.72557	371.47536	21.45140	863.33	1.81723	3.10156	1.81723	23	2.60000	1590.00000	1.30000
UNIT VENT 1200 CFM	CT	21.86266	438.54156	21.51995	933.29	1.81723	3.10156	1.81723	23	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	87.70757	1697.72240	53.29646	3576.81	6.93806	68.23942	4.42635	23	32.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	88.80425	2278.02348	53.57063	4179.36	6.93806	83.60134	4.42635	23	37.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	100.39517	4964.81273	59.81524	7111.92	7.32098	149.60180	4.80928	23	71.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	113.63110	6819.87047	66.47109	9246.11	7.70391	171.62475	5.19221	23	113.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	83.31710	531.21577	82.30934	2417.62	6.97652	17.37926	6.97652	20	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	85.78838	1398.65226	52.81667	3238.82	6.93806	52.87750	4.42635	23	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	21.72557	102.09279	21.45140	593.95	1.81723	3.10156	1.81723	23	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	21.86266	133.39035	21.51995	628.14	1.81723	3.10156	1.81723	23	3.25000	461.10000	1.62500
UNIT HEATER 4000 CFM	CT	21.86266	236.09513	21.51995	730.84	1.81723	5.25811	1.81723	23	3.25000	828.92000	1.62500

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE) PAGE 30

COMPONENT DESCRIPTION Zone: 3	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
UNIT HEATER 8000 CFM	CT	21.86266	340.31136	21.51995	835.06	1.81723	6.18234	1.81723	23	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50MBH	CT	15.42333	93.69268	15.14916	442.82	1.27643	0.00000	1.27643	23	2.60000	445.20000	1.30000
HEAT PUMP 5T	CT	50.34323	1626.53840	50.34323	2768.32	4.31997	139.57390	4.31997	30	8.38500	2994.50000	4.19250
HEAT PUMP 10T	CT	115.48462	3078.13615	115.48462	5697.33	9.90978	264.13607	9.90978	30	14.30000	5089.00000	4.76667
HEAT PUMP 25T	CT	145.78294	8044.48748	145.78294	11350.84	12.50969	690.30063	12.50969	30	19.50000	17755.00000	4.87500
HEAT PUMP 1T	CT	52.59542	519.37100	51.77607	1709.61	4.37262	12.26970	4.37262	18	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	30.24349	16.99010	15.12174	654.52	2.55286	0.00000	1.27643	22	2.34000	80.56000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	51.50714	255.44747	51.50714	1423.63	4.41985	21.92005	4.41985	26	26.00000	2851.40000	6.50000
IND DRAFT FAN 10000 CFM	CT	52.11211	263.85792	51.80963	1444.79	4.47176	22.64175	4.44580	26	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	3.68848	14.87072	3.68848	98.53	0.26154	0.57275	0.26154	24	3.25000	41.58380	3.25000
EXHAUST FAN, 1000 CFM	CT	16.68555	87.71693	16.01371	464.00	1.31649	0.94596	1.31649	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	56.45320	616.55715	52.26343	1883.51	4.40453	22.37559	4.37481	24	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	56.45320	1605.76071	26.94545	2791.69	4.40453	68.23023	2.20226	24	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	57.73435	1884.18243	52.50372	3177.12	4.40453	70.24952	4.37481	24	32.50000	5406.00000	8.12500
EXHAUST FAN, 5000 CFM	CT	20.08760	494.82305	17.42605	941.89	1.32762	1.01221	1.29728	18	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM	CT	4.11629	19.67275	4.11629	113.03	0.35322	1.68813	0.35322	30	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	2.35144	32.04677	1.17572	81.62	0.00000	0.00000	0.00000	20	9.10000	124.02000	4.55000
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
ROOM HUMIDIFIER,FLOOR TYPE	CT	7.61647	58.95497	7.61647	231.70	0.64642	0.39384	0.64642	12	0.13000	84.80000	0.13000
CONTROLS/INSTRUMENT.												
DEVICES												
THERMOSTATS/PNEUMATICS	CT	15.01479	48.37986	15.01479	388.92	1.27113	0.00000	1.27113	20	0.78000	187.22780	0.78000
HUMIDITY SENSOR	CT	14.97304	33.95989	14.97304	373.55	1.26217	0.00000	1.26217	15	0.78000	100.26540	0.78000
FLOW SENSOR	CT	15.03949	21.09903	15.03949	362.19	1.27643	0.00000	1.27643	23	0.78000	100.04280	0.78000
RADIATION SENSOR	CT	14.99529	22.81833	14.99529	362.91	1.26695	0.00000	1.26695	18	0.78000	77.11500	0.78000
WIND VELOCITY SENSOR	CT	14.71246	38.23357	14.71246	371.91	0.00000	0.00000	0.00000	9	1.56000	91.05400	1.56000
PRESSURE SENSOR	CT	14.99529	17.25097	14.99529	357.34	1.26695	0.00000	1.26695	18	0.78000	58.30000	0.78000
DAMPER CONTROLLER/ELECT.	CT	15.65330	111.37887	15.65330	466.40	1.25669	0.00000	1.25669	13	2.60000	287.20700	2.60000
SIMPLEX AIR COMPR.,1 HP	CT	53.47483	1339.72019	35.14179	2493.86	4.52212	4.49839	2.98224	22	3.67900	6103.82980	1.83950

See NOTES on the last page of this table for Explanation of Colum Headings

COMPONENT DESCRIPTION Zone: 4	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.13209	33.38905	0.13209	36.38	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	3.89381	6.99142	1.94690	89.07	0.33413	0.59994	0.16706	93	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.31023	5.64577	0.31023	12.68	0.02002	0.00000	0.02002	17	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.41794	95.66447	0.32562	104.85	0.02002	0.00000	0.02002	17	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	37	2.60000	164.30000	1.30000
OIL FILTER	CT	1.21193	39.52765	1.21193	67.91	0.10400	3.39188	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.72663	160.23384	0.72663	176.71	0.03353	0.00000	0.03353	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	1.13311	2.10096	0.62186	26.16	0.09723	0.18028	0.05336	31	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	37	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITHGS,STEEL/IRON	TF	3.89381	6.99142	1.94690	89.07	0.33413	0.59994	0.16706	93	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	10.17467	9.65254	10.17467	240.41	0.87309	0.82829	0.87309	33	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	10.34928	54.43447	9.32033	285.86	0.71149	0.66817	0.71149	17	6.50000	147.34000	3.25000
STEAM REG. VALVE 2"	CT	9.89742	317.69879	4.94871	526.54	0.00000	0.00000	0.00000	7	7.80000	250.53100	3.90000
COND. METER,<300 #/HR.	CT	7.74183	173.36274	7.74183	348.95	0.66433	14.87632	0.66433	37	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	56	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	56	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	1.09668	48.95833	0.54834	72.08	0.00000	0.00000	0.00000	22	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	1.09668	55.32962	0.54834	78.45	0.00000	0.00000	0.00000	22	5.20000	262.35000	2.60000
SOLAR												
EQUIPMENT												
SOLAR PANEL, 3' X 8'	CT	1.07835	96.71970	0.53918	119.45	0.00000	0.00000	0.00000	19	3.90000	349.80000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	2.87352	404.17164	1.43676	464.75	0.00000	0.00000	0.00000	25	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.34055	1.88192	0.28290	9.42	0.02922	0.16149	0.02428	29	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	447.92270	356.68081	447.92270	10515.57	38.43642	30.60692	38.43642	33	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	503.16981	689.21402	503.16981	12101.11	43.17720	59.14173	43.17720	33	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	517.79419	4071.81073	517.79419	15815.38	44.43212	349.40368	44.43212	33	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR	CT	1433.3662	31297.56000	869.55374	62002.11	103.98820	0.00000	69.86437	33	20800.000	636000.00000	4160.0000
REPAIR BOILER									22	1050.4000	148400.00000	262.60000
BOILER COAL 100,000 KBTU/H	CT	1735.8443	58369.94940	1006.9061	95406.30	125.17747	0.00000	80.45900	33	41600.000	1590000.00000	8320.0000
REPAIR BOILER									22	1313.7800	276766.00000	328.44500
BOILER OIL 250 KBTU/HR	CT	512.36686	248.71564	512.36686	11869.20	43.96640	21.34239	43.96640	33	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	568.56055	248.71564	568.56055	13143.67	48.78840	21.34239	48.78840	33	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	626.12736	277.38945	626.12736	14477.96	53.72823	23.80290	53.72823	33	248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	518.79718	427.01458	518.79718	12193.33	44.51819	36.64229	44.51819	33	184.60000	18689.92000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	541.95686	7693.38347	541.95686	19984.96	46.50553	660.17226	46.50553	33	651.30000	71020.00000	162.82500
BOILR.PNEUMAT.COAL SPREAD.	CT	2361.9307	2877.56080	2304.8113	56263.37	196.62174	59.97292	196.26265	13	182.00000	5618.00000	45.50000
ASH HANDLING SYSTEM	CT	5891.4089	45509.47608	4244.2533	173855.73	317.33104	68.53471	317.14778	22	10400.000	212000.00000	2600.0000
FUEL OIL EQUIPMENT	CT	8.75571	97.99806	4.37785	282.57	0.68070	0.20193	0.34035	17	2.60000	302.10000	1.30000
CHEMICAL FEED SYSTEM	CT	8.39774	123.16373	7.88327	311.98	0.63232	0.00000	0.63232	17	3.25000	389.02000	1.62500
FEED-WATER SUPPLY	CT	230.11846	872.54960	224.08195	6072.32	18.96956	0.00000	18.96956	17	28.60000	2756.00000	9.53333
DEAERATOR	CT	278.24745	4471.08000	125.41523	10292.67	19.17120	0.00000	9.58560	22	260.00000	21200.00000	65.00000

See NOTES on the last page of this table for Explanation of Colum Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
Zone: 4		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks			
	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
BLOWOFF SYSTEM	CT	0.82316	46.64784	0.41158	64.00	0.00000	0.00000	0.00000	17	2.60000	147.34000	1.30000
HOUSE FURN.GAS 25KBTU/HR	CT	50.45677	251.26346	48.81045	1390.35	4.04717	11.91381	4.04717	17	10.40000	355.10000	5.20000
HOUSE FURN.GAS 100KBTU/HR	CT	53.77250	315.47614	50.47986	1524.50	4.04915	14.25619	4.04915	17	20.80000	471.70000	10.40000
HOUSE FURN.GAS 200KBTU/HR	CT	53.77250	767.85446	50.47986	1976.88	4.04915	17.36590	4.04915	17	20.80000	1786.10000	10.40000
HOUSE FURN.OIL 25KBTU/HR	CT	65.21744	465.67496	63.57112	1939.54	5.31379	16.92165	5.31379	17	10.40000	848.00000	5.20000
HOUSE FURN.OIL 100KBTU/HR	CT	68.51008	645.18231	65.21744	2188.45	5.31379	18.45631	5.31379	17	20.80000	1358.49600	10.40000
HOUSE FURN.OIL 200KBTU/HR	CT	68.51008	756.86438	65.21744	2300.14	5.31379	21.60640	5.31379	17	20.80000	1595.30000	10.40000
HOUSE FURN.ELECT 25KBTU/HR	CT	27.30377	284.41093	25.65745	898.39	2.06040	8.07716	2.06040	17	10.40000	601.02000	5.20000
HOUSE FURN.ELECT.100KBTU	CT	30.59641	373.39799	27.30377	1056.79	2.06040	11.63111	2.06040	17	20.80000	751.27500	10.40000
HOUSE FURN.ELECT.200KBTU/H	CT	30.59641	476.17320	27.30377	1159.56	2.06040	14.94275	2.06040	17	20.80000	954.00000	10.40000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	56	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	1.09668	48.95833	0.54834	72.08	0.00000	0.00000	0.00000	22	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	1.09668	55.32962	0.54834	78.45	0.00000	0.00000	0.00000	22	5.20000	262.35000	2.60000
EXPANSION TANK	CT	0.06387	0.00000	0.06387	1.45	0.00548	0.00000	0.00548	56	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	10.24156	9.65254	10.24156	241.93	0.87883	0.82829	0.87883	33	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	10.34928	54.43447	9.32033	285.86	0.71149	0.66817	0.71149	17	6.50000	147.34000	3.25000
STORAGE TANK, DHW	CT	16.22495	23.03592	16.22495	391.02	1.39227	1.97672	1.39227	62	3.59395	346.62000	1.79698
IND. FUR., GAS/OIL 500 MBU	CT	49.86229	490.56700	42.35268	1597.39	4.27870	42.09403	3.63430	37	65.00000	6784.00000	16.25000
IND.FURN.GAS/OIL 2000 MBTU	CT	82.50745	1019.87059	82.50745	2891.14	7.08000	87.51550	7.08000	37	184.60000	13780.00000	46.15000
SURGE TANK, 1000 GAL	CT	1.43780	435.23865	0.71890	465.55	0.00000	0.00000	0.00000	19	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.10290	0.05370	0.10290	2.39	0.00883	0.00461	0.00883	56	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.12089	0.05554	0.12089	2.80	0.01037	0.00477	0.01037	33	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	1.44858	7.12503	1.44858	39.98	0.12430	0.61140	0.12430	31	241.80000	8034.80000	120.90000
PIPE INSULATION	TF	0.50646	3.11308	0.50646	14.60	0.04346	0.26713	0.04346	37	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	0.72612	3.97573	0.72612	20.44	0.05760	0.01696	0.05760	22	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"	CT	0.27821	20.23128	0.27821	26.54	0.01352	0.03392	0.01352	22	0.57200	94.05380	0.57200
DRAIN VALVE	CT	1.20610	9.62795	1.20610	36.98	0.09103	0.50198	0.09103	22	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	0.45274	6.40317	0.22637	15.95	0.00000	0.00000	0.00000	17	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	9.69742	317.89879	4.94871	526.54	0.00000	0.00000	0.00000	7	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	9.51835	96.30941	9.51835	312.19	0.74372	4.00993	0.74372	11	1.30000	75.70520	1.30000
PIPE INSULATION	TF	0.55358	3.40269	0.55358	15.96	0.04750	0.29199	0.04750	33	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	3.36431	122.54363	3.36431	198.85	0.17462	0.43635	0.17462	17	4.19900	371.00000	4.19900
CIRCULATION PUMP 5 HP	CT	3.36431	451.80306	2.69961	525.98	0.17462	4.21225	0.17462	17	4.19900	1272.00000	2.09950
COND. RCVR., 10 - 15 GAL.	CT	24.93975	496.28632	23.29473	1056.66	1.85777	6.05666	1.85777	22	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T	CT	49.95557	939.42415	49.95557	2072.42	3.63988	0.00000	3.63988	30	8.38500	1855.00000	4.19250
REPAIR AIR CONDITIONER									15	20.80000	2592.23000	20.80000
A/C DX PACKAGE 20T	CT	115.09696	3268.31636	115.09696	5878.72	9.22968	0.00000	9.22968	30	20.41000	7950.00000	6.80333
REPAIR AIR CONDITIONER									15	20.80000	9018.53300	20.80000
A/C DX PACKAGE 50T	CT	146.33752	9877.26803	146.33752	13196.20	11.82959	0.00000	11.82959	30	47.71000	21200.00000	11.92750
REPAIR AIR CONDITIONER									15	23.40000	27255.15460	23.40000
A/C WINDOW 1T	CT	21.82580	192.65797	21.82580	687.87	1.68692	0.06744	1.68692	15	5.98000	530.00000	5.98000
A/C WINDOW 2T	CT	22.01425	269.68677	22.01425	768.97	1.68692	0.06744	1.68692	15	6.50000	742.00000	6.50000
A/C PAD MTD. 4T	CT	58.70935	541.73144	57.53155	1869.49	4.83574	0.33722	4.83574	15	6.50000	1484.00000	3.25000
A/C PAD MOUNTED 20 TON	CT	117.45482	4944.97136	114.58517	7599.66	9.06264	0.00000	9.06264	22	20.41000	7950.00000	6.80333
REPAIR AIR CONDITIONER									15	20.80000	9018.53300	20.80000
CHILLER-AIR COOL RECIP.20T	CT	269.28860	1855.41552	134.64430	7532.02	22.48923	0.00000	11.24461	30	28.60000	10759.00000	7.15000
REPAIR HERNETIC CHILLER									15	19.89000	5119.80000	9.94500
CHILLER AIR COOL REC.50T	CT	334.61111	4129.54800	165.82153	11178.40	28.71311	354.35814	14.22921	30	40.30000	19080.00000	10.07500
CHILLER AIR COOL REC.100T	CT	334.61111	10621.58160	165.07951	17668.06	27.94904	0.00000	13.97452	30	72.80000	40280.00000	18.20000
REPAIR HERMETIC CHILLER									15	24.57000	29309.00000	6.14250
CHILLER-AIR COOL RECIP. 5T	CT	148.09532	726.03216	148.09532	4084.83	12.08959	0.00000	12.08959	30	15.60000	3710.00000	5.20000
REPAIR HERMETIC CHILLER									15	19.89000	2003.40000	19.89000
CHILLER AIR COOL REC. 10T	CT	213.41783	1405.96704	106.70891	5904.81	17.54940	0.00000	8.77470	30	20.80000	6360.00000	6.93333
REPAIR HERMETIC CHILLER									15	24.57000	3879.60000	12.28500
CHILLER AIR COOL REC. 15T	CT	274.01447	3286.35192	137.00723	9062.58	22.74922	0.00000	11.37461	30	28.60000	8268.00000	7.15000

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
Zone: 4	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
REPAIR HERMETIC CHILLER									15	24.57000	9068.30000	12.28500
CHILLER WAT.COOL REC.20T	CT	268.92637	1731.72115	134.46319	7400.69	22.74922	0.00000	11.37461	30	29.90000	9540.00000	7.47500
REPAIR HERMETIC CHILLER									15	10.53000	4778.48000	5.26500
CHILLER WAT.COOL REC.50T	CT	271.65887	4071.92640	134.73801	9795.00	22.74922	0.00000	11.37461	30	48.10000	15900.00000	12.02500
REPAIR HERMETIC CHILLER									15	18.07000	11236.00000	6.02333
CHILLER WAT.COOL REC.100T	CT	271.65887	10525.54560	134.19229	16246.88	22.74922	0.00000	11.37461	30	74.10000	27030.00000	18.52500
REPAIR HERMETIC CHILLER									15	18.07000	29044.00000	4.51750
CHILLER WAT. COOL REC. 10T	CT	238.62805	1229.26080	119.31403	6259.54	20.14931	0.00000	10.07465	30	20.80000	5300.00000	5.20000
REPAIR HERMETIC CHILLER									15	10.53000	3392.00000	5.26500
CHILLER WAT.COOL REC.200T	CT	271.65887	15980.39040	134.19229	21701.72	22.74922	0.00000	11.37461	30	74.10000	53000.00000	18.52500
REPAIR HERMETIC CHILLER									15	18.07000	44096.00000	4.51750
CHILL. HERMETIC CENT. 100T	CT	392.38103	8092.76165	196.19051	16364.15	33.14886	0.00000	16.57443	30	62.40000	37789.00000	15.60000
REPAIR CHILLER									15	16.77000	22331.02000	8.38500
CHILL. HERMETIC CENT. 300T	CT	392.19258	24124.62734	196.09629	32392.05	33.14886	0.00000	16.57443	30	97.50000	61771.50000	24.37500
REPAIR CHILLER									15	16.25000	66569.06000	8.12500
CHILL. HERMETIC CENT. 900T	CT	392.38103	72220.22443	196.19051	80491.62	33.14886	0.00000	16.57443	30	162.50000	127200.00000	40.62500
REPAIR CHILLER									15	16.77000	199283.18000	8.38500
CHILL. OPEN CENT. 300T	CT	1017.6424	24124.62734	508.82122	45576.53	86.44703	0.00000	43.22352	30	97.50000	61771.50000	24.37500
REPAIR CHILLER									15	28.21000	66569.06000	14.10500
CHILL. OPEN CENT. 900T	CT	392.38103	72220.22443	196.19051	80491.62	33.14886	0.00000	16.57443	30	162.50000	127200.00000	40.62500
REPAIR CHILLER									15	16.77000	199283.18000	8.38500
CHILL.DBL.BNDL. HERM.100T	CT	452.97767	8188.79765	226.48883	17737.57	38.34868	0.00000	19.17434	30	68.90000	41340.00000	17.22500
REPAIR CHILLER									15	16.77000	22596.02000	8.38500
CHILL.DBL.BNDL. HERM.300T	CT	459.00800	34669.38014	229.50400	44345.27	38.34868	0.00000	19.17434	30	107.90000	67840.00000	26.97500
REPAIR CHILLER									15	33.41000	95666.06000	16.70500
CHILL.DBL.BNDL. HERM.900T	CT	470.73889	72393.08923	235.36945	82316.27	38.34868	0.00000	19.17434	30	178.10000	139920.00000	44.52500
REPAIR CHILLER									15	65.78000	199760.18000	32.89000
CHILL. ONE STG. ABS. 100T	CT	1328.6608	2765.83680	664.33045	30774.01	113.74610	0.00000	56.87305	30	65.00000	37100.00000	16.25000
REPAIR CHILLER									15	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 300T	CT	198.53356	2765.83680	99.26678	6950.92	16.76942	0.00000	8.38471	30	104.00000	61480.00000	26.00000
REPAIR CHILLER									15	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 900T	CT	198.53356	2765.83680	99.26678	6950.92	16.76942	0.00000	8.38471	30	167.70000	113420.00000	41.92500
REPAIR CHILLER									15	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 300T	CT	198.53356	2765.83680	99.26678	6950.92	16.76942	0.00000	8.38471	30	114.40000	67840.00000	28.60000
REPAIR CHILLER									15	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 900T	CT	184.89931	2765.83680	92.44966	6663.51	15.86628	237.33754	7.93314	30	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 5T	CT	31.04977	341.50942	30.09018	1042.65	2.49971	14.43803	2.49971	22	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 20T	CT	33.51730	716.23394	16.02753	1420.44	2.49971	17.33883	1.24985	22	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 50T	CT	56.53565	1352.51665	26.62280	2539.02	4.28671	20.23962	2.14335	22	31.20000	5294.70000	7.80000
AIR COOLED CONDENSER 100T	CT	59.82569	3172.22172	27.44531	4425.45	4.28671	80.76069	2.14335	22	46.80000	10578.80000	11.70000
COOLING TOWER 50T	CT	63.81707	1382.82395	29.44100	2720.19	4.62921	37.61141	2.31460	22	46.80000	4478.50000	11.70000
COOLING TOWER 100T	CT	174.98067	2562.07130	84.75264	6242.06	14.07478	37.61141	7.03739	22	52.00000	10070.00000	13.00000
COOLING TOWER 300T	CT	207.24705	4364.71472	99.51098	8720.32	16.37235	78.15657	8.18618	22	78.00000	16377.00000	19.50000
COOLING TOWER 900T	CT	234.30217	10009.45322	110.36538	14926.83	17.77642	78.15657	8.88821	22	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 20T	CT	107.21100	1065.88385	51.68631	3319.75	8.54107	24.70618	4.27054	22	36.40000	3688.80000	9.10000
EVAPORATIVE CONDENSER 100T	CT	181.63279	2583.31116	85.53862	6395.24	13.77443	40.00951	6.88722	22	100.10000	10038.20000	25.02500
EVAPORATIVE CONDENSER 300T	CT	78.41808	7528.59212	29.61309	9150.94	3.43536	70.53375	1.71768	22	182.00000	31800.00000	45.50000
EXPANSION TANK	CT	0.06387	0.00000	0.06387	1.45	0.00548	0.00000	0.00548	56	3.47100	135.68000	1.73550
REFRIG. FAN COIL 1T	CT	8.55118	199.61528	8.27701	392.68	0.68673	1.64818	0.68673	22	2.60000	855.42000	1.30000
REFRIG. FAN COIL 3T	CT	8.60601	255.57024	8.30443	449.79	0.68673	2.90079	0.68673	22	2.86000	1051.52000	1.43000
REFRIG. FAN COIL 5T	CT	8.68826	332.62482	8.34555	528.58	0.68673	6.09826	0.68673	22	3.25000	1240.20000	1.62500
DIST. PIPING SYSTEM												
PIPE/FITTINGS ST.& C.I.	TF	0.21284	0.11107	0.21284	4.94	0.01826	0.00953	0.01826	33	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	1.25267	10.79507	0.66732	37.33	0.00703	0.00323	0.00703	22	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	49.73933	1650.29771	25.90994	2702.13	0.17853	0.87772	0.17853	24	241.80000	8321.00000	120.90000
GATE VALVE, 3/8" - 1 1/2"	CT	0.30231	3.97573	0.30231	10.83	0.01347	0.01696	0.01347	22	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.27821	20.23128	0.27821	26.54	0.01352	0.03392	0.01352	22	0.57200	94.05380	0.57200
DRAIN VALVE	CT	1.20610	9.62795	1.20610	36.98	0.09103	0.50198	0.09103	22	0.68900	17.91400	0.68900

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 4	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
PIPE INSULATION	TF	0.55358	3.22909	0.55358	15.78	0.04750	0.27709	0.04750	33	91.00000	901.00000	91.00000
CIRCULATOR PUMP, < 1 HP	CT	3.34198	122.54363	3.34198	198.34	0.17270	0.43635	0.17270	17	4.19900	371.00000	4.19900
5 TON CHILLER ACH RECIP	CT	6.97386	451.80306	4.50438	602.07	0.17462	4.21225	0.17462	17	15.60000	1272.00000	7.80000
HEAT/COOL GENERATION EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	95.00088	2965.96281	55.21113	4993.26	7.02011	68.00268	4.45470	14	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	97.35648	3885.74361	55.80003	5960.81	7.02011	83.07904	4.45470	14	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	113.53789	7328.53106	62.96789	9741.75	7.39797	151.22233	4.81711	14	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	128.77706	11907.09252	70.08024	14639.93	7.77582	172.61130	5.19497	14	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	87.86119	1510.94325	53.71599	3394.37	7.06887	52.92161	4.49176	22	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	93.53308	2965.96281	54.47723	4962.31	6.89415	68.00268	4.39172	14	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	95.88868	3886.70107	55.06613	5930.82	6.89415	83.16120	4.39172	14	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	112.07009	7305.55202	62.23399	9687.83	7.27201	149.25049	4.75413	14	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	127.30926	11907.09252	69.34634	14608.99	7.64987	172.61130	5.13199	14	105.30000	27305.60000	26.32500
3 DK.MULTI ZONE 6500 CFM	CT	93.58752	2955.94812	54.85779	4964.58	7.02011	68.00142	4.45470	14	32.50000	5997.48000	8.12500
3 DK.MULTI ZONE 10,000 CFM	CT	97.35648	3886.70107	55.80003	5961.77	7.02011	83.16120	4.45470	14	42.90000	8050.70000	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	113.53789	7052.06453	63.14794	9465.86	7.39797	127.49662	4.83256	14	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	128.77706	11682.32882	70.26029	14415.74	7.77582	153.32424	5.21042	14	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	94.47532	3174.16885	43.70426	5154.40	6.89415	68.00268	3.44708	14	39.00000	6572.00000	9.75000
D.D. VARI.VOL.10000 CFM	CT	97.30204	4195.93699	44.41094	6233.50	6.89415	83.16120	3.44708	14	46.80000	8904.00000	11.70000
D.D. VARI.VOL.25000 CFM	CT	114.89681	7880.00132	49.91048	10277.90	7.27201	148.76925	3.63601	14	83.20000	16960.00000	20.80000
D.D. VARI.VOL.50000 CFM	CT	131.07822	12725.26444	55.05669	15454.85	7.64987	168.98061	3.82494	14	115.70000	29680.00000	28.92500
D.D. VARI.VOL. 100,000CFM	CT	125.45738	13615.52453	53.67683	16231.20	7.70708	285.92371	3.84141	22	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CFM	CT	92.11972	2965.96281	82.74607	5025.24	6.89415	68.00268	6.84780	14	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000 CFM	CT	95.88868	3886.70107	55.06613	5930.82	6.89415	83.16120	4.39172	14	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	94.45644	6677.45837	44.80039	8660.83	5.76058	95.35352	3.25815	14	75.40000	15359.40000	18.85000
VARIABLE VOLUME 50000 CFM	CT	127.30926	11907.09252	69.52639	14609.56	7.64987	172.61130	5.14744	14	105.30000	27305.60000	26.32500
TERM. REHEAT 6500 CFM	CT	89.69808	1975.57694	53.59476	3890.50	6.90875	67.99381	4.40621	19	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	90.93588	2679.66879	53.95421	4623.75	6.90875	83.26765	4.40621	19	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	104.71850	5960.97820	60.72755	8195.22	7.28949	149.09996	4.78694	19	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	120.65781	8315.89377	68.04006	10884.04	7.67022	171.35249	5.16768	19	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	89.69808	1975 57694	53.59476	3890.50	6.90875	67.99381	4.40621	19	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	90.93588	2679.56879	53.95421	4623.75	6.90875	83.26765	4.40621	19	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	104.71850	5960.97820	60.72755	8195.22	7.28949	149.09996	4.78694	19	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	120.65781	8315.89377	68.04006	10884.04	7.67022	171.35249	5.16768	19	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	87.87184	1699.52096	53.37860	3582.08	6.95215	68.39375	4.43340	22	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	88.84122	2278.53748	53.58912	4180.65	6.94123	83.64544	4.42794	22	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	100.43214	4966.06883	59.83372	7113.95	7.32416	149.70959	4.81086	22	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	113.66807	6822.38267	66.48958	9249.40	7.70708	171.84033	5.19379	22	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	13.01368	220.52378	12.73951	514.80	1.06966	7.89286	1.06966	22	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	13.01368	238.40810	12.73951	532.68	1.06966	7.89286	1.06966	22	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	13.06851	250.70357	12.76692	546.13	1.06966	7.89286	1.06966	22	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	13.15076	353.53841	12.80805	650.70	1.06966	7.89286	1.06966	22	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	13.06851	232.14859	12.76692	527.58	1.06966	7.89286	1.06966	22	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	13.06851	413.89799	12.76692	709.33	1.06966	7.89286	1.06966	22	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	13.12334	266.57590	12.79434	563.16	1.06966	7.89286	1.06966	22	3.12000	827.86000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	13.23301	379.69423	12.84917	678.59	1.06966	7.89286	1.06966	22	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	21.75022	372.73146	21.47605	865.15	1.81934	3.20935	1.81934	22	2.60000	1590.00000	1.30000
UNIT VENT 1200 CFM	CT	21.88731	439.79766	21.54459	935.11	1.81934	3.20935	1.81934	22	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	87.74454	1698.23640	53.31495	3578.11	6.94123	68.28353	4.42794	22	32.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	88.84122	2278.53748	53.58912	4180.65	6.94123	83.64544	4.42794	22	37.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	100.43214	4966.06883	59.83372	7113.95	7.32416	149.70959	4.81086	22	71.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	113.66807	6822.38267	66.48958	9249.40	7.70708	171.84033	5.19379	22	113.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	82.81408	546.75676	81.73573	2421.53	6.92124	16.73721	6.92124	19	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	85.82535	1399.16625	52.83515	3240.12	6.94123	52.92161	4.42794	22	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	21.75022	103.34889	21.47605	595.77	1.81934	3.20935	1.81934	22	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	21.88731	134.64645	21.54459	629.95	1.81934	3.20935	1.81934	22	3.25000	461.10000	1.62500
UNIT HEATER 4000 CFM	CT	21.88731	239.10977	21.54459	734.42	1.81934	5.51680	1.81934	22	3.25000	828.92000	1.62500

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
Zone: 4	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
UNIT HEATER 8000 CFM	CT	21.88731	344.07966	21.54459	839.39	1.81934	6.50570	1.81934	22	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50MBH	CT	15.42333	93.89268	15.14916	442.82	1.27643	0.00000	1.27643	22	2.60000	445.20000	1.30000
HEAT PUMP 5T	CT	50.89781	1740.35287	50.89781	2894.72	4.36756	149.34036	4.36756	30	8.38500	2994.50000	4.19250
HEAT PUMP 10T	CT	116.03920	3293.52389	116.03920	5925.29	9.95737	282.61858	9.95737	30	14.30000	5989.00000	4.76667
HEAT PUMP 25T	CT	146.33752	8607.38784	146.33752	11926.32	12.55728	738.60334	12.55728	30	19.50000	17755.00000	4.87500
HEAT PUMP 1T	CT	51.92919	485.33529	51.16356	1660.64	4.32467	11.46661	4.32467	19	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	30.24707	15.87838	15.12354	653.49	2.55594	0.00000	1.27797	24	2.34000	80.56000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	55.48218	776.63754	51.89028	2023.48	4.34998	21.57356	4.34998	25	26.00000	2851.40000	6.50000
IND DRAFT FAN 10000 CFM	CT	56.12958	800.08654	52.21398	2060.58	4.40554	22.34589	4.37776	25	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	3.92695	15.91151	3.92695	104.97	0.27816	0.61281	0.27816	22	3.25000	41.58380	3.25000
EXHAUST FAN, 1000 CFM	CT	16.68555	87.71693	16.01371	464.00	1.31649	0.94596	1.31649	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	56.75101	641.16613	52.29214	1914.01	4.39929	22.34963	4.36958	22	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	56.75101	1661.58789	27.00465	2853.51	4.39929	68.15047	2.19965	22	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	58.12186	1957.85577	52.63485	3258.50	4.39929	70.16976	4.36958	22	32.50000	5406.00000	8.12500
EXHAUST FAN, 5000 CFM	CT	19.76390	462.38241	17.27681	902.67	1.32581	0.94596	1.29746	19	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM	CT	4.11629	19.67275	4.11629	113.03	0.35322	1.68813	0.35322	30	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	2.51615	34.29153	1.25808	87.33	0.00000	0.00000	0.00000	19	9.10000	124.02000	4.55000
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
ROOM HUMIDIFIER,FLOOR TYPE	CT	7.60929	60.12521	7.60929	232.70	0.64565	0.39384	0.64565	11	0.13000	84.80000	0.13000
CONTROLS/INSTRUMENT.												
DEVICES												
THERMOSTATS/PNEUMATICS	CT	15.01479	48.37966	15.01479	388.92	1.27113	0.00000	1.27113	20	0.78000	187.22780	0.78000
HUMIDITY SENSOR	CT	14.96071	36.33618	14.96071	375.65	1.25953	0.00000	1.25953	15	0.78000	100.26540	0.78000
FLOW SENSOR	CT	15.03949	21.09903	15.03949	362.19	1.27643	0.00000	1.27643	22	0.78000	100.04280	0.78000
RADIATION SENSOR	CT	15.00538	21.32230	15.00538	361.64	1.26911	0.00000	1.26911	19	0.78000	77.11500	0.78000
WIND VELOCITY SENSOR	CT	14.74106	35.72959	14.74106	370.06	0.00000	0.00000	0.00000	10	1.56000	91.05400	1.56000
PRESSURE SENSOR	CT	15.00538	16.11995	15.00538	356.44	1.26911	0.00000	1.26911	19	0.78000	58.30000	0.78000
DAMPER CONTROLLER/ELECT.	CT	15.62028	104.08382	15.62028	458.35	1.25953	0.00000	1.25953	14	2.60000	287.20700	2.60000
SIMPLEX AIR COMPR.,1 HP	CT	52.26304	1254.33299	34.54602	2382.96	4.42249	4.39934	2.93330	24	3.67900	6103.82980	1.83950

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks			
Zone: 5	UM	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.13209	33.38905	0.13209	36.38	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	4.45897	8.00618	2.22948	102.00	0.38263	0.68701	0.19131	81	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.32534	6.46240	0.32534	13.84	0.02036	0.00000	0.02036	15	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.44862	109.50171	0.34295	119.34	0.02036	0.00000	0.02036	15	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	32	2.60000	164.30000	1.30000
OIL FILTER	CT	1.21193	39.52765	1.21193	67.01	0.10400	3.39188	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.72663	160.23384	0.72663	176.71	0.03353	0.00000	0.03353	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	1.38223	2.57147	0.75580	31.92	0.11861	0.22066	0.06486	27	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	32	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITNGS,STEEL/IRON	TF	4.45897	8.00618	2.22948	102.00	0.38263	0.68701	0.19131	81	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	12.75712	12.12490	12.75712	301.46	1.09469	1.04044	1.09469	28	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	12.68117	63.20238	11.50337	347.04	0.88604	0.84149	0.88604	14	6.50000	147.34000	3.25000
STEAM REG. VALVE 2"	CT	12.77484	410.31967	6.38742	679.61	0.00000	0.00000	0.00000	6	7.80000	250.53100	3.90000
COND. METER,<300 #/HR.	CT	7.82002	198.50503	7.82002	375.86	0.67104	17.03380	0.67104	32	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	47	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	47	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	1.43780	64.18671	0.71890	94.50	0.00000	0.00000	0.00000	19	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	1.43780	72.53978	0.71890	102.85	0.00000	0.00000	0.00000	19	5.20000	262.35000	2.60000
SOLAR												
EQUIPMENT												
SOLAR PANEL, 3' X 8'	CT	1.23474	110.74668	0.61737	136.77	0.00000	0.00000	0.00000	16	3.90000	349.80000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	3.52092	495.23094	1.76046	569.45	0.00000	0.00000	0.00000	22	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.32781	1.75961	0.27393	9.02	0.02813	0.15099	0.02351	29	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	448.84592	404.89559	448.84592	10584.72	38.51564	34.74425	38.51564	28	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	504.09303	782.37938	504.09303	12215.21	43.25642	67.13628	43.25642	28	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	518.71741	4622.22279	518.71741	16386.73	44.51134	396.63476	44.51134	28	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR	CT	1502.2724	41032.60000	886.78030	73134.56	103.98820	0.00000	69.86437	28	20800.000	636000.00000	4160.0000
REPAIR BOILER									19	1050.4000	148400.00000	262.60000
BOILER COAL 100,000 KBTU/H	CT	1822.0283	76525.79900	1028.4520	115309.96	125.17747	0.00000	80.45900	28	41600.000	1590000.00000	8320.0000
REPAIR BOILER									19	1313.7800	276766.00000	328.44500
BOILER OIL 250 KBTU/HR	CT	514.88116	282.33609	514.88116	11959.84	44.18215	24.22737	44.18215	28	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	569.66056	282.33609	569.66056	13202.24	48.88280	24.22737	48.88280	28	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	627.12737	314.88591	627.22737	14540.40	53.82263	27.02048	53.82263	28	248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	520.13290	484.73680	520.13290	12281.35	44.63281	41.59546	44.63281	28	184.60000	18689.92000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	543.35151	8733.34611	543.35151	21056.56	46.62521	749.41187	46.62521	28	651.30000	71020.00000	162.82500
BOILR.PNEUMAT.COAL SPREAD.	CT	2361.5173	4834.61760	2265.2055	58085.63	192.41484	99.14442	191.82121	11	182.00000	5618.00000	45.50000
ASH HANDLING SYSTEM	CT	6552.6802	59532.34021	4393.5352	201237.86	315.53170	78.45989	315.32190	19	10400.000	212000.00000	2600.0000
FUEL OIL EQUIPMENT	CT	9.99134	113.15129	4.99567	323.77	0.77651	0.31495	0.38825	14	2.60000	302.10000	1.30000
CHEMICAL FEED SYSTEM	CT	8.51682	140.98085	7.92792	332.26	0.62976	0.00000	0.62976	14	3.25000	389.02000	1.62500
FEED-WATER SUPPLY	CT	230.53524	998.77440	223.62548	6205.20	18.89293	0.00000	18.89293	14	28.60000	2756.00000	9.53333
DEAERATOR	CT	294.06605	5861.80000	129.06052	12003.20	19.06501	0.00000	9.53251	19	260.00000	21200.00000	65.00000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 5	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
BLOWOFF SYSTEM	CT	0.94224	53.39602	0.47112	73.26	0.00000	0.00000	0.00000	14	2.60000	147.34000	1.30000
HOUSE FURN.GAS 25KBTU/HR	CT	51.57552	345.23299	49.69104	1508.94	4.10230	18.58179	4.10230	14	10.40000	355.10000	5.20000
HOUSE FURN.GAS 100KBTU/HR	CT	55.38049	430.06373	51.61153	1674.03	4.10539	22.23516	4.10539	14	20.80000	471.70000	10.40000
HOUSE FURN.GAS 200KBTU/HR	CT	55.38049	962.92414	51.61153	2206.89	4.10539	27.08532	4.10539	14	20.80000	1786.10000	10.40000
HOUSE FURN.OIL 25KBTU/HR	CT	66.28957	614.88215	64.40509	2112.30	5.36492	26.39244	5.36492	14	10.40000	848.00000	5.20000
HOUSE FURN.OIL 100KBTU/HR	CT	70.05853	827.77980	66.28957	2404.65	5.36492	28.78603	5.36492	14	20.80000	1358.49600	10.40000
HOUSE FURN.OIL 200KBTU/HR	CT	70.05853	970.85347	66.28957	2547.72	5.36492	33.69918	5.36492	14	20.80000	1595.30000	10.40000
HOUSE FURN.ELECT 25KBTU/HR	CT	28.75685	364.61965	26.87237	1010.79	2.14422	12.59782	2.14422	14	10.40000	601.02000	5.20000
HOUSE FURN.ELECT.100KBTU	CT	32.52581	483.66846	28.75685	1209.29	2.14422	18.14087	2.14422	14	20.80000	751.27500	10.40000
HOUSE FURN.ELECT.200KBTU/H	CT	32.52581	617.32810	28.75685	1342.95	2.14422	23.30597	2.14422	14	20.80000	954.00000	10.40000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	47	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	1.43780	64.18671	0.71890	94.50	0.00000	0.00000	0.00000	19	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	1.43780	72.53978	0.71890	102.85	0.00000	0.00000	0.00000	19	5.20000	262.35000	2.60000
EXPANSION TANK	CT	0.08023	0.00000	0.08023	1.82	0.00688	0.00000	0.00688	47	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	12.73381	12.12490	12.73381	300.93	1.09269	1.04044	1.09269	28	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	12.68117	63.20238	11.50337	347.04	0.88604	0.84149	0.88604	14	6.50000	147.34000	3.25000
STORAGE TANK, DHW	CT	18.29824	25.97954	18.29824	440.98	1.57018	2.22931	1.57018	54	3.59395	346.62000	1.79698
IND. FUR., GAS/OIL 500 MBU	CT	52.32800	660.99427	43.58554	1819.82	4.49029	56.72018	3.74009	32	65.00000	6784.00000	16.25000
IND.FURN.GAS/OIL 2000 MBTU	CT	84.44209	1374.23858	84.44209	3289.39	7.24601	117.92395	7.24601	32	184.60000	13780.00000	46.15000
SURGE TANK, 1000 GAL	CT	1.64632	498.36006	0.82316	533.06	0.00000	0.00000	0.00000	16	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.11778	0.06146	0.11778	2.73	0.01011	0.00527	0.01011	47	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.14487	0.06655	0.14487	3.35	0.01243	0.00571	0.01243	28	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	1.74760	8.59434	1.74760	48.23	0.14996	0.73748	0.14996	27	241.80000	8034.80000	120.90000
PIPE INSULATION	TF	0.56909	3.49806	0.56909	16.41	0.04883	0.30017	0.04883	32	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	0.84039	2.17952	0.84039	24.24	0.06595	0.01942	0.06595	19	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"	CT	0.33855	26.45847	0.33855	34.14	0.01548	0.03884	0.01548	19	0.57200	94.05380	0.57200
DRAIN VALVE	CT	1.50521	11.50939	1.50521	45.65	0.11281	0.56259	0.11281	19	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	0.51823	7.32947	0.25912	18.25	0.00000	0.00000	0.00000	14	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	12.77484	410.31967	6.38742	679.61	0.00000	0.00000	0.00000	6	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	9.85552	113.92332	9.85552	337.45	0.15196	4.67751	0.15196	9	2.60000	151.41040	2.60000
PIPE INSULATION	TF	0.69537	4.27425	0.69537	20.05	0.05967	0.36477	0.05967	28	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	3.75834	140.03137	3.75834	225.27	0.19193	0.47891	0.19193	14	4.19900	371.00000	4.19900
CIRCULATION PUMP 5 HP	CT	3.75834	521.97029	2.99748	604.77	0.19193	5.23422	0.19193	14	4.19900	1272.00000	2.09950
COND. RCVR., 10 - 15 GAL.	CT	27.54619	644.57096	25.38949	1262.42	1.99361	10.04059	1.99361	19	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T	CT	47.79237	669.83223	47.79237	1753.76	3.63988	0.00000	3.63988	39	8.38500	1855.00000	4.19250
REPAIR AIR CONDITIONER									20	20.80000	2592.23000	20.80000
A/C DX PACKAGE 20T	CT	112.93376	2330.38893	112.93376	4891.73	9.22968	0.00000	9.22968	39	20.41000	7950.00000	6.80333
REPAIR AIR CONDITIONER									20	20.80000	9018.53300	20.80000
A/C DX PACKAGE 50T	CT	143.90392	7042.73195	143.90392	10306.47	11.82959	0.00000	11.82959	39	47.71000	21200.00000	11.92750
REPAIR AIR CONDITIONER									20	23.40000	27255.15460	23.40000
A/C WINDOW 1T	CT	21.24275	137.55157	21.24275	619.34	1.69025	0.05145	1.69025	20	5.98000	530.00000	5.98000
A/C WINDOW 2T	CT	21.37712	192.33237	21.37712	677.17	1.69025	0.05145	1.69025	20	6.50000	742.00000	6.50000
A/C PAD MTD. 4T	CT	58.41022	386.46343	57.57042	1708.52	4.86808	0.25725	4.86808	20	6.50000	1484.00000	3.25000
A/C PAD MOUNTED 20 TON	CT	110.65031	2198.17500	106.88806	4695.68	9.01069	0.00000	9.01069	19	20.41000	7950.00000	6.80333
REPAIR AIR CONDITIONER									20	20.80000	9018.53300	20.80000
CHILLER-AIR COOL RECIP.20T	CT	267.22004	1322.95632	133.61002	6955.95	22.48923	0.00000	11.24461	39	28.60000	10759.00000	7.15000
REPAIR HERMETIC CHILLER									20	19.89000	5119.80000	9.94500
CHILLER AIR COOL REC.50T	CT	332.05583	2944.46800	164.96977	9940.82	28.49384	252.66596	14.15612	39	-0.30000	19080.00000	10.07500
CHILLER AIR COOL REC.100T	CT	332.05583	7573.44560	164.44069	14568.10	27.94904	0.00000	13.97452	39	72.80000	40280.00000	18.20000
REPAIR HERMETIC CHILLER									20	24.57000	29309.00000	6.14250
CHILLER-AIR COOL RECIP. 5T	CT	146.02676	517.67856	146.02676	3829.57	12.08959	0.00000	12.08959	39	15.60000	3710.00000	5.20000
REPAIR HERMETIC CHILLER									20	19.89000	2003.40000	19.89000
CHILLER AIR COOL REC. 10T	CT	210.86255	1002.48864	105.43127	5447.47	17.54940	0.00000	8.77470	39	20.80000	6360.00000	6.93333
REPAIR HERMETIC CHILLER									20	24.57000	3879.60000	12.28500
CHILLER AIR COOL REC. 15T	CT	271.45919	2343.24872	135.72959	8065.61	22.74922	0.00000	11.37461	39	28.60000	8268.00000	7.15000

See NOTES on the last page of this table for Explanation of Colum Headings

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks			
Zone: 5	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
REPAIR HERMETIC CHILLER									20	24.57000	9068.30000	12.28500
CHILLER WAT.COOL REC.20T	CT	267.83125	1234.75923	133.91563	6880.64	22.74922	0.00000	11.37461	39	29.90000	9540.00000	7.47500
REPAIR HERMETIC CHILLER									20	10.53000	4778.48000	5.26500
CHILLER WAT.COOL REC.50T	CT	269.77959	2903.38240	134.11159	8587.85	22.74922	0.00000	11.37461	39	48.10000	15900.00000	12.02500
REPAIR HERMETIC CHILLER									20	18.07000	11236.00000	6.02333
CHILLER WAT.COOL REC.100T	CT	269.77959	7504.96960	133.72247	13188.19	22.74922	0.00000	11.37461	39	74.10000	27030.00000	18.52500
REPAIR HERMETIC CHILLER									20	18.07000	29044.00000	4.51750
CHILLER WAT. COOL REC. 10T	CT	237.53293	876.49280	118.76647	5883.69	20.14931	0.00000	10.07465	39	20.80000	5300.00000	5.20000
REPAIR HERMETIC CHILLER									20	10.53000	3392.00000	5.26500
CHILLER WAT.COOL REC.200T	CT	269.77959	11394.40640	133.72247	17077.62	22.74922	0.00000	11.37461	39	74.10000	53000.00000	18.52500
REPAIR HERMETIC CHILLER									20	18.07000	44096.00000	4.51750
CHILL. HERMETIC CENT. 100T	CT	390.63695	5770.33557	195.31847	14004.96	33.14886	0.00000	16.57443	39	62.40000	37789.00000	15.60000
REPAIR CHILLER									20	16.77000	22331.02000	8.38500
CHILL. HERMETIC CENT. 300T	CT	390.50258	17201.44510	195.25129	25433.24	33.14886	0.00000	16.57443	39	97.50000	61771.50000	24.37500
REPAIR CHILLER									20	4.25000	66569.06000	8.12500
CHILL. HERMETIC CENT. 900T	CT	390.63695	51494.77371	195.31847	59729.40	33.14886	0.00000	16.57443	39	162.50000	127200.00000	40.62500
REPAIR CHILLER									20	16.77000	199283.18000	8.38500
CHILL. OPEN CENT. 300T	CT	1014.70865	17201.44510	507.35430	38591.50	86.44703	0.00000	43.22352	39	97.50000	61771.50000	24.37500
REPAIR CHILLER									20	28.25000	66569.06000	14.10500
CHILL. OPEN CENT. 900T	CT	390.63695	51494.77371	195.31847	59729.40	33.14886	0.00000	16.57443	39	162.50000	127200.00000	40.62500
REPAIR CHILLER									20	16.77000	199283.18000	8.38500
CHILL.DBL.BNDL. HERM.100T	CT	451.23359	5838.81157	225.61679	15350.82	38.34868	0.00000	19.17434	39	68.90000	41340.00000	17.22500
REPAIR CHILLER									20	16.77000	22596.02000	8.38500
CHILL.DBL.BNDL. HERM.300T	CT	455.53336	24720.10990	227.76668	34322.75	38.34868	0.00000	19.17434	39	107.90000	67840.00000	26.97500
REPAIR CHILLER									20	33.41000	95666.06000	16.70500
CHILL.DBL.BNDL. HERM.900T	CT	463.89777	51618.03051	231.94889	61397.00	38.34868	0.00000	19.17434	39	178.10000	139920.00000	44.52500
REPAIR CHILLER									20	65.78000	199760.18000	32.89000
CHILL. ONE STG. ABS. 100T	CT	1327.76857	1972.10880	663.88429	29961.47	113.74610	0.00000	56.87305	39	65.00000	37100.00000	16.25000
REPAIR CHILLER									20	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 300T	CT	197.64124	1972.10880	98.82062	6138.39	16.76942	0.00000	8.38471	39	104.00000	61480.00000	26.00000
REPAIR CHILLER									20	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 900T	CT	197.64124	1972.10880	98.82062	6138.39	16.76942	0.00000	8.38471	39	167.70000	113420.00000	41.92500
REPAIR CHILLER									20	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 300T	CT	197.64124	1972.10880	98.82062	6138.39	16.76942	0.00000	8.38471	39	114.40000	67040.00000	28.60000
REPAIR CHILLER									20	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 900T	CT	184.00699	1972.10880	92.00350	5850.98	15.78971	169.22743	7.89486	39	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 5T	CT	28.94809	119.96995	28.94809	776.51	2.47405	10.29467	2.48405	29	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 20T	CT	28.94809	144.07350	14.47404	754.30	2.48405	12.36300	1.24202	29	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 50T	CT	50.15691	168.17706	25.07846	1225.48	4.30398	14.43134	2.15199	29	31.20000	5294.70000	7.80000
AIR COOLED CONDENSER 100T	CT	50.15691	671.06480	25.07846	1728.37	4.30398	57.58433	2.15199	29	46.80000	10578.80000	11.70000
COOLING TOWER 50T	CT	54.36574	312.52446	27.18287	1458.55	4.66515	26.81785	2.33257	29	46.80000	4478.50000	11.70000
COOLING TOWER 100T	CT	166.46952	312.52446	83.23476	3821.70	14.28482	26.81785	7.14241	29	52.00000	10070.00000	13.00000
COOLING TOWER 300T	CT	193.73801	649.42638	96.86901	4733.42	16.62474	55.72753	8.31237	29	78.00000	16377.00000	19.50000
COOLING TOWER 900T	CT	210.40209	649.42638	105.20104	5084.70	18.05469	55.72753	9.02734	29	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 20T	CT	100.04509	205.29105	50.02254	2314.24	8.58491	17.61611	4.29245	29	36.40000	3688.80000	9.10000
EVAPORATIVE CONDENSER 100T	CT	162.15664	332.45098	81.07832	3750.71	13.91473	28.52775	6.95736	29	100.10000	10038.20000	25.02500
EVAPORATIVE CONDENSER 300T	CT	39.44845	586.08608	19.72422	1417.66	3.38509	50.29228	1.69254	29	182.00000	31800.00000	45.50000
EXPANSION TANK	CT	0.08023	0.00000	0.08023	1.82	0.00688	0.00000	0.00688	47	3.47100	135.68000	1.73550
REFRIG. FAN COIL 1T	CT	7.97768	13.69520	7.97768	334.63	0.68457	1.17519	0.68457	29	2.60000	855.42000	1.30000
REFRIG. FAN COIL 3T	CT	7.97768	24.10355	7.97768	205.04	0.68457	2.06834	0.68457	29	2.86000	1051.52000	1.43000
REFRIG. FAN COIL 5T	CT	7.97768	50.67224	7.97768	231.61	0.68457	4.34820	0.68457	29	3.25000	1240.20000	1.62500
DIST. PIPING SYSTEM												
PIPE/FITTINGS ST.& C.I.	TF	0.25506	0.13310	0.25506	5.92	0.02189	0.01142	0.02189	28	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	1.62868	14.14659	0.86126	48.63	0.00805	0.00370	0.00805	19	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	46.51117	1542.42267	24.24139	2526.03	0.16918	0.83189	0.16918	24	241.80000	8321.00000	120.90000
GATE VALVE, 3/8" - 1 1/2"	CT	0.37024	5.17952	0.37024	13.58	0.01542	0.01942	0.01542	19	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.33855	26.45847	0.33855	34.14	0.01548	0.03884	0.01548	19	0.57200	94.05380	0.57200
DRAIN VALVE	CT	1.50521	11.50939	1.50521	45.65	0.11281	0.56259	0.11281	19	0.68900	17.91400	0.68900

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
Zone: 5	UM	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
PIPE INSULATION	TF	0.69537	4.05617	0.69537	19.83	0.05967	0.34806	0.05967	28	91.00000	901.00000	91.00000
CIRCULATOR PUMP, < 1 HP	CT	3.73022	140.03137	3.73022	224.63	0.18951	0.47891	0.18951	14	4.19900	371.00000	4.19900
5 TON CHILLER ACH RECIP	CT	7.89006	521.97029	5.06334	691.87	0.19193	5.23422	0.19193	14	15.60000	1272.00000	7.80000
HEAT/COOL GENERATION EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	95.00088	2965.96281	55.21113	4993.26	7.02011	68.00268	4.45470	15	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	97.35648	3885.74361	55.80003	5960.81	7.02011	83.07904	4.45470	15	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	113.53789	7328.53106	62.96789	9741.75	7.39797	151.22233	4.81711	15	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	128.77706	11907.09252	70.08024	14639.93	7.77582	172.61130	5.19497	15	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	83.72348	625.69415	53.22361	2426.94	7.18435	53.69106	4.56714	29	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	23.53308	2965.96281	54.47723	4962.31	6.89415	68.00268	4.39172	15	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	95.88868	3886.70107	55.08413	5930.82	6.89415	83.16120	4.39172	15	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	112.07009	7305.55202	62.23399	9687.83	7.27201	149.25049	4.75413	15	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	127.30926	11907.09252	69.34634	14608.99	7.64987	172.61130	5.13199	15	105.30000	27305.60000	26.32500
3 DK.MULTI ZONE 6500 CFM	CT	93.58752	2965.94812	54.85779	4964.58	7.02011	68.00142	4.45470	15	32.50000	5997.48000	8.12500
3 DK.MULTI ZONE 10,000 CFM	CT	97.35648	3886.70107	55.80003	5961.77	7.02011	83.16120	4.45470	15	42.90000	8050.70000	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	113.53789	7052.06453	63.14794	9465.86	7.39797	127.49862	4.83256	15	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	128.77706	11682.32882	70.26029	14415.74	7.77582	153.32424	5.21042	15	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	94.47532	3174.16885	43.70426	5154.40	6.89415	68.00268	3.44708	15	39.00000	6572.00000	9.75000
D.D. VARI.VOL.10000 CFM	CT	97.30204	4195.93699	44.41094	6233.50	6.89415	83.16120	3.44708	15	46.80000	8904.00000	11.70000
D.D. VARI.VOL.25000 CFM	CT	114.89681	7880.00132	49.91048	10277.90	7.27201	148.76925	3.63601	15	83.20000	16960.00000	20.80000
D.D. VARI.VOL.50000 CFM	CT	131.07822	12725.26444	55.05669	15454.85	7.64987	168.98061	3.82494	15	115.70000	29680.00000	28.92500
D.D. VARI.VOL. 100,000CFM	CT	91.29806	3382.19264	45.54826	5306.43	7.83432	290.22728	3.90851	29	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CFM	CT	92.11972	2965.96281	82.74607	5025.24	6.89415	68.00268	6.84780	15	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000 CFM	CT	95.88868	3886.70107	55.06613	5930.82	6.89415	83.16120	4.39172	15	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	94.45644	6677.45837	44.80039	8660.83	5.76058	95.35352	3.25815	15	75.40000	15359.40000	18.85000
VARIABLE VOLUME 50000 CFM	CT	127.30926	11907.09252	69.52639	14609.56	7.64987	172.61130	5.14744	15	105.30000	27305.60000	26.32500
TERM. REHEAT 6500 CFM	CT	90.61359	2145.71590	53.78760	4082.99	6.89264	67.86871	4.39480	16	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	92.25991	2925.47863	54.19918	4896.14	6.89264	83.08872	4.39480	16	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	107.38226	6570.62806	61.29573	8858.58	7.27203	148.85441	4.77419	16	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	124.97410	9231.81030	69.00964	11887.14	7.65142	171.30848	5.15358	16	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	90.61359	2145.71590	53.78760	4082.99	6.89264	67.86871	4.39480	16	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	92.25991	2925.47863	54.19918	4896.14	6.89264	83.08872	4.39480	16	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	107.38226	6570.62806	61.29573	8858.58	7.27203	148.85441	4.77419	16	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	124.97410	9231.81030	69.00964	11887.14	7.65142	171.30848	5.15358	16	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	83.02975	818.93772	52.87675	2605.56	7.12482	70.27337	4.53737	29	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	82.20857	990.33677	52.46615	2759.65	7.05435	84.98119	4.50214	29	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	86.75332	1770.94649	57.01090	3643.34	7.44434	151.96561	4.89213	29	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	91.29806	2027.73676	61.55565	4003.20	7.83432	174.00089	5.28211	29	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	12.52243	87.80955	12.52243	371.82	1.07455	7.53497	1.07455	29	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	12.52243	87.80955	12.52243	371.82	1.07455	7.53497	1.07455	29	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	12.52243	87.80955	12.52243	371.82	1.07455	7.53497	1.07455	29	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	12.52243	87.80955	12.52243	371.82	1.07455	7.53497	1.07455	29	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	12.52243	87.80955	12.52243	371.82	1.07455	7.53497	1.07455	29	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	12.52243	87.80955	12.52243	371.82	1.07455	7.53497	1.07455	29	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	12.52243	87.80955	12.52243	371.82	1.07455	7.53497	1.07455	29	3.12000	827.86000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	12.52243	87.80955	12.52243	371.82	1.07455	7.53497	1.07455	29	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	21.47756	32.22379	21.47756	519.33	1.84300	2.76514	1.84300	29	2.50000	1590.00000	1.30000
UNIT VENT 1200 CFM	CT	21.47756	32.22379	21.47756	519.33	1.84300	2.76514	1.84300	29	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	82.20857	808.01546	52.46615	2577.33	7.05435	69.33612	4.50214	29	32.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	82.20857	990.33677	52.46615	2759.65	7.05435	84.98119	4.50214	29	37.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	86.75332	1770.94649	57.01090	3643.34	7.44434	151.96561	4.89213	29	71.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	91.29806	2027.73676	61.55565	4003.20	7.83432	174.00089	5.28211	29	113.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	82.84536	597.11531	81.61062	2472.10	6.89709	16.68155	6.89709	16	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	82.20857	625.69415	52.46615	2395.01	7.05435	53.69106	4.50214	29	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	21.47756	32.22379	21.47756	519.33	1.84300	2.76514	1.84300	29	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	21.47756	32.22379	21.47756	519.33	1.84300	2.76514	1.84300	29	3.25000	461.10000	1.62500
UNIT HEATER 4000 CFM	CT	21.47756	51.39707	21.47756	538.51	1.84300	4.41040	1.84300	29	3.25000	828.92000	1.62500

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION Zone: 5		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
UNIT HEATER 8000 CFM	CT	21.47756	59.61419	21.47756	546.73	1.84300	5 11552	1.84300	29	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50MBH	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	29	2.60000	445.20000	1.30000
HEAT PUMP 5T	CT	48.46421	1240.91385	48.46421	2340.08	4.15873	106.48331	4.15873	39	8.38500	2994.50000	4.19250
HEAT PUMP 10T	CT	113.60560	2348.36251	113.60560	4924.94	9.74854	201.51391	9.74854	39	14.30000	5989.00000	4.76667
HEAT PUMP 25T	CT	143.90392	6137.27654	143.90392	9401.02	12.34845	526.64211	12.34845	39	19.50000	17755.00000	4.87500
HEAT PUMP 1T	CT	51.89484	462.31209	51.17933	1637.00	4.33032	11.46661	4.33032	19	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	30.25043	14.83915	15.12521	652.52	2.55881	0.00000	1.27941	24	2.34000	80.56000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	56.37775	894.06092	51.97660	2158.62	4.33424	21.49550	4.33424	22	26.00000	2851.40000	6.50000
IID DRAFT FAN 10000 CFM	CT	57.11891	922.06861	52.34718	2202.26	4.39784	22.37967	4.36604	22	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	4.84747	19.67251	4.84747	129.61	0.33885	0.70146	0.33885	19	3.25000	41.58380	3.25000
EXHAUST FAN, 1000 CFM	CT	16.68555	87.71693	16.01371	466.00	1.31649	0.94596	1.31649	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	58.26696	759.54244	52.47874	2062.51	4.38302	22.34590	4.34900	19	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	58.26696	1930.37715	27.33623	3152.89	4.38302	68.06377	2.19151	19	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	60.06421	2314.88685	52.92805	3654.31	4.38302	70.37549	4.34900	19	32.50000	5406.00000	8.12500
EXHAUST FAN, 5000 CFM	CT	19.50507	432.83597	17.15916	867.70	1.32783	0.94596	1.29948	19	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM	CT	3.78729	0.00000	3.78729	85.90	0.32499	0.00000	0.32499	39	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	2.88106	39.26473	1.44053	100.00	0.00000	0.00000	0.00000	16	9.10000	124.02000	4.55000
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
ROOM HUMIDIFIER,FLOOR TYPE	CT	7.66276	72.62086	7.66276	246.41	0.04259	0.52085	0.04259	9	0.26000	169.60000	0.26000
CONTROLS/INSTRUMENT.												
DEVICES												
THERMOSTATS/PNEUMATICS	CT	15.01479	48.37966	15.01479	388.92	1.27113	0.00000	1.27113	20	0.78000	187.22780	0.78000
HUMIDITY SENSOR	CT	15.01479	25.90858	15.01479	366.44	1.27113	0.00000	1.27113	20	0.78000	100.26540	0.78000
FLOW SENSOR	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	29	0.78000	100.04280	0.78000
RADIATION SENSOR	CT	15.01479	19.92652	15.01479	330.46	1.27113	0.00000	1.27113	19	0.78000	77.11500	0.78000
WIND VELOCITY SENSOR	CT	14.75048	34.90555	14.75048	369.45	0.00000	0.00000	0.00000	10	1.56000	91.05400	1.56000
PRESSURE SENSOR	CT	15.01479	15.06472	15.01479	355.60	1.27113	0.00000	1.27113	19	0.78000	58.30000	0.78000
DAMPER CONTROLLER/ELECT.	CT	15.62028	104.63382	15.62028	458.35	1.25953	0.00000	1.25953	15	2.60000	287.20700	2.60000
SIMPLEX AIR COMPR.,1 HP	CT	51.81112	1175.19147	34.32954	2294.33	4.38778	4.36483	2.91676	24	3.67900	6103.82980	1.83950

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks			
Zone: 6	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.13209	33.38905	0.13209	36.38	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	6.88830	12.36810	3.44415	157.57	0.59109	1.06131	0.29554	75	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.32117	7.39922	0.32117	14.68	0.01891	0.00000	0.01891	14	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.46232	125.37574	0.34133	135.47	0.01891	0.00000	0.01891	14	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	2.60000	164.30000	1.30000
OIL FILTER	CT	1.21193	39.52765	1.21193	67.01	0.10400	3.39188	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.72663	160.23384	0.72663	176.71	0.03353	0.00000	0.03353	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	11.80085	207.95561	5.97119	456.94	0.13523	0.25237	0.07369	25	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITNGS,STEEL/IRON	TF	6.88830	12.36810	3.44415	157.57	0.59109	1.06131	0.29554	75	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	12.54964	11.94220	12.54964	296.57	1.07689	1.02477	1.07689	30	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	12.68117	63.20238	11.50337	347.04	0.88604	0.84149	0.88604	15	6.50000	147.34000	3.25000
STEAM REG. VALVE 2"	CT	12.50574	401.67635	6.25287	665.30	0.00000	0.00000	0.00000	6	7.80000	250.53100	3.90000
COND. METER,<300 #/HR.	CT	7.90933	227.22118	7.90933	406.60	0.67870	19.49794	0.67870	30	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	50	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	50	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	1.34368	59.98498	0.67184	88.31	0.00000	0.00000	0.00000	20	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	1.34368	67.79124	0.67184	96.12	0.00000	0.00000	0.00000	20	5.20000	262.35000	2.60000
R												
UIPMENT												
SOLAR PANEL, 3' X 8'	CT	1.41336	126.76752	0.70668	156.56	0.00000	0.00000	0.00000	15	3.90000	349.80000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	4.03104	566.98128	2.01552	651.96	0.00000	0.00000	0.00000	20	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.32781	1.75961	0.27393	9.02	0.02813	0.15099	0.02351	30	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	448.74266	399.50293	448.74266	10576.99	38.50678	34.28150	38.50678	30	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	503.98977	771.95916	503.98977	12202.45	43.24756	66.24212	43.24756	30	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	518.61415	4560.66115	518.61415	16322.83	44.50248	391.35213	44.50248	30	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR	CT	1483.2602	38346.56000	882.02724	70062.96	103.98820	0.00000	69.86437	30	20800.000	636000.00000	4160.0000
REPAIR BOILER									20	1050.4000	148400.00000	262.60000
BOILER COAL 100,000 KBTU/H	CT	1798.2489	71516.33440	1022.5072	109818.25	125.17747	0.00000	80.45960	30	41600.000	1590000.00000	8320.0000
REPAIR BOILER									20	1313.7800	276766.00000	328.44500
BOILER OIL 250 KBTU/HR	CT	514.59994	278.57576	514.59994	11949.70	44.15802	23.90470	44.15802	30	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	569.53753	278.57576	569.53753	13195.69	48.87224	23.90470	48.87224	30	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	627.10434	310.69206	627.10434	14533.42	53.81207	26.66061	53.81207	30	248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	519.98350	478.28078	519.98350	12271.51	44.61999	41.04146	44.61999	30	184.60000	18689.92000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	543.19552	8617.02997	543.19552	20936.70	46.61182	739.43073	46.61182	30	651.30000	71020.00000	162.82500
BOILR.PNEUMAT.COAL SPREAD.	CT	2361.6260	4757.08920	2267.1979	58016.60	192.63969	99.14442	192.04605	12	182.00000	5618.00000	45.50000
ASH HANDLING SYSTEM	CT	6370.3485	55695.14021	4352.3836	193717.16	316.03869	78.45989	315.82889	20	10400.000	212000.00000	2600.0000
FUEL OIL EQUIPMENT	CT	9.99134	113.15129	4.99567	323.77	0.77651	0.31495	0.38825	15	2.60000	302.10000	1.30000
CHEMICAL FEED SYSTEM	CT	8.51682	140.98085	7.92792	332.26	0.62976	0.00000	0.62976	15	3.25000	389.02000	1.62500
FEED-WATER SUPPLY	CT	230.53524	998.77440	223.62548	6205.20	18.89293	0.00000	18.89293	15	28.60000	2756.00000	9.53333
DEAERATOR	CT	289.71300	5478.08000	128.06050	11531.48	19.09530	0.00000	9.54765	20	260.00000	21200.00000	65.00000

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks			
Zone: 6	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
BLOWOFF SYSTEM	CT	0.94224	53.39602	0.47112	73.26	0.00000	0.00000	0.00000	15	2.60000	147.34000	1.30000
HOUSE FURN.GAS 25KBTU/HR	CT	51.57552	345.23299	49.69104	1508.94	4.10230	18.58179	4.10230	15	10.40000	355.10000	5.20000
HOUSE FURN.GAS 100KBTU/HR	CT	55.38049	430.06373	51.61153	1674.03	4.10539	22.23516	4.10539	15	20.80000	471.70000	10.40000
HOUSE FURN.GAS 200KBTU/HR	CT	55.38049	962.92414	51.61153	2206.89	4.10539	27.08532	4.10539	15	20.80000	1786.10000	10.40000
HOUSE FURN.OIL 25KBTU/HR	CT	66.28957	614.88215	64.40509	2112.30	5.36492	26.39244	5.36492	15	10.40000	848.00000	5.20000
HOUSE FURN.OIL 100KBTU/HR	CT	70.05853	827.77980	66.28957	2404.65	5.36492	28.78603	5.36492	15	20.80000	1358.49600	10.40000
HOUSE FURN.OIL 200KBTU/HR	CT	70.05853	970.85347	66.28957	2547.72	5.36492	33.69918	5.36492	15	20.80000	1595.30000	10.40000
HOUSE FURN.ELECT 25KBTU/HR	CT	28.75685	364.61965	26.87237	1010.79	2.14422	12.59782	2.14422	15	10.40000	601.02000	5.20000
HOUSE FURN.ELECT.100KBTU	CT	32.52581	483.66846	28.75685	1209.29	2.14422	18.14087	2.14422	15	20.80000	751.27500	10.40000
HOUSE FURN.ELECT.200KBTU/H	CT	32.52581	617.32810	28.75685	1342.95	2.14422	23.30597	2.14422	15	20.80000	954.00000	10.40000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	50	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	1.34368	59.98498	0.67184	88.31	0.00000	0.00000	0.00000	20	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	1.34368	67.79124	0.67184	96.12	0.00000	0.00000	0.00000	20	5.20000	262.35000	2.60000
EXPANSION TANK	CT	0.07903	0.00000	0.07903	1.79	0.00678	0.00000	0.00678	50	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	12.54964	11.94220	12.54964	296.57	1.07689	1.02477	1.07689	30	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	12.68117	63.20238	11.50337	347.04	0.88604	0.84149	0.88604	15	6.50000	147.34000	3.25000
STORAGE TANK, DHW	CT	20.68248	29.36465	20.68248	498.44	1.77477	2.51979	1.77477	50	3.59395	346.62000	1.79698
IND. FUR., GAS/OIL 500 MBU	CT	53.34538	731.32275	44.09423	1911.59	4.57759	62.75509	3.78374	30	65.00000	6784.00000	16.25000
IND.FURN.GAS/OIL 2000 MBTU	CT	85.24034	1520.45484	85.24034	3453.71	7.31451	130.47083	7.31451	30	184.60000	13780.00000	46.15000
SURGE TANK, 1000 GAL	CT	1.88448	570.45384	0.94224	610.18	0.00000	0.00000	0.00000	15	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.11778	0.06146	0.11778	2.73	0.01011	0.00527	0.01011	50	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.14153	0.06502	0.14153	3.27	0.01214	0.00558	0.01214	30	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	46.51117	1489.70463	24.24139	2473.31	0.16918	0.83189	0.16918	25	241.80000	8034.80000	120.90000
PIPE INSULATION		0.68489	4.20984	0.68489	19.74	0.05877	0.36125	0.05877	30	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"		0.83568	4.85527	0.83568	23.81	0.06595	0.01942	0.06595	20	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"		0.32820	24.75609	0.32820	32.20	0.01548	0.03884	0.01548	20	0.57200	94.05380	0.57200
DRAIN VALVE	CT	1.41476	11.11178	1.41476	43.20	0.10612	0.55629	0.10612	20	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	0.51823	7.32947	0.25912	18.25	0.00000	0.00000	0.00000	15	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	12.50574	401.67635	6.25287	665.30	0.00000	0.00000	0.00000	6	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	9.88678	113.87731	9.88678	338.11	0.76286	4.79115	0.76286	10	1.30000	75.70520	1.30000
PIPE INSULATION	TF	0.68489	4.20984	0.68489	19.74	0.05877	0.36125	0.05877	30	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	3.75834	140.03137	3.75834	225.27	0.19193	0.47891	0.19193	15	4.19900	371.00000	4.19900
CIRCULATION PUMP 5 HP	CT	3.75834	521.97029	2.99748	604.77	0.19193	5.23422	0.19193	15	4.19900	1272.00000	2.09950
COND. RCVR., 10 - 15 GAL.	CT	26.82915	603.63869	24.81363	1205.67	1.95631	9.49162	1.95631	20	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T	CT	54.21640	1796.96251	53.13305	3023.12	3.55916	0.00000	3.55916	20	8.38500	1855.00000	4.19250
REPAIR AIR CONDITIONER									10	20.80000	2592.23000	20.80000
A/C DX PACKAGE 20T	CT	121.02059	6638.40032	117.50463	9371.90	9.02502	0.00000	9.02502	20	20.41000	7950.00000	6.80333
REPAIR AIR CONDITIONER									10	20.80000	9018.53300	20.80000
A/C DX PACKAGE 50T	CT	159.02297	19331.87508	149.77677	22908.93	11.56728	0.00000	11.56728	20	47.71000	21200.00000	11.92750
REPAIR AIR CONDITIONER									10	23.40000	27255.15460	23.40000
A/C WINDOW 1T	CT	24.12432	407.90506	24.12432	955.04	1.67669	0.13335	1.67669	10	5.98000	530.00000	5.98000
A/C WINDOW 2T	CT	24.52301	570.44546	24.52301	1126.63	1.67669	0.13335	1.67669	10	6.50000	742.00000	6.50000
A/C PAD MTD. 4T	CT	59.90413	1145.55309	57.41236	2496.21	4.71276	0.66677	4.71276	10	6.50000	1484.00000	3.25000
A/C PAD MOUNTED 20 TON	CT	121.02059	6638.40032	117.50463	9371.90	9.02502	0.00000	9.02502	20	20.41000	7950.00000	6.80333
REPAIR AIR CONDITIONER									10	20.80000	9018.53300	20.80000
CHILLER-AIR COOL RECIP.20T	CT	273.76938	5382.51994	135.03713	11147.67	21.99055	0.00000	10.99527	20	28.60000	10759.00000	7.15000
REPAIR HERMETIC CHILLER									10	19.89000	5119.80000	9.94500
CHILLER AIR COOL REC.50T	CT	341.38711	10722.35050	166.00869	17903.80	28.40097	497.02053	14.02187	20	40.30000	19080.00000	10.07500
CHILLER AIR COOL REC.100T	CT	349.78511	25306.11670	167.06744	32654.55	27.32929	0.00000	13.66465	20	72.80000	40280.00000	18.20000
REPAIR HERMETIC CHILLER									10	24.57000	29309.00000	6.14250
CHILLER-AIR COOL RECIP. 5T	CT	151.90426	1976.99222	149.21690	5413.58	11.82151	0.00000	11.82151	20	15.60000	3710.00000	5.20000
REPAIR HERMETIC CHILLER									10	19.89000	2003.40000	19.89000
CHILLER AIR COOL REC. 10T	CT	217.84239	3615.42468	108.02541	8204.68	17.16025	0.00000	8.58013	20	20.80000	6360.00000	6.93333
REPAIR HERMETIC CHILLER									10	24.57000	3879.60000	12.28500
CHILLER AIR COOL REC. 15T	CT	279.11087	6745.86809	137.70788	12623.61	22.24477	0.00000	11.12239	20	28.60000	8268.00000	7.15000

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
Zone: 6	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
REPAIR HERMETIC CHILLER									10	24.57000	9068.30000	12.28500
CHILLER WAT.COOL REC.20T	CT	272.31026	4894.03738	134.22359	10628.16	22.24477	0.00000	11.12239	20	29.90000	9540.00000	7.47500
REPAIR HERMETIC CHILLER									10	10.53000	4778.48000	5.26500
CHILLER WAT.COOL REC.50T	CT	280.84572	9819.81880	135.78477	15725.20	22.24477	0.00000	11.12239	20	48.10000	15900.00000	12.02500
REPAIR HERMETIC CHILLER									10	18.07000	11236.00000	6.02333
CHILLER WAT.COOL REC.100T	CT	287.56412	21747.61720	136.69896	27786.80	22.24477	0.00000	11.12239	20	74.10000	27030.00000	18.52500
REPAIR HERMETIC CHILLER									10	18.07000	29044.00000	4.51750
CHILLER WAT. COOL REC. 10T	CT	240.33234	3093.67360	118.82249	8155.58	19.70251	0.00000	9.85126	20	20.80000	5300.00000	5.20000
REPAIR HERMETIC CHILLER									10	10.53000	3392.00000	5.26500
CHILLER WAT.COOL REC.200T	CT	287.56412	36109.19680	136.69896	42148.38	22.24477	0.00000	11.12239	20	74.10000	53000.00000	18.52500
REPAIR HERMETIC CHILLER									10	18.07000	44096.00000	4.51750
CHILL. HERMETIC CENT. 100T	CT	402.38597	21115.53507	197.16195	29584.93	32.41381	0.00000	16.20691	20	62.40000	37789.00000	15.60000
REPAIR CHILLER									10	16.77000	22331.02000	8.38500
CHILL. HERMETIC CENT. 300T	CT	411.19150	49798.80880	199.29725	58446.57	32.41381	0.00000	16.20691	20	97.50000	61771.50000	24.37500
REPAIR CHILLER									10	16.25000	66569.06000	8.12500
CHILL. HERMETIC CENT. 900T	CT	428.25181	134164.12039	203.62841	143158.08	32.41381	0.00000	16.20691	20	162.50000	127200.00000	40.62500
REPAIR CHILLER									10	16.77000	199283.18000	8.38500
CHILL. OPEN CENT. 300T	CT	1024.6136	49798.80880	506.00830	71377.51	84.53014	0.00000	42.26507	20	97.50000	61771.50000	24.37500
REPAIR CHILLER									10	28.21000	66569.06000	14.10500
CHILL. OPEN CENT. 900T	CT	428.25181	134164.12039	203.62841	143158.08	32.41381	0.00000	16.20691	20	162.50000	127200.00000	40.62500
REPAIR CHILLER									10	16.77000	199283.18000	8.38500
CHILL.DBL.BNDL. HERM.100T	CT	463.31853	22167.81297	227.20833	31920.32	37.49833	0.00000	18.74917	20	68.90000	41340.00000	17.22500
REPAIR CHILLER									10	16.77000	22596.02000	8.38500
CHILL.DBL.BNDL. HERM.300T	CT	481.85424	66156.91430	233.95678	76292.10	37.49833	0.00000	18.74917	20	107.90000	67840.00000	26.97500
REPAIR CHILLER									10	33.41000	95666.06000	16.70500
CHILL.DBL.BNDL. HERM.900T	CT	516.44759	137693.42749	246.71854	148543.33	37.49833	0.00000	18.74917	20	178.10000	139920.00000	44.52500
REPAIR CHILLER									10	65.78000	199760.18000	32.89000
CHILL. ONE STG. ABS. 100T	CT	1317.3157	13465.98560	654.45886	41221.56	111.22387	0.00000	55.61194	20	65.00000	37100.00000	16.25000
REPAIR CHILLER									10	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 300T	CT	222.32561	19765.77760	104.44441	24430.90	16.39758	0.00000	8.19879	20	104.00000	61480.00000	26.00000
REPAIR CHILLER									10	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 900T	CT	238.78569	33187.07360	108.55943	38186.01	16.39758	0.00000	8.19879	20	167.70000	113420.00000	41.92500
REPAIR CHILLER									10	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 300T	CT	225.01297	21409.20160	105.11625	26128.83	16.39758	0.00000	8.19879	20	114.40000	67840.00000	28.60000
REPAIR CHILLER									10	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 900T	CT	229.82073	36391.75040	102.98521	41198.21	15.62780	332.88817	7.81390	20	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 5T	CT	34.21956	619.22550	32.57064	1390.05	2.65341	27.58923	2.65341	15	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 20T	CT	38.45964	1269.64150	17.97350	2076.35	2.65341	33.13228	1.32670	15	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 50T	CT	62.77786	2369.50598	28.56221	3683.82	4.41674	38.67532	2.20837	15	31.20000	5294.70000	7.80000
AIR COOLED CONDENSER 100T	CT	68.43130	5632.17962	29.97557	7061.14	4.41674	154.32334	2.20837	15	46.80000	10578.80000	11.70000
COOLING TOWER 50T	CT	71.93446	2460.55945	31.72715	3963.37	4.71735	71.87059	2.35868	15	46.80000	4478.50000	11.70000
COOLING TOWER 100T	CT	182.43644	4486.91905	86.50702	8317.60	14.03786	71.87059	7.01893	15	52.00000	10070.00000	13.00000
COOLING TOWER 300T	CT	218.27931	7675.45735	102.07285	12254.17	16.30501	149.34720	8.15251	15	78.00000	16377.00000	19.50000
COOLING TOWER 900T	CT	252.79883	17375.09335	114.73920	22666.78	17.69049	149.34720	8.84525	15	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 20T	CT	115.41312	1886.99160	54.40872	4309.35	8.77169	47.21034	4.38584	15	36.40000	3688.80000	9.10000
EVAPORATIVE CONDENSER 100T	CT	198.67796	4528.79687	90.26992	8687.91	13.93576	76.45304	6.96788	15	100.10000	10038.20000	25.02500
EVAPORATIVE CONDENSER 300T	CT	109.46640	13095.00349	38.24400	15349.79	3.73358	134.78097	1.86679	15	182.00000	31800.00000	45.50000
EXPANSION TANK	CT	0.07903	0.00000	0.07903	1.79	0.00678	0.00000	0.00678	50	3.47100	135.68000	1.73550
REFRIG. FAN COIL 1T	CT	9.36156	346.70671	8.89044	557.52	0.72247	3.14946	0.72247	15	2.60000	855.42000	1.30000
REFRIG. FAN COIL 3T	CT	9.45578	445.66725	8.93755	658.47	0.72247	5.54304	0.72247	15	2.86000	1051.52000	1.43000
REFRIG. FAN COIL 5T	CT	9.59712	585.24773	9.00822	801.03	0.72247	11.65299	0.72247	15	3.25000	1240.20000	1.62500
DIST. PIPING SYSTEM												
PIPE/FITTINGS ST.& C.I.	TF	0.24918	0.13003	0.24918	5.78	0.02138	0.01116	0.02138	30	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	1.52821	13.22336	0.81102	45.59	0.00805	0.00370	0.00805	20	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	46.51117	1542.42267	24.24139	2526.03	0.16918	0.83189	0.16918	25	241.80000	8321.00000	120.90000
GATE VALVE, 3/8" - 1 1/2"	CT	0.35777	4.85527	0.35777	12.97	0.01542	0.01942	0.01542	20	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.32820	24.75609	0.32820	32.20	0.01548	0.03884	0.01548	20	0.57200	94.05380	0.57200
DRAIN VALVE	CT	1.41476	11.11178	1.41476	43.20	0.10612	0.55629	0.10612	20	0.68900	17.91400	0.68900

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 6	UM	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
PIPE INSULATION	TF	0.68489	3.99505	0.68489	19.53	0.05877	0.34282	0.05877	30	91.00000	901.00000	91.00000
CIRCULATOR PUMP, < 1 HP	CT	3.73022	140.03137	3.73022	224.63	0.18951	0.47891	0.18951	15	4.19900	371.00000	4.19900
5 TON CHILLER ACH RECIP	CT	7.89006	521.97029	5.06334	691.87	0.19193	5.23422	0.19193	15	15.60000	1272.00000	7.80000
HEAT/COOL GENERATION EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	95.00088	2965.96281	55.21113	4993.26	7.02011	68.00268	4.45470	15	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	97.35648	3885.74361	55.80003	5960.81	7.02011	83.07904	4.45470	15	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	113.53789	7328.53106	62.96789	9741.75	7.39797	151.22233	4.81711	15	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	128.77706	11907.09252	70.08024	14639.93	7.77582	172.61130	5.19497	15	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	91.23192	2152.40071	54.26889	4103.26	7.02011	52.84416	4.45470	15	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	93.53308	2965.96281	54.47723	4962.31	6.89415	68.00268	4.39172	15	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	95.88868	3886.70107	55.06613	5930.82	6.89415	83.16120	4.39172	15	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	112.07009	7305.55202	62.23399	9687.83	7.27201	149.25049	4.75413	15	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	127.30926	11907.09252	69.34634	14608.99	7.64987	172.61130	5.13199	15	105.30000	27305.60000	26.32500
3 DK.MULTI ZONE 6500 CFM	CT	93.58752	2965.94812	54.85779	4964.58	7.02011	68.00142	4.45470	15	32.50000	5997.48000	8.12500
3 DK.MULTI ZONE 10,000 CFM	CT	97.35648	3886.70107	55.80003	5961.77	7.02011	83.16120	4.45470	15	42.90000	8050.70000	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	113.53789	7052.06453	63.14794	9465.86	7.39797	127.49662	4.83256	15	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	128.77706	11682.32882	70.26029	14415.74	7.77582	153.32424	5.21042	15	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	94.47532	3174.16885	43.70426	5154.40	6.89415	68.00268	3.44708	15	39.00000	6572.00000	9.75000
D.D. VARI.VOL.10000 CFM	CT	97.30204	4195.93699	44.41094	6233.50	6.89415	83.16120	3.44708	15	46.80000	8904.00000	11.70000
D.D. VARI.VOL.25000 CFM	CT	114.89681	7880.00132	49.91048	10277.90	7.27201	148.76925	3.63601	15	83.20000	16960.00000	20.80000
D.D. VARI.VOL.50000 CFM	CT	131.07822	12725.26444	55.05669	15454.85	7.64987	168.98061	3.82494	15	115.70000	29680.00000	28.92500
D.D. VARI.VOL. 100,000CFM	CT	150.39414	20992.62642	59.61560	24113.07	7.64987	285.06233	3.80176	15	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CFM	CT	92.11972	2965.96281	82.74607	5025.24	6.89415	68.00268	6.84780	15	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000 CFM	CT	95.88868	3886.70107	55.06613	5930.82	6.89415	83.16120	4.39172	15	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	94.45644	6677.45837	44.80039	8660.83	5.76058	95.35352	3.25815	15	75.40000	15359.40000	18.85000
VARIABLE VOLUME 50000 CFM	CT	127.30926	11907.09252	69.52639	14609.56	7.64987	172.61130	5.14744	15	105.30000	27305.60000	26.32500
TERM. REHEAT 6500 CFM	CT	92.11972	2343.26538	54.12389	4310.95	6.89415	68.00268	4.39172	15	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	94.00420	3209.45520	54.59501	5215.36	6.89415	83.16120	4.39172	15	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	110.65673	7274.82050	62.06070	9629.01	7.27201	149.25049	4.76958	15	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	130.13598	10293.68772	70.23307	13053.48	7.64987	172.61130	5.14744	15	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	92.11972	2343.26538	54.12389	4310.95	6.89415	68.00268	4.39172	15	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	94.00420	3209.45520	54.59501	5215.36	6.89415	83.16120	4.39172	15	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	110.65673	7274.82050	62.06070	9629.01	7.27201	149.25049	4.76958	15	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	130.13598	10293.68772	70.23307	13053.48	7.64987	172.61130	5.14744	15	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	92.11972	2342.78665	54.12389	4310.48	6.89415	67.96160	4.39172	15	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	94.00420	3209.45520	54.59501	5215.36	6.89415	83.16120	4.39172	15	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	110.65673	7274.82050	62.06070	9629.01	7.27201	149.25049	4.76958	15	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	130.13598	10293.68772	70.23307	13053.48	7.64987	172.61130	5.14744	15	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	13.76497	329.39479	13.29385	640.08	1.10032	9.31146	1.10032	15	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	13.76497	360.12631	13.29385	670.81	1.10032	9.31146	1.10032	15	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	13.85920	381.25423	13.34096	693.92	1.10032	9.31146	1.10032	15	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	14.00053	557.96047	13.41163	873.61	1.10032	9.31146	1.10032	15	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	13.85920	349.37028	13.34096	662.04	1.10032	9.31146	1.10032	15	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	13.85920	661.67935	13.34096	974.35	1.10032	9.31146	1.10032	15	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	13.95342	408.52845	13.38808	723.18	1.10032	9.31146	1.10032	15	3.12000	827.80000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	14.14187	602.90532	13.48230	921.53	1.10032	9.31146	1.10032	15	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	22.21170	630.87087	21.74058	1133.12	1.82514	4.68996	1.82514	15	2.60000	1590.00000	1.30000
UNIT VENT 1200 CFM	CT	22.44726	746.11407	21.85836	1253.33	1.82514	4.68996	1.82514	15	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	92.11972	2343.26538	54.12389	4310.95	6.89415	68.00268	4.39172	15	32.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	94.00420	3209.45520	54.59501	5215.36	6.89415	83.16120	4.39172	15	37.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	110.65673	7274.82050	62.06070	9629.01	7.27201	149.25049	4.76958	15	71.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	130.13598	10293.68772	70.23307	13053.48	7.64987	172.61130	5.14744	15	113.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	83.16844	658.62693	81.75508	2540.36	6.89415	16.96078	6.89415	15	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	88.82188	1960.32871	53.29943	3861.14	6.89415	52.84416	4.39172	15	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	22.21170	167.97735	21.74058	670.23	1.82514	4.68996	1.82514	15	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	22.44726	221.75751	21.85836	728.98	1.82514	4.68996	1.82514	15	3.25000	461.10000	1.62500
UNIT HEATER 4000 CFM	CT	22.44726	406.43898	21.85836	913.66	1.82514	9.09919	1.82514	15	3.25000	828.92000	1.62500

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks			
Zone: 6	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
UNIT HEATER 8000 CFM	CT	22.44726	589.03267	21.85836	1096.25	1.82514	10.98887	1.82514	15	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50#BH	CT	15.62028	161.34048	15.14916	514.10	1.25953	0.00000	1.25953	15	2.60000	445.20000	1.30000
HEAT PUMP 5T	CT	55.53798	3214.78698	54.45463	4470.92	4.57981	209.46387	4.57981	20	8.38500	2994.50000	4.19250
HEAT PUMP 10T	CT	120.76334	6167.03385	118.29993	8898.06	10.04567	396.39907	10.04567	20	14.30000	5989.00000	4.76667
HEAT PUMP 25T	CT	151.73350	16660.56098	147.95440	20089.78	12.58793	1035.96047	12.58793	20	19.50000	17755.00000	4.87500
HEAT PUMP 1T	CT	51.89484	462.31209	51.17933	1637.00	4.33032	11.46661	4.33032	20	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	30.25043	14.83915	15.12521	652.52	2.55881	0.00000	1.27941	25	2.34000	80.56000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	57.08342	986.58489	52.04462	2265.11	4.32184	21.43399	4.32184	20	26.00000	2851.40000	6.50000
IND DRAFT FAN 10000 CFM	CT	57.87636	1017.87759	52.44109	2313.12	4.38989	22.37995	4.35586	20	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	4.68445	18.91984	4.68445	125.16	0.32991	0.70146	0.32991	20	3.25000	41.58380	3.25000
EXHAUST FAN, 1000 CFM	CT	16.68555	87.71693	16.01371	464.00	1.31649	0.94596	1.31649	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	57.87636	727.26545	52.44109	2022.51	4.38989	22.37995	4.35586	20	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	57.87636	1857.15455	27.25858	3071.81	4.38989	68.16838	2.19494	20	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	59.55596	2218.25733	52.86099	3547.56	4.38989	70.48010	4.35586	20	32.50000	5406.00000	8.12500
EXHAUST FAN, 5000 CFM	CT	19.50507	432.83597	17.15916	867.70	1.32783	0.94596	1.29948	20	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM	CT	5.10845	211.84227	5.10845	327.70	0.36629	2.90079	0.36629	20	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	3.29784	44.94485	1.64892	114.46	0.00000	0.00000	0.00000	15	9.10000	124.02000	4.55000
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
ROOM HUMIDIFIER,FLOOR TYPE	CT	7.66714	71.02445	7.66714	244.92	0.64937	0.51557	0.64937	10	0.13000	84.80000	0.13000
CONTROLS/INSTRUMENT.												
DEVICES												
THERMOSTATS/PNEUMATICS	CT	15.01479	48.37966	15.01479	388.92	1.27113	0.00000	1.27113	20	0.78000	187.22780	0.78000
HUMIDITY SENSOR	CT	14.75048	76.87348	14.75048	411.41	1.21443	0.00000	1.21443	10	0.78000	100.26540	0.78000
FLOW SENSOR	CT	14.96071	36.25551	14.96071	375.56	1.25953	0.00000	1.25953	15	0.78000	100.04280	0.78000
RADIATION SENSOR	CT	15.01479	19.92652	15.01479	360.46	1.27113	0.00000	1.27113	20	0.78000	77.11500	0.78000
WIND VELOCITY SENSOR	CT	14.75048	34.90555	14.75048	369.45	1.21443	0.00000	1.21443	10	0.78000	45.52700	0.78000
PRESSURE SENSOR	CT	15.01479	15.06472	15.01479	355.60	1.27113	0.00000	1.27113	20	0.78000	58.30000	0.78000
DAMPER CONTROLLER/ELECT.	CT	15.62028	104.08382	15.62028	458.35	1.25953	0.00000	1.25953	15	2.60000	287.20700	2.60000
SINPLEX AIR COMPR.,1 HP	CT	51.81112	1175.19147	34.32954	2294.33	4.38778	4.36483	2.91676	25	3.67900	6103.82980	1.83950

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION Zone: 7	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks			
		labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.13209	33.38905	0.13209	36.38	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	7.52975	13.51983	3.76487	172.25	0.64613	1.16014	0.32307	66	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.38045	11.43274	0.38045	20.06	0.01928	0.00000	0.01928	12	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.59855	193.72136	0.41160	206.70	0.01928	0.00000	0.01928	12	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	26	2.60000	164.30000	1.30000
OIL FILTER	CT	1.21193	39.52765	1.21193	67.01	0.10400	3.39188	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.72663	160.23384	0.72663	176.71	0.03353	0.00000	0.03353	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	14.32617	254.56868	7.24060	556.81	0.15425	0.28872	0.08378	22	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	26	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITNGS,STEEL/IRON	TF	7.52975	13.51983	3.76487	172.25	0.64613	1.16014	0.32307	66	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	16.24752	178.06904	15.52239	544.24	1.26976	1.20668	1.26976	23	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	16.13404	105.90505	14.05047	465.16	1.02688	0.98213	1.02688	12	6.50000	147.34000	3.25000
STEAM REG. VALVE 2"	CT	16.24506	521.78091	8.12253	864.23	0.00000	0.00000	0.00000	5	7.80000	250.53100	3.90000
COND. METER,<300 #/HR.	CT	7.95886	243.14672	7.95886	423.65	0.68295	20.86452	0.68295	26	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	39	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	39	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	1.76124	78.62582	0.88062	115.75	0.00000	0.00000	0.00000	15	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	1.76124	88.85795	0.88062	125.98	0.00000	0.00000	0.00000	15	5.20000	262.35000	2.60000
SOLAR												
EQUIPMENT												
SOLAR PANEL, 3' X 8'	CT	1.51242	135.65244	0.75621	167.53	0.00000	0.00000	0.00000	13	3.90000	349.80000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	4.61604	649.26378	2.30802	746.57	0.00000	0.00000	0.00000	18	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.29526	1.53776	0.24819	8.08	0.02534	0.13196	0.02130	33	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	456.53057	1161.94360	450.12482	11495.56	38.07571	46.10205	38.07571	23	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	532.61523	4001.12562	505.32673	15993.52	42.58174	89.08295	42.58174	23	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	560.55994	13654.55100	523.79734	26250.41	43.89572	526.29359	43.89572	23	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR REPAIR BOILER	CT	5646.7376	175618.68000	1709.2264	291086.65	102.22482	0.00000	68.67816	23	20800.000	636000.00000	4160.0000
									15	1050.4000	148400.00000	262.60000
BOILER COAL 100,000 KBTU/H REPAIR BOILER	CT	10078.379	407129.64420	2672.8414	612009.56	123.05570	0.00000	79.09360	23	41600.000	1590000.00000	8320.0000
									15	1313.7800	276766.00000	328.44500
BOILER OIL 250 KBTU/HR	CT	526.19059	999.31974	516.58196	12902.57	44.05326	32.14723	44.05326	23	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	599.53321	3337.61953	572.24471	16847.71	48.32400	32.14723	48.32400	23	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	668.75848	7939.15727	631.99588	22968.96	53.18028	35.85341	53.18028	23	248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	551.52382	4326.97919	524.23532	16748.22	44.20429	55.19290	44.20429	23	184.60000	18689.92000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	666.50643	25586.29549	570.22800	40394.57	46.17759	994.39259	46.17759	23	651.30000	71020.00000	162.82500
BOILR.PNEUMAT.COAL SPREAD.	CT	2361.6933	5790.90879	2246.2939	58984.84	186.15780	118.58159	185.44779	9	364.00000	11236.00000	91.00000
ASH HANDLING SYSTEM	CT	7182.0473	73205.86066	4536.4398	227628.75	314.02891	120.25989	313.70734	15	10400.000	212000.00000	2600.0000
FUEL OIL EQUIPMENT	CT	11.24975	198.13043	5.62487	435.28	0.82231	0.38221	0.41116	12	2.60000	302.10000	1.30000
CHEMICAL FEED SYSTEM	CT	9.24144	249.40072	8.19965	455.66	0.61422	0.00000	0.61422	12	3.25000	389.02000	1.62500
FEED-WATER SUPPLY	CT	233.07141	1766.87160	220.84777	7013.82	18.42658	0.00000	18.42658	12	28.60000	2756.00000	9.53333
DEAERATOR	CT	309.20117	7180.44000	132.58508	13627.95	18.97604	0.00000	9.48802	15	260.00000	21200.00000	65.00000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 7	UM	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
BLOWOFF SYSTEM	CT	1.66686	94.45967	0.83343	129.60	0.00000	0.00000	0.00000	12	2.60000	147.34000	1.30000
HOUSE FURN.GAS 25KBTU/HR	CT	53.84305	490.44769	50.50933	1700.94	4.04816	22.55038	4.04816	12	10.40000	355.10000	5.20000
HOUSE FURN.GAS 100KBTU/HR	CT	60.55420	616.86774	53.88676	1968.90	4.05191	26.98401	4.05191	12	20.80000	471.70000	10.40000
HOUSE FURN.GAS 200KBTU/HR	CT	60.55420	1528.12303	53.88676	2880.16	4.05191	32.87004	4.05191	12	20.80000	1786.10000	10.40000
HOUSE FURN.OIL 25KBTU/HR	CT	68.20249	916.90806	64.86877	2453.07	5.28035	32.02918	5.28035	12	10.40000	848.00000	5.20000
HOUSE FURN.OIL 100KBTU/HR	CT	74.86992	1278.03835	68.20249	2954.75	5.28035	34.93397	5.28035	12	20.80000	1358.49600	10.40000
HOUSE FURN.OIL 200KBTU/HR	CT	74.86992	1499.33767	68.20249	3176.05	5.28035	40.89645	5.28035	12	20.80000	1595.30000	10.40000
HOUSE FURN.ELECT 25KBTU/HR	CT	31.74635	563.47872	28.41263	1272.82	2.15203	15.28839	2.15203	12	10.40000	601.02000	5.20000
HOUSE FURN.ELECT.100KBTU	CT	38.41379	738.19971	31.74635	1588.09	2.15203	22.01528	2.15203	12	20.80000	751.27500	10.40000
HOUSE FURN.ELECT.200KBTU/H	CT	38.41379	941.21428	31.74635	1791.10	2.15203	28.28352	2.15203	12	20.80000	954.00000	10.40000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	39	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	1.76124	78.62582	0.88062	115.75	0.00000	0.00000	0.00000	15	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	1.76124	88.85795	0.88062	125.98	0.00000	0.00000	0.00000	15	5.20000	262.35000	2.60000
EXPANSION TANK	CT	0.10074	0.00000	0.10074	2.28	0.00864	0.00000	0.00864	39	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	16.11868	178.06904	15.39355	541.32	1.25870	1.20668	1.25870	23	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	16.13404	105.90505	14.05047	465.16	1.02688	0.98213	1.02688	12	6.50000	147.34000	3.25000
STORAGE TANK, DIW	CT	23.12496	32.83244	23.12496	557.31	1.98436	2.81736	1.98436	44	3.59395	346.62000	1.79698
IND. FUR., GAS/OIL 500 MBU	CT	55.42746	875.25080	45.13527	2099.41	4.75625	75.10562	3.87307	26	65.00000	6784.00000	16.25000
IND.FURN.GAS/OIL 2000 MBTU	CT	86.87397	1819.68813	86.87397	3789.99	7.45469	156.14815	7.45469	26	184.60000	13780.00000	46.15000
SURGE TANK, 1000 GAL	CT	2.01656	610.43598	1.00828	652.95	0.00000	0.00000	0.00000	13	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.20836	0.10873	0.20836	4.83	0.01788	0.00933	0.01788	39	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	1.26406	10.13159	0.71701	37.05	0.01458	0.00670	0.01458	23	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	56.60374	1824.40033	29.51361	3025.32	0.19105	0.93928	0.19105	22	241.80000	8034.80000	120.90000
PIPE INSULATION	TF	0.72721	4.46996	0.72721	20.96	0.06240	0.38357	0.06240	26	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	1.26598	6.41433	1.26598	35.13	0.10108	0.02976	0.10108	15	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"	CT	0.47024	32.54973	0.47024	43.21	0.02373	0.05953	0.02373	15	0.57200	94.05380	0.57200
DRAIN VALVE	CT	1.80119	14.75620	1.80119	55.61	0.13454	0.74558	0.13454	15	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	0.91677	12.96612	0.45839	32.29	0.00000	0.00000	0.00000	12	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	16.24506	521.78091	8.12253	864.23	0.00000	0.00000	0.00000	5	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	10.59560	155.25151	10.59560	395.56	0.19689	6.06064	0.19689	8	2.60000	151.41040	2.60000
PIPE INSULATION	TF	18.74257	192.99055	18.74257	618.07	0.06920	0.42538	0.06920	23	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	5.06591	243.76496	5.06591	358.66	0.20371	0.50773	0.20371	12	4.19900	371.00000	4.19900
CIRCULATION PUMP 5 HP	CT	5.06591	886.07476	3.71993	996.66	0.20371	6.05783	0.20371	12	4.19900	1272.00000	2.09950
COND. RCVR., 10 - 15 GAL.	CT	30.09101	786.12471	27.44915	1460.13	2.12872	12.00360	2.12872	15	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T	CT	42.41765	0.00000	42.41765	962.03	3.63988	0.00000	3.63988	64	8.38500	1855.00000	4.19250
A/C DX PACKAGE 20T	CT	107.55904	0.00000	107.55904	2439.44	9.22968	0.00000	9.22968	64	20.41000	7950.00000	6.80333
A/C DX PACKAGE 50T	CT	137.85736	0.00000	137.85736	3126.60	11.82959	0.00000	11.82959	64	47.71000	21200.00000	11.92750
A/C WINDOW 1T	CT	19.69391	0.00000	19.69391	446.66	1.68994	0.00000	1.68994	32	5.98000	530.00000	5.98000
A/C WINDOW 2T	CT	19.69391	0.00000	19.69391	446.66	1.68994	0.00000	1.68994	32	6.50000	742.00000	6.50000
A/C PAD MTD. 4T	CT	57.56681	0.00000	57.56681	1305.62	4.93983	0.00000	4.93983	32	6.50000	1484.00000	3.25000
A/C PAD MOUNTED 20 TON	CT	111.34570	2692.66500	106.73712	5203.24	8.96142	0.00000	8.96142	15	20.41000	7950.00000	6.80333
CHILLER-AIR COOL RECIP.20T	CT	262.08047	0.00000	131.04023	5524.66	22.48923	0.00000	11.24461	64	28.60000	10759.00000	7.15000
CHILLER AIR COOL REC.50T	CT	325.70694	0.00000	162.85347	6865.90	27.94904	0.00000	13.97452	64	40.30000	19080.00000	10.07500
CHILLER AIR COOL REC.100T	CT	325.70694	0.00000	162.85347	6865.90	27.94904	0.00000	13.97452	64	72.80000	40280.00000	18.20000
CHILLER-AIR COOL RECIP. 5T	CT	140.88719	0.00000	140.88719	3195.32	12.08959	0.00000	12.08959	64	15.60000	3710.00000	5.20000
CHILLER AIR COOL REC. 10T	CT	204.51366	0.00000	102.25683	4311.15	17.54940	0.00000	8.77470	64	20.80000	6360.00000	6.93333
CHILLER AIR COOL REC. 15T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	64	28.60000	8268.00000	7.15000
CHILLER WAT.COOL REC.20T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	64	29.90000	9540.00000	7.47500
CHILLER WAT.COOL REC.50T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	64	48.10000	15900.00000	12.02500
CHILLER WAT.COOL REC.100T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	64	74.10000	27030.00000	18.52500
CHILLER WAT. COOL REC. 10T	CT	234.81198	0.00000	117.40599	4949.84	20.14931	0.00000	10.07465	64	20.80000	5300.00000	5.20000
CHILLER WAT.COOL REC.200T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	64	74.10000	53000.00000	18.52500
CHILL. HERMETIC CENT. 100T	CT	386.30358	0.00000	193.15179	8143.28	33.14886	0.00000	16.57443	64	62.40000	37789.00000	15.60000
CHILL. HERMETIC CENT. 300T	CT	386.30358	0.00000	193.15179	8143.28	33.14886	0.00000	16.57443	64	97.50000	61771.50000	24.37500
CHILL. HERMETIC CENT. 900T	CT	386.30358	0.00000	193.15179	8143.28	33.14886	0.00000	16.57443	64	162.50000	127200.00000	40.62500

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 7	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
CHILL. OPEN CENT. 300T	CT	1007.4191	0.00000	503.70957	21236.40	86.44703	0.00000	43.22352	64	97.50000	61771.50000	24.37500
CHILL. OPEN CENT. 900T	CT	386.30358	0.00000	193.15179	8143.28	33.14886	0.00000	16.57443	64	162.50000	127200.00000	40.62500
CHILL.DBL.BNDL. HERM.100T	CT	446.90022	0.00000	223.45011	9420.66	38.34868	0.00000	19.17434	64	68.90000	41340.00000	17.22500
CHILL.DBL.BNDL. HERM.300T	CT	446.90022	0.00000	223.45011	9420.66	38.34868	0.00000	19.17434	64	107.90000	67840.00000	26.97500
CHILL.DBL.BNDL. HERM.900T	CT	446.90022	0.00000	223.45011	9420.66	38.34868	0.00000	19.17434	64	178.10000	139920.00000	44.52500
CHILL. ONE STG. ABS. 100T	CT	1325.5515	0.00000	662.77575	27942.63	113.74610	0.00000	56.87305	64	65.00000	37100.00000	16.25000
CHILL. ONE STG. ABS. 300T	CT	195.42416	0.00000	97.71208	4119.54	16.76942	0.00000	8.38471	64	104.00000	61480.00000	26.00000
CHILL. ONE STG. ABS. 900T	CT	195.42416	0.00000	97.71208	4119.54	16.76942	0.00000	8.38471	64	167.70000	113420.00000	41.92500
CHILL. TWO STG. ABS. 300T	CT	195.42416	0.00000	97.71208	4119.54	16.76942	0.00000	8.38471	64	114.40000	67840.00000	28.60000
CHILL. TWO STG. ABS. 900T	CT	181.78992	0.00000	90.89496	3832.13	15.59946	0.00000	7.79973	64	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 5T	CT	27.26849	0.00000	27.26849	618.45	2.33992	0.00000	2.33992	48	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 20T	CT	27.26849	0.00000	13.63424	574.82	2.33992	0.00000	1.16996	48	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 50T	CT	48.47731	0.00000	24.23866	1021.90	4.15986	0.00000	2.07993	48	31.20000	5294.70000	7.80000
AIR COOLED CONDENSER 100T	CT	48.47731	0.00000	24.23866	1021.90	4.15986	0.00000	2.07993	48	46.80000	10578.80000	11.70000
COOLING TOWER 50T	CT	53.02206	0.00000	26.51103	1117.71	4.54984	0.00000	2.27492	48	46.80000	4478.50000	11.70000
COOLING TOWER 100T	CT	165.12584	0.00000	82.56292	3480.85	14.16951	0.00000	7.08476	48	52.00000	10070.00000	13.00000
COOLING TOWER 300T	CT	192.39433	0.00000	96.19717	4055.67	16.50943	0.00000	8.25472	48	78.00000	16377.00000	19.50000
COOLING TOWER 900T	CT	209.05841	0.00000	104.52920	4406.95	17.93938	0.00000	8.96969	48	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 20T	CT	96.95462	0.00000	48.47731	2043.80	8.31971	0.00000	4.15986	48	36.40000	3688.80000	9.10000
EVAPORATIVE CONDENSER 100T	CT	159.06618	0.00000	79.53309	3353.12	13.64953	0.00000	6.82477	48	100.10000	10038.20000	25.02500
EVAPORATIVE CONDENSER 300T	CT	36.35798	0.00000	18.17899	766.43	3.11989	0.00000	1.55995	48	182.00000	31800.00000	45.50000
EXPANSION TANK	CT	0.10074	0.00000	0.10074	2.28	0.00864	0.00000	0.00864	39	3.47100	135.68000	1.73550
REFRIG. FAN COIL 1T	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64998	48	2.60000	855.42000	1.30000
REFRIG. FAN COIL 3T	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64998	48	2.86000	1051.52000	1.43000
REFRIG. FAN COIL 5T	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64998	48	3.25000	1240.20000	1.62500
DIST. PIPING SYSTEM												
PIPE/FITTINGS ST.& C.I.	TF	2.41697	8.30426	1.35810	59.73	0.02568	0.01340	0.02568	23	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	2.02395	17.34221	1.08388	60.24	0.01234	0.00567	0.01234	15	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	1.74760	8.59434	1.74760	48.23	0.14996	0.73748	0.14996	27	241.80000	8321.00000	120.90000
GATE VALVE, 3/8" - 1 1/2"	CT	0.50885	6.41433	0.50885	17.96	0.02364	0.02976	0.02364	15	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.47024	32.54973	0.47024	43.21	0.02373	0.05953	0.02373	15	0.57200	94.05380	0.57200
DRAIN VALVE	CT	1.80119	14.75620	1.80119	55.61	0.13454	0.74558	0.13454	15	0.68900	17.91400	0.68900
PIPE INSULATION	TF	18.74257	182.29134	18.74257	607.37	0.06920	0.40367	0.06920	23	91.00000	901.00000	91.00000
CIRCULATOR PUMP, < 1 HP	CT	5.03309	243.76496	5.03309	357.92	0.20089	0.50773	0.20089	12	4.19900	371.00000	4.19900
5 TON CHILLER ACH RECIP	CT	12.37510	886.07476	7.37452	1150.74	0.20371	6.05783	0.20371	12	15.60000	1272.00000	7.80000
HEAT/COOL GENERATION EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	93.32209	2689.71701	54.83317	4683.10	7.01911	67.86871	4.45803	16	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	95.37999	3516.17303	55.34764	5551.29	7.01911	83.00623	4.45803	16	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	110.09076	6620.54799	62.21777	8964.21	7.39850	150.83424	4.82682	16	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	123.97837	10641.31350	69.00562	13277.23	7.77789	171.30848	5.20621	16	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	83.32038	620.09008	53.02206	2412.84	7.14975	53.21017	4.54984	48	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	91.84833	2689.71701	54.09629	4652.03	6.89264	67.86871	4.39480	16	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	93.90623	3517.13438	54.61076	5521.18	6.89264	83.08872	4.39480	16	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	108.61700	6597.47574	61.48089	8910.07	7.27203	148.85441	4.76359	16	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	122.50462	10641.31350	68.26875	13246.16	7.65142	171.30848	5.14298	16	105.30000	27305.60000	26.32500
3 DK.MULTI ZONE 6500 CFM	CT	92.08735	2689.70694	54.52448	4658.05	7.01911	67.86785	4.45803	16	32.50000	5997.48000	8.12500
3 DK.MULTI ZONE 10,000 CFM	CT	95.37999	3517.13438	55.34764	5552.25	7.01911	83.08872	4.45803	16	42.90000	8050.70000	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	110.09076	6342.96000	62.34129	8687.02	7.39850	127.01431	4.83742	16	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	123.97837	10415.63808	69.12915	13051.95	7.77789	151.94319	5.21681	16	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	92.67149	2871.61005	43.24889	4815.25	6.89264	67.86871	3.44632	16	39.00000	6572.00000	9.75000
D.D. VARI.VOL.10000 CFM	CT	95.14097	3787.28916	43.86626	5781.01	6.89264	83.08872	3.44632	16	46.80000	8904.00000	11.70000
D.D. VARI.VOL.25000 CFM	CT	111.08648	7100.37815	48.95796	9421.01	7.27203	148.52425	3.63602	16	83.20000	16960.00000	20.80000
D.D. VARI.VOL.50000 CFM	CT	125.79726	11364.02069	53.74097	13986.52	7.65142	168.81759	3.82571	16	115.70000	29680.00000	28.92500
D.D. VARI.VOL. 100,000CFM	CT	90.89496	3355.89786	45.44748	5271.96	7.79973	287.97092	3.89987	48	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CFM	CT	90.61359	2689.71701	82.52589	4718.95	6.89264	67.86871	6.86084	16	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000 CFM	CT	93.90623	3517.13438	54.61076	5521.18	6.89264	83.08872	4.39480	16	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	90.93191	5966.83428	43.91932	7878.73	5.75447	94.73881	3.25663	16	75.40000	15359.40000	18.85000

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE) PAGE 49

COMPONENT DESCRIPTION Zone: 7	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
VARIABLE VOLUME 50000 CFM	CT	122.50462	10641.31350	68.39227	13246.56	7.65142	171.30848	5.15358	16	105.30000	27305.60000	26.32500
TERM. REHEAT 6500 CFM	CT	92.86410	2451.55972	54.26494	4434.20	6.88719	67.96854	4.38612	13	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	94.88066	3365.68073	54.76908	5389.22	6.88719	83.09296	4.38612	13	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	112.38180	7662.26703	62.43949	10051.27	7.26420	149.20515	4.76313	13	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	132.90779	10876.41289	70.86612	13692.23	7.64121	172.80384	5.14013	13	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	92.86410	2451.55972	54.26494	4434.20	6.88719	67.96854	4.38612	13	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	94.88066	3365.68073	54.76908	5389.22	6.88719	83.09296	4.38612	13	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	112.38180	7662.26703	62.43949	10051.27	7.26420	149.20515	4.76313	13	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	132.90779	10876.41289	70.86612	13692.23	7.64121	172.80384	5.14013	13	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	83.54923	826.15969	53.13649	2623.74	7.16939	70.89309	4.55966	48	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	81.80546	984.73269	52.26460	2745.55	7.01976	84.50030	4.48485	48	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	86.35021	1757.25129	56.80935	3621.14	7.40975	150.79042	4.87483	48	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	90.89496	2000.34636	61.35410	3967.31	7.79973	171.65051	5.26482	48	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	48	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	48	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	48	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	48	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.0399	48	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	48	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	48	3.12000	827.86000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	48	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	48	2.60000	1590.00000	1.30000
UNIT VENT 1200 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	48	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	81.80546	802.41138	52.26460	2563.23	7.01976	68.85524	4.48485	48	32.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	81.80546	984.73269	52.26460	2745.55	7.01976	84.50030	4.48485	48	37.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	86.35021	1757.25129	56.80935	3621.14	7.40975	150.79042	4.87483	48	71.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	90.89496	2000.34636	61.35410	3967.31	7.79973	171.65051	5.26482	48	113.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	83.13646	689.80484	81.62404	2570.50	6.87441	16.86374	6.87441	13	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	81.80546	620.09008	52.26460	2380.91	7.01976	53.21017	4.48485	48	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	48	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	48	3.25000	461.10000	1.62500
UNIT HEATER 4000 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	48	3.25000	828.92000	1.62500
UNIT HEATER 8000 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	48	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50MBH	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	48	2.60000	445.20000	1.30000
HEAT PUMP 5T	CT	42.41765	0.00000	42.41765	962.03	3.63988	0.00000	3.63988	64	8.38500	2994.50000	4.19250
HEAT PUMP 10T	CT	107.55904	0.00000	107.55904	2439.44	9.22968	0.00000	9.22968	64	14.30000	5989.00000	4.76667
HEAT PUMP 25T	CT	137.85736	0.00000	137.85736	3126.60	11.82959	0.00000	11.82959	64	19.50000	17755.00000	4.87500
HEAT PUMP 1T	CT	51.24579	411.98972	50.62083	1572.24	4.29017	10.71766	4.29017	22	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	30.29832	0.00000	15.14916	638.69	2.59991	0.00000	1.29996	27	2.34000	80.56000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	57.89267	1092.69036	52.12262	2387.23	4.30762	21.36345	4.30762	18	26.00000	2851.40000	6.50000
IND DRAFT FAN 10000 CFM	CT	58.74115	1127.69664	52.54686	2440.12	4.38043	22.37566	4.34402	18	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	5.83443	24.09965	5.83443	156.42	0.40620	0.85941	0.40620	15	3.25000	41.58380	3.25000
EXHAUST FAN, 1000 CFM	CT	16.68555	87.71693	16.01371	464.00	1.31649	0.94596	1.31649	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	60.03169	876.33417	52.81934	2214.77	4.39568	22.73286	4.34353	15	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	60.03169	2196.35639	27.81429	3454.78	4.39568	68.93587	2.19784	15	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	62.23324	2675.65553	53.36973	4058.74	4.39568	72.47918	4.34353	15	32.50000	5406.00000	8.12500
EXHAUST FAN, 5000 CFM	CT	18.99430	378.73646	16.92503	802.91	1.32778	0.88417	1.30128	22	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM	CT	3.78729	0.00000	3.78729	85.90	0.32499	0.00000	0.32499	64	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	3.52898	48.09496	1.76449	122.49	0.00000	0.00000	0.00000	13	9.10000	124.02000	4.55000
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
ROOM HUMIDIFIER,FLOOR TYPE	CT	7.56479	101.77892	7.56479	273.35	0.04904	0.59977	0.04904	8	0.26000	169.60000	0.26000
CONTROLS/INSTRUMENT.												

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE) PAGE 50

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
Zone: 7	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
DEVICES												
THERMOSTATS/PNEUMATICS	CT	15.01479	48.37966	15.01479	388.92	1.27113	0.00000	1.27113	20	0.78000	187.22780	0.78000
HUMIDITY SENSOR	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	32	0.78000	100.26540	0.78000
FLOW SENSOR	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	48	0.78000	100.04280	0.78000
RADIATION SENSOR	CT	15.03180	17.40486	15.03180	358.33	1.27478	0.00000	1.27478	22	0.78000	77.11500	0.78000
WIND VELOCITY SENSOR	CT	14.78474	31.90532	14.78474	367.22	1.22178	0.00000	1.22178	11	0.78000	45.52700	0.78000
PRESSURE SENSOR	CT	15.03180	13.15831	15.03180	354.08	1.27478	0.00000	1.27478	22	0.78000	58.30000	0.78000
DAMPER CONTROLLER/ELECT.	CT	15.56074	90.92974	15.56074	443.85	1.26464	0.00000	1.26464	16	2.60000	287.20700	2.60000
SIMPLEX AIR COMPR., 1 HP	CT	45.87185	45.63496	31.49520	1040.00	3.93628	3.91595	2.70262	27	3.67900	6103.82980	1.83950

See NOTES on the last page of this table for Explanation of Column Headings.

COMPONENT DESCRIPTION Zone. 8	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.13209	33.38905	0.13209	36.38	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	8.29767	14.82242	4.17877	189.83	0.71203	1.27192	0.35858	62	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.39595	12.23219	0.39595	21.21	0.01967	0.00000	0.01967	12	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.62931	207.26763	0.42929	220.90	0.01967	0.00000	0.01967	12	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.47892	30.26406	0.23946	40.36	0.00000	0.00000	0.00000	25	2.60000	164.30000	1.30000
OIL FILTER	CT	1.21193	39.52765	1.21193	67.01	0.10400	3.39188	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.72663	160.23384	0.72663	176.71	0.03353	0.00000	0.03353	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	15.32196	272.38623	7.74040	595.63	0.16444	0.30864	0.08903	21	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
LPG STORAGE TANK, 1000 GAL	CT	0.95784	289.94922	0.47892	310.14	0.00000	0.00000	0.00000	25	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITNGS,STEEL/IRON	TF	8.23781	14.79118	4.11890	188.44	0.70689	1.26924	0.35344	62	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	16.24752	178.06904	15.52239	544.24	1.26976	1.20668	1.26976	23	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	16.13404	105.90505	14.05047	465.16	1.02688	0.98213	1.02688	12	6.50000	147.34000	3.25000
STEAM REG. VALVE 2"	CT	16.24506	521.78091	8.12253	864.23	0.00000	0.00000	0.00000	5	7.80000	250.53100	3.90000
COND. METER,<300 #/HR.	CT	8.13163	445.69025	8.13163	630.12	0.68750	22.32794	0.68750	25	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	39	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	39	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	1.76124	79.62582	0.88062	115.75	0.00000	0.00000	0.00000	15	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	1.76124	88.85795	0.88062	125.98	0.00000	0.00000	0.00000	15	5.20000	262.35000	2.60000
SOLAR												
EQUIPMENT												
SOLAR PANEL, 3' X 8'	CT	2.33688	209.60016	1.16844	258.86	0.00000	0.00000	0.00000	12	3.90000	349.80000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	4.93896	694.60372	2.46948	798.80	0.00000	0.00000	0.00000	17	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.27591	1.43692	0.23194	7.55	0.02368	0.12330	0.01990	34	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	456.53057	1161.94360	450.12482	11495.56	38.07571	46.10205	38.07571	23	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	532.61523	4001.12562	505.32673	15993.52	42.58174	89.08295	42.58174	23	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	560.55994	13654.55100	523.79734	26250.41	43.89572	526.29359	43.89572	23	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR	CT	5646.7376	175618.68000	1709.2264	291086.65	102.22482	0.00000	68.67816	23	20800.000	636000.00000	4160.0000
REPAIR BOILER									15	1050.4000	148400.00000	262.60000
BOILER COAL 100,000 KBTU/H	CT	10078.379	407129.64420	2672.8414	612009.56	123.05570	0.00000	79.09360	23	41600.000	1590000.00000	8320.0000
REPAIR BOILER									15	1313.7800	276766.00000	328.44500
BOILER OIL 250 KBTU/HR	CT	526.19059	999.31974	516.58196	12902.57	44.05326	32.14723	44.05326	23	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	599.53321	3337.61953	572.24471	16847.71	48.32400	32.14723	48.32400	23	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	668.75848	7939.15727	631.99588	22908.96	53.18028	35.85341	53.18028	23	248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	551.52382	4326.97919	524.23532	16748.22	44.20429	55.19290	44.20429	23	184.60000	18689.92000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	666.50643	25586.29549	570.22800	40394.57	46.17759	994.39259	46.17759	23	651.30000	71020.00000	162.82500
BOILR.PNEUMAT.COAL SPREAD.	CT	2361.6933	5790.90879	2246.2939	58984.84	186.15780	118.58159	185.44779	9	364.00000	11236.00000	91.00000
ASH HANDLING SYSTEM	CT	7182.0473	73205.06066	4536.4398	227628.75	314.02891	120.25989	313.70734	15	10400.000	212000.00000	2600.0000
FUEL OIL EQUIPMENT	CT	11.24975	198.13043	5.62487	435.28	0.82231	0.38221	0.41116	12	2.60000	302.10000	1.30000
CHEMICAL FEED SYSTEM	CT	9.24144	249.40072	8.19965	455.66	0.61422	0.00000	0.61422	12	3.25000	389.02000	1.62500
FEED-WATER SUPPLY	CT	233.07141	1766.87160	220.84777	7013.82	18.42658	0.00000	18.42658	12	28.60000	2756.00000	9.53333
DEAERATOR	CT	309.20117	7180.44000	132.58508	13627.95	18.97604	0.00000	9.48802	15	260.00000	21200.00000	65.00000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks			
Zone: 8	M	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
SLOWOFF SYSTEM	CT	1.66686	94.45967	0.83343	129.60	0.00000	0.00000	0.00000	12	2.60000	147.34000	1.30000
HOUSE FURN.GAS 25KBTU/HR	CT	53.84305	490.44769	50.50933	1700.94	4.04816	22.55038	4.04816	12	10.40000	355.10000	5.20000
HOUSE FURN.GAS 100KBTU/HR	CT	60.55420	616.86774	53.88676	1968.90	4.05191	26.98401	4.05191	12	20.80000	471.70600	10.40000
HOUSE FURN.GAS 200KBTU/HR	CT	60.55420	1528.12303	53.88676	2880.16	4.05191	32.87004	4.05191	12	20.80008	1786.10000	10.40000
HOUSE FURN.OIL 25KBTU/HR	CT	68.20249	916.90806	64.86877	2453.07	5.28035	32.02918	5.28035	12	10.40000	848.00000	5.20000
HOUSE FURN.OIL 100KBTU/HR	CT	74.86992	1278.03835	68.20249	2954.75	5.28035	34.93397	5.28035	12	20.80000	1358.49600	10.40000
HOUSE FURN.OIL 200KBTU/HR	CT	74.86992	1499.33767	68.20249	3176.05	5.28035	40.89645	5.28035	12	20.80000	1595.30000	10.40000
HOUSE FURN.ELECT 25KBTU/HR	CT	31.74635	563.47872	28.41263	1272.87	2.15203	15.28839	2.15203	12	10.40000	601.02000	5.20000
HOUSE FURN.ELECT.100KBTU	CT	38.41379	738.19971	31.74635	1588.09	2.15203	22.01528	2.15203	12	20.80000	751.27500	10.40000
HOUSE FURN.ELECT.200KBTU/H	CT	38.41379	941.21428	31.74635	1791.10	2.15203	28.23552	2.15203	12	20.80000	954.00000	10.40000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	39	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	1.76124	78.62582	0.88062	115.75	0.00000	0.00000	0.00000	15	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	1.76124	88.85795	0.88062	125.98	0.00000	0.00000	0.00000	15	5.20000	262.35000	2.60000
EXPANSION TANK	CT	0.10074	0.00000	0.10074	2.28	0.00864	0.00000	0.00864	39	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	16.11868	178.06904	15.39355	541.32	1.25870	1.20668	1.25870	23	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	16.13404	105.90505	14.05047	461.16	1.02688	0.90213	1.02688	12	6.50000	147.34000	3.25000
STORAGE TANK, DHW	CT	24.92462	35.38757	24.92462	600.48	2.13879	3.03662	2.13879	42	3.59395	346.62000	1.79600
IND. FUR., GAS/OIL 500 MBU	CT	67.73611	2186.13817	48.02096	3659.30	4.78505	80.36361	3.86385	25	65.00000	6784.00000	16.250
IND.FURN.GAS/OIL 2000 MBTU	CT	120.68677	4485.35687	95.18428	7140.92	7.43834	167.07978	7.43834	25	184.60000	13780.00000	46.150
SURGE TANK, 1000 GAL	CT	3.11584	943.20072	1.55792	1008.83	0.00000	0.00000	0.00000	12	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.20836	0.10873	0.20836	4.83	0.01788	0.00933	0.01788	39	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	1.26406	10.13159	0.71701	37.05	0.01458	0.00670	0.01458	23	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	60.74577	1951.96168	31.54842	3236.24	0.20175	0.99170	0.20175	21	241.80000	8034.80000	120.90000
PIPE INSULATION	TF	17.51594	180.35985	17.51594	577.62	0.06468	0.39756	0.06468	25	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	1.26598	6.41433	1.26598	35.13	0.10103	0.02976	0.10103	15	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"	CT	0.47024	32.54973	0.47024	43.21	0.02373	0.05953	0.02373	15	0.57200	94.05380	0.57200
DRAIN VALVE	CT	1.80119	14.75620	1.80119	55.61	0.13454	0.74558	0.13454	15	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	0.91677	12.96612	0.45839	32.29	0.00000	0.00000	0.00000	12	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	16.24506	521.78091	8.12253	864.23	0.00000	0.00000	0.00000	5	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	10.59560	155.25151	10.59560	395.56	0.19689	6.06064	0.19689	8	2.60000	151.41040	2.60000
PIPE INSULATION	TF	18.74257	192.99055	18.74257	618.07	0.06920	0.42538	0.06920	23	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	5.06591	243.76496	5.06591	358.66	0.20371	0.50773	0.20371	12	4.19900	371.00000	4.19900
CIRCULATION PUMP 5 HP	CT	5.06591	886.07476	3.71993	996.66	0.20371	6.05783	0.20371	12	4.19900	1272.00000	2.09950
COND. RCVR., 10 - 15 GAL.	CT	30.09101	786.12471	27.44915	1460.13	2.12872	12.00300	2.12872	15	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T	CT	42.41765	0.00000	42.41765	962.6	3.63988	0.00000	3.63988	93	8.38500	1855.00000	4.19250
A/C DX PACKAGE 20T	CT	107.55904	0.00000	107.55904	2439.44	9.22968	0.00000	9.22968	93	20.41000	7950.00000	6.80333
A/C DX PACKAGE 50T	CT	137.85736	0.00000	137.85736	3126.60	11.82959	0.00000	11.82959	93	47.71000	21200.00000	11.92750
A/C WINDOW 1T	CT	19.69391	0.00000	19.69391	446.66	1.68994	0.00000	1.68994	46	5.98000	530.00000	5.98000
A/C WINDOW 2T	CT	19.69391	0.00000	19.69391	446.66	1.68994	0.00000	1.68994	46	6.50000	742.00000	6.50000
A/C PAD MTD. 4T	CT	57.56681	0.00000	57.56681	1305.62	4.93683	0.00000	4.93683	46	6.50000	1484.00000	3.25000
A/C PAD MOUNTED 20 TON	CT	111.34570	2692.66550	106.73712	5203.24	8.96142	0.00000	8.96142	15	20.41000	7950.00000	6.80333
CHILLER-AIR COOL RECIP.20T	CT	262.08047	0.00000	131.04023	5524.66	22.48923	0.00000	11.24461	93	28.60000	10759.00000	7.15000
CHILLER AIR COOL REC.50T	CT	325.70694	0.00000	162.85347	6865.90	27.94904	0.00000	13.97452	93	40.30000	15080.00000	10.07500
CHILLER AIR COOL REC.100T	CT	325.70694	0.00000	162.85347	6865.90	27.94904	0.00000	13.97452	93	72.80000	27080.00000	18.20000
CHILLER-AIR COOL RECIP. 5T	CT	140.87719	0.00000	140.88719	3195.32	12.08959	0.00000	12.08959	93	15.60000	5810.00000	5.20000
CHILLER AIR COOL REC. 10T	CT	204.51366	0.00000	102.25683	4311.15	17.54940	0.00000	8.77470	93	20.80000	6360.00000	6.93333
CHILLER AIR COOL REC. 15T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	93	28.60000	8268.00000	7.15000
CHILLER WAT.COOL REC.20T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	93	29.90000	9540.00000	7.47500
CHILLER WAT.COOL REC.50T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	93	48.10000	15900.00000	12.02500
CHILLER WAT.COOL REC.100T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	93	74.10000	27030.00000	18.52500
CHILLER WAT. COOL REC. 10T	CT	234.81198	0.00000	117.40599	4949.84	20.17931	0.00000	10.07465	93	20.80000	5300.00000	5.20000
CHILLER WAT.COOL REC.200T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	93	74.10000	53000.00000	18.52500
CHILL. HERMETIC CENT. 100T	CT	386.30358	0.00000	193.15179	8143.28	33.14886	0.00000	16.57443	93	62.40000	37789.00000	15.60000
CHILL. HERMETIC CENT. 300T	CT	386.30358	0.00000	193.15179	8143.28	33.14886	0.00000	16.57443	93	97.50000	61771.50000	24.37500
CHILL. HERMETIC CENT. 900T	CT	386.30358	0.00000	193.15179	8143.28	33.14886	0.00000	16.57443	93	162.50000	127200.00000	40.62500

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

Zone: 8

COMPONENT DESCRIPTION	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) — By Resources: labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS — Annual Maintenance and Repair: labor	material	equipment	Replacement and High Costs Tasks: yr	labor	material	equipment
CHILL. OPEN CENT. 300T	CT	1007.4191	0.00000	503.70957	21236.40	86.44703	0.00000	43.22352	93	97.50000	61771.50000	24.37500
CHILL. OPEN CENT. 900T	CT	386.30358	0.00000	193.15179	8143.28	33.14886	0.00000	16.57443	93	162.50000	127200.00000	40.62500
CHILL.DBL.BNDL. HERM.100T	CT	446.90022	0.00000	223.45011	9420.66	38.34868	0.00000	19.17434	93	68.90000	41340.00000	17.22500
CHILL.DBL.BNDL. HERM.300T	CT	446.90022	0.00000	223.45011	9420.66	38.34868	0.00000	19.17434	93	107.90000	67340.00000	26.97500
CHILL.DBL.BNDL. HERM.900T	CT	446.90022	0.00000	223.45011	9420.66	38.34868	0.00000	19.17434	93	178.10000	139920.00000	44.52500
CHILL. ONE STG. ABS. 100T	CT	1325.5515	0.00000	662.77575	27942.63	113.74610	0.00000	56.87305	93	65.00000	37100.00000	16.25000
CHILL. ONE STG. ABS. 300T	CT	195.42416	0.00000	97.71208	4119.54	16.76942	0.00000	8.38471	93	104.00000	61480.00000	26.00000
CHILL. ONE STG. ABS. 900T	CT	195.42418	0.00000	97.71208	4119.54	16.76942	0.00000	8.38471	93	167.70000	113420.00000	41.92500
CHILL. TWO STG. ABS. 300T	CT	195.42416	0.00000	97.71208	4119.54	16.76942	0.00000	8.38471	93	114.40000	67840.00000	28.60000
CHILL. TWO STG. ABS. 900T	CT	181.78992	0.00000	90.89496	3832.13	15.59946	0.00000	7.79973	93	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 5T	CT	27.26849	0.00000	27.26849	618.45	2.33992	0.00000	2.33992	70	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 20T	CT	27.26849	0.00000	13.63424	574.82	2.33992	0.00000	1.16996	70	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 50T	CT	48.47731	0.00000	24.23866	1021.90	4.15986	0.00000	2.07993	70	31.[illegible]000	5294.70000	7.[illegible]
AIR COOLED CONDENSER 100T	CT	48.47731	0.00000	24.23866	1021.90	4.15986	0.00000	2.07993	70	46.80000	10578.80000	11.70[illegible]
COOLING TOWER 50T	CT	53.02206	0.00000	26.51103	1117.71	4.54984	0.00000	2.27492	70	45.[illegible]	4478.50000	11.7[illegible]
COOLING TOWER 100T	CT	165.1258[illegible]	0.00000	82.56292	3480.85	14.16951	0.00000	7.08476	70	[illegible]	10070.00000	13.[illegible]
COOLING TOWER 300T	CT	192.3943[illegible]	0.00000	96.19717	4055.67	16.50943	0.00000	8.25472	70	78.00000	16377.00000	19.5[illegible]
COOLING TOWER 900T	CT	209.05841	0.00000	104.52920	4406.95	17.93938	0.00000	8.96969	70	128.[illegible]	43142.00000	32.[illegible]
EVAPORATIVE CONDENSER 20T	CT	96.95462	0.00000	48.47731	2043.80	8.31971	0.00000	4.15986	70	36.[illegible]	3683.80000	9.[illegible]
EVAPORATIVE CONDENSER 100T	CT	159.06618	0.00000	79.53309	3353.12	13.64953	0.00000	6.82477	70	100.[illegible]	10033.20000	25.[illegible]
EVAPORATIVE CONDENSER 300T	CT	36.35798	0.00000	18.17899	766.43	3.11989	0.00000	1.55995	70	182.[illegible]	31800.00000	45.5[illegible]
EXPANSION TANK	CT	0.10074	0.00000	0.10074	2.28	0.00864	0.00000	0.00864	[illegible]	3.[illegible]	135.60000	1.[illegible]
REFRIG. FAN COIL 1T	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64993	70	2.[illegible]	675.42000	1.[illegible]
REFRIG. FAN COIL 3T	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64998	70	2.80000	1051.57000	1.4[illegible]
REFRIG. FAN COIL 5T	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64993	70	3.25000	1240.[illegible]	[illegible]
DIST. PIPING SYSTEM												
PIPE/FITTINGS ST.& C.I.	TF	2.41697	8.30426	1.35810	59.73	0.02568	0.01340	0.02568	25	10.74450	41.34000	5.3[illegible]
PIPE/FITTINGS, COPPER	TF	2.02395	17.34221	1.08388	60.24	0.01234	0.00567	0.01234	[illegible]	7.[illegible]	51.00720	2.[illegible]
PIPE AND FITTINGS, PVC	TF	1.63304	8.03100	1.63304	45.07	0.14013	0.68914	0.14013	2[illegible]	241.50000	8321.00000	120.[illegible]
GATE VALVE, 3/8" - 1 1/2"	CT	0.50885	6.41433	0.50885	17.96	0.02364	0.02976	0.02364	[illegible]	[illegible]	17.91400	0.[illegible]
GATE VALVE, 2"-3"	CT	0.47024	32.54973	0.47024	43.21	0.02373	0.05953	0.02373	15	0.57200	94.05300	0.5[illegible]
DRAIN VALVE	CT	1.80119	14.75620	1.80119	55.61	0.13454	0.74558	0.13454	15	0.64900	17.91400	0.[illegible]
PIPE INSULATION	TF	18.74257	182.29134	18.74257	607.37	0.06920	0.40367	0.06920	23	91.00000	901.00000	91.[illegible]
CIRCULATOR PUMP, < 1 HP	CT	5.03309	243.76496	5.03309	357.92	0.20089	0.50773	0.20089	12	4.17500	371.00000	4.[illegible]
5 TON CHILLER ACH RECIP	CT	12.37510	886.07476	7.37452	1150.74	0.20371	6.05783	0.20371	12	15.60000	1272.[illegible]	7.8[illegible]
HEAT/COOL GENERATION												
EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	93.27357	2689.04253	54.80891	4681.40	7.01494	67.81084	4.45595	17	[illegible]	5997.4[illegible]	[illegible]
MULTI-ZONE 10,000 CFM	CT	95.33147	3515.49855	55.32339	5549.59	7.01494	82.94835	4.45595	17	4[illegible]	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	110.04224	6618.89969	62.20159	8961.57	7.39433	150.69280	4.82543	17	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	123.92986	10638.01690	68.98945	13272.96	7.77372	171.02560	5.20483	17	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	83.32038	620.09008	53.02206	2412.84	7.14975	53.21017	4.54984	70	26.[illegible]	4240.00000	6.[illegible]
DUAL DUCT 6500 CFM	CT	91.79981	2689.04253	54.07203	4650.33	6.88848	67.81084	4.39272	17	36.40000	5997.48000	9.1[illegible]
DUAL DUCT 10,000 CFM	CT	93.85771	3516.45989	54.58651	5519.48	6.88848	83.03085	4.39272	17	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	108.56849	6595.82745	61.46472	8907.43	7.26787	148.71296	4.76220	17	75.40000	15359.40000	18.[illegible]
DUAL DUCT 50,000 CFM	CT	122.45610	10638.01690	68.25257	13241.87	7.64726	171.02560	5.14159	17	105.30000	27305.60000	26.3[illegible]
3 DK.MULTI ZONE 6500 CFM	CT	92.03883	2689.03312	54.50023	4656.35	7.01494	67.81003	4.45595	17	32.50000	5997.48000	8.12500
3 DK.MULTI ZONE 10,000 CFM	CT	95.33147	3516.45989	55.32339	5550.55	7.01494	83.03085	4.45595	17	[illegible]	[illegible]	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	110.04224	6341.31170	62.31703	8684.35	7.39433	126.87287	4.83534	17	[illegible]	[illegible]	[illegible]
3 DK.MULTI ZONE 50,000 CFM	CT	123.92986	10412.34148	69.10489	13047.63	7.77372	151.66030	5.21473	17	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	92.62297	2870.93536	43.22464	4813.55	6.88848	67.81084	3.44424	17	39.00000	6572.00000	9.7[illegible]
D.D. VARI.VOL.10000 CFM	CT	95.09245	3786.61467	43.84201	5779.31	6.88848	83.03085	3.44424	17	46.80000	8934.00000	11.7[illegible]
D.D. VARI.VOL.25000 CFM	CT	111.03797	7098.98171	48.93370	9418.59	7.26787	148.40442	3.63393	17	83.20000	16[illegible]40.00000	20.8[illegible]
D.D. VARI.VOL.50000 CFM	CT	125.74874	11362.62425	53.71672	13984.10	7.64726	168.69776	3.82363	17	115.70000	2[illegible]630.00000	23.92500
D.D. VARI.VOL. 100,000CFM	CT	90.89496	3355.89786	45.44748	5271.96	7.79973	287.97092	3.89987	70	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CFM	CT	90.56507	2689.04253	82.50163	4717.26	6.88848	67.81084	6.85876	17	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000 CFM	CT	93.85771	3516.45989	54.58651	5519.48	6.88848	83.03085	4.39272	17	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	90.88339	5965.18598	43.89506	7876.06	5.75030	94.59737	3.25454	17	75.40000	15359.40000	18.85000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 8	UM	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
VARIABLE VOLUME 50000 CFM	CT	122.45610	10638.01690	68.36801	13242.24	7.64726	171.02560	5.15150	17	105.30000	27305.60000	26.32500
TERM. REHEAT 6500 CFM	CT	98.27366	3341.95131	55.04598	5432.47	6.76183	66.74699	4.30575	12	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	101.38950	4654.99561	55.82494	6808.70	6.76183	81.58759	4.30575	12	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	125.95352	10860.22368	65.19924	13522.44	7.13176	146.53698	4.67568	12	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	155.19130	15672.94457	75.74198	18938.45	7.50170	169.82456	5.04562	12	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	98.27366	3341.95131	55.04598	5432.47	6.76183	66.74699	4.30575	12	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	101.38950	4654.99561	55.82494	6808.70	6.76183	81.58759	4.30575	12	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	125.95352	10860.22368	65.19924	13522.44	7.13176	146.53698	4.67568	12	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	155.19130	15672.94457	75.74198	18938.45	7.50170	169.82456	5.04562	12	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	83.54923	826.15969	53.13649	2623.74	7.16939	70.89309	4.55966	70	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	81.80546	984.73269	52.26460	2745.55	7.01976	84.50030	4.48485	70	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	86.35021	1757.25129	56.80935	3621.14	7.40975	150.79042	4.87483	70	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	90.89496	2000.34636	61.35410	3967.31	7.79973	171.65051	5.26482	70	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	3.12000	827.86000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	70	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	70	2.60000	1590.00000	1.30000
UNIT VENT 1200 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	70	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	81.80546	802.41138	52.26460	2563.23	7.01976	68.85524	4.48485	70	32.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	81.80546	984.73269	52.26460	2745.55	7.01976	84.50030	4.48485	70	37.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	86.35021	1757.25129	56.80935	3621.14	7.40975	150.79042	4.87483	70	71.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	90.89496	2000.34636	61.35410	3967.31	7.79973	171.65051	5.26482	70	113.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	82.96548	950.61678	80.62860	2824.80	6.71824	16.16963	6.71824	12	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	81.80546	620.09008	52.26460	2380.91	7.01976	53.21017	4.48485	70	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	70	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	70	3.25000	461.10000	1.62500
UNIT HEATER 4000 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	70	3.25000	828.92000	1.62500
UNIT HEATER 8000 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	70	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50MBH	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	70	2.60000	445.20000	1.30000
HEAT PUMP 5T	CT	42.41765	0.00000	42.41765	962.03	3.63988	0.00000	3.63988	93	8.38500	2994.50000	4.19250
HEAT PUMP 10T	CT	107.55904	0.00000	107.55904	2439.44	9.22968	0.00000	9.22968	93	14.30000	5989.00000	4.76667
HEAT PUMP 25T	CT	137.85736	0.00000	137.85736	3126.60	11.82959	0.00000	11.82959	93	19.50000	17755.00000	4.87500
HEAT PUMP 1T	CT	50.66786	384.98223	50.08387	1532.27	4.24761	10.01608	4.24761	23	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	30.29832	0.00000	15.14916	638.69	2.59991	0.00000	1.29996	28	2.34000	80.56000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	58.33937	1151.26058	52.16567	2454.64	4.29977	21.32451	4.29977	17	26.00000	2851.40000	6.50000
IND DRAFT FAN 10000 CFM	CT	59.18786	1187.89057	52.58991	2509.16	4.37258	22.33672	4.33617	17	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	5.83443	24.09965	5.83443	156.42	0.40620	0.85941	0.40620	15	3.25000	41.58380	3.25000
EXHAUST FAN, 1000 CFM	CT	16.68555	87.71693	16.01371	464.00	1.31649	0.94596	1.31649	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	60.03169	876.33417	52.81934	2214.77	4.39568	22.73286	4.34353	15	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	60.03169	2196.35639	27.81429	3454.78	4.39568	68.93587	2.19784	15	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	62.23324	2675.65553	53.36973	4058.74	4.39568	72.67918	4.34353	15	32.50000	5406.00000	8.12500
EXHAUST FAN, 5000 CFM	CT	18.74223	353.90245	16.80861	772.79	1.32596	0.82629	1.30119	23	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM	CT	3.78729	0.00000	3.78729	85.90	0.32499	0.00000	0.32499	93	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	5.45272	74.31278	2.72636	189.26	0.00000	0.00000	0.00000	12	9.10000	124.02000	4.55000
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
ROOM HUMIDIFIER,FLOOR TYPE	CT	7.56479	101.77892	7.56479	273.35	0.04904	0.59977	0.04904	8	0.26000	169.60000	0.26000
CONTROLS/INSTRUMENT.												

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
Zone: 8	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipmen
DEVICES												
THERMOSTATS/PNEUMATICS	CT	15.01479	48.37966	15.01479	388.92	1.27113	0.00000	1.27113	20	0.78000	187.22780	0.7800
HUMIDITY SENSOR	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	46	0.78000	100.26540	0.7800
FLOW SENSOR	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	70	0.78000	100.04280	0.7800
RADIATION SENSOR	CT	15.03949	16.26355	15.03949	357.36	1.27643	0.00000	1.27643	23	0.78000	77.11500	0.7800
WIND VELOCITY SENSOR	CT	14.80861	29.81563	14.80861	365.67	1.22690	0.00000	1.22690	11	0.78000	45.52700	0.7800
PRESSURE SENSOR	CT	15.03949	12.29547	15.03949	353.39	1.27643	0.00000	1.27643	23	0.78000	58.30000	0.7800
DAMPER CONTROLLER/ELECT.	CT	15.56074	90.92974	15.56074	443.85	1.26464	0.00000	1.26464	17	2.60000	287.20700	2.6000
SIMPLEX AIR COMPR.,1 HP	CT	44.94540	44.71381	31.03197	1019.55	3.85678	3.83691	2.66287	28	3.67900	6103.82980	1.8395

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION Zone: 9	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.13209	33.38905	0.13209	36.38	0.00000	0.00000	0.00000	16	0.39000	98.58060	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	8.49634	15.17379	4.28020	194.38	0.72907	1.30207	0.36729	58	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.41640	13.37126	0.41640	22.82	0.02010	0.00000	0.02010	11	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.67149	226.56864	0.45284	241.10	0.02010	0.00000	0.02010	11	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.51246	32.38353	0.25623	43.19	0.00000	0.00000	0.00000	23	2.60000	164.30000	1.30000
OIL FILTER		1.21193	39.52765	1.21193	67.01	0.10400	3.39188	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER		0.72663	160.23384	0.72663	176.71	0.03353	0.00000	0.03353	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	16.39387	291.44701	8.28192	637.30	0.17592	0.33018	0.09525	19	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
LPG STORAGE TANK, 1000 GAL	CT	1.02492	310.25511	0.51246	331.86	0.00000	0.00000	0.00000	23	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITNGS,STEEL/IRON	TF	8.43228	15.14036	4.21614	192.89	0.72358	1.29920	0.36179	58	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	18.81785	217.15542	17.92937	641.10	1.46229	1.39041	1.46229	20	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	18.32157	118.71537	15.99262	526.80	1.17248	1.12682	1.17248	10	6.50000	147.34000	3.25000
STEAM REG. VALVE 2"	CT	18.83076	604.83194	9.41538	1001.78	0.00000	0.00000	0.00000	4	7.80000	250.53100	3.90000
COND. METER,<300 #/HR.	CT	7.94034	476.36326	7.94034	656.95	0.67037	23.88820	0.67037	23	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	34	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	34	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	2.01656	90.02389	1.00828	132.53	0.00000	0.00000	0.00000	14	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	2.01656	101.73933	1.00828	144.25	0.00000	0.00000	0.00000	14	5.20000	262.35000	2.60000
SOLAR												
EQUIPMENT												
SOLAR PANEL, 3' X 8'	CT	2.50029	224.25678	1.25015	276.96	0.00000	0.00000	0.00000	12	3.90000	349.80000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	5.28372	743.17554	2.64186	854.56	0.00000	0.00000	0.00000	15	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.26620	1.34367	0.22510	7.25	0.02284	0.11530	0.01932	36	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	458.95591	1353.20910	451.10716	11737.21	38.03618	50.43926	38.03618	20	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	540.66640	4766.25367	507.23072	16921.57	42.56929	97.46374	42.56929	20	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	571.35281	15925.85878	526.30883	28740.00	43.87435	575.80651	43.87435	20	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR REPAIR BOILER	CT	6617.1947	211143.52000	1903.7016	346138.32	101.82688	0.00000	68.41023	20 14	20800.000 1050.4000	636000.00000 148400.00000	4160.0000 262.60000
BOILER COAL 100,000 KBTU/H REPAIR BOILER	CT	11984.347	491314.85480	3054.7833	734545.25	122.57702	0.00000	78.78530	20 14	41600.000 1313.7800	1590000.00000 276766.00000	8320.0000 328.44500
BOILER OIL 250 KBTU/HR	CT	529.81076	1175.28582	518.03764	13153.72	44.11626	35.17160	44.11626	20	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	606.72703	4040.32590	573.29136	17693.90	48.23798	35.17160	48.23798	20	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	678.57856	9672.76927	633.53459	24918.79	53.07544	39.22644	53.07544	20	248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	559.16099	5217.32256	525.72532	17792.10	44.15632	60.38536	44.15632	20	184.60000	18689.92000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	694.84028	29829.78920	576.87356	45211.27	46.12749	1087.94357	46.12749	20	651.30000	71020.00000	162.82500
BOILR.PNEUMAT.COAL SPREAD.	CT	2361.7018	7692.71945	2208.1814	60764.85	182.20102	156.48339	181.26407	8	364.00000	11236.00000	91.00000
ASH HANDLING SYSTEM	CT	7677.7414	83768.14024	4648.7446	248206.53	312.74640	133.39571	312.38971	14	10400.000	212000.00000	2600.0000
FUEL OIL EQUIPMENT	CT	11.76565	221.35344	5.88282	469.37	0.84974	0.41777	0.42487	10	2.60000	302.10000	1.30000
CHEMICAL FEED SYSTEM	CT	9.43774	278.77173	8.27327	489.09	0.61001	0.00000	0.61001	10	3.25000	389.02000	1.62500
FEED-WATER SUPPLY	CT	233.75846	1974.94960	220.09529	7232.87	18.30024	0.00000	18.30024	10	28.60000	2756.00000	9.53333
DEAERATOR	CT	321.05503	8221.36000	135.32552	14908.75	18.89863	0.00000	9.44931	14	260.00000	21200.00000	65.00000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 9	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
BLOWOFF SYSTEM	CT	1.86316	105.58384	0.93158	144.86	0.00000	0.00000	0.00000	10	2.60000	147.34000	1.30000
HOUSE FURN.GAS 25KBTU/HR	CT	54.58424	541.71688	50.85792	1767.76	4.04438	24.64871	4.04438	10	10.40000	355.10000	5.20000
HOUSE FURN.GAS 100KBTU/HR	CT	62.08465	681.74197	54.63201	2065.97	4.04848	29.49490	4.04848	10	20.80000	471.70000	10.40000
HOUSE FURN.GAS 200KBTU/HR	CT	62.08465	1698.61714	54.63201	3082.85	4.04848	35.92863	4.04848	10	20.80000	1786.10000	10.40000
HOUSE FURN.OIL 25KBTU/HR	CT	68.84959	1015.66380	65.12327	2565.25	5.26850	35.00953	5.26850	10	10.40000	848.00000	5.20000
HOUSE FURN.OIL 100KBTU/HR	CT	76.30223	1418.48645	68.84959	3125.17	5.26850	38.18461	5.26850	10	20.80000	1358.49600	10.40000
HOUSE FURN.OIL 200KBTU/HR	CT	76.30223	1664.13004	68.84959	3370.82	5.26850	44.70190	5.26850	10	20.80000	1593.30000	10.40000
HOUSE FURN.ELECT 25KBTU/HR	CT	32.71980	625.43413	28.99348	1355.60	2.16819	16.71099	2.16819	10	10.40000	601.02000	5.20000
HOUSE FURN.ELECT.100KBTU	CT	40.17244	318.79387	32.71980	1706.06	2.16819	24.06383	2.16819	10	20.80000	751.27500	10.40000
HOUSE FURN.ELECT.200KBTU/H	CT	40.17244	1043.91132	32.71980	1931.17	2.16819	30.91533	2.16819	10	20.80000	954.00000	10.40000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	34	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	2.01656	90.02389	1.00828	132.53	0.00000	0.00000	0.00000	14	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	2.01656	101.73933	1.00828	144.25	0.00000	0.00000	0.00000	14	5.20000	262.35000	2.60000
EXPANSION TANK	CT	0.11714	0.00000	0.11714	2.66	0.01005	0.00000	0.01005	34	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	18.61938	217.15542	17.73090	636.60	1.44525	1.39041	1.44525	20	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	18.32157	118.71537	15.99262	526.80	1.17248	1.12682	1.17248	10	6.50000	147.34000	3.25000
STORAGE TANK, DHW	CT	26.58056	37.73865	26.58056	640.59	2.28089	3.23837	2.28089	39	3.59395	346.62000	1.79698
IND. FUR., GAS/OIL 500 MBU	CT	68.93357	2320.61531	48.39078	3818.29	4.81586	84.39357	3.87759	23	65.00000	6784.00000	16.25000
IND.FURN.GAS/OIL 2000 MBTU	CT	122.79605	4760.75830	95.50756	7458.45	7.41500	175.45825	7.41500	23	184.60000	13780.00000	46.15000
SURGE TANK, 1000 GAL	CT	3.33372	1009.15551	1.66686	1079.43	0.00000	0.00000	0.00000	12	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.23290	0.12154	0.23290	5.40	0.01998	0.01043	0.01998	34	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	1.52710	12.40393	0.85682	44.89	0.01601	0.00735	0.01601	20	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	64.99641	2088.55647	33.75585	3462.71	0.21584	1.06097	0.21584	19	241.80000	8034.80000	120.90000
PIPE INSULATION	TF	18.74257	192.99055	18.74257	618.07	0.06920	0.42538	0.06920	23	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	1.40741	7.33179	1.40741	39.25	0.11212	0.03301	0.11212	14	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"	CT	0.52853	37.24355	0.52853	49.23	0.02632	0.06603	0.02632	14	0.57200	94.05380	0.57200
DRAIN VALVE	CT	2.06483	17.78973	2.06483	64.62	0.15426	0.93041	0.15426	14	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	1.02474	14.49309	0.51237	36.09	0.00000	0.00000	0.00000	10	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	18.83076	604.83194	9.41538	1001.78	0.00000	0.00000	0.00000	4	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	10.20456	150.68881	10.20456	382.13	0.15585	4.79731	0.15585	7	2.60000	151.41040	2.60000
PIPE INSULATION	TF	22.90576	236.10295	22.90576	755.61	0.07974	0.49014	0.07974	20	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	5.54727	272.17923	5.54727	397.99	0.21781	0.54238	0.21781	10	4.19900	371.00000	4.19900
CIRCULATION PUMP 5 HP	CT	5.54727	992.04316	4.04277	1113.04	0.21781	6.91013	0.21781	10	4.19900	1272.00000	2.09950
COND. RCVR., 10 - 15 GAL.	CT	32.22998	899.70038	29.20514	1621.00	2.24654	13.71061	2.24654	14	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T	CT	42.41765	0.00000	42.41765	962.03	3.63988	0.00000	3.63988	91	8.38500	1855.00000	4.19250
A/C DX PACKAGE 20T	CT	107.55904	0.00000	107.55904	2439.44	9.22968	0.00000	9.22968	91	20.41000	7950.00000	6.80333
A/C DX PACKAGE 50T	CT	137.85736	0.00000	137.85736	3126.60	11.82959	0.00000	11.82959	91	47.71000	21200.00000	11.92750
A/C WINDOW 1T	CT	19.69391	0.00000	19.69391	446.66	1.68994	0.00000	1.68994	46	5.98000	530.00000	5.98000
A/C WINDOW 2T	CT	19.69391	0.00000	19.69391	446.66	1.68994	0.00000	1.68994	46	6.50000	742.00000	6.50000
A/C PAD MTD. 4T	CT	57.56681	0.00000	57.56681	1305.62	4.93983	0.00000	4.93983	46	6.50000	1484.00000	3.25000
A/C PAD MOUNTED 20 TON	CT	111.89464	3083.01000	106.61797	5603.90	8.92253	0.00000	8.92253	14	20.41000	7950.00000	6.80333
CHILLER-AIR COOL RECIP.20T	CT	262.08047	0.00000	131.04023	5524.66	22.48923	0.00000	11.24461	91	28.60000	10759.00000	7.15000
CHILLER AIR COOL REC.50T	CT	325.70694	0.00000	162.85347	6865.90	27.94904	0.00000	13.97452	91	40.30000	19080.00000	10.07500
CHILLER AIR COOL REC.100T	CT	325.70694	0.00000	162.85347	6865.90	27.94904	0.00000	13.97452	91	72.80000	40280.00000	18.20000
CHILLER-AIR COOL RECIP. 5T	CT	140.88719	0.00000	140.88719	3195.32	12.08959	0.00000	12.08959	91	15.60000	3710.00000	5.20000
CHILLER AIR COOL REC. 10T	CT	204.51366	0.00000	102.25683	4311.15	17.54940	0.00000	8.77470	91	20.80000	6360.00000	6.93333
CHILLER AIR COOL REC. 15T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	91	28.60000	8268.00000	7.15000
CHILLER WAT.COOL REC.20T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	91	29.90000	9540.00000	7.47500
CHILLER WAT.COOL REC.50T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	91	48.10000	15900.00000	12.02500
CHILLER WAT.COOL REC.100T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	91	74.10000	27030.00000	18.52500
CHILLER WAT. COOL REC. 10T	CT	234.81198	0.00000	117.40599	4949.84	20.14931	0.00000	10.07465	91	20.80000	5300.00000	5.20000
CHILLER WAT.COOL REC.200T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	91	74.10000	53000.00000	18.52500
CHILL. HERMETIC CENT. 100T	CT	386.30358	0.00000	193.15179	8143.28	33.14886	0.00000	16.57443	91	62.40000	37789.00000	15.60000
CHILL. HERMETIC CENT. 300T	CT	386.30358	0.00000	193.15179	8143.28	33.14886	0.00000	16.57443	91	97.50000	61771.50000	24.37500
CHILL. HERMETIC CENT. 900T	CT	386.30358	0.00000	193.15179	8143.28	33.14886	0.00000	16.57443	91	162.50000	127200.00000	40.62500

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 9	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
CHILL. OPEN CENT. 300T	CT	1007.4191	0.00000	503.70957	21236.40	86.44703	0.00000	43.22352	91	97.50000	61771.50000	24.37500
CHILL. OPEN CENT. 900T	CT	386.30358	0.00000	193.15179	8143.28	33.14886	0.00000	16.57443	91	162.50000	127200.00000	40.62500
CHILL.DBL.BNDL. HERM.100T	CT	446.90022	0.00000	223.45011	9420.66	38.34868	0.00000	19.17434	91	68.90000	41340.00000	17.22500
CHILL.DBL.BNDL. HERM.300T	CT	446.90022	0.00000	223.45011	9420.66	38.34868	0.00000	19.17434	91	107.90000	67840.00000	26.97500
CHILL.DBL.BNDL. HERM.900T	CT	446.90022	0.00000	223.45011	9420.66	38.34868	0.00000	19.17434	91	178.10000	139920.00000	44.52500
CHILL. ONE STG. ABS. 100T	CT	1325.5515	0.00000	662.77575	27942.63	113.74610	0.00000	56.87305	91	65.00000	37100.00000	16.25000
CHILL. ONE STG. ABS. 300T	CT	195.42416	0.00000	97.71208	4119.54	16.76942	0.00000	8.38471	91	104.00000	61480.00000	26.00000
CHILL. ONE STG. ABS. 900T	CT	195.42416	0.00000	97.71208	4119.54	16.76942	0.00000	8.38471	91	167.70000	113420.00000	41.92500
CHILL. TWO STG. ABS. 300T	CT	195.42416	0.00000	97.71208	4119.54	16.76942	0.00000	8.38471	91	114.40000	67840.00000	28.60000
CHILL. TWO STG. ABS. 900T	CT	181.78992	0.00000	90.89496	3832.13	15.59946	0.00000	7.79973	91	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 5T	CT	27.26849	0.00000	27.26849	618.45	2.33992	0.00000	2.33992	68	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 20T	CT	27.26849	0.00000	13.63424	574.82	2.33992	0.00000	1.16996	68	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 50T	CT	48.47731	0.00000	24.23866	1021.90	4.15986	0.00000	2.07993	68	31.20000	5294.70000	7.80000
AIR COOLED CONDENSER 100T	CT	48.47731	0.00000	24.23866	1021.90	4.15986	0.00000	2.07993	68	46.80000	10578.80000	11.70000
COOLING TOWER 50T	CT	53.02206	0.00000	26.51103	1117.71	4.54984	0.00000	2.27492	68	46.80000	4478.50000	11.70000
COOLING TOWER 100T	CT	165.12584	0.00000	82.56292	3480.85	14.16951	0.00000	7.08476	68	52.00000	10070.00000	13.00000
COOLING TOWER 300T	CT	192.39433	0.00000	96.19717	4055.67	16.50943	0.00000	8.25472	68	78.00000	16377.00000	19.50000
COOLING TOWER 900T	CT	209.05841	0.00000	104.52920	4406.95	17.93938	0.00000	8.96969	68	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 20T	CT	96.95462	0.00000	48.47731	2043.80	8.31971	0.00000	4.15986	68	36.40000	3688.80000	9.10000
EVAPORATIVE CONDENSER 100T	CT	159.06618	0.00000	79.53309	3353.12	13.64953	0.00000	6.82477	68	100.10000	10038.20000	25.02500
EVAPORATIVE CONDENSER 300T	CT	36.35798	0.00000	18.17899	766.43	3.11989	0.00000	1.55995	68	182.00000	31800.00000	45.50000
EXPANSION TANK	CT	0.11714	0.00000	0.11714	2.66	0.01005	0.00000	0.01005	34	3.47100	135.68000	1.73550
REFRIG. FAN COIL 1T	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64998	68	2.60000	855.42000	1.30000
REFRIG. FAN COIL 3T	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64998	68	2.86000	1051.52000	1.43000
REFRIG. FAN COIL 5T	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64998	68	3.25000	1240.20000	1.62500
DIST. PIPING SYSTEM												
PIPE/FITTINGS ST.& C.I.	TF	2.92321	10.15499	1.62581	72.30	0.02818	0.01471	0.02818	20	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	2.31221	19.85388	1.23587	68.85	0.01369	0.00629	0.01369	14	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	1.54998	7.62376	1.54998	42.78	0.13300	0.65420	0.13300	30	241.80000	8321.00000	120.90000
GATE VALVE, 3/8" - 1 1/2"	CT	0.57278	7.33179	0.57278	20.32	0.02622	0.03301	0.02622	14	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.52853	37.24355	0.52853	49.23	0.02632	0.06603	0.02632	14	0.57200	94.05380	0.57200
DRAIN VALVE	CT	2.06483	17.78973	2.06483	64.62	0.15426	0.93041	0.15426	14	0.68900	17.91400	0.68900
PIPE INSULATION	TF	22.90576	223.01202	22.90576	742.51	0.07974	0.46514	0.07974	20	91.00000	901.00000	91.00000
CIRCULATOR PUMP, < 1 HP	CT	5.50962	272.17923	5.50962	397.14	0.21458	0.54238	0.21458	10	4.19900	371.00000	4.19900
5 TON CHILLER ACH RECIP	CT	13.71723	992.04314	8.12775	1285.26	0.21781	6.91013	0.21781	10	15.60000	1272.00000	7.80000
HEAT/COOL GENERATION EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	92.66809	2566.32005	54.71473	4546.58	7.02764	67.93315	4.46403	18	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	94.59144	3350.59652	55.19556	5369.86	7.02764	83.09830	4.46403	18	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	108.63754	6304.12370	61.91366	8618.51	7.40773	150.96427	4.83421	18	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	121.91430	10076.34427	68.55486	12670.61	7.78781	171.33051	5.21429	18	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	83.32038	620.09008	53.02206	2412.84	7.14975	53.21017	4.54984	68	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	91.19165	2566.32005	53.97650	4515.46	6.90095	67.93315	4.40068	18	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	93.11500	3351.55962	54.45734	5339.70	6.90095	83.18095	4.40068	18	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	107.16109	6281.00933	61.17543	8564.27	7.28103	148.98082	4.77086	18	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	120.43785	10076.34427	67.81663	12639.49	7.66112	171.33051	5.15095	18	105.30000	27305.60000	26.32500
3 DK.MULTI ZONE 6500 CFM	CT	91.51408	2566.31063	54.42622	4523.17	7.02764	67.93234	4.46403	18	32.50000	5997.48000	8.12500
3 DK.MULTI ZONE 10,000 CFM	CT	94.59144	3351.55962	55.19556	5370.83	7.02764	83.18095	4.46403	18	42.90000	8050.70000	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	108.63754	6026.02886	62.02910	8340.78	7.40773	127.10084	4.84412	18	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	121.91430	9850.25677	68.67030	12444.89	7.78781	151.92985	5.22420	18	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	91.96099	2736.32051	43.09547	4665.63	6.90095	67.93315	3.45047	18	39.00000	6572.00000	9.75000
D.D. VARI.VOL.10000 CFM	CT	94.26901	3604.05109	43.67247	5580.16	6.90095	83.18095	3.45047	18	46.80000	8904.00000	11.70000
D.D. VARI.VOL.25000 CFM	CT	109.46911	6751.03118	48.57984	9038.94	7.28103	148.67227	3.64052	18	83.20000	16960.00000	20.80000
D.D. VARI.VOL.50000 CFM	CT	123.51521	10751.80154	53.19870	13328.11	7.66112	169.00267	3.83056	18	115.70000	29680.00000	28.92500
D.D. VARI.VOL. 100,000CFM	CT	90.89496	3355.89786	45.44748	5271.96	7.79973	287.97092	3.89987	68	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CFM	CT	90.03764	2566.32005	82.47875	4584.19	6.90095	67.93315	6.87123	18	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000 CFM	CT	93.11500	3351.55962	54.45734	5339.70	6.90095	83.18095	4.40068	18	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	89.44370	5649.21636	43.57348	7531.01	5.76070	94.76642	3.26043	18	75.40000	15359.40000	18.85000

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
Zone: 9	U.S.	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
VARIABLE VOLUME 50000 CFM	CT	120.43785	10076.34427	67.93207	12639.86	7.66112	171.33051	5.16085	18	105.30000	27305.60000	26.32500
TERM. REHEAT 6500 CFM	CT	99.45172	3519.90098	55.25372	5634.03	6.74607	66.63117	4.29436	12	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	102.78544	4912.01286	56.08715	7093.75	6.74607	81.41552	4.29436	12	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	128.74934	11497.66349	65.79916	14216.26	7.11460	146.31680	4.66289	12	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	159.71381	16630.82280	76.76132	19987.68	7.48313	169.85136	5.03143	12	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	99.45172	3519.90098	55.25372	5634.03	6.74607	66.63117	4.29436	12	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	102.78544	4912.01286	56.08715	7093.75	6.74607	81.41552	4.29436	12	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	128.74934	11497.66349	65.79916	14216.26	7.11460	146.31680	4.66289	12	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	159.71381	16630.82280	76.76132	19987.68	7.48313	169.85136	5.03143	12	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	83.75858	829.07016	53.24116	2631.06	7.18736	71.14284	4.56865	68	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	81.80546	984.73269	52.21460	2745.55	7.01976	84.50030	4.48485	68	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	86.35021	1757.25129	56.80935	3621.14	7.40975	150.79042	4.87483	68	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	90.89496	2000.34636	61.35410	3967.31	7.79973	171.65051	5.26482	68	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	68	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	68	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	68	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	68	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	68	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	68	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	68	3.12000	827.86000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	68	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	68	2.60000	1590.00000	1.30000
UNIT VENT 1200 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	68	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	81.80546	802.41138	52.26460	2563.23	7.01976	68.85524	4.48485	68	32.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	81.80546	984.73269	52.26460	2745.55	7.01976	84.50030	4.48485	68	37.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	86.35021	1757.25129	56.80935	3621.14	7.40975	150.79042	4.87483	68	71.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	90.89496	2000.34636	61.35410	3967.31	7.79973	171.65051	5.26482	68	113.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	82.30552	993.60652	79.80523	2852.29	6.63357	15.28518	6.63357	12	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	81.80546	620.09008	52.26460	2380.91	7.01976	53.21017	4.48485	68	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	68	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	68	3.25000	461.10000	1.62500
UNIT HEATER 4000 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	68	3.25000	828.92000	1.62500
UNIT HEATER 8000 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	68	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50MBH	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	68	2.60000	445.20000	1.30000
HEAT PUMP 5T	CT	42.41765	0.00000	42.41765	962.03	3.63988	0.00000	3.63988	91	8.38500	2994.50000	4.19250
HEAT PUMP 10T	CT	107.55904	0.00000	107.55904	2439.44	9.22968	0.00000	9.22968	91	14.30000	5989.00000	4.76667
HEAT PUMP 25T	CT	137.85736	0.00000	137.85736	3126.60	11.82959	0.00000	11.82959	91	19.50000	17755.00000	4.87500
HEAT PUMP 1T	CT	50.64166	367.43463	50.09589	1514.24	4.25192	10.01608	4.25192	24	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	30.29832	0.00000	15.14916	638.69	2.59991	0.00000	1.29996	30	2.34000	80.54000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	58.81629	1213.79207	52.21164	2526.61	4.29139	21.28294	4.29139	15	26.00000	2854.40000	6.50000
IND DRAFT FAN 10000 CFM	CT	60.03169	1257.25651	52.81934	2595.70	4.39568	22.73286	4.34353	15	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	6.74383	30.99790	6.74383	183.95	0.47054	1.27615	0.47054	14	3.25000	41.58380	3.25000
EXHAUST FAN, 1000 CFM	CT	16.68555	87.71693	16.01371	464.00	1.31649	0.94596	1.31649	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	61.22402	965.73781	52.98784	2327.94	4.38845	22.79888	4.33061	14	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	61.22402	2399.49817	28.09131	3682.03	4.38845	69.03912	2.19422	14	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	63.74472	2946.80373	53.61802	4360.13	4.38845	72.96946	4.33061	14	32.50000	5406.00000	8.12500
EXHAUST FAN, 5000 CFM	CT	18.54489	331.37533	16.71891	746.13	1.32750	0.82629	1.30273	24	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM	CT	3.78729	0.00000	3.78729	85.90	0.32499	0.00000	0.32499	91	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	5.83401	79.50922	2.91701	202.49	0.00000	0.00000	0.00000	12	9.10000	124.02000	4.55000
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
ROOM HUMIDIFIER,FLOOR TYPE	CT	7.59360	114.34494	7.59360	286.59	0.05750	0.70325	0.05750	7	0.26000	169.60000	0.26000
CONTROLS/INSTRUMENT.												

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION Zone: 9	UM	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
DEVICES												
THERMOSTATS/PNEUMATICS	CT	15.01479	48.37966	15.01479	388.92	1.27113	0.00000	1.27113	20	0.78000	187.22780	0.78000
HUMIDITY SENSOR	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	46	0.78000	100.26540	0.78000
FLOW SENSOR	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	68	0.78000	100.04280	0.78000
RADIATION SENSOR	CT	15.04667	15.19937	15.04667	356.46	1.27797	0.00000	1.27797	24	0.78000	77.11500	0.78000
WIND VELOCITY SENSOR	CT	14.81579	29.18736	14.81579	365.21	1.22844	0.00000	1.22844	12	0.78000	45.52700	0.78000
PRESSURE SENSOR	CT	15.04667	11.49093	15.04667	352.75	1.27797	0.00000	1.27797	24	0.78000	58.30000	0.78000
DAMPER CONTROLLER/ELECT.	CT	15.53383	84.98455	15.53383	437.29	1.26695	0.00000	1.26695	18	2.60000	287.20700	2.60000
SIMPLEX AIR COMPR., 1 HP	CT	44.18485	43.95762	30.65170	1002.76	3.79152	3.77202	2.63023	30	3.67900	6103.82980	1.83950

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 10	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.13209	33.38905	0.13209	36.38	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	9.07658	16.23970	4.58497	208.11	0.78058	1.39354	0.39344	54	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.38912	13.67273	0.38912	22.50	0.01740	0.00000	0.01740	10	0.25000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.64996	231.67678	0.42638	245.70	0.01740	0.00000	0.01740	10	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.58682	37.08251	0.29341	49.45	0.00000	0.00000	0.00000	22	2.60000	164.30000	1.30000
OIL FILTER	CT	1.21193	39.52765	1.21193	67.01	0.10400	3.39188	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.72663	160.23384	0.72663	176.71	0.03353	0.00000	0.03353	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	18.61143	333.45030	9.39288	726.06	0.18758	0.35299	0.10127	18	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
LPG STORAGE TANK, 1000 GAL	CT	1.17364	355.27437	0.58682	380.01	0.00000	0.00000	0.00000	22	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITNGS,STEEL/IRON	TF	9.02323	16.20142	4.51162	206.41	0.77429	1.39025	0.38714	54	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	22.43693	265.49930	21.34031	770.89	1.73849	1.65450	1.73849	18	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	22.08509	139.81152	19.35574	631.97	1.39053	1.37943	1.39053	9	13.00000	294.68000	6.50000
STEAM REG. VALVE 2"	CT	20.93988	672.57552	10.46994	1113.99	0.00000	0.00000	0.00000	4	7.80000	250.53100	3.90000
COND. METER,<300 #/HR.	CT	7.98239	525.16285	7.98239	706.20	0.67238	25.56145	0.67238	22	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	3.33372	146.82495	1.66686	219.10	0.00000	0.00000	0.00000	12	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	3.33372	168.19259	1.66686	238.47	0.00000	0.00000	0.00000	12	5.20000	262.35000	2.60000
SOLAR												
EQUIPMENT												
SOLAR PANEL, 3' X 8'	CT	2.73312	245.13984	1.36656	302.75	0.00000	0.00000	0.00000	11	3.90000	349.80000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	5.65344	795.17808	2.82672	914.35	0.00000	0.00000	0.00000	14	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.11911	0.01100	0.11911	2.71	0.01022	0.00094	0.01022	38	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	462.23272	1639.63596	452.61597	12092.30	38.01394	60.22264	38.01394	18	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	549.22885	5804.34884	508.26149	18129.76	42.44231	116.36814	42.44231	18	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	583.57086	19303.29970	528.38033	32362.08	43.76188	687.49191	43.76188	18	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR REPAIR BOILER	CT	7802.0534	254082.00000	2140.9264	412916.97	101.33829	0.00000	68.08094	18	20800.000	636000.00000	4160.0000
									12	1050.4000	148400.00000	262.60000
BOILER COAL 100,000 KBTU/H REPAIR BOILER	CT	14314.375	593365.10400	3521.4362	883477.73	121.98952	0.00000	78.40655	18	41600.000	1590000.00000	8320.0000
									12	1313.7800	276766.00000	328.44500
BOILER OIL 250 KBTU/HR	CT	536.95058	1427.20208	522.52546	13559.08	44.42551	41.99360	44.42551	18	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	616.71760	4937.61765	575.75024	18793.68	48.23355	41.99360	48.23355	18	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	691.78689	11837.33963	636.59636	27350.46	53.04794	46.83494	53.04794	18	248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	569.94939	6370.54760	528.98204	19165.90	44.22035	72.09792	44.22035	18	184.60000	18689.92000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	731.05042	36152.43439	586.51067	52270.13	46.19437	1298.96482	46.19437	18	651.30000	71020.00000	162.82500
BOILR.PNEUMAT.COAL SPREAD.	CT	2361.0873	8613.02576	2189.1576	61612.31	180.23881	175.00206	179.19098	7	364.00000	11236.00000	91.00000
ASH HANDLING SYSTEM	CT	10231.013	137644.02460	5225.8048	353666.73	305.79160	148.52274	305.39446	12	10400.000	212000.00000	2600.0000
FUEL OIL EQUIPMENT	CT	13.43164	260.20032	6.71582	543.34	0.48270	0.55749	0.24135	9	5.20000	604.20000	2.60000
CHEMICAL FEED SYSTEM	CT	9.75806	326.69900	8.39339	543.64	0.00000	0.00000	0.00000	9	6.50000	778.04000	3.25000
FEED-WATER SUPPLY	CT	234.87958	2314.48880	218.86739	7590.32	0.00000	0.00000	0.00000	9	57.20000	5512.00000	19.06667
DEAERATOR	CT	382.04738	13591.32000	149.35219	21511.53	18.48024	0.00000	9.24012	12	260.00000	21200.00000	65.00000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 10	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
BLOWOFF SYSTEM	CT	2.18348	123.73613	1.09174	169.76	0.00000	0.00000	0.00000	9	5.20000	294.68000	2.60000
HOUSE FURN.GAS 25KBTU/HR	CT	56.39138	681.52064	52.02442	1946.50	0.35006	32.89178	0.35006	9	20.80000	710.20000	10.40000
HOUSE FURN.GAS 100KBTU/HR	CT	65.18905	854.80350	56.45513	2305.34	0.35553	39.35864	0.35553	9	41.60000	943.40000	20.80000
HOUSE FURN.GAS 200KBTU/HR	CT	65.18905	2058.68642	56.45513	3509.23	0.35553	47.94395	0.35553	9	41.60000	3572.20000	20.80000
HOUSE FURN.OIL 25KBTU/HR	CT	70.51255	1256.57721	66.14559	2841.83	0.35553	46.71748	0.35553	9	20.80000	1696.00000	10.40000
HOUSE FURN.OIL 100KBTU/HR	CT	79.24647	1734.66698	70.51255	3504.03	0.35553	50.95439	0.35553	9	41.60000	2716.99200	20.80000
HOUSE FURN.OIL 200KBTU/HR	CT	79.24647	2034.88412	70.51255	3804.25	0.35553	59.65120	0.35553	9	41.60000	3190.60000	20.80000
HOUSE FURN.ELECT 25KBTU/HR	CT	35.07873	764.60620	30.71177	1546.22	0.45125	22.29951	0.45125	9	20.80000	1202.04000	10.40000
HOUSE FURN.ELECT.100KBTU	CT	43.81265	1005.13297	35.07873	1970.86	0.45125	32.11130	0.45125	9	41.60000	1502.55000	20.80000
HOUSE FURN.ELECT.200KBTU/H	CT	43.81265	1281.92796	35.07873	2247.65	0.45125	41.25410	0.45125	9	41.60000	1908.00000	20.80000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	3.33372	148.82495	1.66686	219.10	0.00000	0.00000	0.00000	12	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	3.33372	168.19259	1.66686	238.47	0.00000	0.00000	0.00000	12	5.20000	262.35000	2.60000
EXPANSION TANK	CT	0.13913	0.00000	0.13913	3.16	0.01194	0.00000	0.01194	30	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	22.09729	265.49930	21.00867	763.18	1.70935	1.65450	1.70935	18	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	22.08509	139.81152	19.35574	631.97	1.39053	1.37943	1.39053	9	13.00000	294.68000	6.50000
STORAGE TANK, DHW	CT	28.56090	40.55030	28.56090	688.31	2.45082	3.47964	2.45082	36	3.59395	346.62000	1.79698
IND. FUR., GAS/OIL 500 MBU	CT	70.98641	2536.77599	48.90969	4076.10	4.83249	86.29326	3.88224	22	65.00000	6784.00000	16.25000
IND.FURN.GAS/OIL 2000 MBTU	CT	128.08150	5200.89285	96.83333	8005.79	7.41550	179.40781	7.41550	22	184.60000	13780.00000	46.15000
SURGE TANK, 1000 GAL	CT	3.64416	1103.12928	1.82208	1179.95	0.00000	0.00000	0.00000	11	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.27294	0.14243	0.27294	6.33	0.02342	0.01222	0.02342	30	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	1.88389	15.20390	1.06262	55.30	0.02071	0.00951	0.02071	18	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	74.20656	2390.56086	38.43225	3959.09	0.22808	1.12099	0.22808	18	241.80000	8034.80000	120.90000
PIPE INSULATION	TF	21.36981	220.42641	21.36981	705.09	0.07132	0.43837	0.07132	22	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	1.62144	11.91304	1.62144	48.69	0.12483	0.03676	0.12483	12	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"	CT	0.70819	61.15463	0.70819	77.22	0.02930	0.07352	0.02930	12	0.57200	94.05380	0.57200
DRAIN VALVE	CT	2.52256	23.63142	2.52256	80.84	0.17856	1.04232	0.17856	12	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	1.20091	16.98479	0.60046	42.30	0.00000	0.00000	0.00000	9	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	20.93988	672.57352	10.46994	1113.99	0.00000	0.00000	0.00000	4	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	10.80226	188.65387	10.80226	433.65	0.18754	5.77296	0.18754	6	2.60000	151.41040	2.60000
PIPE INSULATION	TF	28.03267	289.08547	28.03267	924.87	0.09489	0.58324	0.09489	18	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	6.35243	318.59373	6.35243	462.67	0.14118	0.34734	0.14118	9	8.39800	742.00000	8.39800
CIRCULATION PUMP 5 HP	CT	6.35243	1166.09679	4.58927	1304.53	0.14118	8.14264	0.14118	9	8.39800	2544.00000	4.19900
COND. RCVR., 10 - 15 GAL.	CT	37.65129	1407.95001	32.65071	2245.88	2.37267	15.85186	2.37267	12	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T	CT	42.41765	0.00000	42.41765	962.03	3.63988	0.00000	3.63988	117	8.38500	1855.00000	4.19250
A/C DX PACKAGE 20T	CT	107.55904	0.00000	107.55904	2439.44	9.22968	0.00000	9.22968	117	20.41000	7950.00000	6.80333
A/C DX PACKAGE 50T	CT	137.85736	0.00000	137.85736	3126.60	11.82959	0.00000	11.82959	117	47.71000	21200.00000	11.92750
A/C WINDOW 1T	CT	19.69391	0.00000	19.69391	446.66	1.68994	0.00000	1.68994	59	5.98000	530.00000	5.98000
A/C WINDOW 2T	CT	19.69391	0.00000	19.69391	446.66	1.68994	0.00000	1.68994	59	6.50000	742.00000	6.50000
A/C PAD MTD. 4T	CT	57.56681	0.00000	57.56681	1305.62	4.93983	0.00000	4.93983	59	6.50000	1484.00000	3.25000
A/C PAD MOUNTED 20 TON	CT	114.72653	5096.74500	106.00330	7670.83	8.72191	0.00000	8.72191	12	20.41000	7950.00000	6.80333
CHILLER-AIR COOL RECIP.20T	CT	262.08047	0.00000	131.04023	5524.66	22.48923	0.00000	11.24461	117	28.60000	10759.00000	7.15000
CHILLER AIR COOL REC.50T	CT	325.70694	0.00000	162.85347	6865.90	27.94904	0.00000	13.97452	117	40.30000	19080.00000	10.07500
CHILLER AIR COOL REC.100T	CT	325.70694	0.00000	162.85347	6865.90	27.94904	0.00000	13.97452	117	72.80000	40280.00000	18.20000
CHILLER-AIR COOL RECIP. 5T	CT	140.88719	0.00000	140.88719	3195.32	12.08959	0.00000	12.08959	117	15.60000	3710.00000	5.20000
CHILLER AIR COOL REC. 10T	CT	204.51366	0.00000	102.25683	4311.15	17.54940	0.00000	8.77470	117	20.80000	6360.00000	6.93333
CHILLER AIR COOL REC. 15T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	117	28.60000	8268.00000	7.15000
CHILLER WAT.COOL REC.20T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	117	29.90000	9540.00000	7.47500
CHILLER WAT.COOL REC.50T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	117	48.10000	15900.00000	12.02500
CHILLER WAT.COOL REC.100T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	117	74.10000	27030.00000	18.52500
CHILLER WAT. COOL REC. 10T	CT	234.81198	0.00000	117.40599	4949.84	20.14931	0.00000	10.07465	117	20.80000	5300.00000	5.20000
CHILLER WAT.COOL REC.200T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	117	74.10000	53000.00000	18.52500
CHILL. HERMETIC CENT. 100T	CT	386.30358	0.00000	193.15179	8143.28	33.14886	0.00000	16.57443	117	62.40000	37789.00000	15.60000
CHILL. HERMETIC CENT. 300T	CT	386.30358	0.00000	193.15179	8143.28	33.14886	0.00000	16.57443	117	97.50000	61771.50000	24.37500
CHILL. HERMETIC CENT. 900T	CT	386.30358	0.00000	193.15179	8143.28	33.14886	0.00000	16.57443	117	162.50000	127200.00000	40.62500

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 10	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
CHILL. OPEN CENT. 300T	CT	1007.4191	0.00000	503.70957	21236.40	86.44703	0.00000	43.22352	117	97.50000	61771.50000	24.37500
CHILL. OPEN CENT. 900T	CT	386.30358	0.00000	193.15179	8143.28	33.14886	0.00000	16.57443	117	162.50000	127200.00000	40.62500
CHILL.DBL.BNDL. HERM.100T	CT	446.90022	0.00000	223.45011	9420.66	38.34868	0.00000	19.17434	117	68.90000	41340.00000	17.22500
CHILL.DBL.BNDL. HERM.300T	CT	446.90022	0.00000	223.45011	9420.66	38.34868	0.00000	19.17434	117	107.90000	67840.00000	26.97500
CHILL.DBL.BNDL. HERM.900T	CT	446.90022	0.00000	223.45011	9420.66	38.34868	0.00000	19.17434	117	178.10000	139920.00000	44.52500
CHILL. ONE STG. ABS. 100T	CT	1325.5515	0.00000	662.77575	27942.63	113.74610	0.00000	56.87305	117	65.00000	37100.00000	16.25000
CHILL. ONE STG. ABS. 300T	CT	195.42416	0.00000	97.71208	4119.54	16.76942	0.00000	8.38471	117	104.00000	61480.00000	26.00000
CHILL. ONE STG. ABS. 900T	CT	195.42416	0.00000	97.71208	4119.54	16.76942	0.00000	8.38471	117	167.70000	113420.00000	41.92500
CHILL. TWO STG. ABS. 300T	CT	195.42416	0.00000	97.71208	4119.54	16.76942	0.00000	8.38471	117	114.40000	67840.00000	28.60000
CHILL. TWO STG. ABS. 900T	CT	181.78992	0.00000	90.89496	3832.13	15.59946	0.00000	7.79973	117	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 5T	CT	27.26849	0.00000	27.26849	618.45	2.33992	0.00000	2.33992	88	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 20T	CT	27.26849	0.00000	13.63424	574.82	2.33992	0.00000	1.16996	88	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 50T	CT	48.47731	0.00000	24.23866	1021.90	4.15986	0.00000	2.07993	88	31.20000	5294.70000	7.80000
AIR COOLED CONDENSER 100T	CT	48.47731	0.00000	24.23865	1021.90	4.15986	0.00000	2.07993	88	46.80000	10578.80000	11.70000
COOLING TOWER 50T	CT	53.02206	0.00000	26.51103	1117.71	4.54984	0.00000	2.27492	88	46.80000	4478.50000	11.70000
COOLING TOWER 100T	CT	165.12504	0.00000	82.56292	3480.85	14.16951	0.00000	7.08476	88	52.00000	10070.00000	13.00000
COOLING TOWER 300T	CT	192.39433	0.00000	96.19717	4055.67	16.50943	0.00000	8.25472	88	78.00000	15377.00000	19.50000
COOLING TOWER 900T	CT	209.05841	0.00000	104.52920	4406.95	17.93938	0.00000	8.96969	88	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 20T	CT	96.95462	0.00000	48.47731	2043.80	8.31971	0.00000	4.15986	88	36.40000	3688.80000	9.10000
EVAPORATIVE CONDENSER 100T	CT	159.06618	0.00000	79.53309	3353.12	13.64953	0.00000	6.82477	88	100.10000	10038.20000	25.02500
EVAPORATIVE CONDENSER 300T	CT	36.35798	0.00000	18.17899	766.43	3.11989	0.00000	1.55995	88	182.00000	31800.00000	45.50000
EXPANSION TANK	CT	0.13913	0.00000	0.13913	3.16	0.01194	0.00000	0.01194	30	3.47100	135.68000	1.73550
REFRIG. FAN COIL 1T	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64998	88	2.60000	855.42000	1.30000
REFRIG. FAN COIL 3T	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64998	88	2.86000	1051.52000	1.43000
REFRIG. FAN COIL 5T	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64998	88	3.25000	1240.20000	1.62500
DIST. PIPING SYSTEM												
PIPE/FITTINGS ST.& C.I.	TF	3.60420	12.45424	2.01455	89.11	0.03646	0.01903	0.03646	18	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	3.73637	32.78231	1.95700	111.83	0.01524	0.00700	0.01524	12	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	0.33989	1.68922	0.33989	9.40	0.02917	0.14495	0.02917	32	241.80000	8321.00000	120.90000
GATE VALVE, 3/8" - 1 1/2"	CT	0.78195	11.91304	0.78195	29.65	0.02920	0.03676	0.02920	12	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.70819	61.15463	0.70819	77.22	0.02930	0.07352	0.02930	12	0.57200	94.05380	0.57200
DRAIN VALVE	CT	2.52256	23.63142	2.52256	80.84	0.17856	1.04232	0.17856	12	0.68900	17.91400	0.68900
PIPE INSULATION	TF	28.03267	273.05599	28.03267	908.84	0.09489	0.55348	0.09489	18	91.00000	901.00000	91.00000
CIRCULATOR PUMP, < 1 HP	CT	6.30634	318.59373	6.30634	461.62	0.13723	0.34734	0.13723	9	8.39800	742.00000	8.39800
5 TON CHILLER ACH RECIP	CT	15.92699	1166.09679	9.37655	1506.36	0.14118	8.14264	0.14118	9	31.20000	2544.00000	15.60000
HEAT/COOL GENERATION EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	91.52590	2343.36777	54.52148	4300.76	7.04677	68.10075	4.47673	19	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	93.20558	3051.23202	54.94138	5042.69	7.04677	83.31598	4.47673	19	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	106.04755	5732.34036	61.37695	7994.55	7.42811	151.32417	4.84881	19	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	118.21768	9055.74739	67.75246	11575.44	7.80945	171.61910	5.23015	19	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	83.32038	620.09008	53.02206	2412.8	7.14975	53.21017	4.54984	88	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	90.04466	2343.36777	53.78082	4269.54	6.91966	68.10075	4.41318	19	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	91.72426	3052.19830	54.20072	5012.43	6.91966	83.39890	4.41318	19	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	104.56623	5709.14966	60.63629	7940.14	7.30099	149.33417	4.78526	19	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	116.73636	9055.74739	67.01180	11544.21	7.68233	171.61910	5.16659	19	105.30000	27305.60000	26.32500
3 DK.MULTI ZONE 6500 CFM	CT	90.51822	2343.35897	54.26954	4280.32	7.04677	68.10000	4.47673	19	32.50000	5997.48000	8.12500
3 DK.MULTI ZONE 10,000 CFM	CT	93.20558	3052.19330	54.94138	5043.66	7.04677	83.39890	4.47673	19	42.90000	8050.70000	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	106.04755	5453.32729	61.48485	7715.89	7.42811	127.38195	4.85807	19	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	118.21768	8825.91338	67.86036	11340.95	7.80945	152.15439	5.23941	19	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	90.71650	2491.82373	42.83885	4396.07	6.91966	68.10075	3.45983	19	39.00000	6572.00000	9.75000
D.D. VARI.VOL.10000 CFM	CT	92.73202	3272.69102	43.34273	5217.81	6.91966	83.39890	3.45983	19	46.80000	8904.00000	11.70000
D.D. VARI.VOL.25000 CFM	CT	106.58175	6119.38387	47.91615	8348.93	7.30099	149.04578	3.65050	19	83.20000	16960.00000	20.80000
D.D. VARI.VOL.50000 CFM	CT	119.42372	9643.93651	52.23764	12137.47	7.68233	169.44331	3.84117	19	115.70000	29680.00000	28.92500
D.D. VARI.VOL. 100,000CFM	CT	90.89496	3355.89786	45.44748	5271.96	7.79973	287.97092	3.89987	88	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CFM	CT	89.03690	2343.36777	82.41470	4341.53	6.91966	68.10075	6.89188	19	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000 CFM	CT	91.72426	3052.19830	54.20072	5012.43	6.91966	83.39890	4.41318	19	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	86.79034	5075.27061	42.96830	6903.45	5.77564	94.94076	3.26916	19	75.40000	15359.40000	18.85000

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE) PAGE 64

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
Zone: 10	un	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
VARIABLE VOLUME 50000 CFM	CT	116.73636	9055.74739	67.11970	11544.55	7.68233	171.61910	5.17585	19	105.30000	27305.60000	26.32500
TERM. REHEAT 6500 CFM	CT	101.00111	3771.65216	55.48514	5916.71	6.71253	66.31211	4.27260	11	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	104.64527	5276.42119	56.39618	7495.38	6.71253	81.01631	4.27260	11	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	132.60374	12401.51391	66.58938	15197.72	7.07906	145.62661	4.63913	11	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	166.02846	17986.85344	78.14914	21471.17	7.44559	169.13662	5.00566	11	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	101.00111	3771.65216	55.48514	5916.71	6.71253	66.31211	4.27260	11	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	104.64527	5276.42119	56.39618	7495.38	6.71253	81.01631	4.27260	11	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	132.60374	12401.51391	66.58938	15197.72	7.07906	145.62661	4.63913	11	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	166.02846	17936.85344	78.14914	21471.17	7.44559	169.13662	5.00566	11	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	84.30661	836.68902	53.51518	2650.23	7.23438	71.79661	4.59216	88	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	81.80546	984.73269	52.26460	2745.55	7.01976	84.50030	4.48485	88	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	86.35021	1757.25129	56.80935	3621.14	7.40975	150.79042	4.87483	88	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	90.89496	2000.34636	61.35410	3967.31	7.79973	171.65051	5.26482	88	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	88	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	88	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	88	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	88	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	88	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	88	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	88	3.12000	827.86000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	88	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	88	2.60000	1590.00000	1.30000
UNIT VENT 1200 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	88	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	81.80546	802.41138	52.26460	2563.23	7.01976	68.85524	4.48485	88	32.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	81.80546	984.73269	52.26460	2745.55	7.01976	84.50030	4.48485	88	37.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	86.35021	1757.25129	56.80935	3621.14	7.40975	150.79042	4.87483	88	71.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	90.89496	2000.34636	61.35410	3967.31	7.79973	171.6505	5.26482	88	113.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	82.35209	1068.57924	79.61897	2927.58	6.59760	15.20231	6.59760	11	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	81.80546	620.09008	52.26460	2380.91	7.01976	53.21017	4.48485	88	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	88	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	88	3.25000	461.10000	1.62500
UNIT HEATER 4000 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	88	3.25000	828.92000	1.62500
UNIT HEATER 8000 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	88	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50MBH	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	38	2.60000	445.20000	1.30000
HEAT PUMP 5T	CT	42.41765	0.00000	42.41765	962.03	3.63988	0.00000	3.63988	117	8.38500	2994.50000	4.19250
HEAT PUMP 10T	CT	107.55904	0.00000	107.55904	2439.44	9.22968	0.00000	9.22968	117	14.30000	5989.00000	4.76667
HEAT PUMP 25T	CT	137.85736	0.00000	137.85736	3126.60	11.82959	0.00000	11.82959	117	19.50000	17755.00000	4.87500
HEAT PUMP 1T	CT	49.75485	109.09960	49.75485	1237.54	4.26948	9.36188	4.26948	26	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	30.29832	0.00000	15.14916	638.69	2.59991	0.00000	1.29996	32	2.34000	80.56000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	59.32774	1280.85073	52.26094	2603.79	4.28240	21.23.36	4.28240	14	26.00000	2851.40000	6.50000
IND DRAFT FAN 10000 CFM	CT	60.56466	1326.47348	52.87940	2675.49	4.38854	22.71397	4.33547	14	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	8.16045	44.37548	8.16045	229.45	0.52146	1.52023	0.52146	12	3.25000	41.58380	3.25000
EXHAUST FAN, 1000 CFM	CT	16.6.355	87.71693	16.01371	464.00	1.31649	0.94596	1.31649	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	66.84311	1419.56275	53.59115	2893.16	4.30549	22.50479	4.24109	12	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	66.84311	3429.40404	29.25441	4825.12	4.30549	68.02087	2.15275	12	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	71.01026	4309.47116	54.63294	5867.58	4.30549	72.39690	4.24109	12	32.50000	5406.00000	8.12500
EXHAUST FAN, 5000 CFM	CT	15.68866	9.00035	15.41891	363.96	1.34625	0.77232	1.32310	26	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM	CT	3.78729	0.00000	3.78729	85.90	0.32499	0.00000	0.32499	117	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	6.37728	86.91322	3.18864	221.35	0.00000	0.00000	0.00000	11	9.10000	124.02000	4.55000
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
ROOM HUMIDIFIER,FLOOR TYPE	CT	7.50686	145.32860	7.50686	315.58	0.06573	0.80394	0.06573	6	0.26000	169.60000	0.26000
CONTROLS/INSTRUMENT.												

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
Zone: 10	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
DEVICES												
THERMOSTATS/PNEUMATICS	CT	15.01479	48.37966	15.01479	388.92	1.27113	0.00000	1.27113	20	0.78000	187.22780	0.78000
HUMIDITY SENSOR	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	59	0.78000	100.26540	0.78000
FLOW SENSOR	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	88	0.78000	100.04280	0.78000
RADIATION SENSOR	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	26	0.78000	77.11500	0.78000
WIND VELOCITY SENSOR	CT	14.93336	18.89371	14.93336	357.58	1.25366	0.00000	1.25366	13	0.78000	45.52700	0.78000
PRESSURE SENSOR	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	26	0.78000	58.30000	0.78000
DAMPER CONTROLLER/ELECT.	CT	15.48508	74.21429	15.48508	425.42	1.27113	0.00000	1.27113	19	2.60000	287.20700	2.60000
SIMPLEX AIR COMPR., 1 HP	CT	39.96935	39.76626	28.54395	909.71	3.42979	3.41236	2.44937	32	3.67900	6103.82980	1.83950

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 11	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.13209	33.38905	0.13209	36.38	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	9.09658	16.23970	4.58497	208.11	0.78058	1.39356	0.39344	55	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.38912	13.67273	0.38912	22.50	0.01740	0.00000	0.01740	10	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.64996	231.67678	0.42638	245.70	0.01740	0.00000	0.01740	10	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.58682	37.08251	0.29341	49.45	0.00000	0.00000	0.00000	22	2.60000	164.30000	1.30000
OIL FILTER	CT	1.21193	39.52765	1.21193	67.21	0.10400	3.39188	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.72663	160.23384	0.72663	176.71	0.03353	0.00000	0.03353	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	17.53453	311.85810	8.85443	681.77	0.18758	0.35299	0.10127	18	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
LPG STORAGE TANK, 1000 GAL	CT	1.17364	355.27437	0.58682	380.01	0.00000	0.00000	0.00000	22	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITNGS,STEEL/IRON	TF	9.02323	16.20142	4.51162	206.41	0.77429	1.39025	0.38714	55	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	22.43693	265.49930	21.34831	770.89	1.73849	1.65450	1.73849	18	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	22.08509	139.81152	19.35574	631.97	1.39053	1.37943	1.39053	9	13.00000	294.68000	6.50000
STEAM REG. VALVE 2"	CT	20.93988	672.57552	10.46994	1113.99	0.00000	0.00000	0.00000	4	7.80000	250.53100	3.90000
COND. METER,<300 #/HR.	CT	7.98239	525.16285	7.98239	706.20	0.67238	25.56145	0.67238	22	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	3.33372	148.82495	1.66686	219.10	0.00000	0.00000	0.00000	12	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	3.33372	168.19259	1.66686	238.47	0.00000	0.00000	0.00000	12	5.20000	262.35000	2.60000
SOLAR												
EQUIPMENT												
SOLAR PANEL, 3' X 8'	CT	2.73312	245.13984	1.36656	302.75	0.00000	0.00000	0.00000	11	3.90000	349.80000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	5.65344	795.17808	2.82672	914.35	0.00000	0.00000	0.00000	15	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.08492	0.00784	0.08492	1.93	0.00729	0.00067	0.00729	53	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	462.23272	1639.63596	452.61597	12092.30	38.01394	60.22264	38.01394	18	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	549.22885	5804.34884	508.26149	18129.76	42.44231	116.36814	42.44231	18	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	583.57086	19303.29970	528.38033	32362.08	43.76188	687.49191	43.76188	18	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR REPAIR BOILER	CT	7802.0534	254082.00000	2140.9264	412916.97	101.33829	0.00000	68.08094	18	20800.000	636000.00000	4160.0000
									12	1050.4000	14840.00000	262.60000
BOILER COAL 100,000 KBTU/H REPAIR BOILER	CT	14314.375	593365.10400	3521.4362	883477.73	121.98952	0.00000	78.40655	15	41600.000	1590000.00000	8320.0000
									12	1313.7800	27676.00000	328.44500
BOILER OIL 250 KBTU/HR	CT	536.95058	1427.20208	522.52546	13559.08	44.42551	41.99360	44.42551	18	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	616.71760	4937.61765	575.75024	18793.68	48.23355	41.99360	48.23355	18	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	691.78689	11837.33963	636.59636	27350.46	53.04794	46.83494	53.04794	18	248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	569.94939	6370.54760	528.98204	19165.90	44.22035	72.09792	44.22035	18	184.60000	18689.92000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	731.05042	36152.43439	586.51067	52270.13	46.19437	1298.96482	46.19437	18	551.30000	71020.00000	162.82500
BOILR.PNEUMAT.COAL SPREAD.	CT	2361.0873	8613.02576	2189.1576	61612.31	180.23881	175.00206	179.19098	7	764.00000	11236.00000	91.00000
ASH HANDLING SYSTEM	CT	10231.013	137644.02460	5225.8048	353666.73	305.79160	148.52274	305.39446	1	0400.000	212000.00000	2600.0000
FUEL OIL EQUIPMENT	CT	13.43164	260.20032	6.71582	543.34	0.48270	0.55749	0.24135	9	5.20000	604.20000	2.60000
CHEMICAL FEED SYSTEM	CT	9.75806	326.69900	8.39339	543.64	0.00000	0.00000	0.00000	9	6.50000	778.04000	3.25000
FEED-WATER SUPPLY	CT	234.87958	2314.48880	218.86739	7590.32	0.00000	0.00000	0.00000	9	57.20000	5512.00000	19.06667
DEAERATOR	CT	382.04738	13591.32000	149.35219	21511.53	18.48024	0.00000	9.24012	12	260.00000	21200.00000	65.00000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 11	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
BLOWOFF SYSTEM	CT	2.18348	123.73613	1.09174	169.76	0.00000	0.00000	0.00000	9	5.20000	294.68000	2.60000
HOUSE FURN.GAS 25KBTU/HR	CT	56.39138	681.52064	52.02442	1946.50	0.35006	32.89178	0.35006	9	20.80000	710.20000	10.40000
HOUSE FURN.GAS 100KBTU/HR	CT	65.18905	854.80350	56.45513	2305.34	0.35553	39.35864	0.35553	9	41.60000	943.40000	20.80000
HOUSE FURN.GAS 200KBTU/HR	CT	65.18905	2058.68642	56.45513	3509.23	0.35553	47.94395	0.35553	9	41.60000	3572.20000	20.80000
HOUSE FURN.OIL 25KBTU/HR	CT	70.51255	1256.57721	66.14559	2841.83	0.35553	46.71748	0.35553	9	20.80000	1696.00000	10.40000
HOUSE FURN.OIL 100KBTU/HR	CT	79.24647	1734.66698	70.51255	3504.03	0.35553	50.95439	0.35553	9	41.60000	2716.99200	20.80000
HOUSE FURN.OIL 200KBTU/HR	CT	79.24647	2034.88412	70.51255	3804.25	0.35553	59.65120	0.35553	9	41.60000	3190.60000	20.80000
HOUSE FURN.ELECT 25KBTU/HR	CT	35.07873	764.60620	30.71177	1546.22	0.45125	22.29951	0.45125	9	20.80000	1202.04000	10.40000
HOUSE FURN.ELECT.100KBTU	CT	43.81265	1005.13297	35.07873	1970.86	0.45125	32.11130	0.45125	9	41.60000	1502.55000	20.80000
HOUSE FURN.ELECT.200KBTU/H	CT	43.81265	1281.92796	35.07873	2247.65	0.45125	41.25410	0.45125	9	41.60000	1908.00000	20.80000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	3.33372	148.82495	1.66686	219.10	0.00000	0.00000	0.00000	12	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	3.33372	168.19259	1.66686	238.47	0.00000	0.00000	0.00000	12	5.20000	262.35000	2.60000
EXPANSION TANK	CT	0.13913	0.00000	0.13913	3.16	0.01194	0.00000	0.01194	30	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	22.09729	265.49930	21.00867	763.18	1.70935	1.65450	1.70935	18	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	22.08509	139.81152	19.35574	631.97	1.39053	1.37943	1.39053	9	13.00000	294.68000	6.50000
STORAGE TANK, DHW	CT	28.37686	40.28901	28.37686	683.88	2.43503	3.45722	2.43503	37	3.59395	346.62000	1.79698
IND. FUR., GAS/OIL 500 MBU	CT	70.98641	2536.77599	48.90969	4076.10	4.83249	86.29326	3.88224	22	65.00000	6784.00000	16.25000
IND.FURN.GAS/OIL 2000 MBTU	CT	128.08150	5200.89285	96.83333	8005.79	7.41550	179.40781	7.41550	22	184.60000	13780.00000	46.15000
SURGE TANK, 1000 GAL	CT	3.64416	1103.12928	1.82208	1179.95	0.00000	0.00000	0.00000	11	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.27294	0.14243	0.27294	6.33	0.02342	0.01222	0.02342	30	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	1.88389	15.20390	1.06262	55.30	0.02071	0.00951	0.02071	18	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	69.51564	2234.68574	36.08679	3704.33	0.22808	1.12099	0.22808	18	241.80000	8034.80000	120.90000
PIPE INSULATION	TF	21.36981	220.42641	21.36981	705.09	0.07132	0.43837	0.07132	22	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	1.62144	11.91304	1.62144	48.69	0.12483	0.03676	0.12483	12	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"	CT	0.70819	61.15463	0.70819	77.22	0.02930	0.07352	0.02930	12	0.57200	94.05380	0.57200
DRAIN VALVE	CT	2.52256	23.63142	2.52256	80.84	0.17856	1.04232	0.17856	12	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	1.20091	16.98479	0.60046	42.30	0.00000	0.00000	0.00000	9	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	20.93988	672.57552	10.46994	1113.99	0.00000	0.00000	0.00000	4	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	10.80226	188.65387	10.80226	433.65	0.18754	5.77296	0.18754	6	2.60000	151.41040	2.60000
PIPE INSULATION	TF	28.03267	289.08547	28.03267	924.87	0.09489	0.58324	0.09489	18	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	6.35243	318.59373	6.35243	462.67	0.14118	0.34734	0.14118	9	8.39800	742.00000	8.39800
CIRCULATION PUMP 5 HP	CT	6.35243	1166.09679	4.58927	1304.53	0.14118	8.14264	0.14118	9	8.39800	2544.00000	4.19900
COND. RCVR., 10 - 15 GAL.	CT	37.65129	1407.95001	32.65071	2245.88	2.37267	15.85186	2.37267	12	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T	CT	42.41765	0.00000	42.41765	962.03	3.63988	0.00000	3.63988	385	8.38500	1855.00000	4.19250
A/C DX PACKAGE 20T	CT	107.55904	0.00000	107.55904	2439.44	9.22968	0.00000	9.22968	385	20.41000	7950.00000	6.80333
A/C DX PACKAGE 50T	CT	137.85736	0.00000	137.85736	3126.60	11.82959	0.00000	11.82959	385	47.71000	21200.00000	11.92750
A/C WINDOW 1T	CT	19.69391	0.00000	19.69391	446.66	1.68994	0.00000	1.68994	192	5.98000	530.00000	5.98000
A/C WINDOW 2T	CT	19.69391	0.00000	19.69391	446.66	1.68994	0.00000	1.68994	192	6.50000	742.00000	6.50000
A/C PAD MTD. 4T	CT	57.56681	0.00000	57.56681	1305.62	4.93983	0.00000	4.93983	192	6.50000	1484.00000	6.25000
A/C PAD MOUNTED 20 TON	CT	114.72653	5096.74500	106.00330	7670.83	8.72191	0.00000	8.72191	12	20.41000	7950.00000	6.80333
CHILLER-AIR COOL RECIP.20T	CT	262.08047	0.00000	131.04023	5524.66	22.48923	0.00000	11.24461	385	28.60000	10759.00000	7.15000
CHILLER AIR COOL REC.50T	CT	325.70694	0.00000	162.85347	6865.90	27.94904	0.00000	13.97452	385	40.30000	19080.00000	10.07500
CHILLER AIR COOL REC.100T	CT	325.70694	0.00000	162.85347	6865.90	27.94904	0.00000	13.97452	385	72.80000	40280.00000	18.20000
CHILLER-AIR COOL RECIP. 5T	CT	140.88719	0.00000	140.88719	3195.32	12.08959	0.00000	12.08959	385	15.60000	3710.00000	5.20000
CHILLER AIR COOL REC. 10T	CT	204.51366	0.00000	102.25683	4311.15	17.54940	0.00000	8.77470	385	20.80000	6360.00000	6.93333
CHILLER AIR COOL REC. 15T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	385	28.60000	8268.00000	7.15000
CHILLER WAT.COOL REC.20T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	385	29.90000	9540.00000	7.47500
CHILLER WAT.COOL REC.50T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	385	48.10000	15900.00000	12.02500
CHILLER WAT.COOL REC.100T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	385	74.10000	27030.00000	18.52500
CHILLER WAT. COOL REC. 10T	CT	234.81198	0.00000	117.40599	4949.84	20.14931	0.00000	10.07465	385	20.80000	5300.00000	5.20000
CHILLER WAT.COOL REC.200T	CT	265.11030	0.00000	132.55515	5588.53	22.74922	0.00000	11.37461	385	74.10000	53000.00000	18.52500
CHILL. HERMETIC CENT. 100T	CT	386.30358	0.00000	193.15179	8143.28	33.14886	0.00000	16.57443	385	62.40000	37789.00000	15.60000
CHILL. HERMETIC CENT. 300T	CT	386.30358	0.00000	193.15179	8143.28	33.14886	0.00000	16.57443	385	97.50000	61771.50000	24.37500
CHILL. HERMETIC CENT. 900T	CT	386.30358	0.00000	193.15179	8143.28	33.14886	0.00000	16.57443	385	162.50000	127200.00000	40.62500

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 11	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
CHILL. OPEN CENT. 300T	CT	1007.4191	0.00000	503.70957	21236.40	86.44703	0.00000	43.22352	385	97.50000	61771.50000	24.37500
CHILL. OPEN CENT. 900T	CT	386.30358	0.00000	193.15179	8143.28	33.14886	0.00000	16.57443	385	162.50000	127200.00000	40.62500
CHILL.DBL.BNDL. HERM.100T	CT	446.90022	0.00000	223.45011	9420.66	38.34868	0.00000	19.17434	385	68.90000	41340.00000	17.22500
CHILL.DBL.BNDL. HERM.300T	CT	446.90022	0.00000	223.45011	9420.66	38.34868	0.00000	19.17434	385	107.90000	67840.00000	26.97500
CHILL.DBL.BNDL. HERM.900T	CT	446.90022	0.00000	223.45011	9420.66	38.34868	0.00000	19.17434	385	178.10000	139920.00000	44.52500
CHILL. ONE STG. ABS. 100T	CT	1325.5515	0.00000	662.77575	27942.63	113.74610	0.00000	56.87305	385	65.00000	37100.00000	16.25000
CHILL. ONE STG. ABS. 300T	CT	195.42416	0.00000	97.71208	4119.54	16.76942	0.00000	8.38471	385	104.00000	61480.00000	26.00000
CHILL. ONE STG. ABS. 900T	CT	195.42416	0.00000	97.71208	4119.54	16.76942	0.00000	8.38471	385	167.70000	113420.00000	41.92500
CHILL. TWO STG. ABS. 300T	CT	195.42416	0.00000	97.71208	4119.54	16.76942	0.00000	8.38471	385	114.40000	67840.00000	28.60000
CHILL. TWO STG. ABS. 900T	CT	181.78992	0.00000	90.89496	3832.13	15.59946	0.00000	7.79973	385	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 5T	CT	27.26849	0.00000	27.26849	618.45	2.33992	0.00000	2.33992	288	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 20T	CT	27.26849	0.00000	13.63424	574.82	2.33992	0.00000	1.16996	288	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 50T	CT	48.47731	0.00000	24.23866	1021.90	4.15986	0.00000	2.07993	288	31.20000	5294.70000	7.80000
AIR COOLED CONDENSER 100T	CT	48.47731	0.00000	24.23866	1021.90	4.15986	0.00000	2.07993	288	46.80000	10578.80000	11.70000
COOLING TOWER 50T	CT	53.02206	0.00000	26.51103	1117.71	4.54984	0.00000	2.27492	288	46.80000	4478.50000	11.70000
COOLING TOWER 100T	CT	165.12584	0.00000	82.56292	3480.85	14.16951	0.00000	7.08476	288	52.00000	10070.00000	13.00000
COOLING TOWER 300T	CT	192.39433	0.00000	96.19717	4055.67	16.50943	0.00000	8.25472	288	78.00000	16377.00000	19.50000
COOLING TOWER 900T	CT	209.05841	0.00000	104.52920	4406.95	17.93938	0.00000	8.96969	288	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 20T	CT	96.95462	0.00000	48.47731	2043.80	8.31971	0.00000	4.15986	288	36.40000	3688.80000	9.10000
EVAPORATIVE CONDENSER 100T	CT	159.06518	0.00000	79.53309	3353.12	13.64953	0.00000	6.82477	288	100.10000	10038.20000	25.02500
EVAPORATIVE CONDENSER 300T	CT	36.35798	0.00000	18.17899	766.43	3.11989	0.00000	1.55995	288	182.00000	31800.00000	45.50000
EXPANSION TANK	CT	0.13913	0.00000	0.13913	3.16	0.01194	0.00000	0.01194	30	3.47100	135.68000	1.73550
REFRIG. FAN COIL 1T	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64998	288	2.60000	855.42000	1.30000
REFRIG. FAN COIL 3T	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64998	288	2.86000	1051.52000	1.43000
REFRIG. FAN COIL 5T	CT	7.57458	0.00000	7.57458	171.79	0.64998	0.00000	0.64998	288	3.25000	1240.20000	1.62500
DIST. PIPING SYSTEM												
PIPE/FITTINGS ST.& C.I.	TF	3.60420	12.45424	2.01455	89.11	0.03646	0.01903	0.03646	18	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	3.73637	32.78231	1.95700	111.83	0.01524	0.00700	0.01524	12	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	0.24234	1.20443	0.24234	6.70	0.02080	0.10335	0.02080	44	241.80000	8321.00000	120.90000
GATE VALVE, 3/8" - 1 1/2"	CT	0.78195	11.91304	0.78195	29.65	0.02920	0.03676	0.02920	12	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.70819	61.15463	0.70819	77.22	0.02930	0.07352	0.02930	12	0.57200	94.05380	0.57200
DRAIN VALVE	CT	2.52256	23.63142	2.52256	80.84	0.17856	1.04232	0.17856	12	0.68900	17.91400	0.68900
PIPE INSULATION	TF	28.03267	273.05599	28.03267	908.84	0.09489	0.55348	0.09489	18	91.00000	901.00000	91.00000
CIRCULATOR PUMP, < 1 HP	CT	6.30634	318.59373	6.30634	461.62	0.13723	0.34734	0.13723	9	8.39800	742.00000	8.39800
5 TON CHILLER ACH RECIP	CT	15.92699	1166.09679	9.37655	1506.36	0.14118	8.14264	0.14118	9	31.20000	2544.00000	15.60000
HEAT/COOL GENERATION EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	83.78198	808.82875	53.25286	2611.31	7.18937	69.40591	4.56965	26	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	83.78198	990.16186	53.25286	2792.64	7.18937	84.96618	4.56965	26	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	88.32673	1796.65058	57.72068	3701.96	7.57935	154.17129	4.95303	26	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	92.87148	2031.71176	62.26542	4040.10	7.96934	174.34199	5.34302	26	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	83.32038	620.09008	53.02206	2412.84	7.14975	53.21017	4.54984	288	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	82.26707	808.82875	52.49540	2579.38	7.05937	69.40591	4.50465	26	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	82.26707	991.15005	52.49540	2761.70	7.05937	85.05098	4.50465	26	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	86.81182	1772.93399	56.96322	3546.31	7.44936	152.13616	4.88804	26	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	91.35656	2031.71176	61.50797	4008.16	7.83934	174.34199	5.27802	26	105.30000	27305.60000	26.32500
3 DK.MULTI ZONE 6500 CFM	CT	83.78198	808.82247	53.25286	2611.30	7.18937	69.40537	4.56965	26	32.50000	5997.48000	8.12500
3 DK.MULTI ZONE 10,000 CFM	CT	83.78198	991.15005	53.25286	2793.63	7.18937	85.05093	4.56965	26	42.90000	8050.70000	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	88.32673	1511.31032	57.79761	3416.87	7.57935	129.68613	4.95964	26	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	92.87148	1799.73384	62.34236	3808.37	7.96934	154.43587	5.34962	26	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	82.26707	808.82875	41.13353	2543.02	7.05937	69.40591	3.52968	26	39.00000	6572.00000	9.75000
D.D. VARI.VOL.10000 CFM	CT	82.26707	991.15005	41.13353	2725.34	7.05937	85.05098	3.52968	26	46.80000	8904.00000	11.70000
D.D. VARI.VOL.25000 CFM	CT	86.81182	1770.53767	43.40591	3600.53	7.44936	151.93053	3.72468	26	83.20000	16960.00000	20.80000
D.D. VARI.VOL.50000 CFM	CT	91.35656	2013.63274	45.67828	3939.43	7.83934	172.79062	3.91967	26	115.70000	29680.00000	28.92500
D.D. VARI.VOL. 100,000CFM	CT	90.89496	3355.89786	45.44748	5271.96	7.79973	287.97092	3.89987	288	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CFM	CT	82.26707	808.82875	82.03627	2673.91	7.05937	69.40591	7.03956	26	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000 CFM	CT	82.26707	991.15005	52.49540	2761.70	7.05937	85.05098	4.50465	26	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	68.63282	1124.68045	38.86116	2586.00	5.88941	96.50927	3.33469	26	75.40000	15359.40000	18.85000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 11	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
VARIABLE VOLUME 50000 CFM	CT	91.35656	2031.71176	61.58490	4008.41	7.83934	174.34199	5.28462	26	105.30000	27305.60000	26.32500
TERM. REHEAT 6500 CFM	CT	101.00111	3771.65216	55.48514	5916.71	6.71253	66.31211	4.27260	11	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	104.64527	5276.42119	56.39618	7495.38	6.71253	81.01631	4.27260	11	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	132.60374	12401.51391	66.58938	15197.72	7.07906	145.62661	4.63913	11	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	166.02846	17986.85344	78.14914	21471.17	7.44559	169.13662	5.00566	11	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	101.00111	3771.65216	55.48514	5916.71	6.71253	66.31211	4.27260	11	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	104.64527	5276.42119	56.39618	7495.38	6.71253	81.01631	4.27260	11	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	132.60374	12401.51391	66.58938	15197.72	7.07906	145.62661	4.63913	11	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	166.02846	17986.85344	78.14914	21471.17	7.44559	169.13662	5.00566	11	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	84.30661	836.68902	53.51518	2650.23	7.23438	71.79661	4.59216	288	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	81.80546	984.73269	52.26460	2745.55	7.01976	84.50030	4.48485	288	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	86.35021	1757.25129	56.80935	3621.14	7.40975	150.79042	4.87483	288	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	90.89496	2000.34636	61.35410	3967.31	7.79973	171.65051	5.26482	288	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	288	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	288	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	288	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	288	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	288	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	288	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	288	3.12000	827.86000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	12.11933	74.11435	12.11933	348.98	1.03996	6.35978	1.03996	288	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	288	2.60000	1590.00000	1.30000
UNIT VENT 1200 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	288	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	81.80546	802.41138	52.26460	2563.23	7.01976	68.85524	4.48485	288	32.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	81.80546	984.73269	52.26460	2745.55	7.01976	84.50030	4.48485	288	37.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	86.35021	1757.25129	56.80935	3621.14	7.40975	150.79042	4.87483	288	71.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	90.89496	2000.34636	61.35410	3967.31	7.79973	171.65051	5.26482	288	113.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	82.35209	1068.57924	79.61897	2927.58	6.59760	15.20231	6.59760	11	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	81.80546	620.09008	52.26460	2380.91	7.01976	53.21017	4.48485	288	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	288	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	288	3.25000	461.10000	1.62500
UNIT HEATER 4000 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	288	3.25000	828.92000	1.62500
UNIT HEATER 8000 CFM	CT	21.20882	18.52859	21.20882	499.54	1.81994	1.58995	1.81994	288	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50MBH	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	288	2.60000	445.20000	1.30000
HEAT PUMP 5T	CT	42.41765	0.00000	42.41765	962.03	3.63988	0.00000	3.63988	385	8.36500	2994.50000	4.19250
HEAT PUMP 10T	CT	107.55904	0.00000	107.55904	2439.44	9.22968	0.00000	9.22968	385	14.30000	5989.00000	4.76667
HEAT PUMP 25T	CT	137.85736	0.00000	137.85736	3126.60	11.82959	0.00000	11.82959	385	19.50000	17755.00000	4.87500
HEAT PUMP 1T	CT	47.64916	77.78933	47.64916	1158.47	4.08879	6.67513	4.08879	35	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	30.29832	0.00000	15.14916	638.69	2.59991	0.00000	1.29996	44	2.34000	80.56000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	59.32774	1280.85073	52.26094	2603.79	4.28240	21.23836	4.28240	15	26.00000	2851.40000	6.50000
IND DRAFT FAN 10000 CFM	CT	60.56466	1326.47348	52.87940	2675.49	4.38854	22.71397	4.33547	15	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	8.16045	44.37548	8.16045	229.45	0.52146	1.52023	0.52146	12	3.25000	41.58380	3.25000
EXHAUST FAN, 1000 CFM	CT	16.68555	87.71693	16.01371	464.00	1.31649	0.94596	1.31649	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	66.84311	1419.56275	53.59115	2893.16	4.30549	22.50479	4.24109	12	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	66.84311	3429.40404	29.25441	4825.12	4.30549	68.02087	2.15275	12	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	71.01026	4309.47116	54.63294	5867.58	4.30549	72.39690	4.24109	12	32.50000	5406.00000	8.12500
EXHAUST FAN, 5000 CFM	CT	15.53383	6.41736	15.34150	358.11	1.33296	0.55068	1.31646	35	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM	CT	3.78729	0.00000	3.78729	85.90	0.32499	0.00000	0.32499	385	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	6.37728	86.91322	3.18864	221.35	0.00000	0.00000	0.00000	11	9.10000	124.02000	4.55000
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
ROOM HUMIDIFIER,FLOOR TYPE	CT	7.50686	145.32860	7.50686	315.58	0.06573	0.80394	0.06573	6	0.26000	169.60000	0.26000
CONTROLS/INSTRUMENT.												

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE) PAGE 70

COMPONENT DESCRIPTION Zone: 11	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d= 7%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
DEVICES												
THERMOSTATS/PNEUMATICS	CT	15.01479	48.37966	15.01479	388.92	1.27113	0.00000	1.27113	20	0.78000	187.22780	0.78000
HUMIDITY SENSOR	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	192	0.78000	100.26540	0.78000
FLOW SENSOR	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	288	0.78000	100.04280	0.78000
RADIATION SENSOR	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	35	0.78000	77.11500	0.78000
WIND VELOCITY SENSOR	CT	14.99529	13.47144	14.99529	353.56	1.26695	0.00000	1.26695	18	0.78000	45.52700	0.78000
PRESSURE SENSOR	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	35	0.78000	58.30000	0.78000
DAMPER CONTROLLER/ELECT.	CT	15.14916	0.00000	15.14916	343.58	1.29996	0.00000	1.29996	26	2.60000	287.20700	2.60000
SIMPLEX AIR COMPR., 1 HP	CT	33.73635	33.56894	25.42745	772.12	2.89493	2.88056	2.18194	44	3.67900	6103.82980	1.83950

See NOTES on the last page of this table for Explanation of Column Headings

Notes

1. The resources listed in this table are as of the Date of Study (DOS) and have been calculated using a present worth discount factor (d) of 7 percent. The Date of Study (DOS) is the Beneficial Occupancy Date (BOD). All tasks are assumed to occur at the end of the year. All resources have been assumed to be constant with no differential escalation from year to year.

2. Component Description - This column contains an indented list of systems, subsystems, components, and high cost task descriptions.

3. Unit of Measure (UM) - This column contains a two-character code to indicate the measurement unit for the component. Units used in this column are as follows:

CT	Count
LF	Linear Foot
SF	Square Foot
TF	Thousands of Linear Feet

4. Labor - Labor resources can be used in one of two ways: (1) labor hours per unit of measure, or (2) dollars per unit of measure assuming a $1.00/hr labor rate.

5. Materials - Material resources are expressed in dollars per unit of measure in July 1988 dollars for the Washington, DC, area.

6. Equipment - Equipment resources can be used in one of two ways: (1) equipment hours per unit of measure, or (2) dollars per unit of measure assuming a $1.00/hr equipment rate.

7. Washington, DC, Total - The dollars per unit of measure figures were calculated by applying the Military District of Washington labor and equipment rates to the labor and equipment resources, then adding the labor, material, and equipment costs together to form one total cost figure.

8. Year (YR) - This column contains the average age of the component when the high cost task or replacement task would be performed.

9 Engineered Performance Standards (EPS) - Most labor and equipment resource data is based on the DOD series of Technical Bulletins as discussed in the body of the report.

APPENDIX B:

LIFE-CYCLE COST ANALYSIS (10 PERCENT)

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks			
Zone: 1	UM	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.06689	16.90647	0.06689	18.42	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	316	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.15230	0.00000	0.15230	3.45	0.02129	0.00000	0.02129	59	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.15230	0.00000	0.15230	3.45	0.02129	0.00000	0.02129	59	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	126	2.60000	164.30000	1.30000
OIL FILTER	CT	0.74387	24.26162	0.74387	41.13	0.10400	3.39200	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.38525	72.61371	0.38525	81.35	0.03258	0.00000	0.03258	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	105	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	126	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITNGS,STEEL/IRON	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	316	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	0.82308	0.75910	0.82308	19.43	0.11507	0.10613	0.11507	113	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	1.04415	0.75910	1.04415	24.44	0.14598	0.10613	0.14598	57	6.50000	147.34000	3.25000
STEAM REG. VALVE 2"	CT	0.68640	22.04673	0.34320	36.52	0.00000	0.00000	0.00000	23	7.80000	250.53100	3.90000
COND. METER,<300 #/HR.	CT	4.38269	0.00000	4.38269	99.40	0.61274	0.00000	0.61274	126	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	189	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	189	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	5.20000	262.35000	2.60000
SOLAR												
EQUIPMENT												
SOLAR PANEL, 3' X 8'	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	63	3.90000	349.80000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	84	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.19568	0.96639	0.16613	5.31	0.02736	0.13511	0.02323	26	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	270.65546	0.00000	270.65546	6138.47	37.84015	0.00000	37.84015	113	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	303.74564	0.00000	303.74564	6888.95	42.46646	0.00000	42.46646	113	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	313.17256	0.00000	313.17256	7102.75	43.78444	0.00000	43.78444	113	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR	CT	743.77124	0.00000	499.68876	16087.67	103.98614	0.00000	69.86114	113	20800.000	636000.00000	4160.0000
BOILER COAL 100,000 KBTU/H	CT	895.33483	0.00000	575.47056	19282.63	125.17614	0.00000	80.45614	113	41600.000	1590000.00000	8320.0000
BOILER OIL 250 KBTU/HR	CT	303.02802	0.00000	303.02802	6872.68	42.36614	0.00000	42.36614	113	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	343.94090	0.00000	343.94090	7800.58	48.08614	0.00000	48.08614	113	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	379.27474	0.00000	379.27474	8601.95	53.02614	0.00000	53.02614	113	248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	312.32640	0.00000	312.32640	7083.56	43.66614	0.00000	43.66614	113	184.60000	18689.92000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	326.27397	0.00000	326.27397	7399.89	45.61614	0.00000	45.61614	113	651.30000	71020.00000	162.82500
BOILR.PNEUMAT.COAL SPREAD.	CT	1449.7087	0.00000	1449.7087	32879.39	202.68277	0.00000	202.68277	45	182.00000	5618.00000	45.50000
ASH HANDLING SYSTEM	CT	2308.9331	0.00000	2308.9331	52366.60	322.81033	0.00000	322.81033	75	10400.000	212000.00000	2600.0000
FUEL OIL EQUIPMENT	CT	3.71935	0.00000	1.85968	78.40	0.52000	0.00000	0.26000	57	2.60000	302.10000	1.30000
CHEMICAL FEED SYSTEM	CT	4.64919	0.00000	4.64919	105.44	0.65000	0.00000	0.65000	57	3.25000	389.02000	1.62500
FEED-WATER SUPPLY	CT	139.47570	0.00000	139.47570	3164.31	19.50000	0.00000	19.50000	57	28.60000	2756.00000	9.53333
DEAERATOR	CT	139.47570	0.00000	69.73785	2940.15	19.50000	0.00000	9.75000	75	260.00000	21200.00000	65.00000
BLOWOFF SYSTEM	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	57	2.60000	147.34000	1.30000
HOUSE FURN.GAS 25KBTU/HR	CT	28.82498	0.00000	28.82498	653.75	4.03000	0.00000	4.03000	57	10.40000	355.10000	5.20000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 1	UM	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
HOUSE FURN.GAS 100KBTU/HR	CT	28.82498	0.00000	28.82498	653.75	4.03000	0.00000	4.03000	57	20.80000	471.70000	10.40000
HOUSE FURN.GAS 200KBTU/HR	CT	28.82498	0.00000	28.82498	653.75	4.03000	0.00000	4.03000	57	20.80000	1786.10000	10.40000
HOUSE FURN.OIL 25KBTU/HR	CT	38.12336	0.00000	38.12336	864.64	5.33000	0.00000	5.33000	57	10.40000	848.00000	5.20000
HOUSE FURN.OIL 100KBTU/HR	CT	38.12336	0.00000	38.12336	864.64	5.33000	0.00000	5.33000	57	20.80000	1358.49600	10.40000
HOUSE FURN.OIL 200KBTU/HR	CT	38.12336	0.00000	38.12336	864.64	5.33000	0.00000	5.33000	57	20.80000	1595.30000	10.40000
HOUSE FURN.ELECT 25KBTU/HR	CT	13.94757	0.00000	13.94757	316.33	1.95000	0.00000	1.95000	57	10.40000	601.02000	5.20000
HOUSE FURN.ELECT.100KBTU	CT	13.94757	0.00000	13.94757	316.33	1.95000	0.00000	1.95000	57	20.80000	751.27500	10.40000
HOUSE FURN.ELECT.200KBTU/H	CT	13.94757	0.00000	13.94757	316.33	1.95000	0.00000	1.95000	57	20.80000	954.00000	10.40000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	189	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	5.20000	262.35000	2.60000
EXPANSION TANK	CT	0.00502	0.00000	0.00502	0.11	0.00070	0.00000	0.00070	189	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	1.07637	0.75910	1.07637	25.17	0.15049	0.10613	0.15049	113	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	1.04415	0.75910	1.04415	24.44	0.14598	0.10613	0.14598	57	6.50000	147.34000	3.25000
STORAGE TANK, DHW	CT	1.82953	2.59753	1.82953	44.09	0.25578	0.36316	0.25578	211	3.59395	346.62000	1.79698
IND. FUR., GAS/OIL 500 MBU	CT	26.20723	0.00000	23.79675	586.67	3.66401	0.00000	3.32701	126	65.00000	6784.00000	16.25000
IND.FURN.GAS/OIL 2000 MBTU	CT	47.11381	0.00000	47.11381	1068.54	6.58695	0.00000	6.58695	126	184.60000	13780.00000	46.15000
SURGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	63	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	189	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	113	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	105	241.80000	8034.80000	120.90000
PIPE INSULATION	TF	0.03272	0.20111	0.03272	0.94	0.00457	0.02812	0.00457	126	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	0.57200	94.05380	0.57200
DRAIN VALVE	CT	0.12035	0.11523	0.12035	2.84	0.01683	0.01583	0.01683	75	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	57	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	0.68640	22.04673	0.34320	36.52	0.00000	0.00000	0.00000	23	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	4.83742	5.79427	4.83742	115.51	0.67632	0.81009	0.67632	38	1.30000	75.70520	1.30000
PIPE INSULATION	TF	0.04353	0.26759	0.04353	1.25	0.00609	0.03741	0.00609	113	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	0.85876	2.16240	0.85876	21.64	0.12006	0.30232	0.12006	57	4.19900	371.00000	4.19900
CIRCULATION PUMP 5 HP	CT	0.85876	6.45211	0.85876	25.93	0.12006	0.90206	0.12006	57	4.19900	1272.00000	2.09950
COND. RCVR., 10 - 15 GAL.	CT	10.07624	10.80000	10.07624	239.33	1.40875	1.50994	1.40875	75	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T	CT	33.65919	1129.17677	33.06511	1890.67	3.56789	0.00000	3.56789	18	8.38500	1855.00000	4.19250
REPAIR AIR CONDITIONER									9	20.80000	2592.23000	20.80000
A/C DX PACKAGE 20T	CT	74.55406	4140.50873	72.62600	5825.23	9.04714	0.00000	9.04714	18	20.41000	7950.00000	6.80333
REPAIR AIR CONDITIONER									9	20.80000	9018.53300	20.80000
A/C DX PACKAGE 50T	CT	97.51973	12112.71267	92.44935	14308.24	11.59564	0.00000	11.59564	18	47.71000	21200.00000	11.92750
REPAIR AIR CONDITIONER									9	23.40000	27255.15460	23.40000
A/C WINDOW 1T	CT	14.81006	253.15370	14.81006	589.05	0.09515	0.12956	0.09515	9	11.96000	1060.00000	11.96000
A/C WINDOW 2T	CT	15.05752	354.04450	15.05752	695.55	0.09515	0.12956	0.09515	9	13.00000	1484.00000	13.00000
A/C PAD MTD. 4T	CT	36.75680	710.86910	35.21012	1539.56	0.09515	0.24781	0.09515	9	13.00000	2968.00000	6.50000
A/C PAD MOUNTED 20 TON	CT	75.91722	4291.91985	75.91722	6013.72	9.23000	0.00000	9.23000	75	20.41000	7950.00000	6.80333
REPAIR AIR CONDITIONER									9	20.80000	9018.53300	20.80000
CHILLER-AIR COOL RECIP.20T	CT	168.37500	3235.58746	83.17434	6781.69	22.04445	0.00000	11.02223	18	28.60000	10759.00000	7.15000
REPAIR HERMETIC CHILLER									9	19.89000	5119.80000	9.94500
CHILLER AIR COOL REC.50T	CT	209.87646	6511.84500	102.14205	10927.09	28.54430	532.42303	14.08081	18	40.30000	19080.00000	10.07500
CHILLER AIR COOL REC.100T	CT	214.48171	15502.74380	102.60909	20009.20	27.39628	0.00000	13.69814	18	72.80000	40280.00000	18.20000
REPAIR HERMETIC CHILLER									9	24.57000	29309.00000	6.14250
CHILLER-AIR COOL RECIP. 5T	CT	93.61954	1195.24328	92.14586	3313.82	11.85049	0.00000	11.85049	18	15.60000	3710.00000	5.20000
REPAIR HERMETIC CHILLER									9	19.89000	2003.40000	19.89000
CHILLER AIR COOL REC. 10T	CT	134.19995	2197.77432	66.60875	5025.14	17.20232	0.00000	8.60116	18	20.80000	6360.00000	6.93333
REPAIR HERMETIC CHILLER									9	24.57000	3879.60000	12.28500
CHILLER AIR COOL REC. 15T	CT	171.76189	4202.20146	84.86779	7819.70	22.29930	0.00000	11.14965	18	28.60000	8268.00000	7.15000
REPAIR HERMETIC CHILLER									9	24.57000	9068.30000	12.28500
CHILLER WAT.COOL REC.20T	CT	167.25393	2948.78602	82.56776	6471.11	22.29930	0.00000	11.14965	18	29.90000	9540.00000	7.47500

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 1	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
REPAIR HERMETIC CHILLER									9	10.53000	4778.48000	5.26500
CHILLER WAT.COOL REC.50T	CT	172.35274	6008.10120	83.46593	9632.62	22.29930	0.00000	11.14965	18	48.10000	15900.00000	12.02500
REPAIR HERMETIC CHILLER									9	18.07000	11236.00000	6.02333
CHILLER WAT.COOL REC.100T	CT	176.03694	13536.65580	83.88373	17234.28	22.29930	0.00000	11.14965	18	74.10000	27030.00000	18.52500
REPAIR HERMETIC CHILLER									9	18.07000	29044.00000	4.51750
CHILLER WAT. COOL REC. 10T	CT	147.73612	1884.61640	73.13122	4996.54	19.75081	0.00000	9.87540	18	20.80000	5300.00000	5.20000
REPAIR HERMETIC CHILLER									9	10.53000	3392.00000	5.26500
CHILLER WAT.COOL REC.200T	CT	176.03694	22246.98320	83.88373	25944.61	22.29930	0.00000	11.14965	18	74.10000	53000.00000	18.52500
REPAIR HERMETIC CHILLER									9	18.07000	44096.00000	4.51750
CHILL. HERMETIC CENT. 100T	CT	246.85795	12817.72818	121.21845	18014.42	32.49327	0.00000	16.24663	18	62.40000	37789.00000	15.60000
REPAIR CHILLER									9	16.77000	22331.02000	8.38500
CHILL. HERMETIC CENT. 300T	CT	251.65784	31000.40140	122.37498	36294.30	32.49327	0.00000	16.24663	18	97.50000	61771.50000	24.37500
REPAIR CHILLER									9	16.25000	66569.06000	8.12500
CHILL. HERMETIC CENT. 900T	CT	261.04212	84624.67876	124.76450	90109.03	32.49327	0.00000	16.24663	18	162.50000	127200.00000	40.62500
REPAIR CHILLER									9	16.77000	199283.18000	8.38500
CHILL. OPEN CENT. 300T	CT	629.33584	31000.40140	311.21398	44255.75	84.73734	0.00000	42.36867	18	97.50000	61771.50000	24.37500
REPAIR CHILLER									9	28.21000	66569.06000	14.10500
CHILL. OPEN CENT. 900T	CT	261.04212	84624.67876	124.76450	90109.03	32.49327	0.00000	16.24663	18	162.50000	127200.00000	40.62500
REPAIR CHILLER									9	16.77000	199283.18000	8.38500
CHILL.DBL.BNDL. HERM.100T	CT	284.23568	13409.46788	139.67706	19393.35	37.59025	0.00000	18.79512	18	68.90000	41340.00000	17.22500
REPAIR CHILLER									9	16.77000	22596.02000	8.38500
CHILL.DBL.BNDL. HERM.300T	CT	295.32307	41584.52525	143.83918	47797.70	37.59025	0.00000	18.79512	18	107.90000	67840.00000	26.97500
REPAIR CHILLER									9	33.41000	95666.06000	16.70500
CHILL.DBL.BNDL. HERM.900T	CT	316.08846	86586.51616	151.73504	93229.47	37.59025	0.00000	18.79512	18	178.10000	139920.00000	44.52500
REPAIR CHILLER									9	65.78000	199760.18000	32.89000
CHILL. ONE STG. ABS. 100T	CT	809.56781	7807.68440	402.48128	24866.01	111.49650	0.00000	55.74825	18	65.00000	37100.00000	16.25000
REPAIR CHILLER									9	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 300T	CT	135.17703	11262.33040	63.90431	14100.07	16.43777	0.00000	8.21888	18	104.00000	61480.00000	26.00000
REPAIR CHILLER									9	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 900T	CT	144.20332	18622.22840	66.16089	21643.02	16.43777	0.00000	8.21888	18	167.70000	113420.00000	41.92500
REPAIR CHILLER									9	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 300T	CT	136.65071	12163.54240	64.27273	15031.17	16.43777	0.00000	8.21888	18	114.40000	67840.00000	28.60000
REPAIR CHILLER									9	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 900T	CT	138.39530	20379.59180	62.65819	23276.04	15.69184	356.59961	7.84592	18	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 5T	CT	20.88408	366.49027	19.93996	837.11	2.65579	27.40528	2.65579	13	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 20T	CT	23.31183	741.28683	10.93658	1230.40	2.65579	32.91137	1.32790	13	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 50T	CT	38.10992	1373.43490	17.43646	2171.61	4.42300	38.41745	2.21150	13	31.20000	5294.70000	7.80000
AIR COOLED CONDENSER 100T	CT	41.34692	3291.55440	18.24571	4155.38	4.42300	153.29438	2.21150	13	46.80000	10578.80000	11.70000
COOLING TOWER 50T	CT	43.50665	1439.92276	19.32557	2349.27	4.72495	71.39138	2.36247	13	46.80000	4478.50000	11.70000
COOLING TOWER 100T	CT	111.39751	2600.15901	53.00125	4939.79	14.06587	71.39138	7.03293	13	52.00000	10070.00000	13.00000
COOLING TOWER 300T	CT	133.04404	4459.32587	62.47577	7250.95	16.33798	148.35142	8.16899	13	78.00000	16377.00000	19.50000
COOLING TOWER 900T	CT	153.49578	10013.06337	70.07158	13227.39	17.72650	148.35142	8.86325	13	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 20T	CT	70.38574	1100.85123	33.30462	2578.54	8.78460	46.89557	4.39230	13	36.40000	3688.80000	9.10000
EVAPORATIVE CONDENSER 100T	CT	120.62088	2626.11847	55.11775	5152.19	13.95998	75.94329	6.97999	13	100.10000	10038.20000	25.02500
EVAPORATIVE CONDENSER 300T	CT	64.48322	7556.10660	22.80036	8885.20	3.73546	133.88231	1.86773	13	182.00000	31800.00000	45.50000
EXPANSION TANK	CT	0.00502	0.00000	0.00502	0.11	0.00070	0.00000	0.00070	189	3.47100	135.68000	1.73550
REFRIG. FAN COIL 1T	CT	5.71245	199.87625	5.44270	328.57	0.72323	3.12846	0.72323	13	2.60000	855.42000	1.30000
REFRIG. FAN COIL 3T	CT	5.76640	257.57322	5.46967	387.41	0.72323	5.50608	0.72323	13	2.86000	1051.52000	1.43000
REFRIG. FAN COIL 5T	CT	5.84732	340.13492	5.51013	471.67	0.72323	11.57529	0.72323	13	3.25000	1240.20000	1.62500
DIST. PIPING SYSTEM												
PIPE/FITTINGS ST.& C.I.	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	113	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	24.53284	811.01475	12.82972	1329.97	0.15751	0.77482	0.15751	22	241.80000	8321.00000	120.90000
GATE VALVE, 3/8" - 1 1/2"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	75	0.57200	94.05380	0.57200
DRAIN VALVE	CT	0.12035	0.11323	0.12035	2.84	0.01683	0.01583	0.01683	75	0.68900	17.91400	0.68900
PIPE INSULATION	TF	0.04353	0.25394	0.04353	1.24	0.00609	0.03550	0.00609	113	91.00000	901.00000	91.00000
CIRCULATOR PUMP, < 1 HP	CT	0.85658	2.16240	0.85658	21.59	0.11976	0.30232	0.11976	57	4.19900	371.00000	4.19900

See NOTES on the last page of this table for Explanation of Colum Headings

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks			
Zone: 1	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
5 TON CHILLER ACH RECIP	CT	0.85876	6.45211	0.85876	25.93	0.12006	0.90206	0.12006	57	15.60000	1272.00000	7.80000
HEAT/COOL GENERATION EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	57.86910	1731.85652	33.81777	2967.36	7.03466	68.14018	4.46404	13	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	59.21785	2265.97096	34.15496	3528.83	7.03466	83.24955	4.46404	13	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	68.67019	4270.87729	38.43971	5731.58	7.41334	151.52557	4.82738	13	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	77.58303	6902.83606	42.69936	8550.79	7.79203	172.93349	5.20607	13	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	55.71110	1258.51917	33.27827	2450.26	7.03466	52.94846	4.46404	13	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	56.96623	1731.85652	33.36634	2948.33	6.90843	68.14018	4.40093	13	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	58.31498	2266.55993	33.70353	3510.39	6.90843	83.33189	4.40093	13	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	67.76732	4256.74262	37.98828	5698.41	7.28712	149.54941	4.76427	13	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	76.68016	6902.83606	42.24793	8531.76	7.66580	172.93349	5.14295	13	105.30000	27305.60000	26.32500
3 DK.MULTI ZONE 6500 CFM	CT	57.05985	1731.84757	33.61546	2950.94	7.03466	68.13892	4.46404	13	32.50000	5997.48000	8.12500
3 DK.MULTI ZONE 10,000 CFM	CT	59.21785	2266.55993	34.15496	3529.42	7.03466	83.33189	4.46404	13	42.90000	8050.70000	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	68.67019	4100.81957	38.54949	5561.87	7.41334	127.74992	4.84273	13	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	77.58303	6764.58135	42.80914	8412.89	7.79203	153.60419	5.22142	13	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	57.50573	1851.06972	26.72974	3056.82	6.90843	88.14018	3.45421	13	39.00000	6572.00000	9.75000
D.D. VARI.VOL.10000 CFM	CT	59.12423	2443.61968	27.13437	3682.19	6.90843	83.33189	3.45421	13	46.80000	8904.00000	11.70000
D.D. VARI.VOL.25000 CFM	CT	69.38582	4585.44798	30.37691	6034.29	7.28712	149.07138	3.64356	13	83.20000	16960.00000	20.80000
D.D. VARI.VOL.50000 CFM	CT	78.83816	7369.72032	33.41714	9012.43	7.66580	169.32700	3.83290	13	115.70000	29680.00000	28.92500
D.D. VARI.VOL. 100,000CFM	CT	89.89791	12160.71853	36.01742	14027.19	7.66580	285.63299	3.80988	13	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CFM	CT	56.15698	1731.85652	50.76986	2988.26	6.90843	68.14018	6.86239	13	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000 CFM	CT	58.31498	2266.55993	33.70353	3510.39	6.90843	83.33189	4.40093	13	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	56.93297	3870.39504	27.26370	5066.69	5.77237	95.53443	3.26487	13	75.40000	15359.40000	18.85000
VARIABLE VOLUME 50000 CFM	CT	76.68016	6902.83606	42.35771	8532.11	7.66580	172.93349	5.15830	13	105.30000	27305.60000	26.32500
TERM. REHEAT 6500 CFM	CT	50.21125	492.51087	32.07941	1573.28	7.02000	68.85760	4.48500	63	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	50.21125	604.41759	32.07941	1685.19	7.02000	84.50320	4.48500	63	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	53.00077	1078.58061	34.86893	2222.62	7.41000	150.79560	4.87500	63	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	55.79028	1227.78957	37.65844	2435.09	7.80000	171.65640	5.26500	63	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	50.21125	492.51087	32.07941	1573.28	7.02000	68.85760	4.48500	63	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	50.21125	604.41759	32.07941	1685.19	7.02000	84.50320	4.48500	63	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	53.00077	1078.58061	34.86893	2222.62	7.41000	150.79560	4.87500	63	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	55.79028	1227.78957	37.65844	2435.09	7.80000	171.65640	5.26500	63	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	55.49635	1365.86660	32.83471	2552.05	6.81635	66.81884	4.35489	13	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	57.23598	1878.78808	33.43378	3100.73	6.90843	83.33189	4.40093	13	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	66.95807	4239.14662	37.89574	5664.76	7.28712	149.54941	4.77962	13	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	78.29866	5979.04606	42.76233	7641.14	7.66580	172.93349	5.15830	13	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	8.42104	193.01869	8.15129	383.14	1.10191	9.30395	1.10191	13	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	8.42104	210.61469	8.15129	400.74	1.10191	9.30395	1.10191	13	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	8.47499	222.71194	8.17826	413.98	1.10191	9.30395	1.10191	13	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	8.55591	323.88894	8.21872	516.86	1.10191	9.30395	1.10191	13	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	8.47499	204.45609	8.17826	395.72	1.10191	9.30395	1.10191	13	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	8.47499	383.27544	8.17826	574.54	1.10191	9.30395	1.10191	13	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	8.52894	238.32839	8.20524	430.73	1.10191	9.30395	1.10191	13	3.12000	827.86000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	8.63684	349.62309	8.25919	544.30	1.10191	9.30395	1.10191	13	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	13.61867	363.34431	13.34892	671.35	1.82859	4.67233	1.82859	13	2.60000	1590.00000	1.30000
UNIT VENT 1200 CFM	CT	13.75355	429.32931	13.41636	740.18	1.82859	4.67233	1.82859	13	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	56.15698	1375.31757	33.16403	2575.38	6.90843	68.14018	4.40093	13	32.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	57.23598	1678.78808	33.43378	3100.73	6.90843	83.33189	4.40093	13	37.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	66.95807	4239.14662	37.89574	5664.76	7.28712	149.54941	4.77962	13	71.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	78.29866	5979.04606	42.76233	7641.14	7.66580	172.93349	5.15830	13	113.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	90.95366	126.01873	50.95366	1281.65	7.12379	17.61859	7.12379	63	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	54.26873	1148.54417	32.69196	2310.31	6.90843	52.94846	4.40093	13	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	13.61867	98.30456	13.34892	406.31	1.82859	4.67233	1.82859	13	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	13.75355	129.09756	13.41636	439.95	1.82859	4.67233	1.82859	13	3.25000	461.10000	1.62500
UNIT HEATER 4000 CFM	CT	13.75355	274.74745	13.41636	547.60	1.82859	9.05217	1.82859	13	3.25000	828.92000	1.62500
UNIT HEATER 8000 CFM	CT	13.75355	342.11251	13.41636	652.96	1.82859	10.92924	1.82859	13	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50MBH	CT	9.56813	92.37900	9.29838	308.52	1.26229	0.00000	1.26229	13	2.60000	445.20000	1.30000

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE) PAGE 20

COMPONENT DESCRIPTION Zone: 1	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
HEAT PUMP 5T	CT	34.52811	2029.24871	33.93403	2810.45	4.66124	224.38387	4.66124	18	8.38500	2994.50000	4.19250
HEAT PUMP 10T	CT	74.55720	3885.88104	73.20632	5572.52	10.14049	424.63436	10.14049	18	14.30000	5989.00000	4.76667
HEAT PUMP 25T	CT	93.52238	10453.49116	91.45001	12567.95	12.68898	1109.75137	12.68898	18	19.50000	17755.00000	4.87500
HEAT PUMP 1T	CT	32.21307	268.10044	31.82070	997.44	4.39397	12.28337	4.39397	18	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	18.57159	7.79821	9.28580	399.29	2.56481	0.00000	1.28241	22	2.34000	80.56000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	31.61449	156.79071	31.61449	873.81	4.42000	21.92080	4.42000	84	26.00000	2851.40000	6.50000
IND DRAFT FAN 10000 CFM	CT	31.61449	156.79071	31.61449	873.81	4.42000	21.92080	4.42000	84	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	0.50219	0.00000	0.50219	11.39	0.07021	0.00000	0.07021	75	3.25000	41.58350	3.25000
EXHAUST FAN, 1000 CFM	CT	10.07102	41.34397	9.76656	268.78	1.32289	0.92116	1.32289	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	31.61449	156.79071	31.61449	873.81	4.42000	21.92080	4.42000	75	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	31.61449	481.74478	15.80725	1148.18	4.42000	67.35240	2.21000	75	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	31.61449	481.74478	31.61449	1198.76	4.42000	67.35240	4.42000	75	32.50000	5406.00000	8.12500
EXHAUST FAN, 5000 CFM	CT	11.75915	238.55908	10.43666	501.02	1.33499	1.01334	1.30462	18	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM	CT	3.06277	116.98690	3.06277	186.45	0.36382	2.70609	0.36382	18	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	63	9.10000	124.02000	4.55000
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
ROOM HUMIDIFIER,FLOOR TYPE	CT	4.69942	0.61438	4.69942	107.20	0.65702	0.08590	0.65702	38	0.13000	84.80000	0.13000
CONTROLS/INSTRUMENT.												
DEVICES												
THERMOSTATS/PNEUMATICS	CT	9.23749	21.92438	9.23749	231.43	1.27872	0.00000	1.27872	20	0.78000	187.22780	0.78000
HUMIDITY SENSOR	CT	9.05091	47.71630	9.05091	252.99	0.00000	0.00000	0.00000	9	1.56000	200.53080	1.56000
FLOW SENSOR	CT	9.19048	20.75888	9.19048	229.20	1.26229	0.00000	1.26229	13	0.78000	100.04280	0.78000
RADIATION SENSOR	CT	9.22470	10.92720	9.22470	220.14	1.27425	0.00000	1.27425	18	0.78000	77.11500	0.78000
WIND VELOCITY SENSOR	CT	9.05091	21.66630	9.05091	226.94	0.00000	0.00000	0.00000	9	1.56000	91.05400	1.56000
PRESSURE SENSOR	CT	9.22470	8.26111	9.22470	217.48	1.27425	0.00000	1.27425	18	0.78000	58.30000	0.78000
DAMPER CONTROLLER/ELECT.	CT	9.56813	59.59545	9.56813	276.60	1.26229	0.00000	1.26229	13	2.60000	287.20700	2.60000
SIMPLEX AIR COMPR.,1 HP	CT	30.79386	621.12977	20.57947	1286.85	4.25548	4.23329	2.85230	22	3.67900	6103.82980	1.83950

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE) PAGE 21

COMPONENT DESCRIPTION Zone: 2	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.06689	16.90647	0.06689	18.42	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	0.94552	1.69770	0.47276	21.63	0.13219	0.23735	0.06610	141	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.15230	0.00000	0.15230	3.45	0.02129	0.00000	0.02129	26	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.15230	0.00000	0.15230	3.45	0.02129	0.00000	0.02129	26	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	56	2.60000	164.30000	1.30000
OIL FILTER	CT	0.74387	24.26162	0.74387	41.13	0.10400	3.39200	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.38525	72.61371	0.38525	81.35	0.03258	0.00000	0.03258	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	0.02378	0.01092	0.02378	0.55	0.00332	0.00153	0.00332	47	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	56	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITNGS,STEEL/IRON	TF	0.94552	1.69770	0.47276	21.63	0.13219	0.23735	0.06610	141	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	3.51303	3.31692	3.51303	82.99	0.49115	0.46374	0.49115	49	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	3.66035	13.60007	3.42408	95.86	0.44568	0.40383	0.44568	24	6.50000	147.34000	3.25000
STEAM REG. VALVE 2"	CT	3.28302	105.44850	1.64151	174.65	0.00000	0.00000	0.00000	10	7.80000	250.53100	3.90000
COND. METER,<300 #/HR.	CT	4.38269	0.00000	4.38269	99.40	0.61274	0.00000	0.61274	56	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	81	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	81	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	32	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	32	5.20000	262.35000	2.60000
SOLAR												
EQUIPMENT												
SOLAR PANEL, 3' X 8'	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	28	3.90000	349.80000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	38	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.20568	1.06235	0.17317	5.62	0.02876	0.14853	0.02421	25	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	272.72736	108.20403	272.72736	6293.66	38.12982	15.12793	38.12982	49	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	305.81754	209.08255	305.81754	7145.02	42.75614	29.23168	42.75614	49	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	315.24446	1235.23977	315.24446	8384.98	44.07411	172.69801	44.07411	49	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR	CT	743.77124	0.00000	499.68876	16087.67	103.98614	0.00000	69.86114	49	20800.000	636000.00000	4160.0000
BOILER COAL 100,000 KBTU/H	CT	895.33483	0.00000	575.47056	19282.63	125.17614	0.00000	80.45614	49	41600.000	1590000.00000	8320.0000
BOILER OIL 250 KBTJ/HR	CT	308.67065	75.45131	308.67065	7076.10	43.15503	10.54879	43.15503	49	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	346.40954	75.45131	346.40954	7932.02	48.43128	10.54879	48.43128	49	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	381.74339	84.14990	381.74339	8742.09	53.37128	11.76494	53.37128	49	248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	315.32405	129.54074	315.32405	7281.09	44.08523	18.11100	44.08523	49	184.60000	18689.92000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	329.40387	2333.89366	329.40387	9804.77	46.05372	326.30004	46.05372	49	651.30000	71020.00000	162.82500
BOILR.PNEUMAT.COAL SPREAD.	CT	1450.0657	903.26999	1432.6122	33734.91	199.75304	34.30951	199.54761	19	181.00000	5618.00000	45.50000
ASH HANDLING SYSTEM	CT	2310.4328	280.43604	2309.6830	52678.65	323.02001	39.20757	322.91517	32	10400.000	212000.00000	2600.0000
FUEL OIL EQUIPMENT	CT	4.58599	22.78894	2.29300	119.46	0.61474	0.11552	0.30737	24	2.60000	302.10000	1.30000
CHEMICAL FEED SYSTEM	CT	4.83821	28.28175	4.72007	137.63	0.64339	0.00000	0.64339	24	3.25000	389.02000	1.62500
FEED-WATER SUPPLY	CT	140.13727	200.36120	138.75112	3374.24	19.30180	0.00000	19.30180	24	28.60000	2756.00000	9.53333
DEAERATOR	CT	139.57704	0.00000	69.78852	2942.28	19.51417	0.00000	9.75708	52	260.00000	21200.00000	65.00000
BLOWOFF SYSTEM	CT	0.18902	10.71162	0.09451	14.70	0.00000	0.00000	0.00000	24	2.60000	147.34000	1.30000
HOUSE FURN.GAS 25KBTU/HR	CT	29.80691	74.56570	29.42887	749.38	4.06158	6.81569	4.06158	24	10.40000	355.10000	5.20000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 2	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
HOUSE FURN.GAS 100KBTU/HR	CT	30.57110	92.62725	29.81502	783.56	4.06271	8.15573	4.06271	24	20.80000	471.70000	10.40000
HOUSE FURN.GAS 200KBTU/HR	CT	30.57110	200.90869	29.81502	891.84	4.06271	9.93474	4.06271	24	20.80000	1786.10000	10.40000
HOUSE FURN.OIL 25KBTU/HR	CT	39.01889	130.89103	38.64085	1014.63	5.34950	9.68060	5.34950	24	10.40000	848.00000	5.20000
HOUSE FURN.OIL 100KBTU/HR	CT	39.77497	174.28374	39.01889	1073.96	5.34950	10.55855	5.34950	24	20.80000	1358.49600	10.40000
HOUSE FURN.OIL 200KBTU/HR	CT	39.77497	204.38920	39.01889	1104.07	5.34950	12.36066	5.34950	24	20.80000	1595.30000	10.40000
HOUSE FURN.ELECT 25KBTU/HR	CT	15.23070	76.74495	14.85266	420.97	2.02369	4.62081	2.02369	24	10.40000	601.02000	5.20000
HOUSE FURN.ELECT.100KBTU	CT	15.98678	102.21084	15.23070	462.37	2.02369	6.65397	2.02369	24	20.80000	751.27500	10.40000
HOUSE FURN.ELECT.200KBTU/H	CT	15.98678	130.49978	15.23070	490.66	2.02369	8.54850	2.02369	24	20.80000	954.00000	10.40000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	81	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	32	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	32	5.20000	262.35000	2.60000
EXPANSION TANK	CT	0.02195	0.00000	0.02195	0.50	0.00307	0.00000	0.00307	81	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	3.65477	3.31692	3.65477	86.21	0.51097	0.46374	0.51097	49	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	3.66035	13.60007	3.42408	95.86	0.44568	0.40383	0.44568	24	6.50000	147.34000	3.25000
STORAGE TANK, DHW	CT	5.76817	8.18956	5.76817	139.01	0.80644	1.14498	0.80644	94	3.59395	346.62000	1.79698
IND. FUR., GAS/OIL 500 MBU	CT	27.96061	121.20565	24.67344	744.83	3.90915	16.94568	3.44958	56	65.00000	6784.00000	16.25000
IND.FURN.GAS/OIL 2000 MBTU	CT	48.48953	251.99232	48.48953	1351.73	6.77929	35.23087	6.77929	56	184.60000	13780.00000	46.15000
SURGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	28	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.02363	0.01233	0.02363	0.55	0.00330	0.00172	0.00330	81	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.02878	0.01322	0.02878	0.67	0.00402	0.00185	0.00402	49	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	0.10549	0.52427	0.10549	2.92	0.01475	0.07330	0.01475	47	241.80000	8034.80000	120.90000
PIPE INSULATION	TF	0.14622	0.89877	0.14622	4.22	0.02044	0.12566	0.02044	56	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	0.23571	0.06941	0.23571	5.42	0.03295	0.00970	0.03295	32	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"	CT	0.05533	0.13881	0.05533	1.39	0.00774	0.01941	0.00774	32	0.57200	94.05380	0.57200
DRAIN VALVE	CT	0.42853	1.72215	0.42853	11.44	0.05991	0.24077	0.05991	32	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	0.10396	1.47034	0.05198	3.66	0.00000	0.00000	0.00000	24	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	3.28302	105.44850	1.64151	174.65	0.00000	0.00000	0.00000	10	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	5.34920	30.23099	5.34920	151.55	0.71953	2.57648	0.71953	16	1.30000	75.70520	1.30000
PIPE INSULATION	TF	0.19023	1.16927	0.19023	5.48	0.02660	0.16348	0.02660	49	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	1.37402	29.65023	1.37402	60.81	0.14942	0.37448	0.14942	24	4.19900	371.00000	4.19900
CIRCULATION PUMP 5 HP	CT	1.37402	111.47581	1.22139	142.15	0.14942	2.65657	0.14942	24	4.19900	1272.00000	2.09950
COND. RCVR., 10 - 15 GAL.	CT	12.06211	38.31281	12.06211	311.88	1.68640	5.35649	1.68640	32	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T	CT	32.91014	1004.73997	32.41920	1749.57	3.58041	0.00000	3.58041	19	8.38500	1855.00000	4.19250
REPAIR AIR CONDITIONER									10	20.80000	2592.23000	20.80000
A/C DX PACKAGE 20T	CT	73.64672	3670.77533	72.05338	5335.98	9.07889	0.00000	9.07889	19	20.41000	7950.00000	6.80333
REPAIR AIR CONDITIONER									10	20.80000	9018.53300	20.80000
A/C DX PACKAGE 50T	CT	95.92573	10762.63597	91.73560	12924.82	11.63632	0.00000	11.63632	19	47.71000	21200.00000	11.92750
REPAIR AIR CONDITIONER									10	23.40000	27255.15460	23.40000
A/C WINDOW 1T	CT	14.55565	223.97856	14.55565	554.10	0.09257	0.12605	0.09257	10	11.96000	1060.00000	11.96000
A/C WINDOW 2T	CT	14.77451	313.20936	14.77451	648.30	0.09257	0.12605	0.09257	10	13.00000	1484.00000	13.00000
A/C PAD MTD. 4T	CT	36.65254	629.12341	35.28461	1456.03	0.09257	0.63023	0.09257	10	13.00000	2968.00000	6.50000
A/C PAD MOUNTED 20 TON	CT	74.77322	3795.90054	74.77322	5491.76	9.23000	0.00000	9.23000	32	20.41000	7950.00000	6.80333
REPAIR AIR CONDITIONER									10	20.80000	9018.53300	20.80000
CHILLER-AIR COOL RECIP.20T	CT	167.62004	2815.27414	82.97275	6346.03	22.12180	0.00000	11.06090	19	28.60000	10759.00000	7.15000
REPAIR HERMETIC CHILLER									10	19.89000	5119.80000	9.94500
CHILLER AIR COOL REC.50T	CT	208.82572	5696.06900	101.98902	10090.36	28.53600	483.99197	14.09407	19	40.30000	19080.00000	10.07500
CHILLER AIR COOL REC.100T	CT	212.63147	13620.86220	102.31842	18090.34	27.49241	0.00000	13.74621	19	72.80000	40280.00000	18.20000
REPAIR HERMETIC CHILLER									10	24.57000	29309.00000	6.14250
CHILLER-AIR COOL RECIP. 5T	CT	92.92854	1043.07392	91.71070	3146.80	11.89207	0.00000	11.89207	19	15.60000	3710.00000	5.20000
REPAIR HERMETIC CHILLER									10	19.89000	2003.40000	19.89000
CHILLER AIR COOL REC. 10T	CT	133.37307	1923.37848	66.28059	4733.58	17.26268	0.00000	8.63134	19	20.80000	6360.00000	6.93333
REPAIR HERMETIC CHILLER									10	24.57000	3879.60000	12.28500
CHILLER AIR COOL REC. 15T	CT	170.87105	3723.13234	84.59026	7322.41	22.37754	0.00000	11.18877	19	28.60000	8268.00000	7.15000
REPAIR HERMETIC CHILLER									10	24.57000	9068.30000	12.28500
CHILLER WAT.COOL REC.20T	CT	166.75793	2568.83622	82.50364	6081.29	22.37754	0.00000	11.18877	19	29.90000	9540.00000	7.47500

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 2	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
REPAIR HERMETIC CHILLER									10	10.53000	4778.48000	5.26500
CHILLER WAT.COOL REC.50T	CT	171.17980	5275.38680	83.26683	8876.42	22.37754	0.00000	11.18877	19	48.10000	15900.00000	12.02500
REPAIR HERMETIC CHILLER									10	18.07000	11236.00000	6.02333
CHILLER WAT.COOL REC.100T	CT	174.22440	11988.78020	83.57051	15650.10	22.37754	0.00000	11.18877	19	74.10000	27030.00000	18.52500
REPAIR HERMETIC CHILLER									10	18.07000	29044.00000	4.51750
CHILLER WAT. COOL REC. 10T	CT	147.40002	1651.11960	73.09109	4756.36	19.82011	0.00000	9.91006	19	20.80000	5300.00000	5.20000
REPAIR HERMETIC CHILLER									10	10.53000	3392.00000	5.26500
CHILLER WAT.COOL REC.200T	CT	174.22440	19602.66480	83.57051	23263.98	22.37754	0.00000	11.18877	19	74.10000	53000.00000	18.52500
REPAIR HERMETIC CHILLER									10	18.07000	44096.00000	4.51750
CHILL. HERMETIC CENT. 100T	CT	245.62859	11209.25578	120.98754	16381.26	32.60728	0.00000	16.30364	19	62.40000	37789.00000	15.60000
REPAIR CHILLER									10	16.77000	22331.02000	8.38500
CHILL. HERMETIC CENT. 300T	CT	249.58083	27457.12308	121.93610	32709.15	32.60728	0.00000	16.30364	19	97.50000	61771.50000	24.37500
REPAIR CHILLER									10	16.25000	66569.06000	8.12500
CHILL. HERMETIC CENT. 900T	CT	257.35030	75437.35008	123.91796	80847.07	32.60728	0.00000	16.30364	19	162.50000	127200.00000	40.62500
REPAIR CHILLER									10	16.77000	199283.18000	8.38500
CHILL. OPEN CENT. 300T	CT	628.20642	27457.12308	311.24890	40690.58	85.03467	0.00000	42.51733	19	97.50000	61771.50000	24.37500
REPAIR CHILLER									10	28.21000	66569.06000	14.10500
CHILL. OPEN CENT. 900T	CT	257.35030	75437.35008	123.91796	80847.07	32.60728	0.00000	16.30364	19	162.50000	127200.00000	40.62500
REPAIR CHILLER									10	16.77000	199283.18000	8.38500
CHILL.DBL.BNDL. HERM.100T	CT	282.97434	11705.58488	139.47012	17664.23	37.72215	0.00000	18.86107	19	68.90000	41340.00000	17.22500
REPAIR CHILLER									10	16.77000	22596.02000	8.38500
CHILL.DBL.BNDL. HERM.300T	CT	292.59647	37007.41303	143.13946	43165.24	37.72215	0.00000	18.86107	19	107.90000	67840.00000	26.97500
REPAIR CHILLER									10	33.41000	95666.06000	16.70500
CHILL.DBL.BNDL. HERM.900T	CT	310.65090	77071.77468	150.11157	83603.61	37.72215	0.00000	18.86107	19	178.10000	139920.00000	44.52500
REPAIR CHILLER									10	65.78000	199760.18000	32.89000
CHILL. ONE STG. ABS. 100T	CT	810.50623	6663.01160	403.35024	23742.39	111.88772	0.00000	55.94386	19	65.00000	37100.00000	16.25000
REPAIR CHILLER									10	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 300T	CT	132.77034	9517.90960	63.34057	12306.97	16.49545	0.00000	8.24772	19	104.00000	61480.00000	26.00000
REPAIR CHILLER									10	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 900T	CT	140.22961	15600.08360	65.20539	18540.41	16.49545	0.00000	8.24772	19	167.70000	113420.00000	41.92500
REPAIR CHILLER									10	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 300T	CT	133.98818	10262.66560	63.64503	13076.42	16.49545	0.00000	8.24772	19	114.40000	67840.00000	28.60000
REPAIR CHILLER									10	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 900T	CT	133.97706	17052.35780	61.58437	19859.30	15.70903	324.16207	7.85451	19	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 5T	CT	20.45927	329.73632	19.60114	791.01	2.32045	24.43886	2.62045	14	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 20T	CT	22.66589	669.72814	10.67913	1145.43	2.62045	29.34896	1.31022	14	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 50T	CT	37.30181	1243.62168	17.17983	2025.24	4.39246	34.25905	2.19623	14	31.20000	5294.70000	7.80000
AIR COOLED CONDENSER 100T	CT	40.24397	2972.93218	17.91537	3814.21	4.39246	136.70141	2.19623	14	46.80000	10578.80000	11.70000
COOLING TOWER 50T	CT	42.47048	1300.00679	19.02862	2188.22	4.70374	63.66380	2.35187	14	46.80000	4478.50000	11.70000
COOLING TOWER 100T	CT	110.44488	2354.56369	52.77064	4674.90	14.07008	63.66360	7.03504	14	52.00000	10070.00000	13.00000
COOLING TOWER 300T	CT	131.64424	4034.94459	62.14442	6798.24	16.34838	132.29349	8.17419	14	78.00000	16377.00000	19.50000
COOLING TOWER 900T	CT	151.16478	9082.82359	69.51419	12249.96	17.74068	132.29349	8.87034	14	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 20T	CT	69.30846	994.82564	32.93797	2450.36	8.73017	41.81947	4.36509	14	36.40000	3688.80000	9.10000
EVAPORATIVE CONDENSER 100T	CT	118.44040	2377.60001	54.50049	4859.22	13.91963	67.72299	6.95981	14	100.10000	10038.20000	25.02500
EVAPORATIVE CONDENSER 300T	CT	60.55582	6851.43283	21.69661	8100.49	3.66728	119.39055	1.83364	14	182.00000	31800.00000	45.50000
EXPANSION TANK	CT	0.02195	0.00000	0.02195	0.50	0.00307	0.00000	0.00307	81	3.47100	135.68000	1.73550
REFRIG. FAN COIL 1T	CT	5.60430	181.28671	5.35912	307.61	0.71498	2.78982	0.71498	14	2.60000	855.42000	1.30000
REFRIG. FAN COIL 3T	CT	5.65334	233.43659	5.38364	360.79	0.71498	4.91009	0.71498	14	2.86000	1051.52000	1.43000
REFRIG. FAN COIL 5T	CT	5.72689	307.73337	5.42042	436.64	0.71498	10.32235	0.71498	14	3.25000	1240.20000	1.62500
DIST. PIPING SYSTEM												
PIPE/FITTINGS ST.& C.I.	TF	0.05067	0.02644	0.05067	1.18	0.00708	0.00370	0.00708	49	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.02878	0.01322	0.02878	0.67	0.00402	0.00185	0.00402	32	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	26.96377	892.14750	14.08792	1462.48	0.16946	0.83340	0.16946	21	241.80000	8321.00000	120.90000
GATE VALVE, 3/8" - 1 1/2"	CT	0.05513	0.06941	0.05513	1.32	0.00771	0.00970	0.00771	32	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.05533	0.13881	0.05533	1.39	0.00774	0.01941	0.00774	32	0.57200	94.05380	0.57200
DRAIN VALVE	CT	0.42853	1.72215	0.42853	11.44	0.05991	0.24077	0.05991	32	0.68900	17.91400	0.68900
PIPE INSULATION	TF	0.19023	1.10962	0.19023	5.42	0.02660	0.15513	0.02660	49	91.00000	901.00000	91.00000
CIRCULATOR PUMP, < 1 HP	CT	1.36574	29.65023	1.36574	60.63	0.14826	0.37448	0.14826	24	4.19900	371.00000	4.19900

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 2	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
5 TON CHILLER ACH RECIP	CT	2.20287	111.47581	1.63581	159.62	0.14942	2.65657	0.14942	24	15.60000	1272.00000	7.80000
HEAT/COOL GENERATION EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	58.49123	1855.36272	33.91928	3103.31	7.01579	67.96662	4.45177	13	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	59.97518	2431.86049	34.29026	3709.91	7.01579	83.03074	4.45177	13	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	70.09540	4587.64033	38.73362	6077.05	7.39334	151.14634	4.81366	13	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	79.62205	7468.15489	43.14064	9157.24	7.77089	172.56472	5.19121	13	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	55.28354	1178.39775	33.20577	2361.58	7.04358	52.95050	4.47108	14	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	57.59107	1855.36272	33.46920	3084.34	6.88993	67.96662	4.38885	13	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	59.07502	2432.44767	33.84018	3691.52	6.88993	83.11283	4.38885	13	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	69.19524	4573.54799	38.28354	6043.98	7.26749	149.17610	4.75073	13	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	78.72189	7468.15489	42.69056	9138.27	7.64504	172.56472	5.12828	13	105.30000	27305.60000	26.32500
3 DK.MULTI ZONE 6500 CFM	CT	57.60086	1855.35358	33.69668	3085.25	7.01579	67.96534	4.45177	13	36.50000	5997.48000	8.12500
3 DK.MULTI ZONE 10,000 CFM	CT	59.97518	2432.44767	34.29026	3710.49	7.01579	83.11283	4.45177	13	42.90000	8050.70000	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	70.09540	4418.09192	38.84568	5907.86	7.39334	127.44190	4.82932	13	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	79.62205	7330.31424	43.25270	9019.76	7.77089	153.29331	5.20688	13	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	58.18465	1986.52564	26.86640	3205.94	6.88993	67.96662	3.44497	13	39.00000	6572.00000	9.75000
D.D. VARI.VOL.10000 CFM	CT	59.96539	2627.25606	27.31158	3882.78	6.88993	83.11283	3.44497	13	46.80000	8904.00000	11.70000
D.D. VARI.VOL.25000 CFM	CT	70.97598	4935.47456	30.73935	6416.45	7.26749	148.68811	3.63374	13	83.20000	16960.00000	20.80000
D.D. VARI.VOL.50000 CFM	CT	81.09621	7983.89700	33.94453	9672.27	7.64504	168.88306	3.82252	13	115.70000	29680.00000	28.92500
D.D. VARI.VOL. 100,000CFM	CT	86.77994	11239.94653	35.27479	13043.30	7.67644	285.74378	3.81769	14	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CFM	CT	56.70070	1855.36272	50.79970	3122.45	6.88993	67.96662	6.84293	13	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000 CFM	CT	59.07502	2432.44767	33.84018	3691.52	6.88993	83.11283	4.38885	13	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	58.39334	4188.35749	27.59369	5414.16	5.75728	95.32289	3.25619	13	75.40000	15359.40000	18.85000
VARIABLE VOLUME 50000 CFM	CT	78.72189	7468.15489	42.80262	9138.63	7.64504	172.56472	5.14395	13	105.30000	27305.60000	26.32500
TERM. REHEAT 6500 CFM	CT	50.41218	495.30423	32.17968	1580.31	7.04809	69.24814	4.49905	28	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	50.41218	607.21095	32.17968	1692.22	7.04809	84.89374	4.49905	28	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	53.20169	1085.40701	34.96939	2233.68	7.43809	151.74999	4.88905	28	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	55.99121	1241.44237	37.75890	2452.98	7.82809	173.56519	5.27905	28	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	50.41218	495.30423	32.17988	1580.31	7.04809	69.24814	4.49905	28	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	50.41218	607.21095	32.17988	1692.22	7.04809	84.89374	4.49905	28	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	53.20169	1085.40701	34.96939	2233.68	7.43809	151.74999	4.88905	28	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	55.99121	1241.44237	37.75890	2452.98	7.82809	173.56519	5.27905	28	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	55.01678	1286.28994	32.76592	2462.87	6.83490	67.00068	4.36674	14	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	56.58484	1762.55578	33.30477	2971.40	6.91701	83.41661	4.40780	14	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	65.67548	3950.88462	37.61440	5350.61	7.29673	149.60924	4.78751	14	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	76.23720	5545.51313	42.29180	7165.95	7.67644	172.70981	5.16723	14	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	8.32026	179.19724	8.07508	367.12	1.09469	8.98212	1.09469	14	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	8.32026	195.19052	8.07508	383.11	1.09469	8.98212	1.09469	14	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	8.36930	206.18590	8.09960	395.14	1.09469	8.98212	1.09469	14	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	8.44285	298.14726	8.13637	488.65	1.09469	8.98212	1.09469	14	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	8.36930	189.59287	8.09960	378.55	1.09469	8.98212	1.09469	14	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	8.36930	352.12458	8.09960	541.08	1.09469	8.98212	1.09469	14	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	8.41833	220.37994	8.12412	410.37	1.09469	8.98212	1.09469	14	3.12000	827.86000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	8.51640	321.53743	8.17315	513.59	1.09469	8.98212	1.09469	14	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	13.55640	330.90126	13.31122	637.58	1.82675	4.33790	1.82675	14	2.60000	1590.00000	1.30000
UNIT VENT 1200 CFM	CT	13.67899	390.87606	13.37252	700.13	1.82675	4.33790	1.82675	14	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	55.60412	1294.75060	33.05959	2483.71	6.91701	68.18356	4.40780	14	32.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	56.58484	1762.55578	33.30477	2971.40	6.91701	83.41661	4.40780	14	37.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	65.67548	3950.88462	37.61440	5350.61	7.29673	149.60924	4.78751	14	71.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	76.23720	5545.51313	42.29180	7165.95	7.67644	172.70981	5.16723	14	113.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	50.97581	126.32669	50.97581	1282.46	7.12689	17.66165	7.12689	28	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	53.88786	1078.43975	32.63052	2232.59	6.91701	52.95050	4.40780	14	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	13.55640	90.00248	13.31122	396.68	1.82675	4.33790	1.82675	14	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	13.67899	117.99072	13.37252	427.25	1.82675	4.33790	1.82675	14	3.25000	461.10000	1.62500
UNIT HEATER 4000 CFM	CT	13.67899	215.29787	13.37252	524.56	1.82675	8.24365	1.82675	14	3.25000	828.92000	1.62500
UNIT HEATER 8000 CFM	CT	13.67899	310.83546	13.37252	620.09	1.82675	9.91755	1.82675	14	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50MBH	CT	9.54356	83.96472	9.29838	299.63	1.26572	0.00000	1.26572	14	2.60000	445.20000	1.30000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 2	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
HEAT PUMP 5T	CT	33.70002	1809.59414	33.20908	2572.34	4.57430	203.97313	4.57430	19	8.38500	2994.50000	4.19250
HEAT PUMP 10T	CT	73.72112	3462.27370	72.60476	5130.70	10.07278	386.00814	10.07278	19	14.30000	5989.00000	4.76667
HEAT PUMP 25T	CT	92.62234	9294.68563	90.90975	11389.88	12.63022	1008.80451	12.63022	19	19.50000	17755.00000	4.87500
HEAT PUMP 1T	CT	32.24002	286.16284	31.80833	1015.99	4.38675	12.28337	4.38675	17	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	18.56907	8.57964	9.28454	400.02	2.56129	0.00000	1.28064	21	2.34000	80.56000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	31.61449	156.79071	31.61449	873.81	4.42000	21.92080	4.42000	38	26.00000	2851.40000	6.50000
IND DRAFT FAN 10000 CFM	CT	31.81542	159.58408	31.71496	880.84	4.44809	22.31134	4.43405	38	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	1.34828	1.63988	1.34828	32.22	0.18850	0.22927	0.18850	32	3.25000	41.58380	3.25000
EXHAUST FAN, 1000 CFM	CT	10.07102	41.34397	9.76656	268.78	1.32289	0.92116	1.32289	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	31.85770	160.17181	31.73609	882.32	4.45400	22.39351	4.43700	32	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	31.85770	490.00748	15.92885	1161.57	4.45400	68.50760	2.22700	32	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	31.85770	498.27018	31.73509	1220.41	4.45400	69.66280	4.43700	32	32.50000	5406.00000	8.12500
EXHAUST FAN, 5000 CFM	CT	11.96221	261.73916	10.52896	528.46	1.33241	1.01334	1.30204	17	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM	CT	2.96133	98.27451	2.96133	165.44	0.36081	2.45961	0.36081	19	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	28	9.10000	124.02000	4.55000
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
ROOM HUMIDIFIER,FLOOR TYPE	CT	4.69846	14.81445	4.69846	121.38	0.65405	0.22287	0.65405	16	0.13000	84.80000	0.13000
CONTROLS/INSTRUMENT.												
DEVICES												
THERMOSTATS/PNEUMATICS	CT	9.23749	21.92438	9.23749	231.43	1.27872	0.00000	1.27872	20	0.78000	187.22780	0.78000
HUMIDITY SENSOR	CT	9.07951	42.20171	9.07951	248.13	0.00000	0.00000	0.00000	10	1.56000	200.53080	1.56000
FLOW SENSOR	CT	9.20031	18.86807	9.20031	227.53	1.26572	0.00000	1.26572	14	0.78000	100.04280	0.78000
RADIATION SENSOR	CT	9.21731	12.02223	9.21731	221.07	1.27166	0.00000	1.27166	17	0.78000	77.11500	0.78000
WIND VELOCITY SENSOR	CT	9.04353	22.31278	9.04353	227.42	0.00000	0.00000	0.00000	8	1.56000	91.05400	1.56000
PRESSURE SENSOR	CT	9.21731	9.08897	9.21731	215.14	1.27166	0.00000	1.27166	17	0.78000	58.30000	0.78000
DAMPER CONTROLLER/ELECT.	CT	9.59517	65.56936	9.59517	283.19	1.25851	0.00000	1.25851	13	2.60000	287.20700	2.60000
SIMPLEX AIR COMPR.,1 HP	CT	32.70602	682.20462	21.52937	1388.25	4.51811	4.49441	2.98262	21	3.67900	6103.82980	1.83950

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 3	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.06689	16.90647	0.06689	18.42	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	1.84268	3.30858	0.92134	42.15	0.25762	0.46257	0.12881	99	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.17151	2.45750	0.17151	6.35	0.01930	0.00000	0.01930	18	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.21839	41.64104	0.17821	46.47	0.01930	0.00000	0.01930	18	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	40	2.60000	164.30000	1.30000
OIL FILTER	CT	0.74387	24.26162	0.74387	41.13	0.10400	3.39200	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.38525	72.61371	0.38525	81.35	0.03258	0.00000	0.03258	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	0.03830	0.01760	0.03830	0.89	0.00536	0.00246	0.00536	33	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	40	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITNGS,STEEL/IRON	TF	1.84268	3.30858	0.92134	42.15	0.25762	0.46257	0.12881	99	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	5.69534	5.40797	5.69534	134.58	0.79626	0.75608	0.79626	36	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	5.80410	25.45092	5.34357	155.61	0.68270	0.63933	0.68270	18	6.50000	147.34000	3.25000
STEAM REG. VALVE 2"	CT	5.09340	163.59674	2.54670	270.97	0.00000	0.00000	0.00000	7	7.80000	250.53100	3.90000
COND. METER,<300 #/HR.	CT	4.61104	73.42053	4.61104	178.00	0.64467	10.26487	0.64467	40	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	60	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	60	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	0.41600	18.57120	0.20800	27.34	0.00000	0.00000	0.00000	24	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	0.41600	20.98800	0.20800	29.76	0.00000	0.00000	0.00000	24	5.20000	262.35000	2.60000
SOLAR												
EQUIPMENT												
SOLAR PANEL, 3' X 8'	CT	0.45669	40.96158	0.22835	50.59	0.00000	0.00000	0.00000	20	3.90000	349.80000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	26	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.19568	0.96639	0.16613	5.31	0.02736	0.13511	0.02323	27	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	273.64997	156.38689	273.64997	6362.77	38.25881	21.86434	38.25881	36	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	306.74015	302.18625	306.74015	7259.05	42.88513	42.24845	42.88513	36	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	316.16707	1785.28756	316.16707	8955.96	44.20310	249.59980	44.20310	36	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR	CT	827.80324	11872.00000	520.69676	29663.84	103.93614	0.00000	69.86114	36	20800.000	636000.00000	4160.0000
REPAIR BOILER									24	1050.4000	148400.00000	262.60000
BOILER COAL 100,000 KBTU/H	CT	1000.4372	22141.28000	601.74616	43555.38	125.17614	0.00000	80.45614	36	41600.000	1590000.00000	8320.0000
REPAIR BOILER									24	1313.7800	276766.00000	328.44500
BOILER OIL 250 KBTU/HR	CT	311.18329	109.04950	311.18329	7166.69	43.50632	15.24613	43.50632	36	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	347.50882	109.04950	347.50882	7990.55	48.58497	15.24613	48.58497	36	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	382.84267	121.62155	382.84267	8804.49	53.52497	17.00382	53.52497	36	248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	316.65889	187.22477	316.65889	7369.05	44.27186	26.17576	44.27186	36	184.60000	18689.92000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	330.79760	3373.16804	330.79760	10875.66	46.24858	471.60026	46.24858	36	651.30000	71020.00000	162.82500
BOILR.PNEUMAT.COAL SPREAD.	CT	1450.1994	1454.81131	1422.0889	34255.38	197.95239	55.26054	197.62151	14	182.00000	5618.00000	45.50000
ASH HANDLING SYSTEM	CT	3117.4735	17411.68370	2492.2657	86115.32	319.53045	63.14958	319.36159	24	10400.000	212000.00000	2600.0000
FUEL OIL EQUIPMENT	CT	5.16639	44.13840	2.58319	153.05	0.67080	0.18606	0.33540	18	2.60000	302.10000	1.30000
CHEMICAL FEED SYSTEM	CT	5.01761	55.12413	4.78735	168.19	0.63712	0.00000	0.63712	18	3.25000	389.02000	1.62500
FEED-WATER SUPPLY	CT	140.76517	390.52520	138.06342	3574.43	19.11369	0.00000	19.11369	18	28.60000	2756.00000	9.53333
DEAERATOR	CT	158.87892	1696.00000	74.23946	5028.53	19.30472	0.00000	9.65236	24	260.00000	21200.00000	65.00000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 3	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
BLOWOFF SYSTEM	CT	0.36842	20.87808	0.18421	28.64	0.00000	0.00000	0.00000	18	2.60000	147.34000	1.30000
HOUSE FURN.GAS 25KBTU/HR	CT	30.56327	128.83664	29.62643	819.65	4.06699	10.97768	4.06699	18	10.40000	355.10000	5.20000
HOUSE FURN.GAS 100KBTU/HR	CT	32.05001	160.79649	30.57633	882.97	4.06882	13.13601	4.06882	18	20.80000	471.70000	10.40000
HOUSE FURN.GAS 200KBTU/HR	CT	32.05001	367.54175	30.57633	1089.72	4.06882	16.00137	4.06882	18	20.80000	1786.10000	10.40000
HOUSE FURN.OIL 25KBTU/HR	CT	39.69050	231.68515	38.95366	1129.51	5.34307	15.59203	5.34307	18	10.40000	848.00000	5.20000
HOUSE FURN.OIL 100KBTU/HR	CT	41.16418	314.13675	39.69050	1243.02	5.34307	17.00610	5.34307	18	20.80000	1358.49600	10.40000
HOUSE FURN.OIL 200KBTU/HR	CT	41.16418	368.45282	39.69050	1297.34	5.34307	19.90868	5.34307	18	20.80000	1595.30000	10.40000
HOUSE FURN.ELECT 25KBTU/HR	CT	16.22215	138.39773	15.48531	503.96	2.06197	7.44250	2.06197	18	10.40000	601.02000	5.20000
HOUSE FURN.ELECT.100KBTU	CT	17.69583	185.11148	16.22215	579.74	2.06197	10.71719	2.06197	18	20.80000	751.27500	10.40000
HOUSE FURN.ELECT.200KBTU/H	CT	17.69583	233.66322	16.22215	630.29	2.06197	13.76862	2.06197	18	20.80000	954.00000	10.40000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	60	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	0.41600	18.57120	0.20800	27.34	0.00000	0.00000	0.00000	24	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	0.41600	20.98800	0.20800	29.76	0.00000	0.00000	0.00000	24	5.20000	262.35000	2.60000
EXPANSION TANK	CT	0.03579	0.00000	0.03579	0.81	0.00500	0.00000	0.00500	60	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	5.76263	5.40797	5.76263	136.10	0.80567	0.75608	0.80567	36	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	5.80410	25.45092	5.34357	155.61	0.68270	0.63933	0.68270	18	6.50000	147.34000	3.25000
STORAGE TANK, DHW	CT	8.82920	12.53556	8.82920	212.78	1.23440	1.75259	1.23440	66	3.59395	346.62000	1.79698
IND. FUR., GAS/OIL 500 MBU	CT	29.86270	252.69187	25.62449	916.42	4.17508	35.32867	3.58254	40	65.00000	6784.00000	16.25000
IND.FURN.GAS/OIL 2000 MBTU	CT	49.98195	525.35844	49.98195	1658.95	6.98794	73.45000	6.98794	40	184.60000	13780.00000	46.15000
SURGE TANK, 1000 GAL	CT	0.60892	184.32711	0.30446	197.16	0.00000	0.00000	0.00000	20	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.04605	0.02403	0.04605	1.07	0.00644	0.00336	0.00644	60	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.06112	0.02808	0.06112	1.41	0.00855	0.00393	0.00855	36	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	0.16994	0.84461	0.16994	4.70	0.02376	0.11808	0.02376	33	241.80000	8034.80000	120.90000
PIPE INSULATION	TF	0.24640	1.51457	0.24640	7.10	0.03445	0.21175	0.03445	40	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	0.40044	1.54491	0.40044	10.63	0.05308	0.01563	0.05308	24	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"	CT	0.13488	7.74788	0.13488	10.81	0.01246	0.03126	0.01246	24	0.57200	94.05380	0.57200
DRAIN VALVE	CT	0.64514	4.41994	0.64514	19.05	0.08249	0.41758	0.08249	24	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	0.20263	2.86585	0.10132	7.14	0.00000	0.00000	0.00000	18	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	5.09340	163.59674	2.54670	270.97	0.00000	0.00000	0.00000	7	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	5.72958	51.69810	5.72958	181.65	0.74087	3.72342	0.74087	12	1.30000	75.70520	1.30000
PIPE INSULATION	TF	0.31015	1.90641	0.31015	8.94	0.04336	0.26653	0.04336	36	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	1.82861	55.65434	1.82861	97.13	0.17247	0.43112	0.17247	18	4.19900	371.00000	4.19900
CIRCULATION PUMP 5 HP	CT	1.82861	209.16754	1.53111	249.69	0.17247	4.04400	0.17247	18	4.19900	1272.00000	2.09950
COND. RCVR., 10 - 15 GAL.	CT	14.25395	205.44385	13.62995	526.73	1.81835	7.38247	1.81835	24	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T	CT	29.60266	444.56745	29.60265	1115.96	3.64000	0.00000	3.64000	30	8.38500	1855.00000	4.19250
REPAIR AIR CONDITIONER									15	20.80000	2592.23000	20.80000
A/C DX PACKAGE 20T	CT	69.58570	1546.67841	69.58570	3124.88	9.23000	0.00000	9.23000	30	20.41000	7950.00000	6.80333
REPAIR AIR CONDITIONER									15	20.80000	9018.53300	20.80000
A/C DX PACKAGE 50T	CT	88.62836	4674.25901	88.62836	6684.35	11.83000	0.00000	11.83000	30	47.71000	21200.00000	11.92750
REPAIR AIR CONDITIONER									15	23.40000	27255.15460	23.40000
A/C WINDOW 1T	CT	13.12042	91.29914	13.12042	388.87	1.69097	0.05650	1.69097	15	5.98000	530.00000	5.98000
A/C WINDOW 2T	CT	13.20960	127.65714	13.20960	427.25	1.69097	0.05650	1.69097	15	6.50000	742.00000	6.50000
A/C PAD MTD. 4T	CT	35.89817	256.52668	35.34080	1068.91	4.86305	0.28251	4.86305	15	6.50000	1484.00000	3.25000
A/C PAD MOUNTED 20 TON	CT	70.48010	2182.67841	69.39156	3777.68	9.12676	0.00000	9.12676	24	20.41000	7950.00000	6.80333
REPAIR AIR CONDITIONER									15	20.80000	9018.53300	20.80000
CHILLER-AIR COOL RECIP. 30T	CT	164.27311	878.04570	82.13655	4340.92	22.49000	0.00000	11.24500	30	28.60000	10759.00000	7.15000
REPAIR HERMETIC CHILLER									15	19.89000	5119.80000	9.94500
CHILLER AIR COOL REC.50T	CT	204.12893	1954.24250	101.36217	6255.03	28.53912	273.22128	14.17137	30	40.30000	19080.00000	10.07500
CHILLER AIR COOL REC.100T	CT	204.12893	5026.49350	101.01102	9326.16	27.95000	0.00000	13.97500	30	72.80000	40280.00000	18.20000
REPAIR HERMETIC CHILLER									15	24.57000	29309.00000	6.14250
CHILLER-AIR COOL RECIP. 5T	CT	89.88607	343.58310	89.88607	2382.20	12.09000	0.00000	12.09000	30	15.60000	3710.00000	5.20000
REPAIR HERMETIC CHILLER									15	19.89000	2003.40000	19.89000
CHILLER AIR COOL REC. 10T	CT	129.74189	665.35140	64.87094	3400.31	17.55000	0.00000	8.77500	30	20.80000	6360.00000	6.93333
REPAIR HERMETIC CHILLER									15	24.57000	3879.60000	12.28500
CHILLER AIR COOL REC. 15T	CT	166.93541	1555.21345	83.46770	5074.21	22.75000	0.00000	11.37500	30	28.60000	8268.00000	7.15000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 3	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
REPAIR HERMETIC CHILLER									15	24.57000	9068.30000	12.28500
CHILLER WAT.COOL REC.20T	CT	154.52755	819.50932	82.26377	4287.75	22.75000	0.00000	11.37500	30	29.90000	9540.00000	7.47500
REPAIR HERMETIC CHILLER									15	10.53000	4778.48000	5.26500
CHILLER WAT.COOL REC.50T	CT	165.82066	1926.97400	82.39383	5420.82	22.75000	0.00000	11.37500	30	48.10000	15900.00000	12.02500
REPAIR HERMETIC CHILLER									15	18.07000	11236.00000	6.02333
CHILLER WAT.COOL REC.100T	CT	165.82066	4981.04600	82.13558	8474.07	22.75000	0.00000	11.37500	30	74.10000	27030.00000	18.52500
REPAIR HERMETIC CHILLER									15	18.07000	29044.00000	4.51750
CHILLER WAT. COOL REC. 10T	CT	145.93079	581.72800	72.96539	3657.95	20.15000	0.00000	10.07500	30	20.80000	5300.00000	5.20000
REPAIR HERMETIC CHILLER									15	10.53000	3392.00000	5.26500
CHILLER WAT.COOL REC.200T	CT	165.82066	7562.46400	82.13558	11055.48	22.75000	0.00000	11.37500	30	74.10000	53000.00000	18.52500
REPAIR HERMETIC CHILLER									15	18.07000	44096.00000	4.51750
CHILL. HERMETIC CENT. 100T	CT	239.98475	3829.76993	119.99237	8888.65	33.15000	0.00000	16.57500	30	62.40000	37789.00000	15.60000
REPAIR CHILLER									15	16.77000	22331.02000	8.38500
CHILL. HERMETIC CENT. 300T	CT	239.89557	11416.59379	119.94778	16473.59	33.15000	0.00000	16.57500	30	97.50000	61771.50000	24.37500
REPAIR CHILLER									15	16.25000	66569.06000	8.12500
CHILL. HERMETIC CENT. 900T	CT	239.98475	34177.06537	119.99237	39235.94	33.15000	0.00000	16.57500	30	162.50000	127200.00000	40.62500
REPAIR CHILLER									15	16.77000	199283.18000	8.38500
CHILL. OPEN CENT. 300T	CT	623.18029	11416.59379	311.59014	24553.23	86.45000	0.00000	43.22500	30	97.50000	61771.50000	24.37500
REPAIR CHILLER									15	28.21000	66569.06000	14.10500
CHILL. OPEN CENT. 900T	CT	239.98475	34177.06537	119.99237	39235.94	33.15000	0.00000	16.57500	30	162.50000	127200.00000	40.62500
REPAIR CHILLER									15	16.77000	199283.18000	8.38500
CHILL.DBL.BNDL. HERM.100T	CT	277.17827	3875.21743	138.58913	9718.14	38.35000	0.00000	19.17500	30	68.90000	41340.00000	17.22500
REPAIR CHILLER									15	16.77000	22596.02000	8.38500
CHILL.DBL.BNDL. HERM.300T	CT	280.03203	16406.72929	140.01601	22309.80	38.35000	0.00000	19.17500	30	107.90000	67840.00000	26.97500
REPAIR CHILLER									15	33.41000	95666.06000	16.70500
CHILL.DBL.BNDL. HERM.900T	CT	285.56342	34258.87087	142.79174	40278.97	38.35000	0.00000	19.17500	30	178.10000	139920.00000	44.52500
REPAIR CHILLER									15	65.78000	199760.18000	32.89000
CHILL. ONE STG. ABS. 100T	CT	815.07592	1308.88800	407.53986	18490.77	113.75000	0.00000	56.87500	30	65.00000	37100.00000	16.25000
REPAIR CHILLER									15	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 300T	CT	121.42057	1308.88800	60.71029	3868.43	16.77000	0.00000	8.38500	30	104.00000	61480.00000	26.00000
REPAIR CHILLER									15	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 900T	CT	121.42057	1308.88800	60.71029	3868.43	16.77000	0.00000	8.38500	30	167.70000	113420.00000	41.92500
REPAIR CHILLER									15	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 300T	CT	121.42057	1308.88800	60.71029	3868.43	16.77000	0.00000	8.38500	30	114.40000	67840.00000	28.60000
REPAIR CHILLER									15	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 900T	CT	113.05203	1308.88800	56.52602	3692.02	15.80533	182.99[illegible]	[illegible]	30	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 5T	CT	18.44671	151.91602	18.04631	569.01	2.44[illegible]	11.13[illegible]	[illegible]	[illegible]	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 20T	CT	19.47631	310.16554	9.43309	719.75	[illegible]	[illegible]	[illegible]	[illegible]	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 50T	CT	33.24909	577.55266	15.93814	1276.25	4.26[illegible]	[illegible]	[illegible]	[illegible]	31.20000	5294.70000	7.80000
AIR COOLED CONDENSER 100T	CT	34.62189	1376.31990	16.28136	2102.85	4.2[illegible]	62.269[illegible]	[illegible]	23	46.80000	10578.80000	11.70000
COOLING TOWER 50T	CT	37.15413	601.53039	17.54747	1331.44	4.618[illegible]	28.9995[illegible]	[illegible]	23	46.80000	4478.50000	11.70000
COOLING TOWER 100T	CT	105.57318	1093.58239	51.64239	3315.40	14.1205[illegible]	28.9995[illegible]	[illegible]	23	52.00000	10070.00000	13.00000
COOLING TOWER 300T	CT	124.39235	1872.20009	60.48017	4488.90	16.43156	60.26118	[illegible]21578	23	78.00000	16377.00000	19.50000
COOLING TOWER 900T	CT	138.95632	4227.52009	66.64676	7147.66	17.84396	60.26118	[illegible]92198	23	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 20T	CT	64.03181	460.86601	31.21511	1808.09	8.50441	19.04924	4.25220	23	36.40000	3688.80000	9.10000
EVAPORATIVE CONDENSER 100T	CT	107.29173	1104.00921	51.44367	3358.67	13.76[illegible]	30.84859	6.88441	23	100.10000	10038.20000	25.02500
EVAPORATIVE CONDENSER 300T	CT	40.10869	3187.38515	16.05035	4020.06	3.36838	54.38374	1.68419	23	182.00000	31800.00000	45.50000
EXPANSION TANK	CT	0.03579	0.00000	0.03579	0.81	0.00500	0.00000	0.00500	60	3.47100	135.68000	1.73550
REFRIG. FAN COIL 1T	CT	5.08833	84.36646	4.97393	199.40	0.67941	1.27080	0.67941	23	2.60000	855.42000	1.30000
REFRIG. FAN COIL 3T	CT	5.12121	108.53128	4.98537	224.05	0.67941	2.23660	0.67941	23	2.86000	1051.52000	1.43000
REFRIG. FAN COIL 5T	CT	5.14553	142.76875	5.00253	259.01	0.67941	4.70195	0.67941	23	3.25000	1240.20000	1.62500
DIST. PIPING SYSTEM												
PIPE/FITTINGS ST.& C.I.	TF	0.10761	0.05615	0.10761	2.50	0.01504	0.00785	0.01504	36	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.49043	4.10187	0.26839	14.51	0.00648	0.00298	0.00648	24	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	22.40500	737.78995	11.76580	1211.89	0.15751	0.77482	0.15751	22	241.80000	8321.00000	120.90000
GATE VALVE, 3/8" - 1 1/2"	CT	0.14391	1.54491	0.14391	4.81	0.01241	0.01563	0.01241	24	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.13488	7.74956	0.13488	10.81	0.01246	0.03126	0.01246	24	0.57200	94.05380	0.57200
DRAIN VALVE	CT	0.64514	4.61994	0.64514	19.05	0.08249	0.41758	0.08249	24	0.68900	17.91400	0.68900

See NOTES on the last page of this table for Explanation of Column Headings

CONPONENT DESCRIPTION Zone: 3	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repa r labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
PIPE INSULATION	TF	0.31015	1.80914	0.31015	8.84	0.04336	0.25293	0.04336	36	91.00000	901.00000	91.00000
CIRCULATOR PUMP, < 1 HP	CT	1.81550	55.65434	1.81550	96.83	0.17064	0.43112	0.17064	18	4.19900	371.00000	4.19900
5 TON CHILLER ACH RECIP	CT	3.44413	209.16754	2.33887	283.74	0.17247	4.04400	0.17247	18	15.60000	1272.00000	7.80000
HEAT/COOL GENERATION EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	57.86910	1731.85652	33.81777	2967.36	7.03466	68.14018	4.46404	13	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	59.21785	2265.97098	34.15496	3528.83	7.03466	83.24955	4.46404	13	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	68.67019	4270.87729	38.43971	5731.58	7.41334	151.52557	4.82738	13	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	77.58303	6902.83606	42.69936	8550.79	7.79203	172.93349	5.20607	13	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	53.06743	752.76092	32.84970	1891.63	7.09944	53.07733	4.51272	23	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	56.96623	1731.85652	33.36634	2948.33	6.90843	68.14018	4.40093	13	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	58.31498	2266.55993	33.70353	3510.39	6.90843	83.33189	4.40093	13	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	67.76732	4256.74262	37.98828	5698.41	7.28712	149.54941	4.76427	13	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	76.68016	6902.83606	42.24793	8531.76	7.66580	172.93349	5.14295	13	105.30000	27305.60000	26.32500
3 DK.MULTI ZONE 6500 CFM	CT	57.05965	1731.84757	33.61546	2950.94	7.03466	68.13892	4.46404	13	32.50000	5997.48000	8.12500
3 DK.MULTI ZONE 10,000 CFM	CT	59.21785	2266.55993	34.15496	3529.42	7.03466	83.33189	4.46404	13	42.90000	8050.70000	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	68.67019	4100.81957	38.54949	5561.87	7.41334	127.74992	4.84273	13	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	77.58303	6764.58135	42.80914	8412.89	7.79203	153.60419	5.22207	13	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	57.50573	1851.06947	33.72974	3056.82	6.90843	68.14018	3.45421	13	39.00000	5572.00000	9.75000
D.D. VARI.VOL.10000 CFM	CT	59.12423	2443.61968	27.13437	3682.19	6.90843	83.33189	3.45421	13	46.80000	8904.00000	11.70000
D.D. VARI.VOL.25000 CFM	CT	69.38582	4585.44798	30.37691	6034.29	7.28712	149.07138	3.64356	13	83.20000	16960.00000	20.80000
D.D. VARI.VOL.50000 CFM	CT	78.83816	7369.72832	33.41714	9012.43	7.66580	169.32700	3.83290	13	115.70000	29680.00000	28.92500
D.D. VARI.VOL. 100,000CFM	CT	70.24342	6342.80100	31.33683	7811.42	7.74144	286.37764	3.86137	23	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CFM	CT	56.15698	1731.85652	50.76986	2988.26	6.90843	68.14018	6.86239	13	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000 CFM	CT	58.31498	2266.55993	33.70353	3510.39	6.90843	83.33189	4.40093	13	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	56.93297	3870.39504	27.26370	5066.69	5.77237	95.53443	3.26487	13	75.40000	15359.40000	18.85000
VARIABLE VOLUME 50000 CFM	CT	76.68016	6902.83606	42.35771	8532.11	7.66580	172.93349	5.15830	13	105.30000	27305.60000	26.32500
TERM. REHEAT 6500 CFM	CT	53.51866	990.04448	32.66751	2137.12	6.95033	68.35945	4.43420	20	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	54.12758	1322.92527	32.81974	2482.35	6.95033	83.74891	4.43420	20	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	60.82941	2860.57560	36.55308	4162.50	7.33394	149.86438	4.81782	20	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	68.44461	3905.84016	40.51476	5368.79	7.71756	171.92120	5.20143	20	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	53.51866	990.04448	32.66751	2137.12	6.95033	68.35945	4.43420	20	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	54.12758	1322.92527	32.81974	2482.35	6.95033	83.74891	4.43420	20	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	60.82941	2860.57560	36.55308	4162.50	7.33394	149.86438	4.81782	20	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	68.44461	3905.84016	40.51476	5368.79	7.71756	171.92120	5.20143	20	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	52.84521	868.16898	32.59559	2001.90	6.98840	68.72992	4.45720	23	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	53.17863	1144.70969	32.64790	2285.10	6.97104	83.98355	4.44852	23	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	58.90823	2418.56490	36.14670	3681.77	7.35624	150.21113	4.83372	23	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	65.32422	3241.97960	39.81709	4641.91	7.74144	172.08607	5.21893	23	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	7.84352	107.65636	7.72912	285.18	1.06461	7.55255	1.06461	23	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	7.84352	115.11876	7.72912	292.64	1.06461	7.55255	1.06461	23	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	7.86640	120.24916	7.74056	298.26	1.06461	7.55255	1.06461	23	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	7.90072	163.15796	7.75772	341.89	1.06461	7.55255	1.06461	23	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	7.86640	112.50692	7.74056	290.51	1.06461	7.55255	1.06461	23	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	7.86640	188.34356	7.74056	366.35	1.06461	7.55255	1.06461	23	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	7.88928	126.87204	7.75200	305.36	1.06461	7.55255	1.06461	23	3.12000	827.86000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	7.93504	174.07172	7.77488	353.53	1.06461	7.55255	1.06461	23	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	13.26473	160.24221	13.15033	460.72	1.82254	2.84123	1.82254	23	2.60000	1590.00000	1.30000
UNIT VENT 1200 CFM	CT	13.32193	188.22621	13.17893	489.91	1.82254	2.84123	1.82254	23	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	52.72103	866.74218	32.53350	1997.86	6.97104	68.53044	4.44852	23	32.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	53.17863	1144.70969	32.64790	2285.10	6.97104	83.98355	4.44852	23	37.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	58.90823	2418.56490	36.14670	3681.77	7.35624	150.21113	4.83372	23	71.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	65.32422	3241.97960	39.81709	4641.91	7.74144	172.08607	5.21893	23	113.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	51.04499	273.07576	50.58830	1429.31	.00887	17.35377	7.00887	20	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	51.92023	706.12092	32.33330	1820.99	6.9	53.07733	4.44852	23	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	13.26473	47.83981	13.15033	348.32	1.8224	2.84123	1.82254	23	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	13.32193	60.89901	13.17893	362.58	1.82254	2.84123	1.82254	23	3.25000	461.10000	1.62500
UNIT HEATER 4000 CFM	CT	13.32193	105.99247	13.17893	407.68	1.82254	4.62035	1.82254	23	3.25000	828.92000	1.62500

See NOTES on the last page of this table for explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE) PAGE 30

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
Zone: 3	UM	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
UNIT HEATER 8000 CFM	CT	13.32193	150.43721	13.17893	452.12	1.82254	5.38283	1.82254	23	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50MBH	CT	9.41278	39.17760	9.29838	252.29	1.28401	0.00000	1.28401	23	2.60000	445.20000	1.30000
HEAT PUMP 5T	CT	30.04856	823.59414	30.04856	1505.10	4.20107	115.14612	4.20107	30	8.38500	2994.50000	4.19250
HEAT PUMP 10T	CT	70.03160	1558.60747	70.03160	3146.92	9.79107	217.90782	9.79107	30	14.30000	5989.00000	4.76667
HEAT PUMP 25T	CT	88.62836	4073.30854	88.62836	6083.40	12.39107	569.48642	12.39107	30	19.50000	17755.00000	4.87500
HEAT PUMP 1T	CT	32.21307	268.10044	31.82070	997.44	4.39397	12.28337	4.39397	18	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	18.57388	7.08928	9.28694	398.63	2.56801	0.00000	1.28401	22	2.34000	80.56000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	31.61449	156.79071	31.61449	873.81	4.42000	21.92080	4.42000	26	26.00000	2851.40000	6.50000
IND DRAFT FAN 10000 CFM	CT	31.93819	161.29089	31.77634	885.13	4.46526	22.54997	4.44263	26	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	2.10991	6.52300	2.10991	54.38	0.25864	0.44687	0.25864	24	3.25000	41.58380	3.25000
EXHAUST FAN, 1000 CFM	CT	10.07102	41.34397	9.76656	268.78	1.32289	0.92116	1.32289	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	33.73261	304.89721	31.97675	1064.33	4.42533	22.43699	4.39795	24	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	33.73261	818.68868	16.34630	1528.11	4.42533	68.45970	2.21266	24	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	34.25261	935.45318	32.10675	1705.44	4.42533	70.32033	4.39795	24	32.50000	5406.00000	8.12500
EXHAUST FAN; 5000 CFM	CT	11.75915	238.55908	10.43666	501.02	1.33499	1.01334	1.30462	18	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM	CT	2.46188	8.20864	2.46188	64.04	0.34419	1.14764	0.34419	30	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	1.06561	14.52274	0.53281	36.99	0.00000	0.00000	0.00000	20	9.10000	124.02000	4.55000
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
ROOM HUMIDIFIER,FLOOR TYPE	CT	4.70575	30.87489	4.70575	137.60	0.65189	0.39113	0.65189	12	0.13000	84.80000	0.13000
CONTROLS/INSTRUMENT.												
DEVICES												
THERMOSTATS/PNEUMATICS	CT	9.23749	21.92438	9.23749	231.43	1.27872	0.00000	1.27872	20	0.78000	187.22780	0.78000
HUMIDITY SENSOR	CT	9.20920	17.19552	9.20920	226.06	1.26883	0.00000	1.26883	15	0.78000	100.26540	0.78000
FLOW SENSOR	CT	9.25262	8.80377	9.25262	218.65	1.28401	0.00000	1.28401	23	0.78000	100.04280	0.78000
RADIATION SENSOR	CT	9.22470	10.92720	9.22470	220.14	1.27425	0.00000	1.27425	18	0.78000	77.11500	0.78000
WIND VELOCITY SENSOR	CT	9.05091	21.66630	9.05091	226.94	0.00000	0.00000	0.00000	9	1.56000	91.05400	1.56000
PRESSURE SENSOR	CT	9.22470	8.26111	9.22470	217.48	1.27425	0.00000	1.27425	18	0.78000	58.30000	0.78000
DAMPER CONTROLLER/ELECT.	CT	9.56813	59.59545	9.56813	276.60	1.26229	0.00000	1.26229	13	2.60000	287.20700	2.60000
SIMPLEX AIR COMPR.,1 HP	CT	32.05923	568.70641	21.21857	1261.12	4.43692	4.41369	2.94392	22	3.67900	6103.82980	1.83950

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 4	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.06689	16.90647	0.06689	18.42	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	2.02641	3.63847	1.01321	46.36	0.28331	0.50869	0.14166	93	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.17590	2.70364	0.17590	6.69	0.01944	0.00000	0.01944	17	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.22748	45.81161	0.18327	50.83	0.01944	0.00000	0.01944	17	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	37	2.60000	164.30000	1.30000
OIL FILTER	CT	0.74387	24.26162	0.74387	41.13	0.10400	3.39200	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.38525	72.61371	0.38525	81.35	0.03258	0.00000	0.03258	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	0.45912	0.83468	0.25734	10.60	0.06419	0.11670	0.03598	31	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	37	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITNGS,STEEL/IRON	TF	2.02641	3.63847	1.01321	46.36	0.28331	0.50869	0.14166	93	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	5.84821	5.53881	5.84821	138.18	0.81763	0.77438	0.81763	33	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	5.94337	27.59030	5.43670	160.76	0.68926	0.64592	0.68926	17	6.50000	147.34000	3.25000
STEAM REG. VALVE 2"	CT	5.68620	182.63710	2.84310	302.50	0.00000	0.00000	0.00000	7	7.80000	250.53100	3.90000
COND. METER,<300 #/HR.	CT	4.63385	80.75631	4.63385	185.85	0.64786	11.29048	0.64786	37	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	56	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	56	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	0.45760	20.42832	0.22880	30.07	0.00000	0.00000	0.00000	22	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	0.45760	23.08680	0.22880	32.73	0.00000	0.00000	0.00000	22	5.20000	262.35000	2.60000
SOLAR												
EQUIPMENT												
SOLAR PANEL, 3' X 8'	CT	0.50232	45.05424	0.25116	55.64	0.00000	0.00000	0.00000	19	3.90000	349.30000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	1.13412	159.51834	0.56706	183.43	0.00000	0.00000	0.00000	25	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.17787	0.87842	0.15101	4.83	0.02487	0.12281	0.02111	29	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	274.43816	197.54973	274.43816	6421.81	38.36901	27.61929	38.36901	33	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	307.52834	381.72517	307.52834	7356.47	42.99532	53.36873	42.99532	33	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	316.95526	2255.19594	316.95526	9443.74	44.31329	315.29737	44.31329	33	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR	CT	836.20644	13059.20000	522.79756	31021.45	103.98614	0.00000	69.86114	33	20800.000	636000.00000	4160.0000
REPAIR BOILER									22	1050.4000	148400.00000	262.60000
BOILER COAL 100,000 KBTU/H	CT	1010.9474	24355.40800	604.37372	45982.66	125.17614	0.00000	80.45614	33	41600.000	1590000.00000	8320.0000
REPAIR BOILER									22	1313.7800	276766.00000	328.44500
BOILER OIL 250 KBTU/HR	CT	313.32985	137.75260	313.32985	7244.07	43.80643	19.25909	43.80643	33	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	348.44794	137.75260	348.44794	8040.55	48.71626	19.25909	48.71626	33	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	383.78179	153.63375	383.78179	8857.80	53.65626	21.47943	53.65626	33	248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	317.79925	236.50450	317.79925	7444.19	44.43129	33.06553	44.43129	33	184.60000	18689.92000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	331.98827	4261.02497	331.98827	11790.52	46.41505	595.73092	46.41505	33	651.30000	71020.00000	162.82500
BOILR.PNEUMAT.COAL SPREAD.	CT	1449.8934	1560.99151	1419.2030	34346.37	197.42869	55.26054	197.09781	13	182.00000	5618.00000	45.50000
ASH HANDLING SYSTEM	CT	3198.0932	19107.68370	2510.4854	89440.09	319.16971	63.14958	319.00085	22	10400.000	212000.00000	2600.0000
FUEL OIL EQUIPMENT	CT	5.19592	48.42822	2.59796	157.96	0.66977	0.18606	0.33488	17	2.60000	302.10000	1.30000
CHEMICAL FEED SYSTEM	CT	5.05453	60.64822	4.80119	174.47	0.63583	0.00000	0.63583	17	3.25000	389.02000	1.62500
FEED-WATER SUPPLY	CT	140.89439	429.66040	137.92190	3615.63	19.07497	0.00000	19.07497	17	28.60000	2756.00000	9.53333
DEAERATOR	CT	160.80292	1865.60000	74.68146	5237.02	19.28291	0.00000	9.64145	22	260.00000	21200.00000	65.00000

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
Zone: 4	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
BLOWOFF SYSTEM	CT	0.40534	22.97031	0.20267	31.51	0.00000	0.00000	0.00000	17	2.60000	147.34000	1.30000
HOUSE FURN.GAS 25KBTU/HR	CT	30.65372	133.87906	29.84304	826.51	4.05899	10.97768	4.05899	17	10.40000	355.10000	5.20000
HOUSE FURN.GAS 100KBTU/HR	CT	32.28814	167.49463	30.66678	894.60	4.06082	13.13601	4.06082	17	20.80000	471.70000	10.40000
HOUSE FURN.GAS 200KBTU/HR	CT	32.28814	392.90437	30.66678	1120.01	4.06082	16.00137	4.06082	17	20.80000	1786.10000	10.40000
HOUSE FURN.OIL 25KBTU/HR	CT	39.76249	243.72675	38.95181	1142.95	5.33248	15.59203	5.33248	17	10.40000	848.00000	5.20000
HOUSE FURN.OIL 100KBTU/HR	CT	41.38385	333.42739	39.76249	1266.82	5.33248	17.00610	5.33248	17	20.80000	1358.49600	10.40000
HOUSE FURN.OIL 200KBTU/HR	CT	41.38385	391.10608	39.76249	1324.50	5.33248	19.90868	5.33248	17	20.80000	1595.30000	10.40000
HOUSE FURN.ELECT 25KBTU/HR	CT	16.34214	146.93222	15.53146	514.98	2.05810	7.44250	2.05810	17	10.40000	601.02000	5.20000
HOUSE FURN.ELECT.100KBTU	CT	17.96350	193.77958	16.34214	596.00	2.05810	10.71719	2.05810	17	20.80000	751.27500	10.40000
HOUSE FURN.ELECT.200KBTU/H	CT	17.96350	247.21002	16.34214	649.43	2.05810	13.76862	2.05810	17	20.80000	954.00000	10.40000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	56	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	0.45760	20.42832	0.22880	30.07	0.00000	0.00000	0.00000	22	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	0.45760	23.08680	0.22880	32.73	0.00000	0.00000	0.00000	22	5.20000	262.35000	2.60000
EXPANSION TANK	CT	0.03665	0.00000	0.03665	0.83	0.00512	0.00000	0.00512	56	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	5.89452	5.53881	5.89452	139.23	0.82411	0.77438	0.82411	33	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	5.94337	27.59030	5.43670	160.76	0.68926	0.64592	0.68926	17	6.50000	147.34000	3.25000
STORAGE TANK, DHW	CT	9.66501	13.72223	9.66501	232.92	1.35126	1.91850	1.35126	62	3.59395	346.62000	1.79698
IND. FUR., GAS/OIL 500 MBU	CT	30.22859	277.98442	25.80743	949.42	4.22624	38.86481	3.60812	37	65.00000	6784.00000	16.25000
IND.FURN.GAS/OIL 2000 MBTU	CT	50.26902	577.94286	50.26902	1718.04	7.02800	80.80179	7.02808	37	184.60000	13780.00000	46.15000
SURGE TANK, 1000 GAL	CT	0.66976	202.74408	0.33488	216.86	0.00000	0.00000	0.00000	19	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.05067	0.02644	0.05067	1.18	0.00708	0.00370	0.00708	56	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.06260	0.02876	0.06260	1.45	0.00875	0.00402	0.00875	33	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	0.62456	3.07468	0.62456	17.24	0.08732	0.42987	0.08732	31	241.80000	8034.80000	120.90000
PIPE INSULATION	TF	0.28196	1.73313	0.28196	8.13	0.03942	0.24231	0.03942	37	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	0.40252	1.68822	0.40252	10.82	0.05308	0.01563	0.05308	22	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"	CT	0.13945	8.50031	0.13945	11.66	0.01246	0.03126	0.01246	22	0.57200	94.05380	0.57200
DRAIN VALVE	CT	0.70011	4.92754	0.70011	20.81	0.08941	0.46852	0.08941	22	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	0.22294	3.15305	0.11147	7.85	0.00000	0.00000	0.00000	17	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	5.68620	182.63710	2.84310	302.50	0.00000	0.00000	0.00000	7	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	5.78191	53.75445	5.78191	184.89	0.74673	3.92624	0.74673	11	1.30000	75.70520	1.30000
PIPE INSULATION	TF	0.31765	1.95253	0.31765	9.16	0.04441	0.27298	0.04441	33	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	1.89151	60.93050	1.89151	103.83	0.17293	0.43223	0.17293	17	4.19900	371.00000	4.19900
CIRCULATION PUMP 5 HP	CT	1.89151	227.50434	1.56420	269.36	0.17293	4.08237	0.17293	17	4.19900	1272.00000	2.09950
COND. RCVR., 10 - 15 GAL.	CT	14.64517	224.56920	13.95877	554.53	1.85560	7.92232	1.85560	22	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T	CT	29.95834	488.89458	29.95834	1168.35	3.64000	0.00000	3.64000	30	8.38500	1855.00000	4.19250
REPAIR AIR CONDITIONER									15	20.80000	2592.23000	20.80000
A/C DX PACKAGE 20T	CT	69.94138	1700.89532	69.94138	3287.17	9.23000	0.00000	9.23000	30	20.41000	7950.00000	6.80333
REPAIR AIR CONDITIONER									15	20.80000	9018.53300	20.80000
A/C DX PACKAGE 50T	CT	89.02850	5140.32216	89.02850	7159.49	11.83000	0.00000	11.83000	30	47.71000	21200.00000	11.92750
REPAIR AIR CONDITIONER									15	23.40000	27255.15460	23.40000
A/C WINDOW 1T	CT	13.22342	100.40250	13.22342	400.31	1.69108	0.06214	1.69108	15	5.98000	530.00000	5.98000
A/C WINDOW 2T	CT	13.32149	140.38570	13.32149	442.52	1.69108	0.06214	1.69108	15	6.50000	742.00000	6.50000
A/C PAD MTD. 4T	CT	35.95449	282.10439	35.34154	1095.59	4.85538	0.31072	4.85538	15	6.50000	1484.00000	3.25000
A/C PAD MOUNTED 20 TON	CT	70.92522	2400.49532	69.72783	4005.25	9.11644	0.00000	9.11644	22	20.41000	7950.00000	6.80333
REPAIR AIR CONDITIONER									15	20.80000	9018.53300	20.80000
CHILLER-AIR COOL RECIP.20T	CT	164.61323	965.59428	82.30661	4435.64	22.49000	0.00000	11.24500	30	28.60000	10759.00000	7.15000
REPAIR HERMETIC CHILLER									15	19.89000	5119.80000	9.94500
CHILLER AIR COOL REC.50T	CT	204.54907	2149.09700	101.50222	6458.52	28.59786	300.46375	14.19095	30	40.30000	19080.00000	10.07500
CHILLER AIR COOL REC.100T	CT	204.54907	5527.67740	101.11606	9835.86	27.95000	0.00000	13.97500	30	72.80000	40280.00000	18.20000
REPAIR HERMETIC CHILLER									15	24.57000	29309.00000	6.14250
CHILLER-AIR COOL RECIP. 5T	CT	90.22619	377.84124	90.22619	2424.17	12.09000	0.00000	12.09000	30	15.60000	3710.00000	5.20000
REPAIR HERMETIC CHILLER									15	19.89000	2003.40000	19.89000
CHILLER AIR COOL REC. 10T	CT	130.16203	731.69256	65.08102	3475.51	17.55000	0.00000	8.77500	30	20.80000	6360.00000	6.93333
REPAIR HERMETIC CHILLER									15	24.57000	3879.60000	12.28500
CHILLER AIR COOL REC. 15T	CT	167.35555	1710.28138	83.67778	5238.14	22.75000	0.00000	11.37500	30	28.60000	8268.00000	7.15000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 4	UM	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
REPAIR HERMETIC CHILLER												
CHILLER WAT.COOL REC.20T	CT	164.70761	901.22133	82.35380	4373.26	22.75000	0.00000	11.37500	15	24.57000	9068.30000	12.28500
REPAIR HERMETIC CHILLER									30	29.90000	9540.00000	7.47500
CHILLER WAT.COOL REC.50T	CT	166.12965	2119.10960	82.49683	5619.31	22.75000	0.00000	11.37500	15	10.53000	4778.48000	5.26500
REPAIR HERMETIC CHILLER									30	48.10000	15900.00000	12.02500
CHILLER WAT.COOL REC.100T	CT	166.12965	5477.69840	82.21283	8976.99	22.75000	0.00000	11.37500	15	18.07000	11236.00000	6.02333
REPAIR HERMETIC CHILLER									30	74.10000	27030.00000	18.52500
CHILLER WAT. COOL REC. 10T	CT	146.11085	639.73120	73.05542	3719.75	20.15000	0.00000	10.07500	15	18.07000	29044.00000	4.51750
REPAIR HERMETIC CHILLER									30	20.80000	5300.00000	5.20000
CHILLER WAT.COOL REC.200T	CT	166.12965	8316.50560	82.21283	11815.79	22.75000	0.00000	11.37500	15	10.53000	3392.00000	5.26500
REPAIR HERMETIC CHILLER									30	74.10000	53000.00000	18.52500
CHILL. HERMETIC CENT. 100T	CT	240.27151	4211.63037	120.13576	9276.55	33.15000	0.00000	16.57500	15	18.07000	44096.00000	4.51750
REPAIR CHILLER									30	62.40000	37789.00000	15.60000
CHILL. HERMETIC CENT. 300T	CT	240.17344	12554.92472	120.08672	17617.78	33.15000	0.00000	16.57500	15	16.77000	22331.02000	8.38500
REPAIR CHILLER									30	97.50000	61771.50000	24.37500
CHILL. HERMETIC CENT. 900T	CT	240.27151	37504.80775	120.13576	42649.73	33.15000	0.00000	16.57500	15	16.25000	66569.06000	8.12500
REPAIR CHILLER									30	162.50000	127200.00000	40.62500
CHILL. OPEN CENT. 300T	CT	623.66268	12554.92472	311.83134	25701.73	86.45000	0.00000	43.22500	15	16.77000	199283.18000	8.38500
REPAIR CHILLER									30	97.50000	61771.50000	24.37500
CHILL. OPEN CENT. 900T	CT	240.27151	37584.80775	120.13576	42649.73	33.15000	0.00000	16.57500	15	28.21000	66569.06000	14.10500
REPAIR CHILLER									30	162.50000	127200.00000	40.62500
CHILL.DBL.BNDL. HERM.100T	CT	277.46503	4261.60937	138.73252	10110.57	38.35000	0.00000	19.17500	15	16.77000	199283.13000	8.38500
REPAIR CHILLER									30	68.90000	41340.00000	17.22500
CHILL.DBL.BNDL. HERM.300T	CT	280.60334	18042.61892	140.30167	23957.74	38.35000	0.00000	19.17500	15	16.77000	22596.02000	8.38500
REPAIR CHILLER									30	107.90000	67840.00000	26.97500
CHILL.DBL.BNDL. HERM.900T	CT	286.70832	37674.76995	143.35416	43718.58	38.35000	0.00000	19.17500	15	33.41000	95666.06000	16.70500
REPAIR CHILLER									30	178.10000	139920.00000	44.52500
CHILL. ONE STG. ABS. 100T	CT	815.22644	1439.39520	407.61322	18624.37	113.75000	0.00000	56.87500	15	65.78000	199760.18000	32.89000
REPAIR CHILLER									30	65.00000	37100.00000	16.25000
CHILL. ONE STG. ABS. 300T	CT	121.56729	1439.39520	60.78365	4002.03	16.77000	0.00000	8.38500	15	8.58000	7632.00000	4.29000
REPAIR CHILLER									30	104.00000	61480.00000	26.00000
CHILL. ONE STG. ABS. 900T	CT	121.56729	1439.39520	60.78365	4002.03	16.77000	0.00000	8.38500	15	8.58000	7632.00000	4.29000
REPAIR CHILLER									30	167.70000	113420.00000	41.92500
CHILL. TWO STG. ABS. 300T	CT	121.56729	1439.39520	60.78365	4002.03	16.77000	0.00000	8.38500	15	8.58000	7632.00000	4.29000
REPAIR CHILLER									30	114.40000	67840.00000	28.60000
CHILL. TWO STG. ABS. 900T	CT	113.19875	1439.39520	56.59937	3825.62	15.82624	201.24084	7.91312	15	8.58000	7632.00000	4.29000
AIR COOLED CONDENSER 5T	CT	18.55786	159.85521	18.15746	579.47	2.48260	12.24215	2.48260	30	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 20T	CT	19.58746	319.69982	9.48867	731.63	2.48260	14.70176	1.24130	22	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 50T	CT	33.36024	588.68202	15.99372	1289.72	4.28021	17.16137	2.14011	22	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 100T	CT	34.73304	1420.72860	16.33692	2149.61	4.28021	68.47778	2.14011	22	31.20000	5294.70000	7.80000
COOLING TOWER 50T	CT	37.24305	622.21216	17.59193	1404.00	4.63113	31.89108	2.31557	22	46.80000	10578.80000	11.70000
COOLING TOWER 100T	CT	105.66210	1114.26416	51.68705	3337.96	14.13278	31.89108	7.06639	22	46.80000	4478.50000	11.70000
COOLING TOWER 300T	CT	124.48127	1915.17684	60.52463	4533.75	16.44399	66.26973	8.22199	22	52.00000	10070.00000	13.00000
COOLING TOWER 900T	CT	139.04524	4270.49684	66.69122	7192.51	17.85639	66.26973	8.92820	22	78.00000	16377.00000	19.50000
EVAPORATIVE CONDENSER 20T	CT	64.23633	474.45144	31.31736	1825.99	8.53300	20.94861	4.26650	22	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 100T	CT	107.49625	1126.00965	51.54592	3384.98	13.79742	33.92445	6.89871	22	36.40000	3688.80000	9.10000
EVAPORATIVE CONDENSER 300T	CT	40.31321	3226.17026	16.15260	4063.16	3.39698	59.80626	1.69849	22	100.10000	10038.20000	25.02500
EXPANSION TANK	CT	0.03665	0.00000	0.03665	0.83	0.00512	0.00000	0.00512	22	182.00000	31800.00000	45.50000
REFRIG. FAN COIL 1T	CT	5.11501	85.27276	5.00061	200.92	0.68314	1.39751	0.68314	56	3.47100	135.68000	1.73550
REFRIG. FAN COIL 3T	CT	5.13789	110.12637	5.01205	226.25	0.68314	2.45961	0.68314	22	2.60000	855.42000	1.30000
REFRIG. FAN COIL 5T	CT	5.17221	146.12206	5.02921	262.97	0.68314	5.17077	0.68314	22	2.86000	1051.52000	1.43000
DIST. PIPING SYSTEM									22	3.25000	1240.20000	1.62500
PIPE/FITTINGS ST.& C.I.	TF	0.11021	0.05751	0.11021	2.56	0.01541	0.00804	0.01541	33	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.53484	4.50993	0.29060	15.86	0.00648	0.00298	0.00648	22	5.55.00	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	20.36806	670.71753	10.69606	1101.71	0.14317	0.70429	0.14317	24	241.80000	8321.00000	120.90000
GATE VALVE, 3/8" - 1 1/2"	CT	0.14942	1.68822	0.14942	5.08	0.01241	0.01563	0.01241	22	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.13945	8.50031	0.13945	11.66	0.01246	0.03126	0.01246	22	0.57200	94.05380	0.57200
DRAIN VALVE	CT	0.70011	4.92754	0.70011	20.81	0.00941	0.46852	0.08941	22	0.68900	17.91400	0.68900

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE) PAGE 34

COMPONENT DESCRIPTION Zone: 4	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
PIPE INSULATION	TF	0.31765	1.85291	0.31765	9.06	0.04441	0.25905	0.04441	33	91.00000	901.00000	91.00000
CIRCULATOR PUMP, < 1 HP	CT	1.87826	60.93050	1.87826	103.53	0.17108	0.43223	0.17108	17	4.19900	371.00000	4.19900
5 TON CHILLER ACH RECIP	CT	3.66893	227.50434	2.45291	306.82	0.17293	4.08237	0.17293	17	15.60000	1272.00000	7.80000
HEAT/COOL GENERATION EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	57.24498	1618.81444	33.69613	2841.77	7.04358	68.18356	4.47108	14	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	58.47088	2114.41714	34.00261	3362.24	7.04358	83.33405	4.47108	14	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	67.31634	3981.05103	38.15305	5414.46	7.42330	151.59078	4.83711	14	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	75.67144	6385.16033	42.27880	7994.53	7.80302	172.70981	5.21683	14	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	53.09411	753.13178	32.86304	1892.57	7.10317	53.12918	4.51459	22	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	56.33966	1618.81444	33.24347	2822.69	6.91701	68.18356	4.40780	14	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	57.56556	2115.00769	33.54995	3343.74	6.91701	83.41661	4.40780	14	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	66.41102	3966.87790	37.70039	5381.21	7.29673	149.60924	4.77383	14	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	74.76612	6385.16033	41.82614	7975.45	7.67644	172.70981	5.15354	14	105.30000	27305.60000	26.32500
3 DK.MULTI ZONE 6500 CFM	CT	56.50944	1618.80645	33.51225	2826.85	7.04358	68.18244	4.47108	14	32.50000	5997.48000	8.12500
3 DK.MULTI ZONE 10,000 CFM	CT	58.47088	2115.00769	34.00261	3362.83	7.04358	83.41661	4.47108	14	42.90000	8050.70000	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	67.31634	3810.53053	38.25094	5244.26	7.42330	127.75042	4.85080	14	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	75.67144	6246.52937	42.37669	7856.21	7.80302	153.32791	5.23052	14	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	56.83002	1727.16891	26.57614	2919.26	6.91701	68.18356	3.45851	14	39.00000	6572.00000	9.75000
D.D. VARI.VOL.10000 CFM	CT	58.30110	2275.94007	26.94393	3497.87	6.91701	83.41661	3.45851	14	46.80000	8904.00000	11.70000
D.D. VARI.VOL.25000 CFM	CT	67.88210	4265.70201	30.01817	5684.10	7.29673	149.18296	3.64836	14	83.20000	16960.00000	20.80000
D.D. VARI.VOL.50000 CFM	CT	76.72756	6809.96862	32.90853	8409.93	7.67644	169.49370	3.83822	14	115.70000	29680.00000	28.92500
D.D. VARI.VOL. 100,000CFM	CT	70.27010	6344.54110	31.34349	7813.70	7.74517	287.12092	3.86230	22	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CFM	CT	55.60412	1618.81444	50.71333	2864.27	6.91701	68.18356	6.87595	14	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000 CFM	CT	57.56556	2115.00769	33.54995	3343.74	6.91701	83.41661	4.40780	14	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	55.54718	3579.47894	26.93444	4747.73	5.77786	95.44726	3.26865	14	75.40000	15359.40000	18.85000
VARIABLE VOLUME 50000 CFM	CT	74.76612	6385.16033	41.92403	7975.76	7.67644	172.70981	5.16723	14	105.30000	27305.60000	26.32500
TERM. REHEAT 6500 CFM	CT	53.84922	1039.75683	32.72632	2193.46	6.94338	68.30989	4.42913	19	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	54.51898	1394.71615	32.89376	2562.01	6.94338	83.67375	4.42913	19	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	61.61171	3038.62652	36.72140	4356.33	7.32636	149.77184	4.81211	19	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	69.70907	4173.42370	40.80020	5661.92	7.70933	171.94867	5.19509	19	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	53.84922	1039.75683	32.72632	2193.46	6.94338	68.30989	4.42913	19	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	54.51898	1394.71615	32.89376	2562.01	6.94338	83.67375	4.42913	19	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	61.61171	3038.62652	36.72140	4356.33	7.32636	149.77184	4.81211	19	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	69.70907	4173.42370	40.80020	5661.92	7.70933	171.94867	5.19509	19	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	52.84521	868.16898	32.59559	2001.90	6.98840	68.72992	4.45720	22	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	53.20531	1145.08055	32.66124	2286.04	6.97477	84.03540	4.45039	22	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	58.93490	2419.47120	36.16003	3683.24	7.35997	150.33783	4.83559	22	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	65.35090	3243.79220	39.83043	4644.29	7.74517	172.33949	5.22079	22	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	7.87020	108.56266	7.75580	286.69	1.06834	7.67926	1.06834	22	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	7.87020	116.02506	7.75580	294.16	1.06834	7.67926	1.06834	22	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	7.89308	121.15546	7.76724	299.77	1.06834	7.67926	1.06834	22	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	7.92740	164.06426	7.78440	343.40	1.06834	7.67926	1.06834	22	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	7.89308	113.41322	7.76724	292.03	1.06834	7.67926	1.06834	22	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	7.89308	189.24986	7.76724	367.86	1.06834	7.67926	1.06834	22	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	7.91596	127.77834	7.77868	306.87	1.06834	7.67926	1.06834	22	3.12000	827.86000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	7.96172	174.97802	7.80156	355.04	1.06834	7.67926	1.06834	22	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	13.28252	161.14851	13.16812	462.03	1.82503	2.96794	1.82503	22	2.60000	1590.00000	1.30000
UNIT VENT 1200 CFM	CT	13.33972	189.13251	13.19672	491.22	1.82503	2.96794	1.82503	22	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	52.74771	867.11304	32.54684	1998.79	6.97477	68.5?229	4.45039	22	32.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	53.20531	1145.08055	32.66124	2286.04	6.97477	84.03540	4.45039	22	37.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	58.93490	2419.47120	36.16003	3683.24	7.35997	150.33783	4.83559	22	71.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	65.35090	3243.79220	39.83043	4644.29	7.74517	172.33949	5.22079	22	113.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	50.78564	284.03647	50.28332	1434.25	6.95985	16.80548	6.95985	19	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	51.94691	706.49178	32.34664	1821.93	6.97477	53.12918	4.45039	22	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	13.28252	48.74611	13.16812	349.63	1.82503	2.96794	1.82503	22	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	13.33972	61.80531	13.19672	363.89	1.82503	2.96794	1.82503	22	3.25000	461.10000	1.62500
UNIT HEATER 4200 CFM	CT	13.33972	108.16759	13.19672	410.25	1.82503	4.92445	1.82503	22	3.25000	828.92000	1.62500

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION Zone: 4	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
		labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
UNIT HEATER 8000 CFM	CT	13.33972	153.15611	13.19672	455.24	1.82503	5.76296	1.82503	22	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50K3H	CT	9.41278	39.17760	9.29838	252.29	1.28401	0.00000	1.28401	22	2.60000	445.20000	1.30000
HEAT PUMP 5T	CT	30.44870	905.71344	30.44870	1596.29	4.25701	126.62716	4.25701	30	8.38500	2994.50000	4.19250
HEAT PUMP 10T	CT	70.43174	1714.01381	70.43174	3311.41	9.84701	239.63507	9.84701	30	14.30000	5989.00000	4.76667
HEAT PUMP 25T	CT	89.02850	4479.45184	89.02850	6498.62	12.44701	626.26903	12.44701	30	19.50000	17755.00000	4.87500
HEAT PUMP 1[illegible]	CT	31.65111	243.69976	31.29446	960.41	4.32539	11.16603	4.32539	19	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	18.57596	6.44480	9.28798	398.03	2.57092	0.00000	1.28546	24	2.34000	80.56000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	33.18336	362.49385	31.76571	1110.56	4.37507	21.69799	4.37507	25	26.00000	2851.40000	6.50000
IND DRAFT FAN 10000 CFM	CT	33.53951	373.14772	31.94378	1128.72	4.42487	22.39023	4.39997	25	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	2.25959	7.17598	2.25959	58.42	0.27593	0.49165	0.27593	22	3.25000	41.58380	3.25000
EXHAUST FAN, 1000 CFM	CT	10.07102	41.34397	9.76656	268.78	1.32289	0.92116	1.32289	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	33.90525	319.16328	31.99339	1082.02	4.42039	22.41247	4.39300	22	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	33.90525	851.05247	16.38062	1563.94	4.42039	68.38437	2.21019	22	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	34.47725	978.16237	32.13639	1752.62	4.42039	70.24500	4.39300	22	32.50000	5406.00000	8.12500
EXHAUST FAN, 5000 CFM	CT	11.53516	216.84181	10.33305	474.61	1.33181	0.92116	1.30420	19	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM	CT	2.46188	8.20864	2.46188	64.04	0.34419	1.14764	0.34419	30	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	1.17208	15.97378	0.58604	40.68	0.00000	0.00000	0.00000	19	9.10000	124.02000	4.55000
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
ROOM HUMIDIFIER,FLOOR TYPE	CT	4.70159	31.55329	4.70159	138.19	0.65116	0.39113	0.65116	11	0.13000	84.80000	0.13000
CONTROLS/INSTRUMENT.												
DEVICES												
THERMOSTATS/PNEUMATICS	CT	9.23749	21.92438	9.23749	231.43	1.27872	0.00000	1.27872	20	0.78000	187.22780	0.78000
HUMIDITY SENSOR	CT	9.20031	18.91005	9.20031	227.57	1.26572	0.00000	1.26572	15	0.78000	100.26540	0.78000
FLOW SENSOR	CT	9.25262	8.80377	9.25262	218.65	1.28401	0.00000	1.28401	22	0.78000	100.04280	0.78000
RADIATION SENSOR	CT	9.23140	9.93241	9.23140	219.30	1.27659	0.00000	1.27659	19	0.78000	77.11500	0.78000
WIND VELOCITY SENSOR	CT	9.07343	19.69498	9.07343	225.48	0.00000	0.00000	0.00000	10	1.56000	91.05400	1.56000
PRESSURE SENSOR	CT	9.23140	7.50904	9.23140	216.88	1.27659	0.00000	1.27659	19	0.78000	58.30000	0.78000
DAMPER CONTROLLER/ELECT.	CT	9.54356	54.16724	9.54356	270.62	1.26572	0.00000	1.26572	14	2.60000	287.20700	2.60000
SIMPLEX AIR COMPR.,1 HP	CT	31.19341	519.04419	20.79153	1193.22	4.31998	4.29743	2.88627	24	3.67900	6103.82980	1.83950

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE) PAGE 36

COMPONENT DESCRIPTION Zone: 5	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.06689	16.90647	0.06689	18.42	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	2.45297	4.40436	1.22648	56.11	0.34295	0.61577	0.17147	81	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.18606	3.27222	0.18606	7.49	0.01978	0.00000	0.01978	15	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.24848	55.44595	0.19497	60.91	0.01978	0.00000	0.01978	15	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	32	2.60000	164.30000	1.30000
OIL FILTER	CT	0.74387	24.26162	0.74387	41.13	0.10400	3.39200	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.38525	72.61371	0.38525	81.35	0.03258	0.00000	0.03258	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	0.60619	1.10901	0.33752	14.00	0.08475	0.15505	0.04719	27	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
.LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	32	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITNGS,STEEL/IRON	TF	2.45297	4.40436	1.22648	56.11	0.34295	0.61577	0.17147	81	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	7.39467	7.01633	7.39467	174.73	1.03384	0.98095	1.03384	28	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	7.33690	33.58114	6.72395	198.02	0.85438	0.80989	0.85438	14	6.50000	147.34000	3.25000
STEAM REG. VALVE 2"	CT	7.33044	235.44903	3.66522	389.97	0.00000	0.00000	0.00000	6	7.8[illegible]	250.53100	3.90000
COND. METER,<300 #/HR.	CT	4.68670	97.74774	4.68670	204.04	0.65524	13.66604	0.65524	32	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	47	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	47	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	0.66976	29.89963	0.33488	44.02	0.00000	0.00000	0.00000	19	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	0.66976	33.79068	0.33488	47.91	0.00000	0.00000	0.00000	19	5.20000	262.35000	2.60000
SOLAR												
EQUIPMENT												
SOLAR PANEL, 3' X 8'	CT	0.60801	54.53382	0.30401	67.35	0.00000	0.00000	0.00000	16	3.90000	349.80000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	1.51008	212.39856	0.75504	244.23	0.00000	0.00000	0.00000	22	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.16964	0.79935	0.14522	4.57	0.02372	0.11176	0.02030	29	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	275.10965	232.61792	275.10965	6472.10	38.46289	32.52215	38.46289	28	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	308.19983	449.48740	308.19983	7439.46	43.08920	62.84252	43.08920	28	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	317.62675	2655.52874	317.62675	9859.30	44.40717	371.26761	44.40717	28	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR	CT	879.06276	19113.92000	533.51164	37945.30	103.98614	0.00000	69.86114	28	20800.000	636000.00000	4160.0000
REPAIR BOILER									19	1050.4000	148400.00000	262.60000
BOILER COAL 100,000 KBTU/H	CT	1064.5496	35647.46080	617.77427	58361.77	125.17614	0.00000	80.45614	28	41600.000	1590000.00000	8320.0000
REPAIR BOILER									19	1313.7800	276766.00000	328.44500
BOILER OIL 250 KBTU/HR	CT	315.15858	162.20585	315.15858	7310.00	44.06210	22.67789	44.06210	28	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	349.24802	162.20585	349.24802	8083.15	48.82812	22.67789	48.82812	28	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	384.58186	180.90616	384.58186	8903.22	53.76812	25.29236	53.76812	28	248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	318.77076	278.48777	318.77076	7508.21	44.56712	38.93518	44.56712	28	184.60000	18689.92000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	333.00264	5017.42400	333.00264	12569.92	46.55687	701.48254	46.55687	28	651.30000	71020.00000	162.82500
BOILR.PNEUMAT.COAL SPREAD.	CT	1449.7797	2535.64826	1399.7169	35256.45	194.06419	88.16157	193.53632	11	182.00000	5618.00000	45.50000
ASH HANDLING SYSTEM	CT	3609.5576	27852.08152	2603.4564	106497.33	317.37238	76.40320	317.16808	19	10400.000	212000.00000	2600.0000
FUEL OIL EQUIPMENT	CT	5.83940	58.97151	2.91970	182.07	0.74785	0.27898	0.37392	14	2.60000	302.10000	1.30000
CHEMICAL FEED SYSTEM	CT	5.13955	73.36917	4.83308	188.95	0.63286	0.00000	0.63286	14	3.25000	389.02000	1.62500
FEED-WATER SUPPLY	CT	141.19196	519.78160	137.59599	3710.51	18.98582	0.00000	18.98582	14	28.60000	2756.00000	9.53333
DEAERATOR	CT	170.64957	2730.56000	76.95279	6301.06	19.17646	0.00000	9.58823	19	260.00000	21200.00000	65.00000

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION Zone: 5	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
BLOWOFF SYSTEM	CT	0.49036	27.78832	0.24518	38.13	0.00000	0.00000	0.00000	14	2.60000	147.34000	1.30000
HOUSE FURN.GAS 25KBTU/HR	CT	31.27935	184.70341	30.29863	890.98	4.09892	16.45997	4.09892	14	10.40000	355.10000	5.20000
HOUSE FURN.GAS 100KBTU/HR	CT	33.26037	229.84139	31.29893	977.91	4.10165	19.69616	4.10165	14	20.80000	471.70000	10.40000
HOUSE FURN.GAS 200KBTU/HR	CT	33.26037	508.46716	31.29893	1256.54	4.10165	23.99249	4.10165	14	20.80000	1786.10000	10.40000
HOUSE FURN.OIL 25KBTU/HR	CT	40.35213	327.15151	39.37141	1239.20	5.36738	23.37873	5.36738	14	10.40000	848.00000	5.20000
HOUSE FURN.OIL 100KBTU/HR	CT	42.31357	438.59648	40.35213	1391.99	5.36738	25.49900	5.36738	14	20.80000	1358.49600	10.40000
HOUSE FURN.OIL 200KBTU/HR	CT	42.31357	514.38673	40.35213	1467.78	5.36738	29.85112	5.36738	14	20.80000	1595.30000	10.40000
HOUSE FURN.ELECT 25KBTU/HR	CT	17.15643	193.17037	16.17571	579.14	2.12440	11.15930	2.12440	14	10.40000	601.02000	5.20000
HOUSE FURN.ELECT.100KBTU	CT	19.11787	256.62839	17.15643	683.94	2.12440	16.06939	2.12440	14	20.80000	751.27500	10.40000
HOUSE FURN.ELECT.200KBTU/H	CT	19.11787	327.58770	17.15643	754.90	2.12440	20.64470	2.12440	14	20.80000	954.00000	10.40000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	47	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	0.66976	29.89963	0.33488	44.02	0.00000	0.00000	0.00000	19	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	0.66976	33.79068	0.33488	47.91	0.00000	0.00000	0.00000	19	5.20000	262.35000	2.60000
EXPANSION TANK	CT	0.04643	0.00000	0.04643	1.05	0.00649	0.00000	0.00649	47	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	7.38393	7.01633	7.38393	174.48	1.03234	0.98095	1.03234	28	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	7.33690	33.58114	6.72395	198.02	0.85438	0.80989	0.85438	14	6.50000	147.34000	3.25000
STORAGE TANK, DHW	CT	10.94318	15.53695	10.94318	263.73	1.52996	2.17221	1.52996	54	3.59395	346.62000	1.79698
IND. FUR., GAS/OIL 500 MBU	CT	31.50623	366.30391	26.44625	1064.67	4.40486	51.21269	3.69743	32	65.00000	6784.00000	16.25000
IND.FURN.GAS/OIL 2000 MBTU	CT	51.27148	761.56328	51.27148	1924.40	7.16823	106.47363	7.16823	32	184.60000	13780.00000	46.15000
SURGE TANK, 1000 GAL	CT	0.81068	245.40219	0.40534	262.49	0.00000	0.00000	0.00000	16	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.06130	0.03199	0.06130	1.42	0.00857	0.00447	0.00857	47	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.07986	0.03668	0.07986	1.85	0.01116	0.00513	0.01116	28	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	0.80885	3.98085	0.80885	22.33	0.11308	0.55656	0.11308	27	241.86000	8034.80000	120.90000
PIPE INSULATION	TF	0.32911	2.02296	0.32911	9.49	0.04601	0.28283	0.04601	32	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	0.49280	2.44257	0.49280	13.62	0.06422	0.01891	0.06422	19	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"	CT	0.18149	12.38463	0.18149	16.50	0.01507	0.03782	0.01507	19	0.57200	94.05380	0.57200
DRAIN VALVE	CT	0.87698	6.16352	0.87698	26.05	0.11020	0.53913	0.11020	19	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	0.26970	3.81440	0.13485	9.50	0.00000	0.00000	0.00000	14	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	7.33044	235.44903	3.66522	389.97	0.00000	0.00000	0.00000	6	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	6.00744	65.90436	6.00744	202.15	0.15058	4.63528	0.15058	9	2.60000	151.41040	2.60000
PIPE INSULATION	TF	0.40239	2.47338	0.40239	11.60	0.05626	0.34580	0.05626	28	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	2.14529	73.34850	2.14529	122.00	0.18921	0.47226	0.18921	14	4.19900	371.00000	4.19900
CIRCULATION PUMP 5 HP	CT	2.14529	276.01278	1.74932	323.40	0.18921	5.04901	0.18921	14	4.19900	1272.00000	2.09950
COND. RCVR., 10 - 15 GAL.	CT	16.20261	315.91131	15.19797	680.17	1.98436	9.80915	1.98436	19	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T REPAIR AIR CONDITIONER	CT	28.47114	303.55013	28.47114	949.28	3.64000	0.00000	3.64000	39 20	8.38500 20.80000	1855.00000 2592.23000	4.19250 20.80000
A/C DX PACKAGE 20T REPAIR AIR CONDITIONER	CT	68.45418	1056.07021	68.45418	2608.61	9.23000	0.00000	9.23000	39 20	20.41000 20.80000	7950.00000 9018.53300	6.80333 20.80000
A/C DX PACKAGE 50T REPAIR AIR CONDITIONER	CT	87.35540	3191.57860	87.35540	5172.80	11.83000	0.00000	11.83000	39 20	47.71000 23.40000	21200.00000 27255.15460	11.92750 23.40000
A/C WINDOW 1T	CT	12.81320	62.36659	12.81320	352.97	1.69350	0.04244	1.69350	20	5.98000	530.00000	5.98000
A/C WINDOW 2T	CT	12.87410	87.19179	12.87410	379.18	1.69350	0.04244	1.69350	20	6.50000	742.00000	6.50000
A/C PAD MTD. 4T	CT	35.73947	175.29435	35.35890	984.65	4.89029	0.21222	4.89029	20	6.50000	1484.00000	3.25000
A/C PAD MOUNTED 20 TON REPAIR AIR CONDITIONER	CT	67.45848	1023.96000	65.70594	2548.31	9.06379	0.00000	9.06379	19 20	20.41000 20.80000	7950.00000 9018.53300	6.80333 20.80000
CHILLER-AIR COOL RECIP.20T REPAIR HERMETIC CHILLER	CT	163.19109	599.52858	81.59555	4039.60	22.49000	0.00000	11.24500	39 20	28.60000 19.89000	10759.00000 5119.80000	7.15000 9.94500
CHILLER AIR COOL REC.50T	CT	202.79232	1334.35450	100.91663	5607.68	28.35225	186.55517	14.10908	39	40.30000	19080.00000	10.07500
CHILLER AIR COOL REC.100T REPAIR HERMETIC CHILLER	CT	202.79232	3432.08390	100.67687	7704.64	27.95000	0.00000	13.97500	39 20	72.80000 24.57000	40280.00000 29309.00000	18.20000 14250
CHILLER-AIR COOL RECIP. 5T REPAIR HERMETIC CHILLER	CT	88.80405	234.59814	88.80405	2248.67	12.09000	0.00000	12.09000	39 20	15.60000 19.89000	3710.00000 2003.40000	5.20000 19.89000
CHILLER AIR COOL REC. 10T REPAIR HERMETIC CHILLER	CT	128.40528	454.30116	64.20264	3161.08	17.55000	0.00000	8.77500	39 20	20.80000 24.57000	6360.00000 3879.60000	6.93333 12.28500
CHILLER AIR COOL REC. 15T	CT	165.59880	1061.89793	82.79940	4552.72	22.75000	0.00000	11.37500	39	28.60000	8268.00000	7.15000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 5	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
REPAIR HERMETIC CHILLER									20	24.57000	9068.30000	12.28500
CHILLER WAT.COOL REC.20T	CT	163.95471	559.56001	81.97736	4015.73	22.75000	0.00000	11.37500	39	29.90000	9540.00000	7.47500
REPAIR HERMETIC CHILLER									20	10.53000	4778.48000	5.26500
CHILLER WAT.COOL REC.50T	CT	164.83765	1315.73560	82.06616	4789.38	22.75000	0.00000	11.37500	39	48.10000	15900.00000	12.02500
REPAIR HERMETIC CHILLER									20	18.07000	11236.00000	6.02333
CHILLER WAT.COOL REC.100T	CT	164.83765	3401.05240	81.88982	6874.14	22.75000	0.00000	11.37500	39	74.10000	27030.00000	18.52500
REPAIR HERMETIC CHILLER									20	18.07000	29044.00000	4.51750
CHILLER WAT. COOL REC. 10T	CT	145.35795	397.20320	72.67898	3461.35	20.15000	0.00000	10.07500	39	20.80000	5300.00000	5.20000
REPAIR HERMETIC CHILLER									20	10.53000	3392.00000	5.26500
CHILLER WAT.COOL REC.200T	CT	164.83765	5163.64160	81.88982	8636.73	22.75000	0.00000	11.37500	39	74.10000	53000.00000	18.52500
REPAIR HERMETIC CHILLER									20	18.07000	44096.00000	4.51750
CHILL. HERMETIC CENT. 100T	CT	239.07246	2614.96244	119.53623	7654.61	33.15000	0.00000	16.57500	39	62.40000	37789.00000	15.60000
REPAIR CHILLER									20	16.77000	22331.02000	8.38500
CHILL. HERMETIC CENT. 300T	CT	239.01157	7795.23693	119.50578	12833.60	33.15000	0.00000	16.57500	39	97.50000	61771.50000	24.37500
REPAIR CHILLER									20	16.25000	66569.06000	8.12500
CHILL. HERMETIC CENT. 900T	CT	239.07246	23336.06038	119.53623	28375.71	33.15000	0.00000	16.57500	39	162.50000	127200.00000	40.62500
REPAIR CHILLER									20	16.77000	199283.18000	8.38500
CHILL. OPEN CENT. 300T	CT	621.64566	7795.23693	310.82283	20899.53	86.45000	0.00000	43.22500	39	97.50000	61771.50000	24.37500
REPAIR CHILLER									20	28.21000	66569.06000	14.10500
CHILL. OPEN CENT. 900T	CT	239.07246	23336.06038	119.53623	28375.71	33.15000	0.00000	16.57500	39	162.50000	127200.00000	40.62500
REPAIR CHILLER									20	16.77000	199283.18000	8.38500
CHILL.DBL.BNDL. HERM.100T	C	276.26598	2645.99394	138.13299	8469.68	38.35000	0.00000	19.17500	39	68.90000	41340.00000	17.22500
REPAIR CHILLER									20	16.77000	22596.02000	8.38500
CHILL.DBL.BNDL. HERM.300T	CT	278.21452	11202.49563	139.10726	17067.26	38.35000	0.00000	19.17500	39	107.90000	67840.00000	26.97500
REPAIR CHILLER									20	33.41000	95666.06000	16.70500
CHILL.DBL.BNDL. HERM.900T	CT	282.00505	23391.91708	141.00252	29336.58	38.35000	0.00000	19.17500	39	178.10000	139920.00000	44.52500
REPAIR CHILLER									20	65.78000	199760.18000	32.89000
CHILL. ONE STG. ABS. 100T	CT	814.61297	893.70720	407.30648	18065.75	113.75000	0.00000	56.87500	39	65.00000	37100.00000	16.25000
REPAIR CHILLER									20	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 300T	CT	120.95382	893.70720	60.47691	3443.41	16.77000	0.00000	8.38500	39	104.00000	61480.00000	26.00000
REPAIR CHILLER									20	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 900T	CT	120.95382	893.70720	60.47691	3443.41	16.77000	0.00000	8.38500	39	167.70000	113420.00000	41.92500
REPAIR CHILLER									20	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 300T	CT	120.95382	893.70720	60.47691	3443.41	16.77000	0.00000	8.38500	39	114.40000	67840.00000	28.60000
REPAIR CHILLER									20	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 900T	CT	112.58528	893.70720	56.29264	3267.00	15.74047	124.94858	7.87023	39	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 5T	CT	17.49823	54.36719	17.49823	451.23	2.44642	7.60104	2.44642	29	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 20T	CT	17.49823	65.29028	8.74912	434.15	2.44642	9.12819	1.22321	29	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 50T	CT	30.51597	76.21336	15.25798	719.49	4.26642	10.65534	2.13321	29	31.20000	5294.70000	7.80000
AIR COOLED CONDENSER 100T	CT	30.51597	304.10870	15.25798	947.39	4.26642	42.51722	2.13321	29	46.80000	10578.80000	11.70000
COOLING TOWER 50T	CT	33.15325	141.62777	16.57653	840.50	4.63513	19.80088	2.31757	29	46.80000	4478.50000	11.70000
COOLING TOWER 100T	CT	101.96126	141.62777	50.98063	2290.97	14.25513	19.80088	7.12757	29	52.00000	10070.00000	13.00000
COOLING TOWER 300T	CT	118.69835	294.30275	59.34917	2796.46	16.59513	41.14626	8.29757	29	78.00000	16377.00000	19.50000
COOLING TOWER 900T	CT	128.92656	294.30275	64.46328	3012.07	18.02513	41.14626	9.01257	29	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 20T	CT	60.91015	93.03244	30.45507	1377.02	8.51581	13.00680	4.25790	29	36.40000	3688.80000	9.10000
EVAPORATIVE CONDENSER 100T	CT	99.03351	150.65793	49.51675	2238.28	13.84581	21.06338	6.92290	29	100.10000	10038.20000	25.02500
EVAPORATIVE CONDENSER 300T	CT	23.71663	265.59861	11.85831	765.55	3.31581	37.13316	1.65790	29	182.00000	31800.00000	45.50000
EXPANSION TANK	CT	0.04643	0.00000	0.04643	1.05	0.00649	0.00000	0.00649	47	3.47100	135.68000	1.73550
REFRIG. FAN COIL 1T	CT	4.83187	6.20630	4.83187	115.79	0.67554	0.86770	0.67554	29	2.60000	855.42000	1.30000
REFRIG. FAN COIL 3T	CT	4.83187	10.92309	4.83187	120.51	0.67554	1.52715	0.67554	29	2.86000	1051.52000	1.43000
REFRIG. FAN COIL 5T	CT	4.83187	22.96331	4.83187	132.55	0.67554	3.21048	0.67554	29	3.25000	1240.20000	1.62500
DIST. PIPING SYSTEM												
PIPE/FITTINGS ST.& C.I.	TF	0.14060	0.07337	0.14060	3.26	0.01966	0.01026	0.01966	28	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.77105	6.59549	0.41357	22.94	0.00784	0.00360	0.00784	19	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	18.53250	609.62896	9.74307	1001.82	0.13333	0.65602	0.13333	24	241.80000	8321.00000	120.90000
GATE VALVE, 3/8" - 1 1/2"	CT	0.19617	2.44257	0.19617	6.89	0.01502	0.01891	0.01502	19	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.18149	12.38463	0.18149	16.50	0.01507	0.03782	0.01507	19	0.57200	94.05380	0.57200
DRAIN VALVE	CT	0.87698	6.16352	0.87698	26.05	0.11020	0.53913	0.11020	19	0.68900	17.91400	0.68900

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
Zone: 5		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
PIPE INSULATION	TF	0.40239	2.34719	0.40239	11.47	0.05626	0.32816	0.05626	28	91.00000	901.00000	91.00000
CIRCULATOR PUMP, < 1 HP	CT	2.12867	73.34850	2.12867	121.63	0.18689	0.47226	0.18689	14	4.19900	371.00000	4.19900
5 TON CHILLER ACH RECIP	CT	4.29551	276.01278	2.82443	368.73	0.18921	5.04901	0.18921	14	15.60000	1272.00000	7.80000
HEAT/COOL GENERATION EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	57.24498	1618.81444	33.69613	2841.77	7.04358	68.18356	4.47108	15	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	58.47088	2114.41714	34.00261	3362.24	7.04358	83.33405	4.47108	15	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	67.31634	3961.05103	38.15305	5414.46	7.42330	151.59078	4.83711	15	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	75.67144	6385.16033	42.27880	7994.53	7.80302	172.70981	5.21683	15	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	51.12377	383.14377	32.63567	1487.36	7.17554	53.56706	4.56277	29	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	56.33966	1618.81444	33.24347	2822.69	6.91701	68.18356	4.40780	15	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	57.56556	2115.00769	33.54995	3343.74	6.91701	83.41661	4.40780	15	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	66.41102	3966.87790	37.70039	5381.21	7.29673	149.60924	4.77383	15	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	74.76612	6385.16033	41.82614	7975.45	7.67644	172.70981	5.15354	15	105.30000	27305.60000	26.32500
3 DK.MULTI ZONE 6500 CFM	CT	56.50944	1618.80645	33.51225	2826.85	7.04358	68.18244	4.47108	15	32.50000	5997.48000	8.12500
3 DK.MULTI ZONE 10,000 CFM	CT	58.47088	2115.00769	34.00261	3362.83	7.04358	83.41661	4.47108	15	42.90000	8050.70000	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	67.31634	3810.53053	38.25094	5244.26	7.42330	127.75042	4.85080	15	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	75.67144	6246.52937	42.37669	7856.21	7.80302	153.32791	5.23052	15	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	56.83002	1727.16891	26.57616	2919.26	6.91701	68.18356	3.45851	15	39.00000	6572.00000	9.75000
D.D. VARI.VOL.10000 CFM	CT	58.30110	2275.94007	26.94393	3497.87	6.91701	83.41661	3.45851	15	46.80000	8904.00000	11.70000
D.D. VARI.VOL.25000 CFM	CT	67.88210	4265.70201	30.01817	5684.10	7.29673	149.18296	3.64836	15	83.20000	16960.00000	20.80000
D.D. VARI.VOL.50000 CFM	CT	76.72756	6809.96862	32.90853	8409.93	7.67644	169.49370	3.83822	15	115.70000	29680.00000	28.92500
D.D. VARI.VOL. 100,000CFM	CT	55.97296	2071.72757	27.94081	3251.49	7.82554	289.66678	3.90638	29	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CF	CT	55.60412	1618.81444	50.71333	2834.27	6.91701	68.18356	6.87595	15	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000	CT	57.56556	2115.00769	33.54995	3343.74	6.91701	83.41661	4.40780	15	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000	CT	55.54718	3579.47894	26.93444	4747.73	5.77786	95.44726	3.26865	15	75.40000	15359.40000	18.85000
VARIABLE VOLUME 50000 CFM	CT	74.76612	6385.16033	41.92403	7975.76	7.67644	172.70981	5.16723	15	105.30000	27305.60000	26.32500
TERM. REHEAT 6500 CFM	CT	54.61446	1154.89648	32.86232	2323.95	6.92723	68.19423	4.41736	16	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	55.42514	1560.99498	33.06499	2746.48	6.92723	83.49882	4.41736	16	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	63.42327	3451.02031	37.11106	4805.26	7.30873	149.55543	4.79886	16	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	72.63742	4793.18177	41.46113	6340.83	7.69023	172.00816	5.18036	16	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	54.61446	1154.89648	32.86232	2323.95	6.92723	68.19423	4.41736	16	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	55.42514	1560.99498	33.06499	2746.48	6.92723	83.49882	4.41736	16	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	63.42327	3451.02031	37.11106	4805.26	7.30873	149.55543	4.79886	16	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	72.63742	4793.18177	41.46113	6340.83	7.69023	172.00816	5.18036	16	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	50.88611	501.58966	32.41684	1596.58	7.11435	70.12690	4.53218	29	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	50.39393	606.95721	32.17075	1691.58	7.04554	84.85826	4.49777	29	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	53.18344	1084.78691	34.96026	2232.67	7.43554	151.66330	4.88777	29	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	55.97296	1240.20217	37.74978	2451.35	7.82554	173.39180	5.27777	29	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	7.62138	51.69684	7.62138	224.55	1.06554	7.22770	1.06554	29	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	7.62138	51.69684	7.62138	224.55	1.06554	7.22770	1.06554	29	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	7.62138	51.69684	7.62138	224.55	1.06554	7.22770	1.06554	29	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	7.62138	51.69684	7.62138	224.55	1.06554	7.22770	1.06554	29	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	7.62138	51.69684	7.62138	224.55	1.06554	7.22770	1.06554	29	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	7.62138	51.69684	7.62138	224.55	1.06554	7.22770	1.06554	29	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	7.62138	51.69684	7.62138	224.55	1.06554	7.22770	1.06554	29	3.12000	827.86000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	7.62138	51.69684	7.62138	224.55	1.06554	7.22770	1.06554	29	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	13.13952	17.57893	13.13952	315.58	1.83703	2.45770	1.83703	29	2.60000	1590.00000	1.30000
UNIT VENT 1200 CFM	CT	13.13952	17.57893	13.13952	315.58	1.83703	2.45770	1.83703	29	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	50.39393	495.05049	32.17075	1579.67	7.04554	69.21266	4.49777	29	32.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	50.39393	606.95721	32.17075	1691.58	7.04554	84.85826	4.49777	29	37.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	53.18344	1084.78691	34.96026	2232.67	7.43554	151.66330	4.88777	29	71.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	55.97296	1240.20217	37.74978	2451.35	7.82554	173.39180	5.27777	29	113.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	50.80678	318.06931	50.19877	1468.42	6.93325	16.74419	6.93325	16	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	50.39393	383.14377	32.17075	1467.76	7.04554	53.56706	4.49777	29	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	13.13952	17.57893	13.13952	315.58	1.83703	2.45770	1.83703	29	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	13.13952	17.57893	13.13952	315.58	1.83703	2.45770	1.83703	29	3.25000	461.10000	1.62500
UNIT HEATER 4000 CFM	CT	13.13952	26.26775	13.13952	324.27	1.83703	3.67248	1.83703	29	3.25000	828.92000	1.62500

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE) PAGE 40

COMPONENT DESCRIPTION Zone: 5	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks			
		labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
UNIT HEATER 8000 CFM	CT	13.13952	29.99153	13.13952	328.00	1.83703	4.19310	1.83703	29	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50MBH	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	29	2.60000	445.20000	1.30000
HEAT PUMP 5T	CT	28.77560	562.34912	28.77560	1214.98	4.02310	78.62164	4.02310	39	8.38500	2994.50000	4.19250
HEAT PUMP 10T	CT	68.75864	1064.21536	68.75864	2623.66	9.61310	148.78720	9.61310	39	14.30000	5989.00000	4.76667
HEAT PUMP 25T	CT	87.35540	2781.25032	87.35540	4762.47	12.21310	388.84466	12.21310	39	19.50000	17755.00000	4.87500
HEAT PUMP 1T	CT	31.62890	228.81736	31.30465	945.12	4.33135	11.16603	4.33135	19	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	18.57786	5.85671	9.28893	397.48	2.57357	0.00000	1.28679	24	2.34000	80.56000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	33.70344	430.68430	31.81584	1189.04	4.36018	21.62413	4.36018	22	26.00000	2851.40000	6.50000
IND DRAFT FAN 10000 CFM	CT	34.13431	444.26741	32.03127	1211.70	4.42042	22.46161	4.39030	22	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	2.83063	9.61021	2.83063	73.81	0.33722	0.59478	0.33722	19	3.25000	41.58380	3.25000
EXHAUST FAN, 1000 CFM	CT	10.07102	41.34397	9.76656	268.78	1.32289	0.92116	1.32289	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	34.86792	393.06319	32.11936	1175.07	4.40667	22.44722	4.37354	19	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	34.86792	1018.89983	16.59676	1751.24	4.40667	68.39068	2.20333	19	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	35.70512	1201.56539	32.32866	2000.55	4.40667	70.66181	4.37354	19	32.50000	5406.00000	8.12500
EXHAUST FAN, 5000 CFM	CT	11.36785	197.74273	10.25700	452.01	1.33393	0.92116	1.30632	19	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM.	CT	2.32460	0.00000	2.32460	52.72	0.32500	0.00000	0.32500	39	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	1.41869	19.33472	0.70935	49.24	0.00000	0.00000	0.00000	16	9.10000	124.02000	4.55000
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
ROOM HUMIDIFIER,FLOOR TYPE	CT	4.71982	40.29966	4.71982	147.35	0.04132	0.50544	0.04132	9	0.26000	169.60000	0.26000
CONTROLS/INSTRUMENT.												
DEVICES												
THERMOSTATS/PNEUMATICS	CT	9.23749	21.92438	9.23749	231.43	1.27872	0.00000	1.27872	20	0.78000	187.22780	0.78000
HUMIDITY SENSOR	CT	9.23749	11.74108	9.23749	221.25	1.27872	0.00000	1.27872	20	0.78000	100.26540	0.78000
FLOW SENSOR	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	29	0.78000	100.04280	0.78000
RADIATION SENSOR	CT	9.23749	9.03017	9.23749	218.54	1.27872	0.00000	1.27872	19	0.78000	77.11500	0.78000
WIND VELOCITY SENSOR	CT	9.07951	19.16231	9.07951	225.09	0.00000	0.00000	0.00000	10	1.56000	91.05400	1.56000
PRESSURE SENSOR	CT	9.23749	6.82693	9.23749	216.33	1.27872	0.00000	1.27872	19	0.78000	58.30000	0.78000
DAMPER CONTROLLER/ELECT.	CT	9.54356	54.16724	9.54356	270.62	1.26572	0.00000	1.26572	15	2.60000	287.20700	2.60000
SIMPLEX AIR COMPR.,1 HP	CT	30.91580	474.23693	20.65809	1142.58	4.28492	4.26258	2.86950	24	3.67900	6103.82980	1.83950

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 6	UM	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.06689	16.90647	0.06689	18.42	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	3.55750	6.38758	1.77875	81.38	0.49737	0.89304	0.24869	75	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.18420	3.95910	0.18420	8.14	0.01821	0.00000	0.01821	14	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.25973	67.08475	0.19499	72.77	0.01821	0.00000	0.01821	14	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	2.60000	164.30000	1.30000
OIL FILTER	CT	0.74387	24.26162	0.74387	41.13	0.10400	3.39200	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.38525	72.61371	0.38525	81.35	0.03258	0.00000	0.03258	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	4.76330	82.25412	2.42050	182.79	0.10174	0.18721	0.05630	25	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITNGS,STEEL/IRON	TF	3.55750	6.38758	1.77875	81.38	0.49737	0.89304	0.24869	75	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	7.27105	6.90435	7.27105	171.81	1.01656	0.96529	1.01656	30	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	7.33690	33.58114	6.72395	198.02	0.85438	0.80989	0.85438	15	6.50000	147.34000	3.25000
STEAM REG. VALVE 2"	CT	7.15728	229.88725	3.57864	380.75	0.00000	0.00000	0.00000	6	7.80000	253.53100	3.90000
COND. METER,<300 #/HR.	CT	4.75046	118.25031	4.75046	225.99	0.66416	16.53249	0.66416	30	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	50	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	50	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	0.60892	27.18359	0.30446	40.02	0.00000	0.00000	0.00000	20	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	0.60892	30.72119	0.30446	43.56	0.00000	0.00000	0.00000	20	5.20000	262.35000	2.60000
SOLAR												
EQUIPMENT												
SOLAR PANEL, 3' X 8'	CT	0.73554	65.97228	0.36777	81.48	0.00000	0.00000	0.00000	15	3.90000	349.80000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	1.82676	256.94082	0.91338	295.45	0.00000	0.00000	0.00000	20	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.16964	0.79935	0.14522	4.57	0.02372	0.11176	0.02039	30	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	275.04489	229.23555	275.04489	6467.25	38.45383	32.04926	38.45383	30	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	308.13506	442.95165	308.13506	7431.45	43.08015	61.92876	43.08015	30	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	317.56199	2616.91611	317.56199	9819.22	44.39812	365.86921	44.39812	30	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR REPAIR BOILER	CT	866.77308	17377.64000	530.43922	35959.79	103.98614	0.00000	69.86114	30	20800.000	636000.00000	4160.0000
									20	1050.4000	148400.00000	262.60000
BOILER COAL 100,000 KBTU/H REPAIR BOILER	CT	1049.1784	32409.29860	613.93147	54811.88	125.17614	0.00000	80.45614	30	41600.000	1590000.00000	8320.0000
									20	1313.7800	276766.00000	328.44500
BOILER OIL 250 KBTU/HR	CT	314.98220	159.84730	314.98220	7303.64	44.03744	22.34814	44.03744	30	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	349.17085	159.84730	349.17085	8079.04	48.81733	22.34814	48.81733	30	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	384.50469	178.27570	384.50469	8898.84	53.75733	24.92460	53.75733	30	248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	318.67706	274.43843	318.67706	7502.03	44.55402	38.36904	44.55402	30	184.60000	18689.92000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	332.90481	4944.46832	332.90481	12494.75	46.54319	691.28265	46.54319	30	651.30000	71020.00000	162.82500
BOILR.PNEUMAT.COAL SPREAD.	CT	1449.8737	2490.70426	1400.9029	35217.13	194.28090	88.16157	193.75302	12	182.00000	5618.00000	45.50000
ASH HANDLING SYSTEM	CT	3491.6943	25371.68152	2576.8530	101635.82	317.90598	76.40320	317.70168	20	10400.000	212000.00000	2600.0000
FUEL OIL EQUIPMENT	CT	5.83940	58.97151	2.91970	182.07	0.74785	0.27898	0.37392	15	2.60000	302.10000	1.30000
CHEMICAL FEED SYSTEM	CT	5.13955	73.36917	4.83308	188.95	0.63286	0.00000	0.63286	15	3.25000	389.02000	1.62500
FEED-WATER SUPPLY	CT	141.19196	519.78160	137.59599	3710.51	18.98582	0.00000	18.98582	15	28.60000	2756.00000	9.53333
DEAERATOR	CT	167.83572	2482.52000	76.30636	5996.14	19.20836	0.00000	9.60418	20	260.00000	21200.00000	65.00000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 6	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
BLOWOFF SYSTEM	CT	0.49036	27.78832	0.24518	38.13	0.00000	0.00000	0.00000	15	2.60000	147.34000	1.30000
HOUSE FURN.GAS 25KBTU/HR	CT	31.27935	184.70341	30.29863	690.98	4.09892	16.45997	4.09892	15	10.40000	355.10000	5.20000
HOUSE FURN.GAS 100KBTU/HR	CT	33.26037	229.84139	31.29893	977.91	4.10165	19.69616	4.10165	15	20.80000	471.70000	10.40000
HOUSE FURN.GAS 200KBTU/HR	CT	33.26037	508.46716	31.29893	1256.54	4.10165	23.99249	4.10165	15	20.80000	1786.10000	10.40000
HOUSE FURN.OIL 25KBTU/HR	CT	40.35213	327.15151	39.37141	1239.20	5.36738	23.37873	5.36738	15	10.40000	848.00000	5.20000
HOUSE FURN.OIL 100KBTU/HR	CT	42.31357	438.59648	40.35213	1391.99	5.36738	25.49900	5.36738	15	20.80000	1358.49600	10.40000
HOUSE FURN.OIL 200KBTU/HR	CT	42.31357	514.38673	40.35213	1467.78	5.36738	29.85112	5.36738	15	20.80000	1595.30000	10.40000
HOUSE FURN.ELECT 25KBTU/HR	CT	17.15643	193.17037	16.17571	579.14	2.12440	11.15930	2.12440	15	10.40000	601.02000	5.20000
HOUSE FURN.ELECT.100KBTU	CT	19.11787	256.62839	17.15643	683.94	2.12440	16.06939	2.12440	15	20.80000	751.27500	10.40000
HOUSE FURN.ELECT.200KBTU/H	CT	19.11787	327.58770	17.15643	754.90	2.12440	20.64470	2.12440	15	20.80000	954.00000	10.40000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	50	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	0.60892	27.18359	0.30446	40.02	0.00000	0.00000	0.00000	20	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	0.60892	30.72119	0.30446	43.56	0.00000	0.00000	0.00000	20	5.20000	262.35000	2.60000
EXPANSION TANK	CT	0.04569	0.00000	0.04569	1.04	0.00639	0.00000	0.00639	50	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	7.27105	6.90435	7.27105	171.81	1.01656	0.96529	1.01656	30	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	7.33690	33.58114	6.72395	198.02	0.85438	0.80989	0.85438	15	6.50000	147.34000	3.25000
STORAGE TANK, DHW	CT	12.58494	17.86789	12.58494	303.29	1.75949	2.49810	1.75949	50	3.59395	346.62000	1.79698
IND. FUR., GAS/OIL 500 MBU	CT	32.27771	419.63439	26.83199	1134.27	4.51272	58.66879	3.75136	30	65.00000	6784.00000	16.25000
IND.FURN.GAS/OIL 2000 MBTU	CT	51.87680	872.43990	51.87680	2049.01	7.25286	121.97521	7.25286	30	184.60000	13780.00000	46.15000
SURGE TANK, 1000 GAL	CT	0.98072	296.87526	0.49036	317.55	0.00000	0.00000	0.00000	15	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.06130	0.03199	0.06130	1.42	0.00857	0.00447	0.00857	50	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.07770	0.03569	0.07770	1.80	0.01086	0.00499	0.01086	30	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	18.53250	588.82222	9.74307	961.01	0.13333	0.65602	0.13333	25	241.80000	8034.80000	120.90000
PIPE INSULATION	TF	0.39597	2.43391	0.39597	11.41	0.05536	0.34028	0.05536	30	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	0.48976	2.23298	0.48976	13.34	0.06422	0.01891	0.06422	20	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"	CT	0.17480	11.28420	0.17480	15.25	0.01507	0.03782	0.01507	20	0.57200	94.05380	0.57200
DRAIN VALVE	CT	0.83496	5.92197	0.83496	24.86	0.10545	0.53466	0.10545	20	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	0.26970	3.81440	0.13485	9.50	0.00000	0.00000	0.00000	15	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	7.15728	229.88725	3.57864	380.76	0.00000	0.00000	0.00000	6	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	6.02609	65.82684	6.02609	202.50	0.76600	4.74828	0.76600	10	1.30000	75.70520	1.30000
PIPE INSULATION	TF	0.39597	2.43391	0.39597	11.41	0.05536	0.34028	0.05536	30	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	2.14529	73.34850	2.14529	122.00	0.18921	0.47226	0.18921	15	4.19900	371.00000	4.19900
CIRCULATION PUMP 5 HP	CT	2.14529	276.01278	1.74932	323.40	0.18921	5.04901	0.18921	15	4.19900	1272.00000	2.09950
COND. RCVR., 10 - 15 GAL.	CT	15.83462	290.78671	14.92124	646.99	1.95843	9.41754	1.95843	20	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T REPAIR AIR CONDITIONER	CT	32.91014	1004.73997	32.41920	1749.57	3.58041	0.00000	3.58041	20	8.38500	1855.00000	4.19250
A/C DX PACKAGE 20T REPAIR AIR CONDITIONER	CT	73.64672	3670.77533	72.05338	5335.98	9.07889	0.00000	9.07889	10	20.80000	2592.23000	20.80000
A/C DX PACKAGE 50T REPAIR AIR CONDITIONER	CT	95.92573	10762.63597	91.73560	12924.82	11.63632	0.00000	11.63632	20	20.41000	7950.00000	6.80333
A/C WINDOW 1T	CT	14.55565	223.97856	14.55565	554.10	1.68312	0.12605	1.68312	10	20.80000	9018.53300	20.80000
A/C WINDOW 2T	CT	14.77451	313.20936	14.77451	648.30	1.68312	0.12605	1.68312	20	47.71000	21200.00000	11.92750
A/C PAD MTD. 4T	CT	36.65254	629.12341	35.28461	1456.03	4.74187	0.63023	4.74187	10	28.40000	27135.14460	23.40000
A/C PAD MOUNTED 20 TON REPAIR AIR CONDITIONER	CT	73.64672	3670.77533	72.05338	5335.98	9.07889	0.00000	9.07889	10	6.50000	530.00000	5.98000
CHILLER-AIR COOL RECIP.20T REPAIR HERMETIC CHILLER	CT	167.62004	2815.27414	82.97275	6346.03	22.12180	0.00000	11.06090	10	6.50000	742.00000	6.50000
CHILLER AIR COOL REC.50T	CT	208.82572	5696.06900	101.98902	10090.36	28.53690	483.99197	14.09407	20	20.41000	1484.00000	3.25000
CHILLER AIR COOL REC.100T REPAIR HERMETIC CHILLER	CT	212.63147	13620.86220	102.31842	18090.34	27.49241	0.00000	13.74621	20	20.80000	7950.00000	6.80333
CHILLER-AIR COOL RECIP. 5T REPAIR HERMETIC CHILLER	CT	92.92854	1043.07392	91.71070	3146.80	11.89207	0.00000	11.89207	10	20.80000	9018.53300	20.80000
CHILLER AIR COOL REC. 10T REPAIR HERMETIC CHILLER	CT	133.37307	1923.37848	66.28059	4733.58	17.26268	0.00000	8.63134	20	28.60000	10759.00000	7.15000
CHILLER AIR COOL REC. 15T	CT	170.87105	3723.13234	84.59826	7322.41	22.37754	0.00000	11.18877	10	19.89000	5119.80000	9.94500
									20	40.30000	19080.00000	10.07500
									20	72.80000	40280.00000	18.20000
									10	24.57000	29309.00000	6.14250
									20	35.60000	3710.00000	5.20000
									10	19.89000	2003.40000	19.89000
									20	20.80000	6360.00000	6.93333
									10	24.57000	3879.60000	12.28500
									20	28.60000	8268.00000	7.15000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 6	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
REPAIR HERMETIC CHILLER									10	24.57000	9068.30000	1..28500
CHILLER WAT.COOL REC.20T	CT	166.75793	2568.83622	82.50364	6081.29	22.37754	0.00000	11.18877	20	29.90000	9540.00000	7.47500
REPAIR HERMETIC CHILLER									10	10.53000	4778.48000	5.26500
CHILLER WAT.COOL REC.50T	CT	171.17980	5275.38680	83.26683	8876.42	22.37754	0.00000	11.18877	20	48.10000	15900.00000	12.02500
REPAIR HERMETIC CHILLER									10	18.07000	11236.00000	6.02333
CHILLER WAT.COOL REC.100T	CT	174.22440	11988.78020	83.57051	15650.10	22.37754	0.00000	11.18877	20	74.10000	27030.00000	18.52500
REPAIR HERMETIC CHILLER									10	18.07000	29044.00000	4.51750
CHILLER WAT. COOL REC. 10T	CT	147.40002	1651.11960	73.09109	4756.35	19.82011	0.00000	9.91006	20	20.80000	5300.00000	5.20000
REPAIR HERMETIC CHILLER									10	10.53000	3392.00000	5.26500
CHILLER WAT.COOL REC.200T	CT	174.22440	19602.66480	83.57051	23263.93	22.37754	0.00000	11.18877	20	74.10000	53000.00000	18.52500
REPAIR HERMETIC CHILLER									10	18.07000	44096.00000	4.51750
CHILL. HERMETIC CENT. 100T	CT	245.62859	11209.25578	120.98754	16381.35	32.60728	0.00000	16.30364	20	62.40000	37789.00000	15.60000
REPAIR CHILLER									10	16.77000	22331.02000	8.38500
CHILL. HERMETIC CENT. 300T	CT	249.58083	27457.12308	121.93610	32709.15	32.60728	0.00000	16.30364	20	97.50000	61771.50000	24.37500
REPAIR CHILLER									10	16.25000	66569.06000	8.12500
CHILL. HERMETIC CENT. 900T	CT	257.35030	75437.35008	123.91796	80847.07	32.60728	0.00000	16.30364	20	162.50000	127200.00000	40.62500
REPAIR CHILLER									10	16.77000	199283.18000	8.38500
CHILL. OPEN CENT. 300T	CT	628.20642	27457.12308	311.24890	40690.58	85.03467	0.00000	42.51733	20	97.50000	61771.50000	24.37500
REPAIR CHILLER									10	28.21000	66569.06000	14.10500
CHILL. OPEN CENT. 900T	CT	257.35030	75437.35008	123.91796	80847.07	32.60728	0.00000	16.30364	20	162.50000	127200.00000	40.62500
REPAIR CHILLER									10	16.77000	199283.18000	8.38500
CHILL.DBL.BNDL. HERM.100T	CT	282.97434	11705.58488	139.47012	17664.23	37.72215	0.00000	18.86107	20	68.90000	41340.00000	17.22500
REPAIR CHILLER									10	16.77000	22596.02000	8.38500
CHILL.DBL.BNDL. HERM.300T	CT	292.59547	37007.41303	143.13946	43165.24	37.72215	0.00000	18.86107	20	107.90000	67840.00000	26.97500
REPAIR CHILLER									10	33.41000	95666.06000	16.70500
CHILL.DBL.BNDL. HERM.900T	CT	310.65090	77071.77468	150.11157	83603.61	37.72215	0.00000	18.86107	20	178.10000	139920.00000	44.52500
REPAIR CHILLER									10	65.78000	199760.18000	32.89000
CHILL. ONE STG. ABS. 100T	CT	810.50623	6663.01160	403.35024	23742.39	111.88772	0.00000	55.94386	20	65.00000	37100.00000	16.25000
REPAIR CHILLER									10	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 300T	CT	132.77034	9517.90960	63.34057	12306.97	16.49545	0.00000	8.24772	20	104.00000	61480.00000	26.00000
REPAIR CHILLER									10	8.58000	7632.00000	4.29000
CHILL. ONE STG. ABS. 900T	CT	140.22961	15600.08360	65.20539	18540.41	16.49545	0.00000	8.24772	20	167.70000	113420.00000	41.92500
REPAIR CHILLER									10	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 300T	CT	133.98818	10262.66560	63.64503	13076.42	16.49545	0.00000	8.24772	20	114.40000	67840.00000	28.60000
REPAIR CHILLER									10	8.58000	7632.00000	4.29000
CHILL. TWO STG. ABS. 900T	CT	133.97706	17052.35780	61.58437	19859.30	15.70903	324.16207	7.85451	20	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 5T	CT	20.45927	329.73632	19.60114	791.01	2.62045	24.43886	2.62045	15	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 20T	CT	22.66589	669.72814	10.67913	1145.43	2.62045	29.34896	1.31022	15	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 50T	CT	37.30181	1243.62168	17.17983	2025.24	4.39246	34.25905	2.19623	15	31.20000	5294.70000	7.80000
AIR COOLED CONDENSER 100T	CT	40.24397	2972.93218	17.91537	3814.21	4.39246	136.70141	2.19623	15	46.80000	10578.80000	11.70000
COOLING TOWER 50T	CT	42.47048	1300.00679	19.02862	2188.22	4.70374	63.66380	2.35187	15	46.80000	4478.50000	11.70000
COOLING TOWER 100T	CT	110.44488	2354.56369	52.77064	4674.90	14.07008	63.66380	7.03504	15	52.00000	10070.00000	13.00000
COOLING TOWER 300T	CT	131.64424	4034.94459	62.14442	6798.24	16.34838	132.29349	8.17419	15	78.00000	16377.00000	19.50000
COOLING TOWER 900T	CT	151.16478	9082.82359	69.51419	12249.96	17.74068	132.29349	8.87034	15	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 20T	CT	69.30846	994.82564	32.93797	2450.36	8.73017	41.81947	4.36509	15	36.40000	3688.80000	9.10000
EVAPORATIVE CONDENSER 100T	CT	118.44040	2377.60001	54.50049	4859.22	13.91963	67.72299	6.95981	15	100.10000	10038.20000	25.02500
EVAPORATIVE CONDENSER 300T	CT	60.55582	6851.43283	21.69661	8100.49	3.66728	119.39055	1.83364	15	182.00000	31800.00000	45.50000
EXPANSION TANK	CT	0.04569	0.00000	0.04569	1.04	0.00639	0.00000	0.00639	50	3.47100	135.68000	1.73550
REFRIG. FAN COIL 1T	CT	5.60430	181.28671	5.35912	307.61	0.71498	2.78982	0.71498	15	2.60000	855.42000	1.30000
REFRIG. FAN COIL 3T	CT	5.65334	233.63659	5.38364	360.79	0.71498	4.91009	0.71498	15	2.86000	1051.52000	1.43000
REFRIG. FAN COIL 5T	CT	5.72689	307.73337	5.42042	436.64	0.71498	10.32235	0.71498	15	3.25000	1240.20000	1.62500
DIST. PIPING SYSTEM												
PIPE/FITTINGS ST.& C.I.	TF	0.13679	0.07138	0.13679	3.17	0.01912	0.00998	0.01912	30	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.70610	5.99871	0.38109	20.97	0.00784	0.00360	0.00784	20	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	18.53250	609.62896	9.74307	1001.82	0.13333	0.65602	0.13333	25	241.80000	8321.00000	120.90000
GATE VALVE, 3/8" - 1 1/2"	CT	0.18811	2.23298	0.18811	6.50	0.01502	0.01891	0.01502	20	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.17480	11.28420	0.17480	15.25	0.01507	0.03782	0.01507	20	0.57200	94.05380	0.57200
DRAIN VALVE	CT	0.83496	5.92197	0.83496	24.86	0.10545	0.53456	0.10545	20	0.68900	17.91400	0.68900

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Cost Tasks			
Zone: 6	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
PIPE INSULATION	TF	0.39597	2.30973	0.39597	11.29	0.05536	0.32292	0.05536	30	91.00000	903.00000	91.00000
CIRCULATOR PUMP, < 1 HP	CT	2.12867	73.34850	2.12867	121.63	0.18689	0.47226	0.18689	15	4.19900	371.00000	4.19900
5 TON CHILLER ACH RECIP	CT	4.29551	276.01278	2.82443	368.73	0.18921	5.04901	0.18921	15	15.60000	1272.00000	7.80000
HEAT/COOL GENERATION EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	57.24498	1618.81444	33.69613	2841.77	7.04358	68.18356	4.47108	15	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	58.47088	2114.41714	34.00261	3362.24	7.04358	83.33405	4.47108	15	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	67.31634	3981.05103	38.15305	5414.46	7.42330	151.59078	4.83711	15	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	75.67144	6385.16033	42.27880	7994.53	7.80302	172.70981	5.21683	15	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	55.28354	1178.39775	33.20577	2361.58	7.04358	52.95050	4.47108	15	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	56.33966	1618.81444	33.24347	2822.69	6.91701	68.18356	4.40780	15	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	57.56556	2115.00769	33.54995	3345.74	6.91701	83.41661	4.40780	15	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	66.41102	3966.87790	37.70039	5381.21	7.29673	149.60924	4.77383	15	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	74.76612	6385.16033	41.82614	7975.45	7.67644	172.70981	5.15354	15	105.30000	27305.60000	26.32500
3 DK.MULTI ZONE 6500 CFM	CT	56.50944	1618.80545	33.51225	2826.85	7.04358	68.18244	4.47108	15	32.50000	5997.48000	8.12500
3 DK.MULTI ZONE 10,000 CFM	CT	58.47088	2115.00769	34.00261	3362.83	7.04358	83.41661	4.47108	15	42.90000	8050.70000	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	67.31634	3910.53053	38.25094	5244.26	7.42330	127.75042	4.85080	15	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	75.67144	6246.52937	42.37669	7856.21	7.80302	153.32791	5.23052	15	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	56.83002	1727.16891	26.57616	2919.26	6.91701	68.18356	3.45851	15	39.00000	6572.00000	9.75000
D.D. VARI.VOL.10000 CFM	CT	58.30110	2275.94007	26.94393	3497.87	6.91701	83.41661	3.45851	15	46.80000	8904.00000	11.70000
D.D. VARI.VOL.25000 CFM	CT	67.88210	4265.70201	30.01017	5684.10	7.29673	149.18296	3.64836	15	83.20000	16960.00000	20.80000
D.D. VARI.VOL.50000 CFM	CT	76.72756	6809.96862	32.90853	8409.93	7.67644	169.49370	3.83822	15	115.70000	29680.00000	28.92500
D.D. VARI.VOL. 100,000CFM	CT	86.77994	11239.94693	35.27479	13043.30	7.67644	285.74378	3.81769	15	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CFM	CT	55.60412	1618.81444	50.71333	2864.27	6.91701	68.18356	6.87595	15	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000 CFM	CT	57.56556	2115.00769	33.54995	3343.74	6.91701	83.41661	4.40780	15	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	55.54718	3579.47894	26.93444	4747.73	5.77786	95.44726	3.26865	15	75.40000	15359.40000	18.85000
VARIABLE VOLUME 50000 CFM	CT	76.76612	6385.16033	41.92403	7975.76	7.67644	172.70981	5.16723	15	105.30000	27305.60000	26.32500
TERM. REHEAT 6500 CFM	CT	55.60412	1294.75060	33.05959	2483.71	6.91701	68.18356	4.40780	15	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	56.58484	1762.55578	33.30477	2971.40	6.91701	83.41661	4.40780	15	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	65.67548	3950.88462	37.61440	5350.61	7.29673	149.60924	4.78751	15	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	76.23720	5545.51313	42.29180	7165.95	7.67644	172.70981	5.16723	15	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	55.60412	1294.75060	33.05959	2483.71	6.91701	68.18356	4.40780	15	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	56.58484	1762.55578	33.30477	2971.40	6.91701	83.41661	4.40780	15	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	65.67548	3950.88462	37.61440	5350.61	7.29673	149.60924	4.78751	15	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	76.23720	5545.51313	42.29180	7165.95	7.67644	172.70981	5.16723	15	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	55.60412	1294.45533	33.05959	2483.41	6.91701	68.14227	4.40780	15	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	56.58484	1762.55578	33.30477	2971.40	6.91701	83.41661	4.40780	15	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	65.67548	3950.88462	37.61440	5350.61	7.29673	149.60924	4.78751	15	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	76.23720	5545.51313	42.29180	7165.95	7.67644	172.70981	5.16723	15	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	8.32026	179.19724	8.07508	367.12	1.09469	8.98212	1.09469	15	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	8.32026	195.19052	8.07508	383.11	1.09469	8.98212	1.09469	15	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	8.36930	206.18590	8.09960	395.14	1.09469	8.98212	1.09469	15	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	8.44285	298.14726	8.13637	488.65	1.09469	8.98212	1.09469	15	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	8.36930	189.59287	8.09960	378.55	1.09469	8.98212	1.09469	15	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	8.36930	352.12458	8.09960	541.08	1.09469	8.98212	1.09469	15	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	8.41833	220.37994	8.12412	410.37	1.09469	8.98212	1.09469	15	3.12000	827.86000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	8.51640	321.53743	8.17315	513.59	1.09469	8.98212	1.09469	15	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	13.55640	330.90126	13.31122	637.58	1.82675	4.33790	1.82675	15	2.60000	1500.00000	1.30000
UNIT VENT 1200 CFM	CT	13.67899	390.87606	13.37252	700.13	1.82675	4.33790	1.82675	15	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	55.60412	1294.75060	33.05959	2483.71	6.91701	68.18356	4.40780	15	32.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	56.58484	1762.55578	33.30477	2971.40	6.91701	83.41661	4.40780	15	37.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	65.67548	3950.88462	37.61440	5350.61	7.29673	149.60924	4.78751	15	71.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	76.23720	5545.51313	42.29180	7165.95	7.67644	172.70981	5.16723	15	113.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	50.94570	360.71146	50.21016	1513.81	6.91701	16.89068	6.91701	15	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	53.08786	1078.43975	32.63052	2232.59	6.91701	52.95050	4.40780	15	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	13.55640	90.00248	13.31122	396.68	1.82675	4.33790	1.82675	15	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	13.67899	117.99072	13.37252	427.25	1.82675	4.33790	1.82675	15	3.25000	461.10000	1.62500
UNIT HEATER 4000 CFM	CT	13.67899	215.29787	13.37252	524.56	1.82675	8.24365	1.82675	15	3.25000	828.92000	1.62500

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION Zone: 6	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
		labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
UNIT HEATER 8000 CFM	CT	13.67899	310.83546	13.37252	620.09	1.82675	9.91755	1.82675	15	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50MBH	CT	9.54356	83.96472	9.29838	299.63	1.26572	0.00000	1.26572	15	2.60000	445.20000	1.30000
HEAT PUMP 5T	CT	33.70002	1809.59414	33.20908	2572.34	4.57430	203.97313	4.57430	20	8.38500	2994.50000	4.19250
HEAT PUMP 10T	CT	73.72112	3462.27370	72.60476	5130.70	10.07278	386.00814	10.07278	20	14.30000	5989.00000	4.76667
HEAT PUMP 25T	CT	92.62234	9294.68563	90.90975	11389.88	12.63022	1008.80451	12.63022	20	19.50000	17755.00000	4.87500
HEAT PUMP 1T	CT	31.62890	228.81736	31.30465	945.12	4.33135	11.16603	4.33135	20	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	18.57786	5.85671	9.28893	397.48	2.57357	0.00000	1.28679	25	2.34000	80.56000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	34.14151	488.12273	31.85806	1255.15	4.34764	21.56192	4.34764	20	26.00000	2851.40000	6.50000
IND DRAFT FAN 10000 CFM	CT	34.61544	503.89675	32.09502	1280.91	4.41390	22.48308	4.38077	20	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	2.74067	9.12368	2.74057	71.28	0.32956	0.59478	0.32996	20	3.25000	41.58380	3.25000
EXHAUST FAN, 1000 CFM	CT	10.07102	41.34397	9.76656	268.73	1.32289	0.92116	1.32289	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	34.61544	372.19906	32.09502	1149.21	4.41390	22.48308	4.38077	20	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	34.61544	971.56809	16.54657	1698.63	4.41390	68.50085	2.20695	20	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	35.37659	1139.10321	32.28531	1931.55	4.41390	70.75198	4.38077	20	32.50000	5406.00000	8.12500
EXHAUST FAN, 5000 CFM	CT	11.36785	197.74273	10.25700	452.01	1.33393	0.92116	1.30632	20	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM	CT	2.96133	98.27451	2.96133	165.44	0.36081	2.45961	0.36081	20	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	1.71626	23.39017	0.85813	59.57	0.00000	0.00000	0.00000	15	9.10000	124.02000	4.55000
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
ROOM HUMIDIFIER,FLOOR TYPE	CT	4.72306	39.27268	4.72306	146.39	0.65268	0.50057	0.65268	10	0.13000	84.80000	0.13000
CONTROLS/INSTRUMENT.												
DEVICES												
THERMOSTATS/PNEUMATICS	CT	9.23749	21.92438	9.23749	231.43	1.27872	0.00000	1.27872	20	0.78000	187.22780	0.78000
HUMIDITY SENSOR	CT	9.07951	42.20171	9.07951	248.13	1.22350	0.00000	1.22350	10	0.78000	100.26540	0.78000
FLOW SENSOR	CT	9.20031	18.86807	9.20031	227.53	1.26572	0.00000	1.26572	15	0.78000	100.04280	0.78000
RADIATION SENSOR	CT	9.23749	9.03017	9.23749	218.54	1.27872	0.00000	1.27872	20	0.78000	77.11500	0.78000
WIND VELOCITY SENSOR	CT	9.07951	19.16231	9.07951	225.09	1.22350	0.00000	1.22350	10	0.78000	45.52700	0.78000
PRESSURE SENSOR	CT	9.23749	6.82693	9.23749	216.33	1.27872	0.00000	1.27872	20	0.78000	58.30000	0.78000
DAMPER CONTROLLER/ELECT.	CT	9.54356	54.16724	9.54356	270.62	1.26572	0.00000	1.26572	15	2.60000	287.20700	2.60000
SIMPLEX AIR COMPR.,1 HP	CT	30.91580	474.23693	20.65809	1142.58	4.28492	4.26258	2.86950	25	3.67900	6103.82980	1.83950

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
Zone: 7	UM	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.06689	16.90647	0.06689	18.42	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	4.00770	7.19592	2.00385	91.68	0.56031	1.00606	0.28016	66	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.21122	5.74308	0.21122	10.53	0.01859	0.00000	0.01859	12	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.32079	97.31330	0.22688	104.29	0.01859	0.00000	0.01859	12	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	26	2.60000	164.30000	1.30000
OIL FILTER	CT	0.74387	24.26162	0.74387	41.13	0.10400	3.39200	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.38525	72.61371	0.38525	81.35	0.03258	0.00000	0.03258	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	6.24780	109.35588	3.16782	241.20	0.12225	0.22614	0.06727	22	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
LPG STORAGE TANK, 1000 GAL	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	26	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITNGS,STEEL/IRON	TF	4.00770	7.19592	2.00385	91.68	0.56031	1.00606	0.28016	66	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	9.55719	75.08720	9.26287	290.90	1.25389	1.19106	1.25389	23	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	9.51412	55.82359	8.43804	268.16	1.02927	0.98416	1.02927	12	6.50000	147.34000	3.25000
STEAM REG. VALVE 2"	CT	9.43332	302.99219	4.71666	501.85	0.00000	0.00000	0.00000	5	7.80000	250.53100	3.90000
COND. METER,<300 #/HR.	CT	4.78732	130.10043	4.78732	238.68	0.66931	18.18925	0.66931	26	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	39	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	39	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	0.89180	39.81201	0.44590	58.61	0.00000	0.00000	0.00000	15	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	0.89180	44.99303	0.44590	63.79	0.00000	0.00000	0.00000	15	5.20000	262.35000	2.60000
SOLAR												
EQUIPMENT												
SOLAR PANEL, 3' X 8'	CT	0.80925	72.58350	0.40463	89.64	0.00000	0.00000	0.00000	13	3.90000	349.80000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	2.21052	310.91814	1.10526	357.52	0.00000	0.00000	0.00000	18	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.14742	0.66145	0.12724	3.94	0.02061	0.09248	0.01779	33	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	278.69517	564.25169	276.09517	6876.74	38.23717	43.43871	38.23717	23	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	320.26446	1802.99832	309.18846	9031.15	42.71125	83.93657	42.71125	23	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	335.08504	6599.69757	320.16364	14151.68	44.06647	495.88927	44.06647	23	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR REPAIR BOILER	CT	2579.5740	76330.60000	871.91386	129370.83	102.82001	0.00000	69.07669	23	20800.000	636000.00000	4160.0000
									15	1050.4000	148400.00000	262.60000
BOILER COAL 100,000 KBTU/H REPAIR BOILER	CT	4438.6121	174665.36900	1290.9404	265260.54	123.77301	0.00000	79.55319	23	41600.000	1590000.00000	8320.0000
									15	1313.7800	276766.00000	328.44500
BOILER OIL 250 KBTU/HR	CT	321.01919	470.20473	317.11919	7738.44	44.15446	30.29007	44.15446	23	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	361.92863	1419.28633	350.85263	9592.38	48.53628	30.29007	48.53628	23	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	401.99448	3294.43008	387.07308	12363.92	53.42103	33.78213	53.42103	23	248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	332.18671	1867.16005	321.11071	9365.71	44.37809	52.00437	44.37809	23	184.60000	18689.92000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	383.69403	12383.19911	344.61603	20960.33	46.35937	936.94588	46.35937	23	651.30000	71020.00000	162.82500
BOILR.PNEUMAT.COAL SPREAD.	CT	1449.9743	3232.03593	1386.1243	35913.13	187.43746	112.08360	186.7663'	9	364.00000	11236.00000	91.00000
ASH HANDLING SYSTEM	CT	4041.2101	37163.15183	2701.3571	124530.27	315.63489	112.56771	315.3336.	15	10400.000	212000.00000	2600.0000
FUEL OIL EQUIPMENT	CT	6.63233	102.59422	3.31616	242.40	0.80690	0.35916	0.40345	12	2.60000	302.10000	1.30000
CHEMICAL FEED SYSTEM	CT	5.51005	128.80452	4.97201	252.05	0.61991	0.00000	0.61991	12	3.25000	389.02000	1.62500
FEED-WATER SUPPLY	CT	142.48871	912.51160	136.17574	4123.95	18.59733	0.00000	18.59733	12	28.60000	2756.00000	9.53333
DEAERATOR	CT	181.01239	3635.80000	79.35870	7415.87	19.07312	0.00000	9.53656	15	260.00000	21200.00000	65.00000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 7	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
CHILL. OPEN CENT. 300T	CT	618.34227	0.00000	309.17114	13034.66	86.45000	0.00000	43.22500	64	97.50000	61771.50000	24.37500
CHILL. OPEN CENT. 900T	CT	237.10869	0.00000	118.55435	4998.25	33.15000	0.00000	16.57500	64	162.50000	127200.00000	40.62500
CHILL.DBL.BNDL. HERM.100T	CT	274.30221	0.00000	137.15111	5782.29	38.35000	0.00000	19.17500	64	68.90000	41140.00000	17.22500
CHILL.DBL.BNDL. HERM.300T	CT	274.30221	0.00000	137.15111	5782.29	38.35000	0.00000	19.17500	64	107.90000	67840.00000	26.97500
CHILL.DBL.BNDL. HERM.900T	CT	274.30221	0.00000	137.15111	5782.29	38.35000	0.00000	19.17500	64	178.10000	139920.00000	44.52500
CHILL. ONE STG. ABS. 100T	CT	813.60825	0.00000	406.80413	17150.86	113.75000	0.00000	56.87500	64	65.00000	37100.00000	16.25000
CHILL. ONE STG. ABS. 300T	CT	119.94910	0.00000	59.97455	2528.53	16.77000	0.00000	8.38500	64	104.00000	61480.00000	26.00000
CHILL. ONE STG. ABS. 900T	CT	119.94910	0.00000	59.97455	2528.53	16.77000	0.00000	8.38500	64	167.70000	113420.00000	41.92500
CHILL. TWO STG. ABS. 300T	CT	119.94910	0.00000	59.97455	2528.53	16.77000	0.00000	8.38500	64	114.40000	67840.00000	28.60000
CHILL. TWO STG. ABS. 900T	CT	111.58056	0.00000	55.79028	2352.12	15.60000	0.00000	7.80000	64	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 5T	CT	16.73708	0.00000	16.73708	379.60	2.34000	0.00000	2.34000	48	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 20T	CT	16.73708	0.00000	8.36854	352.82	2.34000	0.00000	1.17000	48	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 50T	CT	29.75482	0.00000	14.87741	627.23	4.16000	0.00000	2.08000	48	31.20000	5294.70000	7.80000
AIR COOLED CONDENSER 100T	CT	29.75482	0.00000	14.87741	627.23	4.16000	0.00000	2.08000	48	46.80000	10578.80000	11.70000
COOLING TOWER 50T	CT	32.54433	0.00000	16.27217	686.03	4.55000	0.00000	2.27500	48	46.80000	4478.50000	11.70000
COOLING TOWER 100T	CT	101.35234	0.00000	50.67617	2136.51	14.17000	0.00000	7.08500	48	52.00000	10070.00000	13.00000
COOLING TOWER 300T	CT	118.08943	0.00000	59.04471	2489.33	16.51000	0.00000	8.25500	48	78.00000	16377.00000	19.50000
COOLING TOWER 900T	CT	128.31764	0.00000	64.15882	2704.94	17.94000	0.00000	8.97000	48	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 20T	CT	59.50963	0.00000	29.75482	1254.46	8.32000	0.00000	4.16000	48	36.40000	3688.80000	9.10000
EVAPORATIVE CONDENSER 100T	CT	97.63299	0.00000	48.81650	2058.10	13.65000	0.00000	6.82500	48	100.10000	10038.20000	25.02500
EVAPORATIVE CONDENSER 300T	CT	22.31611	0.00000	11.15806	470.42	3.12000	0.00000	1.56000	48	182.00000	31800.00000	45.50000
EXPANSION TANK	CT	0.05949	0.00000	0.05949	1.35	0.00832	0.00000	0.00832	39	3.47100	135.68000	1.73550
REFRIG. FAN COIL 1T	CT	4.64919	0.00000	4.64919	105.44	0.65000	0.00000	0.65000	48	2.60000	855.42000	1.30000
REFRIG. FAN COIL 3T	CT	4.64919	0.00000	4.64919	105.44	0.65000	0.00000	0.65000	48	2.86000	1051.52000	1.43000
REFRIG. FAN COIL 5T	CT	4.64919	0.00000	4.64919	105.44	0.65000	0.00000	0.65000	48	3.25000	1240.20000	1.62500
DIST. PIPING SYSTEM												
PIPE/FITTINGS ST.& C.I.	TF	1.03477	3.39863	0.60499	25.49	0.02450	0.01278	0.02450	23	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	1.03462	8.78569	0.55863	30.73	0.01155	0.00531	0.01155	15	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	0.80885	3.98085	0.80885	22.33	0.11308	0.55656	0.11308	27	241.80000	8321.00000	120.90000
GATE VALVE, 3/8" - 1 1/2"	CT	0.27643	3.27152	0.27643	9.54	0.02213	0.02786	0.02213	15	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.25695	16.52877	0.25695	22.36	0.02221	0.05572	0.02221	15	0.57200	94.05380	0.57200
DRAIN VALVE	CT	1.07104	8.13252	1.07104	32.42	0.13322	0.70747	0.13322	15	0.68900	17.91400	0.68900
PIPE INSULATION	TF	7.76858	74.92995	7.76858	251.12	0.06831	0.39645	0.06831	23	91.00000	901.00000	91.00000
CIRCULATOR PUMP, < 1 HP	CT	2.83547	126.49060	2.83547	190.80	0.20205	0.51065	0.20205	12	4.19900	371.00000	4.19900
5 TON CHILLER ACH RECIP	CT	6.63053	464.59143	4.04795	606.71	0.20487	6.07223	0.20487	12	15.60000	1272.00000	7.80000
HEAT/COOL GENERATION EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	56.13204	1422.77322	33.46911	2623.33	7.05440	68.19423	4.48095	16	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	57.14539	1851.74446	33.72245	3072.85	7.05440	83.41587	4.48095	16	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	64.94085	3478.48032	37.64604	4864.00	7.43590	151.54627	4.85241	16	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	72.33097	5487.24857	41.54010	7029.18	7.81740	172.00816	5.23391	16	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	51.14109	380.60415	32.54433	1480.97	7.15000	53.21200	4.55000	48	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	55.22247	1422.77322	33.01433	2604.15	6.92723	68.19423	4.41736	16	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	56.23582	1852.33778	33.26766	3054.27	6.92723	83.49882	4.41736	16	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	64.03128	3464.24063	37.19125	4830.58	7.30873	149.55543	4.78882	16	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	71.42140	5487.24857	41.08532	7010.01	7.69023	172.00816	5.17032	16	105.30000	27305.60000	26.32500
3 DK.MULTI ZONE 6500 CFM	CT	55.52403	1422.76736	33.31711	2610.99	7.05440	68.19342	4.48095	16	32.50000	5997.48000	8.12500
3 DK.MULTI ZONE 10,000 CFM	CT	57.14539	1852.33778	33.72245	3073.44	7.05440	83.49882	4.48095	16	42.90000	8050.70000	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	64.94085	3307.15912	37.71785	4692.90	7.43590	127.59397	4.86245	16	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	72.33097	5347.96667	41.61191	6890.13	7.81740	152.53525	5.24395	16	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	55.62781	1512.34089	26.29388	2680.11	6.92723	68.19423	3.46362	16	39.00000	6572.00000	9.75000
D.D. VARI.VOL.10000 CFM	CT	56.84383	1985.36725	26.59788	3177.80	6.92723	83.49882	3.46362	16	46.80000	8904.00000	11.70000
D.D. VARI.VOL.25000 CFM	CT	65.24730	3711.53740	29.38093	5076.57	7.30873	149.24271	3.65436	16	83.20000	16960.00000	20.80000
D.D. VARI.VOL.50000 CFM	CT	73.04276	5840.54216	32.01197	7365.85	7.69023	169.64882	3.84511	16	115.70000	29680.00000	28.92500
D.D. VARI.VOL. 100,000CFM	CT	55.79028	2059.81147	27.89514	3235.87	7.80000	287.98080	3.90000	48	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CFM	CT	54.61446	1422.77322	50.59896	2648.58	6.92723	68.19423	6.89711	16	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000 CFM	CT	56.23582	1852.33778	33.26766	3054.27	6.92723	83.49882	4.41736	16	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	53.11643	3075.02261	26.34821	4194.04	5.78273	95.13913	3.27287	16	75.40000	15359.40000	18.85000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 7	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
VARIABLE VOLUME 50000 CFM	CT	71.42140	5487.24857	41.15713	7010.24	7.69023	172.00816	5.18036	16	105.30000	27305.60000	26.32500
TERM. REHEAT o500 CFM	CT	56.15698	1375.31757	33.16403	2575.38	6.90843	68.14018	4.40093	13	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	57.23598	1878.78808	33.43378	3100.73	6.90843	83.33189	4.40093	13	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	66.95807	4239.14662	37.89574	5664.76	7.28712	149.54941	4.77962	13	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	78.29866	5979.04606	42.76233	7641.14	7.66580	172.93349	5.15830	13	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	56.15698	1375.31757	33.16403	2575.38	6.90843	68.14018	4.40093	13	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	57.23598	1878.78808	33.43378	3100.73	6.90843	83.33189	4.40093	13	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	66.95807	4239.14662	37.89574	5664.76	7.28712	149.54941	4.77962	13	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	78.29866	5979.04606	42.76233	7641.14	7.66580	172.93349	5.15830	13	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	51.17705	505.63439	32.56231	1606.76	7.15503	70.69239	4.55251	48	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	50.21125	604.41759	32.07941	1685.19	7.02000	84.50320	4.48500	48	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	53.00077	1078.58061	34.86893	2222.62	7.41000	150.79560	4.87500	48	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	55.79028	1227.78957	37.65844	2435.09	7.80000	171.65640	5.26500	48	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	48	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	48	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	48	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	48	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	48	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	48	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	48	3.12000	827.86000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	48	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	48	2.60000	1590.00000	1.30000
UNIT VENT 1200 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	48	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	50.21125	492.51087	32.07941	1573.28	7.02000	68.85760	4.48500	48	32.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	50.21125	604.41759	32.07941	1685.19	7.02000	84.50320	4.48500	48	37.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	53.00077	1078.58061	34.86893	2222.62	7.41000	150.79560	4.87500	48	71.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	55.79028	1227.78957	37.65844	2435.09	7.80000	171.65640	5.26500	48	113.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	50.91739	383.84796	50.10814	1536.06	6.89244	16.76425	6.89244	13	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	50.21125	380.60415	32.07941	1461.37	7.02000	53.21200	4.48500	48	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	48	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	48	3.25000	461.10000	1.62500
UNIT HEATER 4000 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	48	3.25000	828.92000	1.62500
UNIT HEATER 8000 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	48	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50MBH	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	48	2.60000	445.20000	1.30000
HEAT PUMP 5T	CT	26.03546	0.00000	26.03546	590.48	3.64000	0.00000	3.64000	64	8.38500	2994.50000	4.19250
HEAT PUMP 10T	CT	66.01850	0.00000	66.01850	1497.30	9.23000	0.00000	9.23000	64	14.30000	5989.00000	4.76667
HEAT PUMP 25T	CT	84.61526	0.00000	84.61526	1919.07	11.83000	0.00000	11.83000	64	19.50000	17755.00000	4.87500
HEAT PUMP 1T	CT	31.10241	195.73998	30.83437	900.28	4.27346	10.15161	4.27346	22	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	18.59676	0.00000	9.29838	392.02	2.60000	0.00000	1.30000	27	2.34000	80.56000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	34.67238	557.72792	31.90923	1335.26	4.33244	21.48653	4.33244	18	26.00000	2851.40000	6.50000
IND DRAFT FAN 10000 CFM	CT	35.19373	576.09086	32.16990	1364.61	4.40533	22.49986	4.36888	18	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	3.45437	12.79563	3.45437	91.14	0.40503	0.79188	0.40503	15	3.25000	41.58380	3.25000
EXHAUST FAN, 1000 CFM	CT	10.07102	41.34397	9.76656	268.78	1.32289	0.92116	1.32289	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	36.01372	472.32704	32.32034	1277.30	4.41164	22.75238	4.36283	15	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	36.01372	1199.26184	16.89211	1954.86	4.41164	69.05414	2.20582	15	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	37.12847	1444.76844	32.59903	2272.35	4.41164	72.37081	4.36283	15	32.50000	5406.00000	8.12500
EXHAUST FAN, 5000 CFM	CT	11.04168	164.00644	10.10711	411.44	1.33261	0.83747	1.30751	22	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM	CT	2.32460	0.00000	2.32460	52.72	0.32500	0.00000	0.32500	64	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	1.88825	25.73415	0.94413	65.54	0.00000	0.00000	0.00000	13	9.10000	124.02000	4.55600
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
ROOM HUMIDIFIER,FLOOR TYPE	CT	4.68075	56.82321	4.68075	162.98	0.04942	0.60447	0.04942	8	0.26000	169.60000	0.26000
CONTROLS/INSTRUMENT.												

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 7	UM	PRESENT WORTH OF 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
BLOWOFF SYSTEM	CT	0.86086	48.78427	0.43043	66.93	0.00000	0.00000	0.00000	12	2.60000	147.34000	1.30000
HOUSE FURN.GAS 25KBTU/HR	CT	32.54717	269.13930	30.82545	1001.80	4.06897	21.19029	4.06897	12	10.40000	355.10000	5.20000
HOUSE FURN.GAS 100KBTU/HR	CT	36.01581	337.54492	32.57237	1143.36	4.07250	25.35652	4.07250	12	20.80000	471.70000	10.40000
HOUSE FURN.GAS 200KBTU/HR	CT	36.01581	812.30397	32.57237	1618.12	4.07250	30.88755	4.07250	12	20.80000	1786.10000	10.40000
HOUSE FURN.OIL 25KBTU/HR	CT	41.44032	496.04746	39.71860	1430.40	5.31232	30.09740	5.31232	12	10.40000	848.00000	5.20000
HOUSE FURN.OIL 100KBTU/HR	CT	44.88376	684.59640	41.44032	1691.54	5.31232	32.82700	5.31232	12	20.80000	1358.49600	10.40000
HOUSE FURN.OIL 200KBTU/HR	CT	44.88376	803.07720	41.44032	1810.02	5.31232	38.42985	5.31232	12	20.80000	1595.30000	10.40000
HOUSE FURN.ELECT 25KBTU/HR	CT	18.82473	301.75412	17.10301	723.19	2.15045	14.36630	2.15045	12	10.40000	601.02000	5.20000
HOUSE FURN.ELECT.100KBTU	CT	22.26817	396.71637	18.82473	890.74	2.15045	20.68747	2.15045	12	20.80000	751.27500	10.40000
HOUSE FURN.ELECT.200KBTU/H	CT	22.26817	505.96874	18.82473	999.99	2.15045	26.57766	2.15045	12	20.80000	954.00000	10.40000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	39	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	0.89180	39.81201	0.44590	58.61	0.00000	0.00000	0.00000	15	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	0.89180	44.99303	0.44590	63.79	0.00000	0.00000	0.00000	15	5.20000	262.35060	2.60000
EXPANSION TANK	CT	0.05949	0.00000	0.05949	1.35	0.00832	0.00000	0.00832	39	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	9.48014	75.08720	9.18582	289.16	1.24311	1.19106	1.24311	23	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	9.51412	55.82359	8.43804	268.16	1.02927	0.98416	1.02927	12	6.50000	147.34000	3.25000
STORAGE TANK, DHW	CT	13.87505	19.69957	13.87505	334.39	1.93986	2.75418	1.93986	44	3.59395	346.62000	1.79698
IND. FUR., GAS/OIL 500 MBU	CT	33.25622	487.27591	27.32125	1222.54	4.64953	68.12570	3.81976	26	65.00000	6784.00000	16.25000
IND.FURN.GAS/OIL 2000 MBTU	CT	52.64455	1013.06963	52.64455	2207.05	7.36020	141.63658	7.36020	26	184.60000	13780.00000	46.15000
SURGE TANK, 1000 GAL	CT	1.07900	326.62575	0.53950	349.37	0.00000	0.00000	0.00000	13	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.10761	0.05615	0.10761	2.50	0.01504	0.00785	0.01504	39	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.54360	4.12629	0.32156	15.74	0.01391	0.00639	0.01391	23	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	24.53284	783.31059	12.82972	1302.27	0.15751	0.77482	0.15751	22	241.80000	8034.80000	120.90000
PIPE INSULATION	TF	0.42612	2.61923	0.42612	12.28	0.05958	0.36619	0.05958	26	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	0.72132	3.27152	0.72132	19.63	0.09461	0.02786	0.09461	15	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"	CT	0.25695	16.52877	0.25695	22.36	0.02221	0.05572	0.02221	15	0.57200	94.05380	0.57200
DRAIN VALVE	CT	1.07104	8.13252	1.07104	32.42	0.13322	0.70747	0.13322	15	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	0.47347	6.69643	0.23674	16.68	0.00000	0.00000	0.00000	12	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	9.43332	302.99219	4.71666	501.85	0.00000	0.00000	0.00000	5	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	6.44052	89.62297	6.44052	235.69	0.19418	5.97739	0.19418	8	2.60000	151.41040	2.60000
PIPE INSULATION	TF	7.76858	79.32317	7.76858	255.51	0.06831	0.41987	0.06831	23	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	2.85566	126.49060	2.85566	191.26	0.20487	0.51065	0.20487	12	4.19900	371.00000	4.19900
CIRCULATION PUMP 5 HP	CT	2.85566	464.59143	2.16051	527.13	0.20487	6.07223	0.20487	12	4.19900	1272.00000	2.09950
COND. RCVR., 10 - 15 GAL.	CT	17.89411	412.32609	16.55641	813.88	2.12772	11.89834	2.12772	15	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T	CT	26.03546	0.00000	26.03546	590.48	3.64000	0.00000	3.64000	64	8.38500	1855.00000	4.19250
A/C DX PACKAGE 20T	CT	66.01850	0.00000	66.01850	1497.30	9.23000	0.00000	9.23000	64	20.41000	7950.00000	6.80333
A/C DX PACKAGE 50T	CT	84.61526	0.00000	84.61526	1919.07	11.83000	0.00000	11.83000	64	47.71000	21200.00000	11.92750
A/C WINDOW 1T	CT	12.08789	0.00000	12.08789	274.15	1.69000	0.00000	1.69000	32	5.98000	530.00000	5.98000
A/C WINDOW 2T	CT	12.08789	0.00000	12.08789	274.15	1.69000	0.00000	1.69000	32	6.50000	742.00000	6.50000
A/C PAD MTD. 4T	CT	35.33384	0.00000	35.33384	801.37	4.94000	0.00000	4.94000	32	6.50000	1484.00000	3.25000
A/C PAD MOUNTED 20 TON	CT	67.93587	1363.42500	65.60232	2896.74	9.00869	0.00000	9.00869	15	20.41000	7950.00000	6.80333
CHILLER-AIR COOL RECIP.20T	CT	160.86197	0.00000	80.43099	3390.97	22.49000	0.00000	11.24500	64	28.60000	10759.00000	7.15000
CHILLEP AIR COOL REC.50T	CT	199.91517	0.00000	99.95758	4214.21	27.95000	0.00000	13.97500	64	40.30000	19080.00000	10.07500
CHILLER AIR COOL REC.100T	CT	199.91517	0.00000	99.95758	4214.21	27.95000	0.00000	13.97500	64	72.80000	40280.00000	18.20000
CHILLER-AIR COOL RECIP. 5T	CT	86.47493	0.00000	86.47493	1961.25	12.09000	0.00000	12.09000	64	15.60000	3710.00000	5.20000
CHILLER AIR COOL REC. 10T	CT	125.52813	0.00000	62.76407	2646.13	17.55000	0.00000	8.77500	64	20.80000	6360.00000	6.93333
CHILLER AIR COOL REC. 15T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	64	28.60000	8268.00000	7.15000
CHILLER WAT.COOL REC.20T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	64	29.90000	9540.00000	7.47500
CHILLER WAT.COOL REC.50T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	64	48.10000	15900.00000	12.02500
CHILLER WAT.COOL REC.100T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	64	74.10000	27030.00000	18.52500
CHILLER WAT. COOL REC. 10T	CT	144.12489	0.00000	72.06245	3038.15	20.15000	0.00000	10.07500	64	20.80000	5300.00000	5.20000
CHILLER WAT.COOL REC.200T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	64	74.10000	53000.00000	18.52500
CHILL. HERMETIC CENT. 100T	CT	237.10869	0.00000	118.55435	4998.25	33.15000	0.00000	16.57500	64	62.40000	37789.00000	15.60000
CHILL. HERMETIC CENT. 300T	CT	237.10869	0.00000	118.55435	4998.25	33.15000	0.00000	16.57500	64	97.50000	61771.50000	24.37500
CHILL. HERMETIC CENT. 900T	CT	237.10869	0.00000	118.55435	4998.25	33.15000	0.00000	16.57500	64	162.50000	127200.00000	40.62500

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
Zone: 7	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
DEVICES												
THERMOSTATS/PNEUMATICS	CT	9.23749	21.92438	9.23749	231.43	1.27872	0.00000	1.27872	20	0.78000	187.22780	0.78000
HUMIDITY SENSOR	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	32	0.78000	100.26540	0.78000
FLOW SENSOR	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	48	0.78000	100.04280	0.78000
RADIATION SENSOR	CT	9.24804	7.46473	9.24804	217.21	1.28241	0.00000	1.28241	22	0.78000	77.11500	0.78000
WIND VELOCITY SENSOR	CT	9.10442	16.98157	9.10442	223.47	1.23221	0.00000	1.23221	11	0.78000	45.52700	0.78000
PRESSURE SENSOR	CT	9.24804	5.64344	9.24804	215.39	1.28241	0.00000	1.28241	22	0.78000	58.30000	0.78000
DAMPER CONTROLLER/ELECT.	CT	9.50105	44.77557	9.50105	260.26	1.27166	0.00000	1.27166	16	2.60000	287.20700	2.60000
SIMPLEX AIR COMPR.,1 HP	CT	27.35724	27.21641	18.93221	620.72	3.82480	3.80511	2.64690	27	3.67900	6103.82980	1.83950

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION Zone: 8	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.06689	16.90647	0.06689	18.42	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	4.54599	8.13233	2.28481	104.00	0.63557	1.13698	0.31944	62	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.22204	6.31739	0.22204	11.35	0.01901	0.00000	0.01901	12	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.34256	107.04463	0.23926	114.48	0.01901	0.00000	0.01901	12	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.18902	11.94461	0.09451	15.93	0.00000	0.00000	0.00000	25	2.60000	164.30000	1.30000
OIL FILTER	CT	0.74387	24.26162	0.74387	41.13	0.10400	3.39200	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.38525	72.61371	0.38525	81.35	0.03258	0.00000	0.03258	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	6.86769	120.31123	3.47908	265.23	0.13364	0.24840	0.07314	21	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
LPG STORAGE TANK, 1000 GAL	CT	0.37804	114.43707	0.18902	122.41	0.00000	0.00000	0.00000	25	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITNGS,STEEL/IRON	TF	4.52236	8.12000	2.26118	103.45	0.63227	1.13525	0.31613	62	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	9.55719	75.08720	9.26287	290.90	1.25389	1.19106	1.25389	23	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	9.51412	55.82359	8.43804	268.16	1.02927	0.98416	1.02927	12	6.50000	147.34000	3.25000
STEAM REG. VALVE 2".	CT	9.43332	302.99219	4.71666	501.85	0.00000	0.00000	0.00000	5	7.80000	250.53100	3.90000
COND. METER,<300 #/HR.	CT	4.87513	216.35072	4.87513	326.92	0.67498	20.01256	0.67498	25	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	39	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	39	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	0.89180	39.81201	0.44590	58.61	0.00000	0.00000	0.00000	15	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	0.89180	44.99303	0.44590	63.79	0.00000	0.00000	0.00000	15	5.20000	262.35000	2.60000
SOLAR												
EQUIPMENT												
SOLAR PANEL, 3' X 8'	CT	1.17390	105.28980	0.58695	130.04	0.00000	0.00000	0.00000	12	3.90000	349.80000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	2.43204	342.07578	1.21602	393.34	0.00000	0.00000	0.00000	17	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.13402	0.60131	0.11567	3.58	0.01874	0.08407	0.01617	34	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	278.69517	564.25169	276.09517	6876.74	38.23717	43.43871	38.23717	23	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	320.26446	1802.99832	309.18846	9031.15	42.71125	83.93657	42.71125	23	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	335.08504	6599.69757	320.16364	14151.68	44.06647	495.88927	44.06647	23	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR	CT	2579.5740	76330.60000	871.91386	129370.83	102.82001	0.00000	69.07669	23	20800.000	636000.00000	4160.0000
REPAIR BOILER									15	1050.4000	148400.00000	262.60000
BOILER COAL 100,000 KBTU/H	CT	4438.6121	174665.36900	1290.9404	265260.54	123.77301	0.00000	79.55319	23	41600.000	1590000.00000	8320.0000
REPAIR BOILER									15	1313.7800	276766.00000	328.44500
BOILER OIL 250 KBTU/HR	CT	321.01919	470.20473	317.11919	7738.44	44.15446	30.29007	44.15446	23	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	361.92863	1419.28633	350.85263	9592.38	48.53628	30.29007	48.53628	23	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	401.99448	3294.43008	387.07308	12363.92	53.42103	33.78213	53.42103	23	248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	332.18671	1867.16005	321.11071	9365.71	44.37809	52.00437	44.37809	23	184.60000	18689.92000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	383.69403	12383.19911	344.61603	20960.33	46.35937	936.94588	46.35937	23	651.30000	71020.00000	162.82500
BOILR.PNEUMAT.COAL SPREAD.	CT	1449.9743	3232.03593	1386.1243	35913.13	187.43746	112.08360	186.76635	9	364.00000	11236.00000	91.00000
ASH HANDLING SYSTEM	CT	4041.2101	37163.15183	2701.3571	124530.27	315.63489	112.56771	315.33389	15	10400.000	212000.00000	2600.0000
FUEL OIL EQUIPMENT	CT	6.63233	102.59422	3.31616	242.40	0.80690	0.35916	0.40345	12	2.60000	302.10000	1.30000
CHEMICAL FEED SYSTEM	CT	5.51005	128.80452	4.97201	252.05	0.61991	0.00000	0.61991	12	3.25000	389.02000	1.62500
FEED-WATER SUPPLY	CT	142.48871	912.51160	136.17574	4123.95	18.59733	0.00000	18.59733	12	28.60000	2756.00000	9.53333
DEAERATOR	CT	181.01239	3635.80000	79.35870	7415.87	19.07312	0.00000	9.53656	15	260.00000	21200.00000	65.00000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 8	UM	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
BLOWOFF SYSTEM	CT	0.86086	48.78427	0.43043	66.93	0.00000	0.00000	0.00000	12	2.60000	147.34000	1.30000
HOUSE FURN.GAS 25KBTU/HR	CT	32.54717	269.13930	30.82545	1001.80	4.06897	21.19029	4.06897	12	10.40000	355.10000	5.20000
HOUSE FURN.GAS 100KBTU/HR	CT	36.01581	337.54492	32.57237	1143.36	4.07250	25.35652	4.07250	12	20.80000	471.70000	10.40000
HOUSE FURN.GAS 200KBTU/HR	CT	36.01581	812.30397	32.57237	1618.12	4.07250	30.68755	4.07250	12	20.80000	1786.10000	10.40000
HOUSE FURN.OIL 25KBTU/HR	CT	41.44032	496.04746	39.71860	1430.40	5.31232	30.09740	5.31232	12	10.40000	848.00000	5.20000
HOUSE FURN.OIL 100KBTU/HR	CT	44.88376	684.59640	41.44032	1691.54	5.31232	32.82700	5.31232	12	20.80000	1358.49600	10.40000
HOUSE FURN.OIL 200KBTU/HR	CT	44.88376	803.07720	41.44032	1810.02	5.31232	38.42985	5.31232	12	20.80000	1595.30000	10.40000
HOUSE FURN.ELECT 25KBTU/HR	CT	18.82473	301.75412	17.10301	723.19	2.15045	14.36630	2.15045	12	10.40000	601.02000	5.20000
HOUSE FURN.ELECT.100KBTU	CT	22.26817	396.71637	18.82473	890.74	2.15045	20.68747	2.15045	12	20.80000	751.27500	10.40000
HOUSE FURN.ELECT.200KBTU/H	CT	22.26817	505.96874	18.82473	999.99	2.15045	26.57766	2.15045	12	20.80000	954.00000	10.40000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	39	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	0.89180	39.81201	0.44590	58.61	0.00000	0.00000	0.00000	15	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	0.89180	44.99303	0.44590	63.79	0.00000	0.00000	0.00000	15	5.20000	262.35000	2.60000
EXPANSION TANK	CT	0.05949	0.00000	0.05949	1.35	0.00832	0.00000	0.00832	39	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	9.48014	75.08720	9.18582	289.16	1.24311	1.19106	1.24311	23	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	9.51412	55.82359	8.43804	268.16	1.02927	0.98416	1.02927	12	6.50000	147.34000	3.25000
STORAGE TANK, DNW	CT	15.00502	21.30388	15.00502	361.62	2.09784	2.97848	2.09784	42	3.59395	346.62000	1.79698
IND. FUR., GAS/OIL 500 MBU	CT	38.46908	1029.18862	28.63762	1870.21	4.71767	74.93664	3.83864	25	65.00000	6784.00000	16.25000
IND.FURN.GAS/OIL 2000 MBTU	CT	66.26823	2116.15853	56.20291	3586.91	7.38862	155.79685	7.38862	25	184.60000	13730.00000	46.15000
SURGE TANK, 1000 GAL	CT	1.56520	473.80410	0.78260	506.80	0.00000	0.00000	0.00000	12	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.10761	0.05615	0.10761	2.50	0.01504	0.00785	0.01504	39	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.54360	4.12629	0.32156	15.74	0.01391	0.00639	0.01391	23	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	26.96377	861.66720	14.08792	1432.00	0.16946	0.83340	0.16946	21	241.80000	8034.80000	120.90000
PIPE INSULATION	TF	7.05990	72.08618	7.05990	232.20	0.06210	0.38173	0.06210	25	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	0.72132	3.27152	0.72132	19.63	0.09461	0.02786	0.09461	15	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"	CT	0.25695	16.52877	0.25695	22.36	0.02221	0.05572	0.02221	15	0.57200	94.05380	0.57200
DRAIN VALVE	CT	1.07104	8.13252	1.07104	32.42	0.13322	0.70747	0.13322	15	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	0.47347	6.69643	0.23674	16.68	0.00000	0.00000	0.00000	12	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	9.43332	302.99219	4.71666	501.85	0.00000	0.00000	0.00000	5	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	6.44052	89.62297	6.44052	235.69	0.19418	5.97739	0.19418	8	2.60000	151.41040	2.60000
PIPE INSULATION	TF	7.76858	79.32317	7.76858	255.51	0.06831	0.41987	0.06831	23	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	2.85566	126.49060	2.85566	191.26	0.20487	0.51065	0.20487	12	4.19900	371.00000	4.19900
CIRCULATION PUMP 5 HP	CT	2.85566	464.59143	2.16051	527.13	0.20487	6.07223	0.20487	12	4.19900	1272.00000	2.09950
COND. RCVR., 10 - 15 GAL.	CT	17.89411	412.32609	16.55641	813.88	2.12772	11.89834	2.12772	15	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T	CT	26.03546	0.00000	26.03546	590.48	3.64000	0.00000	3.64000	93	8.38500	1855.00000	4.19250
A/C DX PACKAGE 20T	CT	66.01850	0.00000	66.01850	1497.30	9.23000	0.00000	9.23000	93	20.41000	7950.00000	6.80333
A/C DX PACKAGE 50T	CT	84.61526	0.00000	84.61526	1919.07	11.83000	0.00000	11.83000	93	47.71000	21200.00000	11.92750
A/C WINDOW 1T	CT	12.08789	0.00000	12.08789	274.15	1.69000	0.00000	1.69000	46	5.98000	530.00000	5.98000
A/C WINDOW 2T	CT	12.08789	0.00000	12.08789	274.15	1.69000	0.00000	1.69000	46	6.50000	742.00000	6.50000
A/C PAD MTD. 4T	CT	35.33384	0.00000	35.33384	801.37	4.94000	0.00000	4.94000	46	6.50000	1484.00000	3.25000
A/C PAD MOUNTED 20 TON	CT	67.93587	1363.42500	65.60232	2896.74	9.00869	0.00000	9.00869	15	20.41000	7950.00000	6.80333
CHILLER-AIR COOL RECIP.20T	CT	160.86197	0.00000	80.43099	3390.97	22.49000	0.00000	11.24500	93	28.60000	10759.00000	7.15000
CHILLER AIR COOL REC.50T	CT	199.91517	0.00000	99.95758	4214.21	27.95000	0.00000	13.97500	93	40.30000	19080.00000	10.07500
CHILLER AIR COOL REC.100T	CT	199.91517	0.00000	99.95758	4214.21	27.95000	0.00000	13.97500	93	72.80000	40280.00000	18.20000
CHILLER-AIR COOL RECIP. 5T	CT	86.47493	0.00000	86.47493	1961.25	12.09000	0.00000	12.09000	93	15.60000	3710.00000	5.20000
CHILLER AIR COOL REC. 10T	CT	125.52813	0.00000	62.76407	2646.13	17.55000	0.00000	8.77500	93	20.80000	6360.00000	6.93333
CHILLER AIR COOL REC. 15T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	93	28.60000	8268.00000	7.15000
CHILLER WAT.COOL REC.20T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	93	29.90000	9540.00000	7.47500
CHILLER WAT.COOL REC.50T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	93	48.10000	15900.00000	12.02500
CHILLER WAT.COOL REC.100T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	93	74.10000	27030.00000	18.52500
CHILLER WAT. COOL REC. 10T	CT	144.12489	0.00000	72.06245	3038.15	20.15000	0.00000	10.07500	93	20.80000	5300.00000	5.20000
CHILLER WAT.COOL REC.200T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	93	74.10000	53000.00000	18.52500
CHILL. HERMETIC CENT. 100T	CT	237.10869	0.00000	118.55435	4998.25	33.15000	0.00000	16.57500	93	62.40000	37789.00000	15.60000
CHILL. HERMETIC CENT. 300T	CT	237.10869	0.00000	118.55435	4998.25	33.15000	0.00000	16.57500	93	97.50000	61771.50000	24.37500
CHILL. HERMETIC CENT. 900T	CT	237.10869	0.00000	118.55435	4998.25	33.15000	0.00000	16.57500	93	162.50000	127200.00000	40.62500

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
Zone: 8	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
CHILL. OPEN CENT. 300T	CT	618.34227	0.00000	309.17114	13034.66	86.45000	0.00000	43.22500	93	97.50000	61771.50000	24.37500
CHILL. OPEN CENT. 900T	CT	237.10869	0.00000	118.55435	4998.25	33.15000	0.00000	16.57500	93	162.50000	127200.00000	40.62500
CHILL.DBL.BNDL. HERM.100T	CT	274.30221	0.00000	137.15111	5782.29	38.35000	0.00000	19.17500	93	68.90000	41340.00000	17.22500
CHILL.DBL.BNDL. HERM.300T	CT	274.30221	0.00000	137.15111	5782.29	38.35000	0.00000	19.17500	93	107.90000	67840.00000	26.97500
CHILL.DBL.BNDL. HERM.900T	CT	274.30221	0.00000	137.15111	5782.29	38.35000	0.00000	19.17500	93	178.10000	139920.00000	44.52500
CHILL. ONE STG. ABS. 100T	CT	813.60825	0.00000	406.80413	17150.86	113.75000	0.00000	56.87500	93	65.00000	37100.00000	16.25000
CHILL. ONE STG. ABS. 300T	CT	119.94910	0.00000	59.97455	2528.53	16.77000	0.00000	8.38500	93	104.00000	61480.00000	26.00000
CHILL. ONE STG. ABS. 900T	CT	119.94910	0.00000	59.97455	2528.53	16.77000	0.00000	8.38500	93	167.70000	113420.00000	41.92500
CHILL. TWO STG. ABS. 300T	CT	119.94910	0.00000	59.97455	2528.53	16.77000	0.00000	8.38500	93	114.40000	67840.00000	28.60000
CHILL. TWO STG. ABS. 900T	CT	111.58056	0.00000	55.79028	2352.12	15.60000	0.00000	7.80000	93	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 5T	CT	16.73708	0.00000	16.73708	379.60	2.34000	0.00000	2.34000	70	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 20T	CT	16.73708	0.00000	8.36854	352.82	2.34000	0.00000	1.17000	70	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 50T	CT	29.75482	0.00000	14.87741	627.23	4.16000	0.00000	2.08000	70	31.20000	5294.70000	7.80000
AIR COOLED CONDENSER 100T	CT	29.75482	0.00000	14.87741	627.23	4.16000	0.00000	2.08000	70	46.80000	10578.80000	11.70000
COOLING TOWER 50T	CT	32.54433	0.00000	16.27217	686.03	4.55000	0.00000	2.27500	70	46.80000	4478.50000	11.70000
COOLING TOWER 100T	CT	101.35234	0.00000	50.67617	2136.51	14.17000	0.00000	7.08500	70	52.00000	10070.00000	13.00000
COOLING TOWER 300T	CT	118.08943	0.00000	59.04471	2489.33	16.51000	0.00000	8.25500	70	78.00000	16377.00000	19.50000
COOLING TOWER 900T	CT	128.31764	0.00000	64.15882	2704.94	17.94000	0.00000	8.97000	70	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 20T	CT	59.50963	0.00000	29.75482	1254.46	8.32000	0.00000	4.16000	70	36.40000	3688.80000	9.10000
EVAPORATIVE CONDENSER 100T	CT	97.63299	0.00000	48.81650	2058.10	13.65000	0.00000	6.82500	70	100.10000	10038.20000	25.02500
EVAPORATIVE CONDENSER 300T	CT	22.31611	0.00000	11.15806	470.42	3.12000	0.00000	1.56000	70	182.00000	31800.00000	45.50000
EXPANSION TANK	CT	0.05949	0.00000	0.05949	1.35	0.00832	0.00000	0.00832	39	3.47100	135.68000	1.73550
REFRIG. FAN COIL 1T	CT	4.64919	0.00000	4.64919	105.44	0.65000	0.00000	0.65000	70	2.60000	855.42000	1.30000
REFRIG. FAN COIL 3T	CT	4.64919	0.00000	4.64919	105.44	0.65000	0.00000	0.65000	70	2.86000	1051.52000	1.43000
REFRIG. FAN COIL 5T	CT	4.64919	0.00000	4.64919	105.44	0.65000	0.00000	0.65000	70	3.25000	1240.20000	1.62500
DIST. PIPING SYSTEM												
PIPE/FITTINGS ST.& C.I.	TF	1.03477	3.39863	0.60499	25.49	0.02450	0.01278	0.02450	23	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	1.03462	8.78569	0.55863	30.73	0.01155	0.00531	0.01155	15	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	0.73532	3.61899	0.73532	20.30	0.10280	0.50597	0.10280	28	241.80000	8321.00000	120.90000
GATE VALVE, 3/8" - 1 1/2"	CT	0.27643	3.27152	0.27643	9.54	0.02213	0.02786	0.02213	15	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.25695	16.52877	0.25695	22.36	0.02221	0.05572	0.02221	15	0.57200	94.05380	0.57200
DRAIN VALVE	CT	1.07104	8.13252	1.07104	32.42	0.13322	0.70747	0.13322	15	0.68900	17.91400	0.68900
PIPE INSULATION	TF	7.76858	74.92995	7.76858	251.12	0.06831	0.39645	0.06831	23	91.00000	901.00000	91.00000
CIRCULATOR PUMP, < 1 HP	CT	2.83547	126.49060	2.83547	190.80	0.20205	0.51065	0.20205	12	4.19900	371.00000	4.19900
5 TON CHILLER ACH RECIP	CT	6.63053	464.59143	4.04795	606.71	0.20487	6.07223	0.20487	12	15.60000	1272.00000	7.80000
HEAT/COOL GENERATION EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	56.09288	1422.22886	33.44953	2621.96	7.04892	68.11813	4.47821	17	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	57.10623	1851.20011	33.70287	3071.48	7.04892	83.33976	4.47821	17	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	64.90169	3477.15002	37.63299	4861.86	7.43042	151.36028	4.85058	17	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	72.29182	5484.58797	41.52705	7025.72	7.81192	171.63618	5.23208	17	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	51.14109	380.60415	32.54433	1480.97	7.15000	53.21200	4.55000	70	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	55.18331	1422.22886	32.99475	2602.78	6.92176	68.11813	4.41463	17	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	56.15666	1851.79343	33.24809	3052.90	6.92176	83.42271	4.41463	17	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	63.99212	3462.91033	37.17820	4828.45	7.30326	149.36944	4.79700	17	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	71.38225	5484.58797	41.07227	7006.55	7.68475	171.63618	5.16850	17	105.30000	27305.60000	26.32500
3 DK.MULTI ZONE 6500 CFM	CT	55.48487	1422.22353	33.29753	2609.62	7.04892	68.11738	4.47821	17	36.40000	5997.48000	9.10000
3 DK.MULTI ZONE 10,000 CFM	CT	57.10623	1851.79343	33.70287	3072.07	7.04892	83.42271	4.47821	17	42.90000	8050.70000	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	64.90169	3305.82882	37.69827	4690.75	7.43042	127.40799	4.85971	17	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	72.29182	5345.30607	41.59234	6886.65	7.81192	152.16327	5.24121	17	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	55.58865	1511.79653	26.27430	2678.74	6.92176	68.11813	3.46088	17	39.00000	6572.00000	9.75000
D.D. VARI.VOL.10000 CFM	CT	56.80467	1984.82290	26.57831	3176.43	6.92176	83.42271	3.46088	17	46.80000	8904.00000	11.70000
D.D. VARI.VOL.25000 CFM	CT	65.20814	3710.41037	29.36135	5074.62	7.30326	149.08514	3.65163	17	83.20000	16960.00000	20.80000
D.D. VARI.VOL.50000 CFM	CT	73.00361	5839.41513	31.99240	7363.90	7.68475	169.49125	3.84238	17	115.70000	29680.00000	28.92500
D.D. VARI.VOL. 100,000CFM	CT	55.79028	2059.81147	27.89514	3235.87	7.80000	287.98080	3.90000	70	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CFM	CT	54.57530	1422.22886	50.57938	2647.21	6.92176	68.11813	6.89437	17	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000 CFM	CT	56.19666	1851.79343	33.24809	3052.90	6.92176	83.42271	4.41463	17	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	53.07727	3073.69231	26.32863	4191.89	5.77726	94.95314	3.27013	17	75.40000	15359.40000	18.85000

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks			
Zone: 8	UM	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
VARIABLE VOLUME 50000 CFM	CT	71.38225	5484.58797	41.13755	7006.75	7.68475	171.63618	5.17763	17	105.30000	27305.60000	26.32500
TERM. REHEAT 6500 CFM	CT	58.55309	1769.17731	33.51123	3017.03	6.81858	67.26674	4.34326	12	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	60.11829	2449.08740	33.90253	3728.68	6.81858	82.25393	4.34326	12	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	72.96422	5653.68873	39.11811	7200.21	7.19217	147.64339	4.71685	12	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	88.15794	8100.74059	44.92063	9961.80	7.56576	170.81998	5.09044	12	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	58.55309	1769.17731	33.51123	3017.03	6.81858	67.26674	4.34326	12	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	60.11829	2449.08740	33.90253	3728.68	6.81858	82.25393	4.34326	12	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	72.96422	5653.68873	39.11811	7200.21	7.19217	147.64339	4.71685	12	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	88.15794	8100.74059	44.92063	9961.80	7.56576	170.81998	5.09044	12	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	51.17705	505.63439	32.56231	1606.76	7.15503	70.69239	4.55251	70	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	50.21125	604.41759	32.07941	1685.19	7.02000	84.50320	4.48500	70	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	53.00077	1078.58061	34.86893	2222.62	7.41000	150.79560	4.87500	70	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	55.79028	1227.78957	37.65844	2435.09	7.80000	171.65640	5.26500	70	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	70	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	70	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	70	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	70	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	70	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	70	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	70	3.12000	827.86000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	70	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	70	2.60000	1590.00000	1.30000
UNIT VENT 1200 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	70	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	50.21125	492.51087	32.07941	1573.28	7.02000	68.85760	4.48500	70	32.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	50.21125	604.41759	32.07941	1685.19	7.02000	84.50320	4.48500	70	37.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	53.00077	1078.58061	34.86893	2222.62	7.41000	150.79560	4.87500	70	71.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	55.79028	1227.78957	37.65844	2435.09	7.80000	171.65640	5.26500	70	113.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	50.83775	499.14650	49.66385	1648.39	6.77935	16.25626	6.77935	12	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	50.21125	380.60615	32.07941	1461.37	7.02000	53.21200	4.48500	70	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	70	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	70	3.25000	461.10000	1.62500
UNIT HEATER 4000 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	70	3.25000	828.92000	1.62500
UNIT HEATER 8000 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	70	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50MBH	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	70	2.60000	445.20000	1.30000
HEAT PUMP 5T	CT	26.03546	0.00000	26.03546	590.48	3.64000	0.00000	3.64000	93	8.38500	2994.50000	4.19250
HEAT PUMP 10T	CT	66.01850	0.00000	66.01850	1497.30	9.23000	0.00000	9.23000	93	14.30000	5989.00000	4.76667
HEAT PUMP 25T	CT	84.61526	0.00000	84.61526	1919.07	11.83000	0.00000	11.83000	93	19.50000	17755.00000	4.87500
HEAT PUMP 1T	CT	30.64194	177.94783	30.39826	872.13	4.21589	9.22907	4.21589	23	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	18.59676	0.00000	9.29838	392.02	2.60000	0.00000	1.30000	28	2.34000	80.56000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	34.97881	597.90652	31.93876	1381.50	4.32366	21.44301	4.32366	17	26.00000	2851.40000	6.50000
IND DRAFT FAN 10000 CFM	CT	35.50017	617.38331	32.19944	1411.96	4.39655	22.45635	4.36011	17	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	3.45437	12.79563	3.45437	91.14	0.40503	0.79188	0.40503	15	3.25000	41.58380	3.25000
EXHAUST FAN, 1000 CFM	CT	10.07102	41.34397	9.76656	268.78	1.32289	0.92116	1.32289	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	36.01372	472.32704	32.32034	1277.30	4.41164	22.75238	4.36283	15	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	56.01372	1199.26184	16.89211	1954.86	4.41164	69.05414	2.20582	15	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	37.12847	1444.76844	32.59903	2272.35	4.41164	72.37081	4.36283	15	32.50000	5406.00000	8.12500
EXHAUST FAN, 5000 CFM	CT	10.88321	149.09696	10.03360	393.21	1.32964	0.76137	1.30682	23	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM	CT	2.32460	0.00000	2.32460	52.72	0.32500	0.00000	0.32500	93	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	2.73910	37.33002	1.36955	95.07	0.00000	0.00000	0.00000	12	9.10000	124.02000	4.55000
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
ROOM HUMIDIFIER,FLOOR TYPE	CT	4.68075	56.82321	4.68075	162.98	0.04942	0.60447	0.04942	8	0.26000	169.60000	0.26000
CONTROLS/INSTRUMENT.												

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE) PAGE 55

COMPONENT DESCRIPTION Zone: 8	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
DEVICES												
THERMOSTATS/PNEUMATICS	CT	9.23749	21.92438	9.23749	231.43	1.27872	0.00000	1.27872	20	0.78000	187.22780	0.78000
HUMIDITY SENSOR	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	46	0.78000	100.26540	0.78000
FLOW SENSOR	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	70	0.78000	100.04280	0.78000
RADIATION SENSOR	CT	9.25262	6.78612	9.25262	216.64	1.28401	0.00000	1.28401	23	0.78000	77.11500	0.78000
WIND VELOCITY SENSOR	CT	9.12205	15.43821	9.12205	222.33	1.23837	0.00000	1.23837	11	0.78000	45.52700	0.78000
PRESSURE SENSOR	CT	9.25262	5.13040	9.25262	214.98	1.28401	0.00000	1.28401	23	0.78000	58.30000	0.78000
DAMPER CONTROLLER/ELECT.	CT	9.50105	44.77557	9.50105	260.26	1.27166	0.00000	1.27166	17	2.60000	287.20700	2.60000
SIMPLEX AIR COMPR.,1 HP	CT	26.66572	26.52885	18.58644	605.45	3.72812	3.70898	2.59856	28	3.67900	6103.82980	1.83950

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 9	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.06689	16.90647	0.06689	18.42	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	4.67407	8.35929	2.35004	106.93	0.65348	1.16871	0.32856	58	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.23622	7.11684	0.23622	12.47	0.01947	0.00000	0.01947	11	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.37200	120.59090	0.25562	128.66	0.01947	0.00000	0.01947	11	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.20800	13.14400	0.10400	17.53	0.00000	0.00000	0.00000	23	2.60000	164.30000	1.30000
OIL FILTER	CT	0.74387	24.26162	0.74387	41.13	0.10400	3.39200	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.38525	72.61371	0.38525	81.35	0.03258	0.00000	0.03258	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	7.55174	132.28681	3.82563	291.64	0.14701	0.27326	0.08046	19	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
LPG STORAGE TANK, 1000 GAL	CT	0.41600	125.92800	0.20800	134.70	0.00000	0.00000	0.00000	23	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITNGS,STEEL/IRON	TF	4.64807	8.34572	2.32404	106.33	0.64984	1.16681	0.32492	58	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	11.04947	98.37197	10.65766	347.72	1.43526	1.36360	1.43526	20	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	10.74579	64.31745	9.50201	304.05	1.15458	1.10875	1.15458	10	6.50000	147.34000	3.25000
STEAM REG. VALVE 2"	CT	10.81782	347.46144	5.40891	575.50	0.00000	0.00000	0.00000	4	7.80000	250.53100	3.90000
COND. METER,<300 #/HR.	CT	4.82034	237.99719	4.82034	347.32	0.66666	22.01118	0.66666	23	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	34	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	34	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	1.07900	48.16905	0.53950	70.91	0.00000	0.00000	0.00000	14	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	1.07900	54.43763	0.53950	77.13	0.00000	0.00000	0.00000	14	5.20000	262.35000	2.60000
SOLAR												
EQUIPMENT												
SOLAR PANEL, 3' X 8'	CT	1.29129	115.81878	0.64565	143.04	0.00000	0.00000	0.00000	12	3.90000	349.80000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	2.67540	376.30530	1.33770	432.70	0.00000	0.00000	0.00000	15	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.12839	0.54725	0.11171	3.41	0.01795	0.07651	0.01562	36	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	280.27650	688.15917	276.81525	7033.75	38.21743	49.01967	38.21743	20	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	325.11649	2278.50496	310.37157	9604.96	42.70567	94.72066	42.70567	20	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	341.57344	8066.63942	321.70933	15749.96	44.05223	559.60062	44.05223	20	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR REPAIR BOILER	CT	3165.8208	98527.00000	989.74414	163364.37	102.43307	0.00000	68.81618	20 14	20800.000 1050.4000	636000.00000 148400.00000	4160.0000 262.60000
BOILER COAL 100,000 KBTU/H REPAIR BOILER	CT	5584.9790	226763.94500	1521.1004	340426.86	123.30756	0.00000	79.25343	20 14	41600.000 1313.7800	1590000.00000 276766.00000	8320.0000 328.44500
BOILER OIL 250 KBTU/HR	CT	323.68865	582.02915	318.49678	7906.67	44.28685	34.18170	44.28685	20	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	366.44498	1845.49403	351.70005	10109.28	48.48378	34.18170	48.48378	20	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	408.07829	4336.71447	388.21418	13528.37	53.35022	38.12243	53.35022	20	248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	337.01534	2410.23280	322.27042	10006.56	44.36924	58.68584	44.36924	20	184.60000	18689.92000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	400.88732	15126.24385	348.86473	24051.90	46.35012	1057.32375	46.35012	20	651.30000	71020.00000	162.82500
BOILR.PNEUMAT.COAL SPREAD.	CT	1450.0983	4194.26259	1367.0942	36816.88	184.22464	144.34642	183.36036	8	364.00000	11236.00000	91.00000
ASH HANDLING SYSTEM	CT	4404.6521	44909.01714	2783.6947	139619.46	314.10286	128.48714	313.75929	14	10400.000	212000.00000	2600.0000
FUEL OIL EQUIPMENT	CT	7.02142	118.50800	3.51071	266.52	0.84255	0.40465	0.42127	10	2.60000	302.10000	1.30000
CHEMICAL FEED SYSTEM	CT	5.64421	148.87795	5.02232	274.90	0.61522	0.00000	0.61522	10	3.25000	389.02000	1.62500
FEED-WATER SUPPLY	CT	142.95827	1054.72120	135.66146	4273.66	18.45665	0.00000	18.45665	10	28.60000	2756.00000	9.53333
DEAERATOR	CT	189.71154	4399.00000	81.36827	8354.96	18.98073	0.00000	9.49036	14	260.00000	21200.00000	65.00000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Repair			Replacement and high Costs Tasks			
Zone: 9	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
BLOWOFF SYSTEM	CT	0.99502	56.38702	0.49751	77.36	0.00000	0.00000	0.00000	10	2.60000	147.34000	1.30000
HOUSE FURN.GAS 25KBTU/HR	CT	33.08020	306.66224	31.09016	1050.55	4.06847	23.87460	4.06847	10	10.40000	355.10000	5.20000
HOUSE FURN.GAS 100KBTU/HR	CT	37.08868	384.85929	33.10860	1213.29	4.07244	28.56859	4.07244	10	20.80000	471.70000	10.40000
HOUSE FURN.GAS 200KBTU/HR	CT	37.08868	932.45285	33.10860	1760.89	4.07244	34.80027	4.07244	10	20.80000	1786.10000	10.40000
HOUSE FURN.OIL 25KBTU/HR	CT	41.90947	567.07445	39.91943	1511.21	5.30288	33.91003	5.30288	10	10.40000	848.00000	5.20000
HOUSE FURN.OIL 100KBTU/HR	CT	45.88955	784.43818	41.90947	1812.48	5.30288	36.98540	5.30288	10	20.80000	1358.49606	10.40000
HOUSE FURN.OIL 200KBTU/HR	CT	45.88955	920.21462	41.90947	1948.25	5.30288	43.29800	5.30288	10	20.80000	1595.30000	10.40000
HOUSE FURN.ELECT 25KBTU/HR	CT	19.52415	345.78355	17.53411	782.22	2.17321	16.18617	2.17321	10	10.40000	601.02000	5.20000
HOUSE FURN.ELECT.100KBTU	CT	23.50423	454.22635	19.52415	974.57	2.17321	23.30808	2.17321	10	20.80000	751.27500	10.40000
HOUSE FURN.ELECT.200KBTU/H	CT	23.50423	579.27622	19.52415	1099.62	2.17321	29.94441	2.17321	10	20.80000	954.00000	10.40000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	34	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	1.07900	48.16905	0.53950	70.91	0.00000	0.00000	0.00000	14	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	1.07900	54.43763	0.53950	77.18	0.00000	0.00000	0.00000	14	5.20000	262.35000	2.60000
EXPANSION TANK	CT	0.06898	0.00000	0.06898	1.56	0.00964	0.00000	0.00964	34	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	10.92507	98.37197	10.53326	344.90	1.41787	1.36360	1.41787	20	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	10.74579	64.31745	9.50201	304.05	1.15458	1.10875	1.15458	10	6.50000	147.34000	3.25000
STORAGE TANK, DHW	CT	15.97223	22.67711	15.97223	384.93	2.23307	3.17047	2.23307	39	3.59395	346.62000	1.79698
IND. FUR., GAS/OIL 500 MBU	CT	39.28140	1111.48115	28.91424	1969.21	4.76490	79.51810	3.86073	23	65.00000	6784.00000	16.25000
IND.FURN.GAS/OIL 2000 MBTU	CT	67.65104	2284.88153	56.57504	3783.76	7.39354	165.32192	7.39354	23	184.60000	13780.00000	46.15000
SURGE TANK, 1000 GAL	CT	1.72172	521.18451	0.86086	557.48	0.00000	0.00000	0.00000	12	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.12438	0.06491	0.12438	2.89	0.01739	0.00907	0.01739	34	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.70414	5.48416	0.40855	20.51	0.01579	0.00725	0.01579	20	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	29.64810	947.43239	15.49071	1574.55	0.18641	0.91677	0.18641	19	241.80000	8034.80000	120.90000
PIPE INSULATION	TF	7.76858	79.32317	7.76858	255.51	0.06831	0.41987	0.06831	23	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	0.82638	3.94461	0.82638	22.69	0.10799	0.03180	0.10799	14	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"	CT	0.30001	19.97107	0.30001	26.78	0.02535	0.06360	0.02535	14	0.57200	94.05380	0.57200
DRAIN VALVE	CT	1.21468	9.98752	1.21468	37.54	0.14984	0.87665	0.14984	14	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	0.54726	7.74003	0.27363	19.28	0.00000	0.00000	0.00000	10	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	10.81782	347.46144	5.40891	575.50	0.00000	0.00000	0.00000	4	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	6.22685	88.57639	6.22685	229.80	0.15529	4.78005	0.15529	7	2.60000	151.41040	2.60000
PIPE INSULATION	TF	10.25086	105.03922	10.25086	337.53	0.07820	0.48070	0.07820	20	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	3.15790	145.84435	3.15790	217.47	0.21684	0.54004	0.21684	10	4.19900	371.00000	4.19900
CIRCULATION PUMP 5 HP	CT	3.15790	535.47253	2.35442	604.52	0.21684	6.80566	0.21684	10	4.19900	1272.00000	2.09950
COND. RCVR., 10 - 15 GAL.	CT	19.15366	491.31900	17.53516	920.54	2.22530	13.33907	2.22530	14	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T	CT	26.03546	0.00000	26.03546	590.48	3.64000	0.00000	3.64000	91	8.38500	1855.00000	4.19250
A/C DX PACKAGE 20T	CT	66.01850	0.00000	66.01850	1497.30	9.23000	0.00000	9.23000	91	20.41000	7950.00000	6.80333
A/C DX PACKAGE 50T	CT	84.61526	0.00000	84.61526	1919.07	11.83000	0.00000	11.83000	91	47.71000	21200.00000	11.92750
A/C WINDOW 1T	CT	12.08789	0.00000	12.08789	274.15	1.69000	0.00000	1.69000	46	5.98000	530.00000	5.98000
A/C WINDOW 2T	CT	12.08789	0.00000	12.08789	274.15	1.69000	0.00000	1.69000	46	6.50000	742.00000	6.50000
A/C PAD MTD. 4T	CT	35.33384	0.00000	35.33384	801.37	4.94000	0.00000	4.94000	46	6.50000	1484.00000	3.25000
A/C PAD MOUNTED 20 TON	CT	68.33835	1649.62500	65.51496	3190.50	8.96223	0.00090	8.96223	14	20.41000	7950.00000	6.80333
CHILLER-AIR COOL RECIP.20T	CT	160.86197	0.00000	80.43099	3390.97	22.49000	0.00000	11.24500	91	28.60000	10759.00000	7.15000
CHILLER AIR COOL REC.50T	CT	199.91517	0.00000	99.95758	4214.21	27.95000	0.00000	13.97500	91	40.30000	19080.00000	10.07500
CHILLER AIR COOL REC.100T	CT	199.91517	0.00000	99.95758	4214.21	27.95000	0.00000	13.97500	91	72.80000	40280.00000	18.20000
CHILLER-AIR COOL RECIP. 5T	CT	86.47493	0.00000	86.47493	1961.25	12.09000	0.00000	12.09000	91	15.60000	3710.00000	5.20000
CHILLER AIR COOL REC. 10T	CT	125.52813	0.00000	62.76407	2646.13	17.55000	0.00000	8.77500	91	20.80000	6360.00000	6.93333
CHILLER AIR COOL REC. 15T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	91	28.60000	8268.00000	7.15000
CHILLER WAT.COOL REC.20T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	91	29.90000	9540.00000	7.47500
CHILLER WAT.COOL REC.50T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	91	48.10000	15900.00000	12.02500
CHILLER WAT.COOL REC.100T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	91	74.10000	27030.00000	18.52500
CHILLER WAT. COOL REC. 10T	CT	144.12489	0.00000	72.06245	3038.15	20.15000	0.00000	10.07500	91	20.80000	5300.00000	5.20000
CHILLER WAT.COOL REC.200T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	91	74.10000	53000.00000	18.52500
CHILL. HERMETIC CENT. 100T	CT	237.10869	0.00000	118.55435	4998.25	33.15000	0.00000	16.57500	91	62.40000	37789.00000	15.60000
CHILL. HERMETIC CENT. 300T	CT	237.10869	0.00000	118.55435	4998.25	33.15000	0.00000	16.57500	91	97.50000	61771.50000	24.37500
CHILL. HERMETIC CENT. 900T	CT	237.10869	0.00000	118.55435	4998.25	33.15000	0.00000	16.57500	91	162.50000	127200.00000	40.62500

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 9	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
CHILL. OPEN CENT. 300T	CT	618.34227	0.00000	309.17114	13034.66	86.45000	0.00000	43.22500	91	97.50000	61771.50000	24.37500
CHILL. OPEN CENT. 900T	CT	237.10869	0.00000	118.55435	4998.25	33.15000	0.00000	16.57500	91	162.50000	127200.00000	40.62500
CHILL.DBL.BNDL. HERM.100T	CT	274.30221	0.00000	137.15111	5782.29	38.35000	0.00000	19.17500	91	68.90000	41340.00000	17.22500
CHILL.DBL.BNDL. HERM.300T	CT	274.30221	0.00000	137.15111	5782.29	38.35000	0.00000	19.17500	91	107.90000	67840.00000	26.97500
CHILL.DBL.BNDL. HERM.900T	CT	274.30221	0.00000	137.15111	5782.29	38.35000	0.00000	19.17500	91	178.10000	139920.00000	44.52500
CHILL. ONE STG. ABS. 100T	CT	813.60825	0.00000	406.80413	17150.86	113.75000	0.00000	56.87500	91	65.00000	37100.00000	16.25000
CHILL. ONE STG. ABS. 300T	CT	119.94910	0.00000	59.97455	2528.53	16.77000	0.00000	8.38500	91	104.00000	61480.00000	26.00000
CHILL. ONE STG. ABS. 900T	CT	119.94910	0.00000	59.97455	2528.53	16.77000	0.00000	8.38500	91	167.70000	113420.00000	41.92500
CHILL. TWO STG. ABS. 300T	CT	119.94910	0.00000	59.97455	2528.53	16.77000	0.00000	8.38500	91	114.40000	67840.00000	28.60000
CHILL. TWO STG. ABS. 900T	CT	111.58056	0.00000	55.79028	2352.12	15.60000	0.00000	7.80000	91	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 5T	CT	16.73708	0.00000	16.73708	379.60	2.34000	0.00000	2.34000	68	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 20T	CT	16.73708	0.00000	8.36854	352.82	2.34000	0.00000	1.17000	68	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 50T	CT	29.75482	0.00000	14.87741	627.23	4.16000	0.00000	2.08000	68	31.20000	5294.70000	7.80000
AIR COOLED CONDENSER 100T	CT	29.75482	0.00000	14.87741	627.23	4.16000	0.00000	2.08000	68	46.80000	10578.80000	11.70000
COOLING TOWER 50T	CT	32.54433	0.00000	16.27217	686.03	4.55000	0.00000	2.27500	68	46.80000	4478.50000	11.70000
COOLING TOWER 100T	CT	101.35234	0.00000	50.67617	2136.51	14.17000	0.00000	7.08500	68	52.00000	10070.00000	13.00000
COOLING TOWER 300T	CT	118.08943	0.00000	59.04471	2489.33	16.51000	0.00000	8.25500	68	78.00000	16377.00000	19.50000
COOLING TOWER 900T	CT	128.31764	0.00000	64.15882	2704.94	17.94000	0.00000	8.97000	68	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 20T	CT	59.50963	0.00000	29.75482	1254.46	8.32000	0.00000	4.16000	68	36.40000	3688.80000	9.10000
EVAPORATIVE CONDENSER 100T	CT	97.63299	0.00000	48.81650	2058.10	13.65000	0.00000	6.82500	68	100.10000	10038.20000	25.02500
EVAPORATIVE CONDENSER 300T	CT	22.31611	0.00000	11.15806	470.42	3.12000	0.00000	1.56000	68	182.00000	31800.00000	45.50000
EXPANSION TANK	CT	0.06898	0.00000	0.06898	1.56	0.00964	0.00000	0.00964	34	3.47100	135.68000	1.73550
REFRIG. FAN COIL 1T	CT	4.64919	0.00000	4.64919	105.44	0.65000	0.00000	0.65000	68	2.60000	855.42000	1.30000
REFRIG. FAN COIL 3T	CT	4.64919	0.00000	4.64919	105.44	0.65000	0.00000	0.65000	68	2.86000	1051.52000	1.43000
REFRIG. FAN COIL 5T	CT	4.64919	0.00000	4.64919	105.44	0.65000	0.00000	0.65000	68	3.25000	1240.20000	1.62500
DIST. PIPING SYSTEM												
PIPE/FITTINGS ST.& C.I.	TF	1.34316	4.50649	0.77101	33.14	0.02780	0.01451	0.02780	20	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	1.24614	10.62732	0.67023	37.05	0.01319	0.00606	0.01319	14	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	0.68717	3.38291	0.68717	18.97	0.09607	0.47296	0.09607	30	241.80000	8321.00000	120.90000
GATE VALVE, 3/8" - 1 1/2"	CT	0.32362	3.94461	0.32362	11.28	0.02526	0.03180	0.02526	14	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.30001	19.97107	0.30001	26.78	0.02535	0.06360	0.02535	14	0.57200	94.05380	0.57200
DRAIN VALVE	CT	1.21468	9.98752	1.21468	37.54	0.14984	0.87665	0.14984	14	0.68900	17.91400	0.68900
PIPE INSULATION	TF	10.25086	99.21930	10.25086	331.71	0.07820	0.45617	0.07820	20	91.00000	901.00000	91.00000
CIRCULATOR PUMP, < 1 HP	CT	3.13516	145.84435	3.13516	216.95	0.21366	0.54004	0.21366	10	4.19900	371.00000	4.19900
5 TON CHILLER ACH RECIP	CT	7.52106	535.47253	4.53600	696.50	0.21684	6.80566	0.21684	10	15.60000	1272.00000	7.80000
HEAT/COOL GENERATION EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	55.67753	1338.04242	33.38492	2529.47	7.06312	68.25483	4.48724	18	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	56.59858	1738.07891	33.61519	2948.19	7.06312	83.50736	4.48724	18	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	63.93808	3261.21674	37.43546	4626.52	7.44539	151.66370	4.86039	18	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	70.90916	5099.28597	41.22892	6612.53	7.82766	171.97697	5.24266	18	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	51.14109	380.60415	32.54433	1480.97	7.15000	53.21200	4.55000	68	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	54.76611	1338.04242	32.92921	2510.26	6.93569	68.25483	4.42353	18	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	55.68716	1738.67343	33.15948	2929.57	6.93569	83.59048	4.42353	18	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	63.02667	3246.94815	36.97975	4593.04	7.31797	149.66882	4.79668	18	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	69.99775	5099.28597	40.77321	6593.32	7.70024	171.97697	5.17895	18	105.30000	27305.60000	26.32500
3 DK.MULTI ZONE 6500 CFM	CT	55.12490	1338.03710	33.24677	2518.26	7.06312	68.25409	4.48724	18	32.50000	5997.48000	8.12500
3 DK.MULTI ZONE 10,000 CFM	CT	56.59858	1738.67343	33.61519	2948.78	7.06312	83.59048	4.48724	18	42.90000	8050.70000	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	63.93808	3089.54784	37.50075	4455.06	7.44539	127.66279	4.86952	18	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	70.90916	4959.72139	41.29421	6473.17	7.82766	152.46454	5.25179	18	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	55.13453	1419.45190	26.18569	2577.27	6.93569	68.25483	3.46785	18	39.00000	6572.00000	9.75000
D.D. VARI.VOL.10000 CFM	CT	56.23979	1859.58604	26.46201	3039.82	6.93569	83.59048	3.46785	18	46.80000	8904.00000	11.70000
D.D. VARI.VOL.25000 CFM	CT	64.13193	3471.71966	29.11860	4814.19	7.31797	149.38451	3.65898	18	83.20000	16960.00000	20.80000
D.D. VARI.VOL.50000 CFM	CT	71.47143	5420.39665	31.63704	6913.90	7.70024	169.83204	3.85012	18	115.70000	29680.00000	28.92500
D.D. VARI.VOL. 100,000CFM	CT	55.79028	2059.81147	27.89514	3235.87	7.80000	287.98080	3.90000	68	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CFM	CT	54.21348	1338.04242	50.56369	2555.92	6.93569	68.25483	6.90831	18	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000 CFM	CT	55.68716	1738.67343	33.15948	2929.57	6.93569	83.59048	4.42353	18	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	52.08966	2856.94020	26.10804	3955.19	5.78887	95.14208	3.27671	18	75.40000	15359.40000	18.85000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 9	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
VARIABLE VOLUME 50000 CFM	CT	69.99775	5099.28597	40.83850	6593.53	7.70024	171.97697	5.18808	18	105.30000	27305.60000	26.32500
TERM. REHEAT 6500 CFM	CT	59.40381	1897.07384	33.66268	3161.98	6.80075	67.13980	4.33024	12	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	61.12553	2633.78427	34.09311	3933.61	6.80075	82.06115	4.33024	12	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	74.97710	6111.76135	39.55129	7698.88	7.17270	147.40672	4.70219	12	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	91.41124	8789.15929	45.65512	10715.95	7.54465	170.89343	5.07414	12	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	59.40381	1897.07384	33.66268	3161.98	6.80075	67.13980	4.33024	12	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	61.12553	2633.78427	34.09311	3933.61	6.80075	82.06115	4.33024	12	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	74.97710	6111.76135	39.55129	7698.88	7.17270	147.40672	4.70219	12	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	91.41124	8789.15929	45.65512	10715.95	7.54465	170.89343	5.07414	12	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	51.33196	507.78797	32.63976	1612.18	7.17668	70.99348	4.56334	68	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	50.21125	604.41759	32.07941	1685.19	7.02000	84.50320	4.48500	68	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	53.00077	1078.58061	34.86893	2222.62	7.41000	150.79560	4.87500	68	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	55.79028	1227.78957	37.65844	2435.09	7.80000	171.65640	5.26500	68	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	68	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	68	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	68	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	68	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	68	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	68	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	68	3.12000	827.86000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	68	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	68	2.60000	1590.00000	1.30000
UNIT VENT 1200 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	68	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	50.21125	492.51087	32.07941	1573.28	7.02000	68.85760	4.48500	68	32.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	50.21125	604.41759	32.07941	1685.19	7.02000	84.50320	4.48500	68	37.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	53.00077	1078.58061	34.86893	2222.62	7.41000	150.79560	4.87500	68	71.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	55.79028	1227.78957	37.65844	2435.09	7.80000	171.65640	5.26500	68	113.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	50.46951	531.50106	49.17822	1672.02	6.69504	15.42682	6.69504	12	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	50.21125	380.60415	32.07941	1461.37	7.02000	53.21200	4.48500	68	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	68	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	68	3.25000	461.10000	1.62500
UNIT HEATER 4000 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	68	3.25000	828.92000	1.62500
UNIT HEATER 8000 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	68	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50#BH	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	68	2.60000	445.20000	1.30000
HEAT PUMP 5T	CT	26.03546	0.00000	26.03546	590.48	3.64000	0.00000	3.64000	91	8.38500	2994.50000	4.19250
HEAT PUMP 10T	CT	66.01850	0.00000	66.01850	1497.30	9.23000	0.00000	9.23000	91	14.30000	5989.00000	4.76667
HEAT PUMP 25T	CT	84.61526	0.00000	84.61526	1919.07	11.83000	0.00000	11.83000	91	19.50000	17755.00000	4.87500
HEAT PUMP 1T	CT	30.62675	167.77183	30.40523	861.68	4.21996	9.22907	4.21996	24	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	18.59676	0.00000	9.29838	392.02	2.60000	0.00000	1.30000	30	2.34000	80.56000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	35.31546	642.04640	31.97121	1432.30	4.31402	21.39520	4.31402	15	26.00000	2851.40000	6.50000
IND DRAFT FAN 10000 CFM	CT	36.01372	665.20623	32.32034	1470.18	4.41164	22.75238	4.36283	15	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	4.00240	16.49871	4.00240	107.27	0.46529	1.10031	0.46529	14	3.25000	41.58380	3.25000
EXHAUST FAN, 1000 CFM	CT	10.07102	41.34397	9.76656	268.78	1.32289	0.92116	1.32289	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	36.88935	537.89719	32.44459	1360.32	4.40320	22.83398	4.34749	14	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	36.88935	1348.25285	17.09592	2121.56	4.40320	69.18419	2.20160	14	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	38.23810	1643.66955	32.78178	2493.45	4.40320	72.96991	4.34749	14	32.50000	5406.00000	8.12500
EXHAUST FAN, 5000 CFM	CT	10.76881	136.03776	9.98160	377.76	1.33110	0.76137	1.30828	24	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM	CT	2.32460	0.00000	2.32460	52.72	0.32500	0.00000	0.32500	91	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	3.01301	41.06302	1.50651	104.58	0.00000	0.00000	0.00000	12	9.10000	124.02000	4.55000
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
ROOM HUMIDIFIER,FLOOR TYPE	CT	4.67685	65.82770	4.67685	171.90	0.05610	0.68610	0.05610	7	0.26000	169.60000	0.26000
CONTROLS/INSTRUMENT.												

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION Zone: 9	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS					
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks		
		labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
DEVICES												
THERMOSTATS/PNEUMATICS	CT	9.23749	21.92438	9.23749	231.43	1.27872	0.00000	1.27872	20	0.78000	187.22780	0.78000
HUMIDITY SENSOR	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	46	0.78000	100.26540	0.78000
FLOW SENSOR	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	68	0.78000	100.04280	0.78000
RADIATION SENSOR	CT	9.25678	6.16920	9.25678	216.11	1.28546	0.00000	1.28546	24	0.78000	77.11500	0.78000
WIND VELOCITY SENSOR	CT	9.12621	15.07399	9.12621	222.06	1.23982	0.00000	1.23982	12	0.78000	45.52700	0.78000
PRESSURE SENSOR	CT	9.25678	4.66400	9.25678	214.61	1.28546	0.00000	1.28546	24	0.78000	58.30000	0.78000
DAMPER CONTROLLER/ELECT.	CT	9.48259	40.69723	9.48259	255.76	1.27425	0.00000	1.27425	18	2.60000	287.20700	2.60000
SIMPLEX AIR COMPR., 1 HP	CT	26.15338	26.01945	18.33028	594.14	3.65649	3.63776	2.56274	30	3.67900	6103.82980	1.83950

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 10	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.06689	16.90647	0.06689	18.42	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	5.14477	9.19748	2.58811	117.70	0.71929	1.28589	0.36184	54	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.22490	7.30192	0.22490	12.40	0.01753	0.00000	0.01753	10	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.36420	123.72691	0.24480	131.60	0.01753	0.00000	0.01753	10	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.25168	15.90424	0.12584	21.21	0.00000	0.00000	0.00000	22	2.60000	164.30000	1.30000
OIL FILTER	CT	0.74387	24.26162	0.74387	41.13	0.10400	3.39200	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.38525	72.61371	0.38525	81.35	0.03258	0.00000	0.03258	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	9.01536	159.85838	4.55902	350.07	0.16072	0.30007	0.08754	18	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
LPG STORAGE TANK, 1000 GAL	CT	0.50336	152.37268	0.25168	162.98	0.00000	0.00000	0.00000	22	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITINGS,STEEL/IRON	TF	5.11331	9.18106	2.55665	116.97	0.71489	1.28360	0.35744	54	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	13.41198	129.67927	12.89067	432.19	1.72935	1.64565	1.72935	18	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	13.23362	79.92016	11.68695	375.11	1.38130	1.37028	1.38130	9	13.00000	294.68000	6.50000
STEAM REG. VALVE 2"	CT	12.45036	399.89758	6.22518	662.35	0.00000	0.00000	0.00000	4	7.80000	250.53100	3.90000
COND. METER,<300 #/HR.	CT	4.85836	270.65224	4.85836	380.84	0.67045	24.21142	0.67045	22	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	1.72172	76.86155	0.86086	113.16	0.00000	0.00000	0.00000	12	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	1.72172	86.86409	0.86086	123.16	0.00000	0.00000	0.00000	12	5.20000	262.35000	2.60000
SOLAR												
EQUIPMENT												
SOLAR PANEL, 3' X 8'	CT	1.45470	130.47540	0.72735	161.14	0.00000	0.00000	0.00000	11	3.90000	349.80000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	2.94216	413.82612	1.47108	475.85	0.00000	0.00000	0.00000	14	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.06552	0.00605	0.06552	1.49	0.00916	0.00085	0.00916	38	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	282.25616	862.55123	277.65091	7249.38	38.17432	57.80377	38.17432	18	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	330.64546	2929.06851	311.02709	10365.33	42.57020	111.69417	42.57020	18	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	349.45759	10127.11917	323.02806	17968.24	43.93063	659.87853	43.93063	18	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR REPAIR BOILER	CT	3940.0943	127384.44000	1145.1428	207801.94	101.91804	0.00000	68.46908	18	20800.000	636000.00000	4160.0000
									12	1050.4000	148400.00000	262.60000
BOILER COAL 100,000 KBTU/H REPAIR BOILER	CT	7102.1500	294798.94260	1825.4290	438990.20	122.68824	0.00000	78.85419	18	41600.000	1590000.00000	8320.0000
									12	1313.7800	276766.00000	328.44500
BOILER OIL 250 KBTU/HR	CT	327.73823	737.40319	320.83035	8148.40	44.53314	40.30691	44.53314	18	65.00000	3169.40000	16.25000
BOILER OIL 2000 KBTU/HR	CT	372.66015	2418.46397	353.04178	10807.62	48.44425	40.30691	48.44425	18	184.60000	15032.92000	46.15000
BOILER OIL 10,000 KBTU/HR	CT	416.37554	5728.80851	389.94601	15087.63	53.28638	44.95379	53.28638	18	248.69000	38160.00000	62.17250
BOILER GAS/OIL 2000 KBTU/H	CT	343.69326	3143.33643	324.07489	10875.52	44.39441	69.20208	44.39441	18	184.60000	18689.92000	46.15000
BOILER GAS/OIL 20000 KBTU	CT	424.00123	18981.33411	354.78432	28376.19	46.37642	1246.79139	46.37642	18	651.30000	71020.00000	162.82500
BOILR.PNEUMAT.COAL SPREAD.	CT	1449.8519	4862.98108	1353.5658	37437.51	181.95241	166.99201	180.95254	7	364.00000	11236.00000	91.00000
ASH HANDLING SYSTEM	CT	5650.8015	71248.20793	3065.4004	191135.10	308.60967	147.49992	308.21526	12	10400.000	212000.00000	2600.0000
FUEL OIL EQUIPMENT	CT	7.98302	147.55041	3.99151	315.83	0.45771	0.52862	0.22885	9	5.20000	604.20000	2.60000
CHEMICAL FEED SYSTEM	CT	5.88653	185.13462	5.11319	316.17	0.00000	0.00000	0.00000	9	6.50000	778.04000	3.25000
FEED-WATER SUPPLY	CT	143.80639	1311.58040	134.73256	4544.07	0.00000	0.00000	0.00000	9	57.20000	5512.00000	19.06667
DEAERATOR	CT	219.48648	7019.32000	88.22174	11577.23	18.65063	0.00000	9.32531	12	260.00000	21200.00000	65.00000

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 10	UM	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Recources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
BLOWOFF SYSTEM	CT	1.23734	70.11911	0.61867	96.20	0.00000	0.00000	0.00000	9	5.20000	294.68000	2.60000
HOUSE FURN.GAS 25KBTU/HR	CT	34.23066	392.07227	31.75598	1160.50	0.33193	31.18868	0.33193	9	20.80000	710.20000	10.40000
HOUSE FURN.GAS 100KBTU/HR	CT	39.21711	491.42204	34.26775	1365.03	0.33712	37.32070	0.33712	9	41.60000	943.40000	20.80000
HOUSE FURN.GAS 200KBTU/HR	CT	39.21711	1175.17271	34.26775	2048.78	0.33712	45.46147	0.33712	9	41.60000	3572.20000	20.80000
HOUSE FURN.OIL 25KBTU/HR	CT	42.94746	720.41268	40.47278	1686.54	0.33712	44.29650	0.33712	9	20.80000	1696.00000	10.40000
HOUSE FURN.OIL 100KBTU/HR	CT	47.89682	992.09347	42.94746	2062.56	0.33712	48.31603	0.33712	9	41.60000	2716.99200	20.80000
HOUSE FURN.OIL 200KBTU/HR	CT	47.89682	1163.77241	42.94746	2234.23	0.33712	56.56253	0.33712	9	41.60000	3190.60000	20.80000
HOUSE FURN.ELECT 25KBTU/HR	CT	21.02941	437.26622	18.55473	906.29	0.42788	21.14487	0.42788	9	20.80000	1202.04000	10.40000
HOUSE FURN.ELECT.100KBTU	CT	25.97877	575.31852	21.02941	1148.68	0.42788	30.44861	0.42788	9	41.60000	1502.55000	20.80000
HOUSE FURN.ELECT.200KBTU/H	CT	25.97877	733.80408	21.02941	1307.16	0.42788	39.11801	0.42788	9	41.60000	1908.00000	20.80000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	1.72172	76.86155	0.86086	113.16	0.00000	0.00000	0.00000	12	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	1.72172	86.86409	0.86086	123.16	0.00000	0.00000	0.00000	12	5.20000	262.35000	2.60000
EXPANSION TANK	CT	0.08342	0.00000	0.00342	1.89	0.01166	0.00000	0.01166	30	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	13.20609	129.67927	12.68477	427.53	1.70056	1.64565	1.70056	18	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	13.23362	79.92016	11.68695	375.11	1.38130	1.37028	1.38130	9	13.00000	294.68000	6.50000
STORAGE TANK, DHW	CT	17.25114	24.49289	17.25114	415.75	2.41187	3.42433	2.41187	36	3.59395	346.62000	1.79698
IND. FUR., GAS/OIL 500 MBU	CT	40.51293	1240.23068	29.23188	2122.96	4.78440	81.58425	3.86697	22	65.00000	6784.00000	16.25000
IND.FURN.GAS/OIL 2000 MBTU	CT	70.77591	2547.11038	57.37395	4109.42	7.39684	169.61753	7.39684	22	184.60000	13780.00000	46.15000
SURGE TANK, 1000 GAL	CT	1.93960	56 .13930	0.96980	628.03	0.00000	0.00000	0.00000	11	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.15467	0.08071	0.15467	3.59	0.02162	0.01128	0.02162	30	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.92981	7.29352	0.53652	27.12	0.02003	0.00920	0.02003	18	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	35.69931	1145.59310	18.56778	1900.43	0.20080	0.98732	0.20080	18	241.80000	8034.80000	120.90000
PIPE INSULATION	TF	9.31560	95.46235	9.31560	306.74	0.07085	0.43553	0.07085	22	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	0.97282	6.19244	0.97282	28.26	0.12397	0.03651	0.12397	12	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"	CT	0.39754	31.66343	0.39754	40.68	0.02910	0.07301	0.02910	12	0.57200	94.05380	0.57200
DRAIN VALVE	CT	1.49481	13.16507	1.49481	47.07	0.17709	1.01134	0.17709	12	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	0.68054	9.62498	0.34027	23.97	0.00000	0.00000	0.00000	9	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	12.45036	399.89758	6.22518	662.35	0.00000	0.00000	0.00000	4	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	6.60768	111.39395	6.60768	261.26	0.19043	5.86177	0.19043	6	2.60000	151.41040	2.60000
PIPE INSULATION	TF	13.56975	139.33118	13.56975	447.09	0.09438	0.58012	0.09438	18	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	3.73052	180.86689	3.73052	265.48	0.14025	0.34503	0.14025	9	8.39800	742.00000	8.39800
CIRCULATION PUMP 5 HP	CT	3.73052	665.03934	2.73137	746.45	0.14025	8.08859	0.14025	9	8.39800	2544.00000	4.19900
COND. RCVR., 10 - 15 GAL.	CT	22.17634	744.54120	19.59376	1239.24	2.37832	15.77082	2.37832	12	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T	CT	26.03546	0.00000	26.03546	590.48	3.64000	0.00000	3.64000	117	8.38500	1855.00000	4.19250
A/C DX PACKAGE 20T	CT	66.01850	0.00000	66.01850	1497.30	9.23000	0.00000	9.23000	117	20.41000	7950.00000	6.80333
A/C DX PACKAGE 50T	CT	84.61526	0.00000	84.61526	1919.07	11.83000	0.00000	11.83000	117	47.71000	21200.00000	11.92750
A/C WINDOW 1T	CT	12.08789	0.00000	12.08789	274.15	1.69000	0.00000	1.69000	59	5.98000	530.00000	5.98000
A/C WINDOW 2T	CT	12.08789	0.00000	12.08789	274.15	1.69000	0.00000	1.69000	59	6.50000	742.00000	6.50000
A/C PAD MTD. 4T	CT	35.33384	0.00000	35.33384	801.37	4.94000	0.00000	4.94000	59	6.50000	1484.00000	3.25000
A/C PAD MOUNTED 20 TON	CT	69.72020	2632.24500	65.21503	4199.08	8.80274	0.00000	8.80274	12	20.41000	7950.00000	6.80333
CHILLER-AIR COOL RECIP.20T	CT	160.86197	0.00000	80.43099	3390.97	22.49000	0.00000	11.24500	117	28.60000	10759.00000	7.15000
CHILLER AIR COOL REC.50T	CT	199.91517	0.00000	99.95758	4214.21	27.95000	0.00000	13.97500	117	40.30000	19080.00000	10.07500
CHILLER AIR COOL REC.100T	CT	199.91517	0.00000	99.95758	4214.21	27.95000	0.00000	13.97500	117	72.80000	40280.00000	18.20000
CHILLER-AIR COOL RECIP. 5T	CT	86.47493	0.00000	86.47493	1961.25	12.09000	0.00000	12.09000	117	15.60000	3710.00000	5.20000
CHILLER AIR COOL REC. 10T	CT	125.52813	0.00000	62.76407	2646.13	17.55000	0.00000	8.77500	117	20.80000	6360.00000	6.93333
CHILLER AIR COOL REC. 15T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	117	28.60000	8268.00000	7.15000
CHILLER WAT.COOL REC.20T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	117	29.90000	9540.00000	7.47500
CHILLER WAT.COOL REC.50T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	117	48.10000	15900.00000	12.02500
CHILLER WAT.COOL REC.100T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	117	74.10000	27030.00000	18.52500
CHILLER WAT. COOL REC. 10T	CT	144.12489	0.00000	72.06245	3038.15	20.15000	0.00000	10.07500	117	20.80000	5300.00000	5.20000
CHILLER WAT.COOL REC.200T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	117	74.10000	53000.00000	18.52500
CHILL. HERMETIC CENT. 100T	CT	237.10869	0.00000	118.55435	4998.25	33.15000	0.00000	16.57500	117	62.40000	37789.00000	15.60000
CHILL. HERMETIC CENT. 300T	CT	237.10869	0.00000	118.55435	4998.25	33.15000	0.00000	16.57500	117	97.50000	61771.50000	24.37500
CHILL. HERMETIC CENT. 900T	CT	237.10869	0.00000	118.55435	4998.25	33.15000	0.00000	16.57500	117	162.50000	127200.00000	40.62500

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE) PAGE 65

COMPONENT DESCRIPTION Zone: 10	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
DEVICES												
THERMOSTATS/PNEUMATICS	CT	9.23749	21.92438	9.23749	231.43	1.27872	0.00000	1.27872	20	0.78000	187.22780	0.78000
HUMIDITY SENSOR	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	59	0.78000	100.26540	0.78000
FLOW SENSOR	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	88	0.78000	100.04280	0.78000
RADIATION SENSOR	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	26	0.78000	77.11500	0.78000
WIND VELOCITY SENSOR	CT	9.17966	10.39381	9.17966	218.59	1.25851	0.00000	1.25851	13	0.78000	45.52700	0.78000
PRESSURE SENSOR	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	26	0.78000	58.30000	0.78000
DAMPER CONTROLLER/ELECT.	CT	9.45061	33.63194	9.45061	247.97	1.27872	0.00000	1.27872	19	2.60000	287.20700	2.60000
SIMPLEX AIR COMPR.,1 HP	CT	23.76690	23.64663	17.13703	541.46	3.32283	3.30602	2.39592	32	3.67900	6103.82980	1.83950

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION Zone: 11		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks			
	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
HVAC												
NATURAL GAS SYSTEM												
EQUIPMENT												
GAS METER	CT	0.06689	16.90647	0.06689	18.42	0.00000	0.00000	0.00000	16	0.39000	98.58000	0.39000
PIPING SYSTEM												
PIPE/FITTINGS, STEEL/IRON	TF	5.14477	9.19748	2.58811	117.70	0.71929	1.28589	0.36184	55	1074.4500	1929.20000	537.22500
PRESS. REDUCING VALVE, .5"	CT	0.22490	7.30192	0.22490	12.40	0.01753	0.00000	0.01753	10	0.26000	19.08000	0.26000
PRESS. REDUCING VALVE, 2"	CT	0.36420	123.72691	0.24480	131.60	0.01753	0.00000	0.01753	10	0.62400	323.30000	0.31200
FUEL OIL SYSTEM												
STORAGE SYSTEMS												
OIL STORAGE TANK, 275 GAL.	CT	0.25168	15.90424	0.12584	21.21	0.00000	0.00000	0.00000	22	2.60000	164.30000	1.30000
OIL FILTER	CT	0.74387	24.26162	0.74387	41.13	0.10400	3.39200	0.10400	30	0.65000	10.60000	0.65000
FUEL LEVEL METER	CT	0.38525	72.41371	0.38525	81.35	0.03258	0.00000	0.03258	20	1.30000	620.10000	1.30000
DISTRIBUTION SYSTEM												
PIPE/FITTINGS, COPPER	TF	8.29928	145.50068	4.20098	320.61	0.16072	0.30007	0.08754	18	55.51000	1113.00000	27.75500
LPG SYSTEM												
STORAGE SYSTEM												
LPG STORAGE TANK, 1000 GAL	CT	0.50336	152.37288	0.25168	162.98	0.00000	0.00000	0.00000	22	5.20000	1574.10000	2.60000
DISTRIBUTION SYSTEM												
PIPE/FITNGS,STEEL/IRON	TF	5.11331	9.18106	2.55665	116.97	0.71489	1.28360	0.35744	55	1074.4500	1929.20000	537.22500
STEAM, CENTRAL												
PRESS.RED./REG. SYSTEM												
STEAM CONVERTOR, <300,000	CT	13.41198	129.67927	12.89067	432.19	1.72935	1.64565	1.72935	18	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	13.23362	79.92016	11.68695	375.11	1.38130	1.37028	1.38130	9	13.00000	294.68000	6.50000
STEAM REG. VALVE 2"	CT	12.45036	399.89758	6.22518	662.35	0.00000	0.00000	0.00000	4	7.80000	250.53100	3.90000
COND. METER,<300 #/HR.	CT	4.85836	270.65224	4.85836	380.84	0.67045	24.21142	0.67045	22	0.65000	1007.00000	0.65000
VALVES												
RADIATOR VALVE 1"	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	1.43000	20.22480	0.71500
EQUIPMENT												
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	1.72172	76.86155	0.86086	113.16	0.00000	0.00000	0.00000	12	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	1.72172	86.86409	0.86086	123.16	0.00000	0.00000	0.00000	12	5.20000	262.35000	2.60000
SOLAR												
EQUIPMENT												
SOLAR PANEL, 3' X 8'	CT	1.45470	130.47540	0.72735	161.14	0.00000	0.00000	0.00000	11	3.90000	349.80000	1.95000
SOLAR,STORAGE TANK,1000GAL	CT	2.94216	413.82612	1.47108	475.85	0.00000	0.00000	0.00000	15	15.60000	2194.20000	7.80000
PIPING SYSTEM												
PIPE/FITTINGS, PVC	TF	0.04067	0.00376	0.04067	0.93	0.00569	0.00052	0.00569	53	41.70530	669.12500	20.85265
HEATING GENERATION												
EQUIPMENT												
BOILER GAS 250 KBTU/HR	CT	282.25616	862.55123	277.65091	7249.38	38.17432	57.80377	38.17432	18	65.00000	3169.40000	32.50000
BOILER GAS 2000 KBTU/HR	CT	330.64546	2929.06851	311.02709	10365.33	42.57020	111.69417	42.57020	18	184.60000	15032.92000	46.15000
BOILER GAS 10,000 KBTU/HR	CT	349.45759	10127.11917	323.02806	17968.24	43.93063	659.87853	43.93063	18	248.69000	38160.00000	62.17250
BOILER COAL 40,000 KBTU/HR REPAIR BOILER	CT	3940.0943	127384.44000	1145.1428	207801.94	101.91804	0.00000	68.46908	18	20800.000	636000.00000	4160.0000
BOILER COAL 100,000 KBTU/H REPAIR BOILER	CT	7102.1500	294798.94260	1825.4290	438990.20	122.68824	0.00000	78.85419	12	1050.4000	148400.00000	262.60000
									18	41600.000	1590000.00000	8320.0000
BOILER OIL 250 KBTU/HR	CT	327.73823	737.40319	320.83035	8148.40	44.53314	40.30691	44.53314	12	1313.7800	276766.00000	328.44500
BOILER OIL 2000 KBTU/HR	CT	372.66015	2418.46397	353.04178	10807.62	48.44425	40.30691	48.44425	18	65.00000	3169.40000	16.25000
BOILER OIL 10,000 KBTU/HR	CT	416.37554	5728.80851	389.94601	15087.63	53.28638	44.95379	53.28638	18	184.60000	15032.92000	46.15000
BOILER GAS/OIL 2000 KBTU/H	CT	343.69326	3143.33643	324.07489	10875.52	44.39441	69.20208	44.39441	18	248.69000	38160.00000	62.17250
BOILER GAS/OIL 20000 KBTU	CT	424.00123	18981.33411	354.78432	28376.19	46.37642	1246.79139	46.37642	18	184.60000	18689.92000	46.15000
BOILR.PNEUMAT.COAL SPREAD.	CT	1449.8519	4862.98108	1353.5658	37437.51	181.95241	166.99201	180.95254	18	651.30000	71020.00000	162.82500
ASH HANDLING SYSTEM	CT	5650.8015	71248.20793	3065.4004	191135.10	308.60967	147.49992	308.21526	7	364.00000	11236.00000	91.00000
FUEL OIL EQUIPMENT	CT	7.98302	147.55041	3.99151	315.83	0.45771	0.52862	0.22885	12	10400.000	212000.00000	2600.0000
CHEMICAL FEED SYSTEM	CT	5.88653	185.13462	5.11319	316.17	0.00000	0.00000	0.00000	9	5.20000	604.20000	2.60000
FEED-WATER SUPPLY	CT	143.80639	1311.58040	134.73256	4544.07	0.00000	0.00000	0.00000	9	6.50000	778.04000	3.25000
DEAERATOR	CT	219.48648	7019.32000	88.22174	11577.23	18.65063	0.00000	9.32531	9	57.20000	5512.00000	19.06667
									12	260.00000	21200.00000	65.00000

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION Zone: 10	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
VARIABLE VOLUME 50000 CFM	CT	67.56368	4429.37416	40.30264	5874.48	7.72209	172.22946	5.20370	19	105.30000	27305.60000	26.32500
TERM. REHEAT 6500 CFM	CT	60.48968	2073.74177	33.82432	3360.32	6.76218	66.77190	4.30525	11	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	62.42928	2889.51978	34.30922	4215.43	6.76218	81.60160	4.30525	11	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	77.68072	6746.06885	40.10512	8387.63	7.13184	146.61005	4.67491	11	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	95.84156	9740.77293	46.62836	11756.98	7.50150	170.06125	5.04457	11	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	60.48968	2073.74177	33.82432	3360.32	6.76218	66.77190	4.30525	11	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	62.42928	2889.51978	34.30922	4215.43	6.76218	81.60160	4.30525	11	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	77.68072	6746.06885	40.10512	8387.63	7.13184	146.61005	4.67491	11	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	95.84156	9740.77293	46.62836	11756.98	7.50150	170.06125	5.04457	11	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	51.64271	512.10814	32.79514	1623.05	7.22013	71.59748	4.58507	88	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	50.21125	604.41759	32.07941	1685.19	7.02000	84.50320	4.48500	88	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	53.00077	1078.58061	34.86893	2222.62	7.41000	150.79560	4.87500	88	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	55.79028	1227.78957	37.65844	2435.09	7.80000	171.65640	5.26500	88	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	88	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	88	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	88	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	88	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	88	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	88	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	88	3.12000	827.86000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	88	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	88	2.60000	1590.00000	1.30000
UNIT VENT 1200 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	88	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	50.21125	492.51087	32.07941	1573.28	7.02000	68.85760	4.48500	88	32.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	50.21125	604.41759	32.07941	1685.19	7.02000	84.50320	4.48500	88	37.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	53.00077	1078.58061	34.86893	2222.62	7.41000	150.79560	4.87500	88	71.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	55.79028	1227.78957	37.65844	2435.09	7.80000	171.65640	5.26500	88	113.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	50.50219	584.12010	49.04749	1724.85	6.65391	15.33206	6.65391	11	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	50.21125	380.60415	32.07941	1461.37	7.02000	53.21200	4.48500	88	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	88	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	88	3.25000	461.10000	1.62500
UNIT HEATER 4000 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	88	3.25000	828.92000	1.62500
UNIT HEATER 8000 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	88	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50MBH	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	88	2.60000	445.20000	1.30000
HEAT PUMP 5T	CT	26.03546	0.00000	26.03546	590.48	3.64000	0.00000	3.64000	117	8.38500	2994.50000	4.19250
HEAT PUMP 10T	CT	66.01850	0.00000	66.01850	1497.30	9.23000	0.00000	9.23000	117	14.30000	5989.00000	4.76667
HEAT PUMP 25T	CT	84.61526	0.00000	84.61526	1919.07	11.83000	0.00000	11.83000	117	19.50000	17755.00000	4.87500
HEAT PUMP 1T	CT	30.07181	60.01792	30.07181	742.05	4.20432	8.39106	4.20432	26	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	18.59676	0.00000	9.29838	392.02	2.60000	0.00000	1.30000	32	2.34000	80.56000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	35.68448	690.43049	32.00678	1487.99	4.30345	21.34279	4.30345	14	26.00000	2851.40000	6.50000
IND DRAFT FAN 10000 CFM	CT	36.39522	715.10515	32.36215	1527.64	4.40282	22.72423	4.35314	14	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	4.81713	23.70918	4.81713	132.96	0.52303	1.38981	0.52303	12	3.25000	41.58380	3.25000
EXHAUST FAN, 1000 CFM	CT	10.07102	41.34397	9.76656	268.78	1.32289	0.92116	1.32289	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	39.67457	759.94761	32.76065	1637.64	4.34331	22.68441	4.27935	12	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	39.67457	1852.27698	17.68514	2681.73	4.34331	68.58050	2.17166	12	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	41.82672	2311.54000	33.29869	3232.88	4.34331	72.92640	4.27935	12	32.50000	5406.00000	8.12500
EXHAUST FAN, 5000 CFM	CT	9.59517	4.95128	9.44678	222.09	1.34149	0.69223	1.32075	26	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM	CT	2.32460	0.00000	2.32460	52.72	0.32500	0.00000	0.32500	117	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	3.39430	46.25946	1.69715	117.81	0.00000	0.00000	0.00000	11	9.10000	124.02000	4.55000
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
RCOM HUMIDIFIER,FLOOR TYPE	CT	4.64835	83.63808	4.64835	189.06	0.06659	0.81447	0.06659	6	0.26000	169.60000	0.26000
CONTROLS/INSTRUMENT-												

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION Zone: 11	um	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
BLOWOFF SYSTEM	CT	1.23734	70.11911	0.61867	96.20	0.00000	0.00000	0.00000	9	5.20000	294.68000	2.60000
HOUSE FURN.GAS 25KBTU/HR	CT	34.23066	392.07227	31.75598	1160.50	0.33193	31.18868	0.33193	9	20.80000	710.20000	10.40000
HOUSE FURN.GAS 100KBTU/HR	CT	39.21711	491.42204	34.26775	1365.03	0.33712	37.32070	0.33712	9	41.60000	943.40000	20.80000
HOUSE FURN.GAS 200KBTU/HR	CT	39.21711	1175.17271	34.26775	2048.78	0.33712	45.46147	0.33712	9	41.60000	3572.20000	20.80000
HOUSE FURN.OIL 25KBTU/HR	CT	42.94746	720.41268	40.47278	1686.54	0.33712	44.29850	0.33712	9	20.80000	1696.00000	10.40000
HOUSE FURN.OIL 100KBTU/HR	CT	47.89682	992.09347	42.94746	2062.56	0.33712	48.31603	0.33712	9	41.60000	2716.99200	20.80000
HOUSE FURN.OIL 200KBTU/HR	CT	47.89682	1163.77241	42.94746	2234.23	0.33712	56.56253	0.33712	9	41.60000	3190.60000	20.80000
HOUSE FURN.ELECT 25KBTU/HR	CT	21.02941	437.26622	18.55473	906.29	0.42788	21.14487	0.42788	9	20.80000	1202.04000	10.40000
HOUSE FURN.ELECT.100KBTU	CT	25.97877	575.31852	21.02941	1148.68	0.42788	30.44861	0.42788	9	41.60000	1502.55000	20.80000
HOUSE FURN.ELECT.200KBTU/H	CT	25.97877	733.80408	21.02941	1307.16	0.42788	39.11801	0.42788	9	41.60000	1908.00000	20.80000
CAST IRON RADIATOR 10 SECT	CT	0.00000	0.00000	0.00000	0.00	0.00000	0.00000	0.00000	30	5.20000	175.96000	2.60000
BASEBOARD RADIATION 10 FT	CT	1.72172	76.86155	0.86086	113.16	0.00000	0.00000	0.00000	12	5.20000	232.14000	2.60000
FINNED RADIATOR, WALL 10 F	CT	1.72172	86.86409	0.86086	123.16	0.00000	0.00000	0.00000	12	5.20000	262.35000	2.60000
EXPANSION TANK	CT	0.08342	0.00000	0.08342	1.89	0.01166	0.00000	0.01166	30	3.47100	135.68000	1.73550
STEAM CONVERTOR, <300,000	CT	13.20609	129.67927	12.68477	427.53	1.70056	1.64565	1.70056	18	7.35800	832.10000	3.67900
FLASH TANK, 24 GAL.	CT	13.23362	79.92016	11.68695	375.11	1.38130	1.37028	1.38130	9	13.00000	294.68000	6.50000
STORAGE TANK, DHW	CT	17.11526	24.29997	17.11526	412.47	2.39287	3.39736	2.39287	37	3.59395	346.62000	1.79698
IND. FUR., GAS/OIL 500 MBU	CT	40.51293	1240.23068	29.23188	2122.96	4.78440	81.58425	3.86697	22	65.00000	6784.00000	16.25000
IND.FURN.GAS/OIL 2000 MBTU	CT	70.77591	2547.11038	57.37395	4109.42	7.39684	169.61753	7.39684	22	184.60000	13780.00000	46.15000
SURGE TANK, 1000 GAL	CT	1.93960	587.13930	0.96980	628.03	0.00000	0.00000	0.00000	11	5.20000	1574.10000	2.60000
DIST. PIPING SYSTEM												
PIPE/FITTINGS, ST. & C.I.	TF	0.15467	0.08071	0.15467	3.59	0.02162	0.01128	0.02162	30	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	0.92981	7.29352	0.53652	27.12	0.02003	0.00920	0.02003	18	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	32.58009	1041.94418	17.00817	1731.03	0.20080	0.98732	0.20080	18	241.80000	8034.80000	120.90000
PIPE INSULATION	TF	9.31560	95.46235	9.31560	306.74	0.07085	0.43553	0.07085	22	91.00000	954.00000	91.00000
GATE VALVE, 3/8" - 1 1/2"	CT	0.97282	6.19244	0.97282	28.26	0.12397	0.03651	0.12397	12	0.26000	17.91400	0.26000
GATE VALVE, 2" - 3"	CT	0.39754	31.66343	0.39754	40.68	0.02910	0.07301	0.02910	12	0.57200	94.05380	0.57200
DRAIN VALVE	CT	1.49481	13.16507	1.49481	47.07	0.17709	1.01134	0.17709	12	0.68900	17.91400	0.68900
RADIATOR VALVE 1"	CT	0.68054	9.62498	0.34027	23.97	0.00000	0.00000	0.00000	9	1.43000	20.22480	0.71500
PRESSURE REDUCER VALVE 2"	CT	12.45036	399.89758	6.22518	662.35	0.00000	0.00000	0.00000	4	7.80000	250.53100	3.90000
STEAM TRAP, F & T, <1"	CT	6.60768	111.39395	6.60768	261.26	0.19043	5.86177	0.19043	6	2.60000	131.41040	2.60000
PIPE INSULATION	TF	13.56975	139.33118	13.56975	447.09	0.09438	0.58012	0.09438	18	91.00000	954.00000	91.00000
CIRCULATION PUMP, < 1 HP	CT	3.73052	180.86689	3.73052	265.48	0.14025	0.34503	0.14025	9	8.39800	742.00000	8.39800
CIRCULATION PUMP 5 HP	CT	3.73052	665.03934	2.73137	746.45	0.14025	8.08859	0.14025	9	8.39800	2544.00000	4.19900
COND. RCVR., 10 - 15 GAL.	CT	22.17634	744.54120	19.59376	1239.24	2.37832	15.77082	2.37832	12	15.60000	1908.00000	7.80000
COOLING GENERATION EQUIPMENT												
A/C DX PACKAGE 5T	CT	26.03546	0.00000	26.03546	590.48	3.64000	0.00000	3.64000	385	8.38500	1855.00000	4.19250
A/C DX PACKAGE 20T	CT	66.01850	0.00000	66.01850	1497.30	9.23000	0.00000	9.23000	385	20.41000	7950.00000	6.80333
A/C DX PACKAGE 50T	CT	84.61526	0.00000	84.61526	1919.07	11.83000	0.00000	11.83000	385	47.71000	21200.00000	11.92750
A/C WINDOW 1T	CT	12.08789	0.00000	12.08789	274.15	1.69000	0.00000	1.69000	192	5.98000	530.00000	5.98000
A/C WINDOW 2T	CT	12.08789	0.00000	12.08789	274.15	1.69000	0.00000	1.69000	192	6.50000	742.00000	6.50000
A/C PAD MTD. 4T	CT	35.33384	0.00000	35.33384	801.37	4.94000	0.00000	4.94000	192	6.50000	1484.00000	3.25000
A/C PAD MOUNTED 20 TON	CT	69.72020	2632.24500	65.21503	4199.08	8.80274	0.00000	8.80274	12	20.41000	7950.00000	6.80333
CHILLER-AIR COOL RECIP.20T	CT	160.86197	0.00000	80.43099	3390.97	22.49000	0.00000	11.24500	385	28.60000	10759.00000	7.15000
CHILLER AIR COOL REC.50T	CT	199.91517	0.00000	99.95758	4214.21	27.95000	0.00000	13.97500	385	40.30000	19080.00000	10.07500
CHILLER AIR COOL REC.100T	CT	199.91517	0.00000	99.95758	4214.21	27.95000	0.00000	13.97500	385	72.80000	40280.00000	18.20000
CHILLER-AIR COOL RECIP. 5T	CT	86.47493	0.00000	86.47493	1961.25	12.09000	0.00000	12.09000	385	15.60000	3710.00000	5.20000
CHILLER AIR COOL REC. 10T	CT	125.52813	0.00000	62.76407	2646.13	17.55000	0.00000	8.77500	385	20.80000	6360.00000	6.93333
CHILLER AIR COOL REC. 15T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	385	28.60000	8268.00000	7.15000
CHILLER WAT.COOL REC.20T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	385	29.90000	9540.00000	7.47500
CHILLER WAT.COOL REC.50T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	385	48.10000	15900.00000	12.02500
CHILLER WAT.COOL REC.100T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	385	74.10000	27030.00000	18.52500
CHILLER WAT. COOL REC. 10T	CT	144.12489	0.00000	72.06245	3038.15	20.15000	0.00000	10.07500	385	20.80000	5300.00000	5.20000
CHILLER WAT.COOL REC.200T	CT	162.72165	0.00000	81.36083	3430.17	22.75000	0.00000	11.37500	385	74.10000	53000.00000	18.52500
CHILL. HERMETIC CENT. 100T	CT	237.10869	0.00000	118.55435	4998.25	33.15000	0.00000	16.57500	385	62.40000	37789.00000	15.60000
CHILL. HERMETIC CENT. 300T	CT	237.10869	0.00000	118.55435	4998.25	33.15000	0.00000	16.57500	385	97.50000	61771.50000	24.37500
CHILL. HERMETIC CENT. 900T	CT	237.10869	0.00000	118.55435	4998.25	33.15000	0.00000	16.57500	385	162.50000	127200.00000	40.62500

See NOTES on the last page of this table for Explanation of Column Headings

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks			
Zone: 11	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
CHILL. OPEN CENT. 300T	CT	618.34227	0.00000	309.17114	13034.66	86.45000	0.00000	43.22500	385	97.50000	61771.50000	24.37500
CHILL. OPEN CENT. 900T	CT	237.10869	0.00000	118.55435	4998.25	33.15000	0.00000	16.57500	385	162.50000	127200.00000	40.62500
CHILL.DBL.BNDL. HERM.100T	CT	274.30221	0.00000	137.15111	5782.29	38.35000	0.00000	19.17500	385	68.90000	41340.00000	17.22500
CHILL.DBL.BNDL. HERM.300T	CT	274.30221	0.00000	137.15111	5782.29	38.35000	0.00000	19.17500	385	107.90000	67840.00000	26.97500
CHILL.DBL.BNDL. HERM.900T	CT	274.30221	0.00000	137.15111	5782.29	38.35000	0.00000	19.17500	385	178.10000	139920.00000	44.52500
CHILL. ONE STG. ABS. 100T	CT	813.60825	0.00000	406.80413	17150.86	113.75000	0.00000	56.87500	385	65.00000	37100.00000	16.25000
CHILL. ONE STG. ABS. 300T	CT	119.96910	0.00000	59.97455	2528.53	16.77000	0.00000	8.38500	385	104.00000	61480.00000	26.00000
CHILL. ONE STG. ABS. 900T	CT	119.96910	0.00000	59.97455	2528.53	16.77000	0.00000	8.38500	385	167.70000	113420.00000	41.92500
CHILL. TWO STG. ABS. 300T	CT	119.96910	0.00000	59.97455	2528.53	16.77000	0.00000	8.38500	385	114.40000	67840.00000	28.60000
CHILL. TWO STG. ABS. 900T	CT	111.58056	0.00000	55.79028	2352.12	15.60000	0.00000	7.80000	385	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 5T	CT	16.73708	0.00000	16.73708	379.60	2.34000	0.00000	2.34000	288	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 20T	CT	16.73708	0.00000	8.36854	352.82	2.34000	0.00000	1.17000	288	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 50T	CT	29.75482	0.00000	14.87741	627.23	4.16000	0.00000	2.08000	288	31.20000	5294.70000	7.80000
AIR COOLED CONDENSER 100T	CT	29.75482	0.00000	14.87741	627.23	4.16000	0.00000	2.08000	288	46.80000	10578.80000	11.70000
COOLING TOWER 50T	CT	32.54433	0.00000	16.27217	686.03	4.55000	0.00000	2.27500	288	46.80000	4478.50000	11.70000
COOLING TOWER 100T	CT	101.35234	0.00000	50.67617	2136.51	14.17000	0.00000	7.08500	288	52.00000	10070.00000	13.00000
COOLING TOWER 300T	CT	118.08943	0.00000	59.04471	2489.33	16.51000	0.00000	8.25500	288	78.00000	16377.00000	19.50000
COOLING TOWER 900T	CT	128.31764	0.00000	64.15882	2704.94	17.94000	0.00000	8.97000	288	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 20T	CT	59.50963	0.00000	29.75482	1254.46	8.32000	0.00000	4.16000	288	36.40000	3688.80000	9.10000
EVAPORATIVE CONDENSER 100T	CT	97.63299	0.00000	48.81650	2058.10	13.65000	0.00000	6.82500	288	100.10000	10038.20000	25.02500
EVAPORATIVE CONDENSER 300T	CT	22.31611	0.00000	11.15806	470.42	3.12000	0.00000	1.56000	288	182.00000	31800.00000	45.50000
EXPANSION TANK	CT	0.08342	0.00000	0.08342	1.89	0.01166	0.00000	0.01166	30	3.47100	135.68000	1.73550
REFRIG. FAN COIL 1T	CT	4.64919	0.00000	4.64919	105.44	0.65000	0.00000	0.65000	288	2.60000	855.42000	1.30000
REFRIG. FAN COIL 3T	CT	4.64919	0.00000	4.64919	105.44	0.65000	0.00000	0.65000	288	2.86000	1051.52000	1.43000
REFRIG. FAN COIL 5T	CT	4.64919	0.00000	4.64919	105.44	0.65000	0.00000	0.65000	288	3.25000	1240.20000	1.62500
DIST. PIPING SYSTEM												
PIPE/FITTINGS ST.& C.I.	TF	1.77466	5.98947	1.01342	43.80	0.03526	0.01840	0.03526	18	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	1.94620	16.93822	1.02724	58.14	0.01514	0.00695	0.01514	12	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	0.11605	0.57678	0.11605	3.21	0.01623	0.08064	0.01623	44	241.80990	8321.03000	120.90000
GATE VALVE, 3/8" - 1 1/2"	CT	0.43551	6.19244	0.43551	16.07	0.02899	0.03651	0.02899	12	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.39754	31.66343	0.39754	40.68	0.02910	0.07301	0.02910	12	0.57200	94.05380	0.57200
DRAIN VALVE	CT	1.49481	13.16507	1.49481	47.07	0.17709	1.01134	0.17709	12	0.68900	17.91400	0.68900
PIPE INSULATION	TF	13.56975	131.60938	13.56975	439.37	0.09438	0.55052	0.09438	18	91.00000	901.00000	91.00000
CIRCULATOR PUMP, < 1 HP	CT	3.70242	180.86689	3.70242	264.84	0.13632	0.34503	0.13632	9	8.39800	742.00000	8.39800
5 TON CHILLER ACH RECIP	CT	9.15626	665.03934	5.44424	860.82	0.14025	8.08859	0.14025	9	31.20000	2544.00000	15.60000
HEAT/COOL GENERATION EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	51.36214	495.58400	32.65486	1600.61	7.18091	69.28725	4.56545	26	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	51.36214	606.88418	32.65486	1711.91	7.18091	84.84805	4.56545	26	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	54.15166	1100.64768	35.40753	2268.83	7.57091	153.88078	4.95030	26	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	56.94117	1242.80977	38.19704	2474.25	7.96091	173.75636	5.34030	26	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	51.14109	380.60415	32.54433	1480.97	7.15000	53.21200	4.55000	288	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	50.43230	495.58400	32.18994	1581.01	7.05091	69.28725	4.50045	26	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	50.43230	607.49072	32.18994	1692.92	7.05091	84.93285	4.50045	26	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	53.22182	1086.09071	34.94261	2234.67	7.44091	151.84558	4.88530	26	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	56.01133	1242.80977	37.73212	2454.65	7.83091	173.75636	5.27530	26	105.30000	27305.60000	26.32500
3 DK.MULTI ZONE 6500 CFM	CT	51.36214	495.58100	32.65486	1600.61	7.18091	69.28683	4.56545	26	32.50000	5997.48000	8.12500
3 DK.MULTI ZONE 10,000 CFM	CT	51.36214	607.49072	32.65486	1712.52	7.18091	84.93285	4.56545	26	42.90000	8050.70000	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	54.15166	925.50912	35.44437	2093.81	7.57091	129.39478	4.95545	26	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	56.94117	1100.42439	38.23388	2331.99	7.96091	153.84956	5.34545	26	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	50.43230	495.58400	25.21615	1558.70	7.05091	69.28725	3.52545	26	39.00000	6572.00000	9.75000
D.D. VARI.VOL.10000 CFM	CT	50.43230	607.49072	25.21615	1670.60	7.05091	84.93285	3.52545	26	46.80000	8904.00000	11.70000
D.D. VARI.VOL.25000 CFM	CT	53.22182	1084.94317	26.61091	2206.86	7.44091	151.68514	3.72045	26	83.20000	16960.00000	20.80000
D.D. VARI.VOL.50000 CFM	CT	56.01133	1234.15212	28.00567	2414.87	7.83091	172.54594	3.91545	26	115.70000	29680.00000	28.92500
D.D. VARI.VOL. 100,000CFM	CT	55.79028	2059.81147	27.89514	3235.87	7.80000	287.98080	3.90000	288	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CFM	CT	50.43230	495.58400	50.32178	1639.03	7.05091	69.28725	7.03545	26	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000 CFM	CT	50.43230	607.49072	32.18994	1692.92	7.05091	84.93285	4.50045	26	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	42.06376	688.20015	23.82140	1583.83	5.88091	96.21678	3.33045	26	75.40000	15359.40000	18.85000

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE) PAGE 63

COMPONENT DESCRIPTION Zone: 10	un	PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%) By Resources labor	material	equipment	Washington D.C. Total	ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS Annual Maintenance and Repair labor	material	equipment	Replacement and High Costs Tasks yr	labor	material	equipment
CHILL. OPEN CENT. 300T	CT	618.34227	0.00000	309.17114	13034.66	86.45000	0.00000	43.22500	117	97.50000	61771.50000	24.37500
CHILL. OPEN CENT. 900T	CT	237.10869	0.00000	118.55435	4998.25	33.15000	0.00000	16.57500	117	162.50000	127200.00000	40.62500
CHILL.DBL.BNDL. HERM.100T	CT	274.30221	0.00000	137.15111	5782.29	38.35000	0.00000	19.17500	117	68.90000	41340.00000	17.22500
CHILL.DBL.BNDL. HERM.300T	CT	274.30221	0.00000	137.15111	5782.29	38.35000	0.00000	19.17500	117	107.90000	67840.00000	26.97500
CHILL.DBL.BNDL. HERM.900T	CT	274.30221	0.00000	137.15111	5782.29	38.35000	0.00000	19.17500	117	178.10000	139920.00000	44.52500
CHILL. ONE STG. ABS. 100T	CT	813.60825	0.00000	406.80413	17150.86	113.75000	0.00000	56.87500	117	65.00000	37100.00000	16.25000
CHILL. ONE STG. ABS. 300T	CT	119.94910	0.00000	59.97455	2528.53	16.77000	0.00000	8.38500	117	104.00000	61480.00000	26.00000
CHILL. ONE STG. ABS. 900T	CT	119.94910	0.00000	59.97455	2528.53	16.77000	0.00000	8.38500	117	167.70000	113420.00000	41.92500
CHILL. TWO STG. ABS. 300T.	CT	119.94910	0.00000	59.97455	2528.53	16.77000	0.00000	8.38500	117	114.40000	67840.00000	28.60000
CHILL. TWO STG. ABS. 900T	CT	111.58056	0.00000	55.79028	2352.12	15.60000	0.00000	7.80000	117	184.60000	125822.00000	46.15000
AIR COOLED CONDENSER 5T	CT	16.73708	0.00000	16.73708	379.60	2.34000	0.00000	2.34000	88	9.10000	821.50000	4.55000
AIR COOLED CONDENSER 20T	CT	16.73708	0.00000	8.36854	352.82	2.34000	0.00000	1.17000	88	20.80000	2438.00000	6.93333
AIR COOLED CONDENSER 50T	CT	29.75482	0.00000	14.87741	627.23	4.16000	0.00000	2.08000	88	31.20000	5294.70000	7.80000
AIR COOLED CONDENSER 100T	CT	29.75482	0.00000	14.87741	627.23	4.16000	0.00000	2.08000	88	46.80000	10578.80000	11.70000
COOLING TOWER 50T	CT	32.54433	0.00000	16.27217	686.03	4.55000	0.00000	2.27500	88	46.80000	4478.50000	11.70000
COOLING TOWER 100T	CT	101.35234	0.00000	50.67617	2136.51	14.17000	0.00000	7.08500	88	52.00000	10070.00000	13.00000
COOLING TOWER 300T	CT	118.08943	0.00000	59.04471	2489.33	16.51000	0.00000	8.25500	88	78.00000	16377.00000	19.50000
COOLING TOWER 900T	CT	128.31764	0.00000	64.15882	2704.94	17.94000	0.00000	8.97000	88	128.70000	43142.00000	32.17500
EVAPORATIVE CONDENSER 20T	CT	59.50963	0.00000	29.75482	1254.46	8.32000	0.00000	4.16000	88	36.40000	3688.80000	9.10000
EVAPORATIVE CONDENSER 100T	CT	97.63299	0.00000	48.81650	2058.10	13.65000	0.00000	6.82500	88	100.10000	10038.20000	25.02500
EVAPORATIVE CONDENSER 300T	CT	22.31611	0.00000	11.15806	470.42	3.12000	0.00000	1.56000	88	182.00000	31800.00000	45.50000
EXPANSION TANK	CT	0.08342	0.00000	0.08342	1.89	0.01166	0.00000	0.01166	30	3.47100	135.68000	1.73550
REFRIG. FAN COIL 1T	CT	4.64919	0.00000	4.64919	105.44	0.65000	0.00000	0.65000	88	2.60000	855.42000	1.30000
REFRIG. FAN COIL 3T	CT	4.64919	0.00000	4.64919	105.44	0.65000	0.00000	0.65000	88	2.86000	1051.52000	1.43000
REFRIG. FAN COIL 5T	CT	4.64919	0.00000	4.64919	105.44	0.65000	0.00000	0.65000	88	3.25000	1240.20000	1.62500
DIST. PIPING SYSTEM												
PIPE/FITTINGS ST.& C.I.	TF	1.77466	5.98947	1.01342	43.80	0.03526	0.01840	0.03526	18	10.74450	41.34000	5.37225
PIPE/FITTINGS, COPPER	TF	1.94620	16.93822	1.02724	58.14	0.01514	0.00695	0.01514	12	5.55100	51.00720	2.77550
PIPE AND FITTINGS, PVC	TF	0.18698	0.92927	0.18698	5.17	0.02614	0.12992	0.02614	32	241.80000	8321.00000	120.90000
GATE VALVE, 3/8" - 1 1/2"	CT	0.43551	6.19244	0.43551	16.07	0.02899	0.03651	0.02899	12	0.68900	17.91400	0.68900
GATE VALVE, 2"-3"	CT	0.39754	31.66343	0.39754	40.68	0.02910	0.07301	0.02910	12	0.57200	94.05380	0.57200
DRAIN VALVE	CT	1.49481	13.16507	1.49481	47.07	0.17709	1.01134	0.17709	12	0.68900	17.91400	0.68900
PIPE INSULATION	TF	13.56975	131.60938	13.56975	439.37	0.09438	0.55052	0.09438	18	91.00000	901.00000	91.00000
CIRCULATOR PUMP, < 1 HP	CT	3.70242	180.86689	3.70242	264.84	0.13632	0.34503	0.13632	9	8.39800	742.00000	8.39800
5 TON CHILLER ACH RECIP	CT	9.15626	665.03934	5.44424	860.82	0.14025	8.08859	0.14025	9	31.20000	2544.00000	15.60000
HEAT/COOL GENERATION EQUIPMENT												
MULTI-ZONE 6500 CFM	CT	54.92241	1191.70383	33.25521	2368.01	7.08274	68.42252	4.50041	19	36.40000	5997.48000	9.10000
MULTI-ZONE 10,000 CFM	CT	55.68356	1541.61390	33.44550	2733.36	7.08274	83.72856	4.50041	19	42.90000	8050.70000	10.72500
MULTI-ZONE 25,000 CFM	CT	62.23316	2885.92673	37.08142	4216.89	7.46635	152.02038	4.87572	19	75.40000	15359.40000	18.85000
MULTI-ZONE 50,000 CFM	CT	68.47829	4429.37416	40.70059	5893.57	7.84997	172.22946	5.25934	19	105.30000	27305.60000	26.32500
MULTI-ZONE 2500 CFM	CT	51.14109	380.60415	32.54433	1480.97	7.15000	53.21200	4.55000	88	26.00000	4240.00000	6.50000
DUAL DUCT 6500 CFM	CT	54.00780	1191.70383	32.79790	2348.73	6.95486	68.42252	4.43647	19	36.40000	5997.48000	9.10000
DUAL DUCT 10,000 CFM	CT	54.76895	1542.21051	32.98819	2714.67	6.95486	83.81198	4.43647	19	42.90000	8050.70000	10.72500
DUAL DUCT 25,000 CFM	CT	61.31854	2871.60808	36.62411	4183.29	7.33848	150.01850	4.81179	19	75.40000	15359.40000	18.85000
DUAL DUCT 50,000 CFM	CT	67.56368	4429.37416	40.24328	5874.29	7.72209	172.22946	5.19540	19	105.30000	27305.60000	26.32500
3 DK.MULTI ZONE 6500 CFM	CT	54.46572	1191.69899	33.14104	2358.74	7.08274	68.42184	4.50041	19	32.50000	5997.48000	8.12500
3 DK.MULTI ZONE 10,000 CFM	CT	55.68356	1542.21051	33.44550	2733.95	7.08274	83.81198	4.50041	19	42.90000	8050.70000	10.72500
3 DK.MULTI ZONE 25,000 CFM	CT	62.23316	2713.65548	37.14078	4044.81	7.46635	127.93526	4.88402	19	75.40000	15359.40000	18.85000
3 DK.MULTI ZONE 50,000 CFM	CT	68.47829	4289.31987	40.75995	5753.71	7.84997	152.64856	5.26764	19	105.30000	27305.60000	26.32500
D.D. VARI.VOL. 6500 CFM	CT	54.31226	1258.98012	26.01440	2400.23	6.95486	68.42252	3.47743	19	39.00000	6572.00000	9.75000
D.D. VARI.VOL.10000 CFM	CT	55.22564	1642.13194	26.24275	2801.90	6.95486	83.81198	3.47743	19	46.80000	8904.00000	11.70000
D.D. VARI.VOL.25000 CFM	CT	62.23192	3057.18948	28.68028	4361.24	7.33848	149.76001	3.66924	19	83.20000	16960.00000	20.80000
D.D. VARI.VOL.50000 CFM	CT	68.78152	4693.46764	31.00364	6132.54	7.72209	170.27929	3.86105	19	115.70000	29680.00000	28.92500
D.D. VARI.VOL. 100,000CFM	CT	55.79028	2059.81147	27.89514	3235.87	7.80000	287.98080	3.90000	88	169.00000	48760.00000	42.25000
VARIABLE VOLUME 6500 CFM	CT	53.55111	1191.70383	50.51872	2396.54	6.95486	68.42252	6.92997	19	32.50000	5997.48000	8.12500
VARIABLE VOLUME 10000 CFM	CT	54.76895	1542.21051	32.98819	2714.67	6.95486	83.81198	4.43647	19	42.90000	8050.70000	10.72500
VARIABLE VOLUME 25000 CFM	CT	50.34316	2480.23166	25.70809	3543.18	5.80402	95.30044	3.28562	19	75.40000	15359.40000	18.85000

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks			
Zone: 11	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
VARIABLE VOLUME 50000 CFM	CT	56.01133	1242.80977	37.76897	2454.77	7.83091	173.75636	5.28045	26	105.30000	27305.60000	26.32500
TERM. REHEAT 6500 CFM	CT	60.48968	2073.74177	33.82432	3360.32	6.76218	66.77190	4.30525	11	32.50000	4279.22000	8.12500
TERM. REHEAT 10000 CFM	CT	62.42926	2889.51978	34.30922	4215.43	6.76218	81.60160	4.30525	11	37.70000	6181.92000	9.42500
TERM. REHEAT 25000 CFM	CT	77.68072	6746.06885	40.10512	8387.63	7.13184	146.61005	4.67491	11	71.50000	15274.60000	17.87500
TERM. REHEAT 50000 CFM	CT	95.84156	9740.77293	46.62836	11756.98	7.50150	170.06125	5.04457	11	113.10000	22853.60000	28.27500
2 PIPE INDUCTION 6500 CFM	CT	60.48968	2073.74177	33.82432	3360.32	6.76218	66.77190	4.30525	11	32.50000	4279.22000	8.12500
2 PIPE INDUCTION 10000 CFM	CT	62.42928	2889.51978	34.30922	4215.43	6.76218	81.60160	4.30525	11	37.70000	6181.92000	9.42500
2 PIPE INDUCTION 25000 CFM	CT	77.68072	6746.06885	40.10512	8387.63	7.13184	146.61005	4.67491	11	71.50000	15274.60000	17.87500
2 PIPE INDUCTION 50000 CFM	CT	95.84156	9740.77293	46.62836	11756.98	7.50150	170.06125	5.04457	11	113.10000	22853.60000	28.27500
4 PIPE INDUCTION 6500 CFM	CT	51.64271	512.10814	32.79514	1623.05	7.22013	71.59748	4.58507	288	32.50000	4279.22000	8.12500
4 PIPE INDUCTION 10000 CFM	CT	50.21125	604.41759	32.07941	1685.19	7.02000	84.50320	4.48500	288	37.70000	6181.92000	9.42500
4 PIPE INDUCTION 25000 CFM	CT	53.00077	1078.58061	34.86893	2222.62	7.41000	150.79560	4.87500	288	71.50000	15274.60000	17.87500
4 PIPE INDUCTION 50000 CFM	CT	55.79028	1227.78957	37.65844	2435.09	7.80000	171.65640	5.26500	288	113.10000	22853.60000	28.27500
2 PIPE FAN COIL 200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	288	2.60000	609.50000	1.30000
2 PIPE FAN COIL 400 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	288	2.60000	694.30000	1.30000
2 PIPE FAN COIL 600 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	288	2.86000	752.60000	1.43000
2 PIPE FAN COIL 1200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	288	3.25000	1240.20000	1.62500
4 PIPE FAN COIL 200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	288	2.86000	664.62000	1.43000
4 PIPE FAN COIL 400 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	288	2.86000	1526.40000	1.43000
4 PIPE FAN COIL 600 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	288	3.12000	827.86000	1.56000
4 PIPE FAN COIL 1200 CFM	CT	7.43870	45.49054	7.43870	214.20	1.04000	6.36000	1.04000	288	3.64000	1364.22000	1.82000
UNIT VENT 400 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	288	2.60000	1590.00000	1.30000
UNIT VENT 1200 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	288	3.25000	1908.00000	1.62500
SIN.ZONE DRAW THRU 6500CFM	CT	50.21125	492.51087	32.07941	1573.28	7.02000	68.85760	4.48500	288	32.50000	4279.22000	8.12500
SIN.ZONE DRAW THR.10000CFM	CT	50.21125	604.41759	32.07941	1685.19	7.02000	84.50320	4.48500	288	37.70000	6181.92000	9.42500
SIN.ZONE DRAW THR.25000CFM	CT	53.00077	1078.58061	34.86893	2222.62	7.41000	150.79560	4.87500	288	71.50000	15274.60000	17.87500
SIN.ZONE DRAW THR.50000CFM	CT	55.79028	1227.78957	37.65844	2435.09	7.80000	171.65640	5.26500	288	113.10000	22853.60000	28.27500
SIN.ZONE DRAWTHRU 1000CFM	CT	50.50219	584.12010	49.04749	1724.85	6.65391	15.33206	6.65391	11	7.80000	1272.00000	3.90000
SIN.ZONE DRAWTHRU 2500CFM	CT	50.21125	380.60415	32.07941	1461.37	7.02000	53.21200	4.48500	288	23.40000	3710.00000	5.85000
UNIT HEATER 400 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	288	2.60000	312.70000	1.30000
UNIT HEATER 1200 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	288	3.25000	461.10000	1.62500
UNIT HEATER 4000 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	288	3.25000	828.92000	1.62500
UNIT HEATER 8000 CFM	CT	13.01773	11.37263	13.01773	306.61	1.82000	1.59000	1.82000	288	3.25000	1272.00000	1.62500
GASFIRED RADIANT HTR 50MBH	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	288	2.60000	445.20000	1.30000
HEAT PUMP 5T	CT	26.03546	0.00000	26.03546	590.48	3.64000	0.00000	3.64000	385	8.38500	2994.50000	4.19250
HEAT PUMP 10T	CT	66.01850	0.00000	66.01850	1497.30	9.23000	0.00000	9.23000	385	14.30000	5989.00000	4.76667
HEAT PUMP 25T	CT	84.61526	0.00000	84.61526	1919.07	11.83000	0.00000	11.83000	385	19.50000	17755.00000	4.87500
HEAT PUMP 1T	CT	28.54072	37.25160	28.54072	684.56	3.99026	5.20812	3.99026	35	5.53800	1272.00000	2.76900
DUCTCOIL 1-ROW H.W.12X24	CT	18.59676	0.00000	9.29838	392.02	2.60000	0.00000	1.30000	44	2.34000	80.56000	1.17000
VENTILATION SYSTEM												
FIXTURES												
FORCE DRAFT FAN 10,000 CFM	CT	35.68448	690.43049	32.00678	1487.99	4.30345	21.34279	4.30345	15	26.00000	2851.40000	6.50000
IND DRAFT FAN 10000 CFM	CT	36.39522	715.10515	32.36215	1527.64	4.40282	22.72423	4.35314	15	26.00000	2929.84000	6.50000
EXAUST SYSTEM												
EQUIPMENT												
EXHAUST FAN <200 CFM	CT	4.81713	23.70918	4.81713	132.96	0.52303	1.38981	0.52303	12	3.25000	41.58380	3.25000
EXHAUST FAN, 1000 CFM	CT	10.07102	41.34397	9.76656	268.78	1.32289	0.92116	1.32289	20	5.20000	296.80000	2.60000
EXHAUST FAN 10,000 CFM	CT	39.67457	759.94761	32.76065	1637.64	4.34331	22.68441	4.27935	12	26.00000	1805.18000	6.50000
EXHAUST FAN 25,000 CFM	CT	39.67457	1852.27698	17.68514	2681.73	4.34331	68.58050	2.17166	12	26.00000	4112.80000	6.50000
EXHAUST FAN 50,000 CFM	CT	41.82672	2311.54000	33.29869	3232.88	4.34331	72.92640	4.27935	12	32.50000	5406.00000	8.12500
EXHAUST FAN, 5000 CFM	CT	9.48259	3.07313	9.39049	217.84	1.32575	0.42965	1.31288	35	15.60000	1632.40000	7.80000
AIR CURTAIN, 1000 CFM	CT	2.32460	0.00000	2.32460	52.72	0.32500	0.00000	0.32500	385	3.25000	689.00000	3.25000
FIXTURES												
METAL FLUE/CHIMNEY	LF	3.39430	46.25946	1.69715	117.81	0.00000	0.00000	0.00000	11	9.10000	124.02000	4.55000
SPECIAL SYSTEM												
HUMIDITY CONTROL SYSTEM												
ROOM HUMIDIFIER,FLOOR TYPE	CT	4.64835	83.63808	4.64835	189.06	0.06659	0.81447	0.06659	6	0.26000	169.60000	0.26000
CONTROLS/INSTRUMENT.												

See NOTES on the last page of this table for Explanation of Column Headings

EPS BASED MAINTENANCE AND REPAIR COST DATA FOR USE IN LIFE CYCLE COST ANALYSIS ($ PER UNIT MEASURE)

COMPONENT DESCRIPTION		PRESENT WORTH OF ALL 25 YEAR MAINTENANCE AND REPAIR COSTS (d=10%)				ANNUAL MAINTENANCE AND REPAIR PLUS HIGH COST REPAIR AND REPLACEMENT COSTS						
		By Resources			Washington	Annual Maintenance and Repair			Replacement and High Costs Tasks			
Zone: 11	um	labor	material	equipment	D.C. Total	labor	material	equipment	yr	labor	material	equipment
DEVICES												
THERMOSTATS/PNEUMATICS	CT	9.23749	21.92438	9.23749	231.43	1.27872	0.00000	1.27872	20	0.78000	187.22780	0.78000
HUMIDITY SENSOR	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	192	0.78000	100.26540	0.78000
FLOW SENSOR	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	288	0.78000	100.04280	0.78000
RADIATION SENSOR	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	35	0.78000	77.11500	0.78000
WIND VELOCITY SENSOR	CT	9.22470	6.45118	9.22470	215.67	1.27425	0.00000	1.27425	18	0.78000	45.52700	0.78000
PRESSURE SENSOR	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	35	0.78000	58.30000	0.78000
DAMPER CONTROLLER/ELECT.	CT	9.29838	0.00000	9.29838	210.89	1.30000	0.00000	1.30000	26	2.60000	287.20700	2.60000
SIMPLEX AIR COMPR.,1 HP	CT	20.04249	19.94355	15.27483	459.25	2.80213	2.78829	2.13556	44	3.67900	6103.82980	1.83950

See NOTES on the last page of this table for Explanation of Column Headings

Notes

1. The resources listed in this table are as of the Date of Study (DOS) and have been calculated using a discount rate (d) of 10 percent. The Date of Study (DOS) is 3 years before the Beneficial Occupancy Date (BOD). All tasks are assumed to occur at mid-year. All resources have been assumed to be constant with no differential escalation from year to year.

2 Component Description - This column contains an indented list of systems, subsystems, components, and high cost task descriptions.

3 Unit of Measure (UM) - This column contains a two-character code to indicate the measurement unit for the component. Units used in this column are as follows:

CT	Count
LF	Linear Foot
SF	Square Foot
TF	Thousands of Linear Feet

4. Labor - Labor resources can be used in one of two ways: (1) labor hours per unit of measure, or (2) dollars per unit of measure assuming a $1.00/hr labor rate.

5. Materials - Material resources are expressed in dollars per unit of measure in July 1988 dollars for the Washington, DC, area.

6. Equipment - Equipment resources can be used in one of two ways: (1) equipment hours per unit of measure, or (2) dollars per unit of measure assuming a $1.00/hr equipment rate.

7. Washington, DC, Total - The dollars per unit of measure figures were calculated by applying the Military District of Washington labor and equipment rates to the labor and equipment resources, then adding the labor, material, and equipment costs together to form one total cost figure.

8. Year (YR) - This column contains the average age of the component when the high-cost task or replacement task would be performed.

9. Engineered Performance Standards (EPS) - Most labor and equipment resource data is based on the DOD series of Technical Bulletins as discussed in the body of the report.

APPENDIX C:

TECHNICAL BULLETIN INDEX FOR ENGINEERED PERFORMANCE STANDARDS

TB No.	Date	Title
TB 420-1	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Engineers Manual (NAVDOCKS P-700.0)
TB 420-2	5 Oct 72	Engineered Performance Standards Public Works Maintenance: General Handbook (NAVDOCKS P-701.0)
TB 420-3	5 Oct 72	Engineered Performance Standards Public Works Maintenance: General Formulas
TB 420-4	1 Mar 82	Tri-Service Coordination of the Carpentry Handbook
TB 420-5	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Carpentry Formulas
TB 420-6	1 Feb 82	Tri-Service Coordination of the Electric, Electronic Handbook
TB 420-7	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Electric, Electronic Formulas
TB 420-8	1 Feb 82	Tri-Service Coordination of the Heating, Cooling and Ventilating Handbook
TB 420-9	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Heating, Cooling, Ventilating Formulas
TB 420-10	1 Apr 81	Engineered Performance Standards Real Property Maintenance Activities Janitorial Handbook
TB 420-11	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Janitorial Formulas
TB 420-12	1 Apr 83	Engineered Performance Standards Real Property Maintenance Activities Machine Shop, Machine Repairs Handbook
TB 420-13	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Machine Shop and Repairs Formulas
TB 420-14	Sep 80	Engineered Performance Standards Real Property Maintenance Activities: Masonry Handbook
TB 420-15	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Masonry Formulas

TB 420-16	1 Apr 81	Engineered Performance Standards Real Property Maintenance Activities: Moving, Rigging Handbook
TB 420-17	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Moving, Rigging Formulas
TB 420-18	1 Nov 78	Engineered Performance Standards Real Property Maintenance Activities: Paint Handbook
TB 420-19	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Paint Formulas
TB 420-20	1 Aug 83	Engineered Performance Standards Real Property Maintenance Activities: Pipefitting, Plumbing Handbook
TB 420-21	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Pipefitting, Plumbing Formulas
TB 420-22	1 Sep 80	Engineered Performance Standards Public Works Maintenance: Roads, Grounds, Pest Control, Refuse Collection Handbook
TB 420-24	1 Mar 84	Engineered Performance Standards Real Property Maintenance Activities: Sheet Metal, Structural Iron and Welding Handbook
TB 420-25	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Sheet Metal, Structural Iron and Welding Handbook
TB 420-26	1 Nov 79	Engineered Performance Standards Real Property Maintenance Activities: Trackage Handbook
TB 420-27	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Trackage Formulas
TB 420-28	1 Nov 79	Engineered Performance Standards Real Property Maintenance Activities: Wharfbuilding Handbook
TB 420-29	5 Oct 72	Engineered Performance Standards Public Works Maintenance: Wharfbuilding Formulas
TB 420-30	1 Aug 79	Engineered Performance Standards Real Property Maintenance Activities: Emergency/Service Handbook
TB 420-31	1 Dec 73	Engineered Performance Standards Real Property Maintenance Activities: Planner and Estimator's Workbook (Instructor's Manual) (S&I OCE)
TB 420-32	1 Mar 80	Engineered Performance Standards Real Property Maintenance Activities: Planner and Estimator's Workbook, Student's Manual

TB 420-33	1 Aug 83	Engineered Performance Standards Real Property Maintenance Activities: Unit Price Standards Handbook
TB 420-34	1 Mar 84	Engineered Performance Standards Real Property Maintenance Activities: Preventive/Recurring Maintenance Handbook
TB 420-35	1 Apr 81	Tri-Service Coordination of the Moving, Rigging Handbook
TB 420-51	30 Oct 73	Engineered Performance Standards Public Works Maintenance: Facilities Engineering Management of Maintenance Painting of Facilities

APPENDIX D:

GEOGRAPHICAL LOCATION ADJUSTMENT FACTORS

State	Location	ACF Index
Alabama	State Average	.86
	Birmingham	.96
	Mobile	.86
	Montgomery	.76
	Anniston Army Depot	.81
	Huntsville	.88
	Fort McClellan	.80
	Redstone Arsenal	.88
	Fort Rucker	.80
Alaska	State Average	2.25
	Anchorage	1.92
	Delta Junction	2.70
	Fairbanks	2.13
	Adak	3.88
	Aleutian Islands	3.86
	Anchorage NSGA	1.92
	Barrow	4.18
	Burnt Mtn.	6.86
	Clear	3.10
	Eielson AFB	2.13
	Elmendorf AFB	1.92
	Galena	3.73
	Fort Greely	2.70
	Fort Richardson	1.92
	Fort Wainwright	2.13
Arizona	State Average	1.02
	Flagstaff	1.02
	Phoenix	.99
	Tucson	1.05
	Fort Huachuca	1.22
	Yuma Proving Ground	1.31
	Yuma	1.31
Arkansas	State Average	.89
	Pinebluff	.93
	Little Rock	.83
	Fort Smith	.92
	Fort Chaffee	.92
	Pine Bluff Arsenal	.93
California	State Average	1.21
	Los Angeles	1.20
	San Diego	1.18
	San Francisco	1.25
	Beale	1.28
	Bridgeport NWTC	1.27
	Castle	1.13
	Centerville Beach	1.32
	Desert Area	1.18
	Edwards AFB	1.30

State	Location	ACF Index
California (Cont'd)	El Centro	1.27
	George AFB	1.31
	Fort Hunter Liggett	1.29
	Fort Irwin	1.20
	Le Moore NAS	1.20
	March AFB	1.18
	Mather AFB	1.17
	McClellan AFB	1.17
	Monterey Area	1.23
	Presidio of Monterey	1.23
	Norton AFB	1.16
	Oakland Army Base	1.33
	Fort Ord	1.24
	Port Huenema Area	1.20
	Riverside	1.18
	Sacramento	1.15
	Sacramento Army Depot	1.15
	Presidio of San Francisco	1.25
	San Nicholas Island	2.59
	Sharpe Army Depot	1.13
	Sierra Army Depot	1.33
	Stockton	1.15
	Travis AFB	1.27
	Vandenburg AFB	1.38
Colorado	State Average	.98
	Colorado Springs	.94
	Denver	1.04
	Pueblo	.96
	Fort Carson	1.01
	Fitzsimmons AMC	1.06
	Pueblo Army Depot	.96
	Peterson AFB	.94
	Rocky Mountain Arsenal	1.06
Connecticut	State Average	1.13
	Bridgeport	1.16
	Hartford	1.10
	New London	1.14
Delaware	State Average	.99
	Dover	1.04
	Lewes	.98
	Milford	.96
	Lewes NF	1.04
	Dover AFB	1.04
District of Columbia	Washington	1.03
	Fort McNair	1.03
	Walter Reed AMC	1.03
Florida	State Average	.89
	Miami	.95
	Panama City	.92
	Tampa	.79
	Cape Canaveral	.96
	Cape Kennedy	.96

State	Location	ACF Index
Florida (Cont'd)	Gulf Coast	.85
	Homestead AFB	.88
	Homestead	.88
	Jacksonville Area	.85
	Key West NAS	1.08
	Orlando	.80
	Pensacola Area	.85
	McDill AFB	.77
	Eglin AFB	.77
	Tyndall AFB	.92
Georgia	State Average	.80
	Albany	.82
	Atlanta	.87
	Macon	.70
	Athens	.90
	Atlanta-Marietta	.93
	Fort Benning	.71
	Columbus	.71
	Fort Gillem	.87
	Fort Gordon	.94
	Kings Bay	.93
	Fort McPherson	.87
	Fort Stewart	.84
Hawaii	State Average	1.28
	Hawaii	1.29
	Honolulu	1.27
	Maui	1.29
	Alimanu	1.27
	Barbars Point NAS	1.34
	Fort Debussy	1.27
	EWA Beach Area	1.34
	Helemano	1.34
	Hickam Army Air Field	1.27
	Kaneohe MCAS	1.34
	Moanalua	1.27
	Pearl City	1.27
	Pearl Harbor	1.27
	Pohakuloa	1.32
	Schofield Barracks	1.27
	Fort Shafter	1.27
	Tripler AMC	1.27
	Wheeler Army Air Field	1.34
Idaho	State Average	1.11
	Boise	1.05
	Idaho Falls	1.08
	Mountain Home	1.19
	Mountain Home AFB	1.20
Illinois	State Average	1.03
	Belleville	.96
	Chicago	1.09
	Rock Island	1.03
	Rock Island Arsenal	1.06

State	Location	ACF Index
Illinois (Cont'd)	St. Louis Support Ctr	.96
	Savannah Army Depot	1.05
	Scott AFB	1.03
	Fort Sheridan	1.10
Indiana	State Average	.99
	Indianapolis	1.03
	Logansport	.99
	Madison	.94
	Fort Benjamin Harrison	1.07
	Crane	1.10
	Crane AAP	1.10
	Grissom AFB	1.06
	Indiana AAP	1.02
	Jefferson Proving Ground	.94
Iowa	State Average	1.02
	Burlington	1.04
	Cedar Rapids	.98
	Des Moines	1.05
	Iowa AAP	1.06
Kansas	State Average	.94
	Manhattan	.97
	Topeka	.96
	Wichita	.88
	Kansas AAP	.94
	Fort Leavenworth	.94
	Fort Riley	.97
	Sunflower AAP	.97
Kentucky	State Average	.96
	Bowling Green	.99
	Lexington	.96
	Louisville	.93
	Fort Campbell	.93
	Fort Knox	.99
	Lexington/Bluegrass Army Depot	1.06
	Louisville NAS	.93
Louisiana	State Average	.92
	Alexandria	.87
	New Orleans	.94
	Shreveport	.94
	Barksdale AFB	.94
	England AFB	.87
	Gulf Outport New Orleans	.94
	Louisiana AAP	.94
	Fort Polk	.94
Maine	State Average	.93
	Bangor	.85
	Caribou	.99
	Portland	.94
	Brunswick	.93
	Cutler	.98
	Northern Area	1.17
	Winter Harbor	.98

State	Location	ACF Index
Maryland	State Average	.97
	Baltimore	.95
	Fredrick	.94
	Lexington Park	1.01
	Aberdeen Proving Ground	.94
	Annapolis	1.03
	Fort Detrick	.94
	Harry Diamond Lab	1.00
	Fort Meade	.95
	Patuxent River Area	1.08
	Fort Ritchie	.90
Massachusetts	State Average	1.10
	Boston	1.13
	Fitchburg	1.08
	Springfield	1.08
	Army Mtls & Mech Research Ctr	1.13
	Fort Devens	1.15
	Natick Research & Development Ctr	1.13
	South Weymouth	1.13
Michigan	State Average	1.06
	Bay City	1.02
	Detroit	1.14
	Marquette	1.03
	Detroit Arsenal	1.14
	Northern Area	1.25
	Republic (Elfcom)	1.10
	Selfridge AFB	1.14
Minnesota	State Average	1.08
	Duluth	1.05
	Minneapolis	1.09
	St. Cloud	1.10
	Twin Cities AAP	1.09
Mississippi	State Average	.84
	Biloxi	.87
	Columbus	.81
	Jackson	.84
	Columbus AFB	.81
	Gulfport Area	.87
	Meridian	.92
Missouri	State Average	.92
	Kansas City	.92
	St. Louis	.99
	Rolla	.85
	Lake City AAP	.93
	Fort Leonard Wood	.91
Montana	State Average	1.15
	Billings	1.15
	Butte	1.18
	Great Falls	1.12
	Malmstrom AFB	1.12
Nebraska	State Average	1.03
	Grand Island	1.00

State	Location	ACF Index
Nebraska (Cont'd)	Lincoln	1.05
	Omaha	1.05
	Offutt AFB	1.05
Nevada	State Average	1.18
	Hawthorne	1.26
	Las Vegas	1.13
	Reno	1.15
	Fallon	1.28
	Hawthorne AAP	1.26
	Nellis AFB	1.13
New Hampshire	State Average	1.09
	Concord	1.06
	Nashua	1.06
	Portsmouth	1.14
	Cold Regions Lab	1.17
New Jersey	State Average	1.08
	Newark	1.11
	Red Bank	1.08
	Trenton	1.06
	Bayonne	1.10
	Bayonne Mil Ocean Term	1.09
	Fort Dix	1.03
	Earle	1.10
	Lakehurst	1.05
	Fort Monmouth	1.09
	Picatinny Arsenal	1.20
New Mexico	State Average	1.03
	Alamogordo	.99
	Albuquerque	1.03
	Gallup	1.06
	Holloman AFB	1.05
	Kirtland AFB	1.03
	White Sands Missile Range	1.09
	Fort Wingate	1.06
New York	State Average	1.12
	Albany	1.07
	New York City	1.24
	Syracuse	1.05
	Brooklyn	1.24
	Fort Drum	1.18
	Fort Hamilton	1.24
	Seneca Army Depot	1.15
	U.S. Military Academy	1.17
	Watervliet Arsenal	1.07
North Carolina	State Average	.76
	Fayetteville	.76
	Greensboro	.75
	Wilmington	.78
	Fort Bragg	.76
	Camp Lejeune Area	.86
	Cherry Point	.86
	Goldsboro	.77

State	Location	ACF Index
North Carolina (Cont'd)	Pope AFB	.82
	Seymour AFB	.77
	Sunny Point Mil Ocean Term	.78
North Dakota	State Average	1.03
	Bismarck	1.02
	Grand Forks	.98
	Minot	1.10
	Grand Forks AFB	.98
	Stanley R. Hicklesen CPX	1.03
	Minot AFB	1.12
Ohio	State Average	1.00
	Columbus	1.03
	Dayton	.98
	Youngstown	.99
	Cleveland	1.14
	Wright-Patterson AFB	.98
Oklahoma	State Average	.93
	Lawton	.90
	McAlester	.91
	Oklahoma City	.98
	Altus AFB	.94
	Enid	1.01
	McAlester AAP	.91
	Fort Sill	.90
Oregon	State Average	1.05
	Pendleton	1.08
	Portland	1.07
	Salem	.99
	Charleston	1.11
	Coos Head	1.08
	Umatilla Army Depot	1.18
Pennsylvania	State Average	1.00
	Harrisburg	.91
	Philadelphia	1.05
	Pittsburgh	1.04
	Carlisle Barracks	.93
	New Cumberland Army Depot	.91
	Fort Indiantown Gap	1.07
	Letterkenny Army Depot	1.07
	Mechanicsburg Area	.91
	Tobyhanna Army Depot	1.14
	Warminster Area	1.04
Rhode Island	State Average	1.11
	Bristol	1.13
	Newport	1.11
	Providence	1.10
	Davisville	1.17
South Carolina	State Average	.82
	Charleston	.81
	Columbia	.82
	Myrtle Beach	.84
	Beaufort Area	.89

State	Location	ACF Index
South Carolina (Cont'd)	Charleston AFB	.81
	Fort Jackson	.82
	Sumter	.80
South Dakota	State Average	.95
	Aberdeen	.95
	Sioux Falls	.94
	Rapid City	.96
	Ellsworth AFB	.98
Tennessee	State Average	.84
	Chattanooga	.86
	Kingsport	.72
	Memphis	.95
	Arnold AFB	.90
	Milan AAP	.98
	Holston AAP	.71
Texas	State Average	.85
	San Angelo	.76
	San Antonio	.86
	Fort Worth	.93
	Fort Bliss	.96
	Carswell AFB	.93
	Chase Field - Beeville	.97
	Corpus Christi Army Depot	.92
	Corpus Christi	.92
	Dallas	.93
	Dyess AFB	.94
	Fort Hood	.89
	Kingsville	.99
	Red River Army Depot	.78
	Fort Sam Houston	.86
	William Beaumont AMC	.96
	Bergstrom AFB	.95
	Brooks AFB	.86
	Randolph AFB	.86
	Kelly AFB	.86
	Lackland AFB	.86
Utah	State Average	1.03
	Ogden	1.05
	Salt Lake City	1.00
	Tooele	1.06
	Dugway Proving Ground	1.03
	Hill AFB	1.07
	Tooele Army Depot	1.05
Vermont	State Average	.99
	Burlington	1.00
	Montpelier	1.00
	Rutland	.96
Virginia	State Average	.95
	Norfolk	.95
	Radford	.95
	Richmond	.94
	Arlington	1.04

State	Location	ACF Index
Virginia (Cont'd)	Arlington Hall Station	1.04
	Arlington National Cemetery	1.04
	Fort Belvoir	1.04
	Cameron Station	1.04
	Dahlgren	1.10
	Fort Eustis	.96
	Humphreys Engineer Center	1.03
	Fort A. P. Hill	.92
	Fort Lee	.93
	Fort Monroe	.94
	Fort Myer	1.03
	Norfolk-Newport News Area	.95
	Fort Pickett	.98
	Quantico	1.03
	Nadford AAP	1.02
	Port Story	.95
	Vint Hill Farms Station	1.08
Washington	State Average	1.09
	Spokane	1.08
	Tacoma	1.07
	Yakima	1.11
	Fairchild AFB	1.13
	Jim Creek	1.34
	Fort Lewis	1.07
	Pacific Beach	1.27
	Puget Sound Area	1.15
	Seattle Area	1.12
	Widbey Island	1.12
	Yakima Firing Center	1.18
West Virginia	State Average	.95
	Bluefield	.92
	Clarksburg	.95
	Charleston	.99
	Sugar Grove	1.15
Wisconsin	State Average	1.06
	LaCrosse	1.04
	Madison	1.02
	Milwaukee	1.13
	Badger AAP	1.06
	Clam Lake	1.20
	Fort McCoy	1.11
Wyoming	State Average	1.08
	Casper	1.07
	Cheyenne	1.10
	Laramie	1.08
	F. E. Warren AFB	1.10

DISTRIBUTION

Chief of Engineers
ATTN: CEHSC-IM-LH (2)
ATTN: CEHSC-IM-LP (2)
ATTN: CEMP-EC
ATTN: CERD-L

USAEHSC
ATTN: CEHSC-FM-R

US Army Engineer Districts (41)
ATTN: Chief, Design Branch
ATTN: Chief, Cost Estimating Branch

US Army Engr. Divisions (14)
ATTN: Chief, Design Branch
ATTN: Chief, Cost Estimating Branch

Fort Belvoir, VA
ATTN: CECC-R

Defense Technical Info. Center 22304
ATTN: DTIC-FAB (2)