ORNL/TM-12868

ornl

OAK RIDGE
NATIONAL
LABORATORY

MARTIN MARIETTA

Technical Support Section Annual Work Plan for FY 1995

B. P. Adkisson
R. A. Hess
C. W. Kunselman
A. J. Millet
D. R. Smelcer

INSTRUMENTATION & CONTROLS DIVISION

MANAGED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

DISCLAIMER

ORNL/TM-12868

Intrumentation and Controls Division

TECHNICAL SUPPORT SECTION ANNUAL WORK PLAN FOR FY 1995

B. P. Adkisson
R. A. Hess
C. W. Kunselman
A. J. Millet
D. R. Smelcer

Date Published: October 1994

Prepared by
OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37831-6285
managed by
MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

CONTENTS

Page

1. INTRODUCTION/OVERVIEW 1

2. ANALYSIS OF PREVIOUS YEAR'S PERFORMANCE (FY 1994) 2
   - 2.1 HFIR OPERATIONS 2
   - 2.2 MAINTENANCE ENGINEERING SUPPORT 2
   - 2.3 TRAINING 2
   - 2.4 INITIATIVES 3

3. ANNUAL WORK PLAN 3

4. FINANCIAL ANNUAL WORK PLAN 4

5. MAINTENANCE BACKLOG 5

6. LONG-RANGE WORK PLAN 5

7. MAINTENANCE PERFORMANCE INDICES 6

1. INTRODUCTION/OVERVIEW

The Technical Support Section (TSS) of the Instrumentation and Controls (I&C) Division of Oak Ridge National Laboratory (ORNL) provides technical services such as fabrication, modification, installation, calibration, operation, repair, and preventive maintenance of instruments and other related equipment. Work performed by TSS is in support of basic and applied research and development (R&D), engineering, and instrument and computer systems managed by ORNL.

One of the missions of TSS is to support programs and policies of ORNL, emphasizing safety and ensuring cost-effective support for R&D.

Because the activities and priorities of TSS must be adapted to the technical support needs of ORNL, the TSS Annual Work Plan is derived from and driven directly by current trends in the budgets and activities of each ORNL division for which TSS provides support. Trends that will affect TSS planning during this period are reductions in the staffing levels of some R&D programs because of attrition or budget cuts and the establishment of new facilities or environmental safety and health programs.

TSS does not have an annual budget to cover operating expenses incurred in providing instrumentation maintenance support to ORNL. Each year, TSS contacts ORNL division finance managers or division finance officers to obtain information concerning projected funding levels of programs and facilities they manage. TSS workforce and resource projections are based on the information obtained and are weighted depending on the percentage of support provided to that division or program. Annually, TSS sets the standard rate per hour to charge for the following fiscal year. The standard rate is based on annual-projected inflation rate, proposed increases or decreases in manpower due to perceived changes in program or division funding, upgrade or aging equipment or facilities, overhead burden, compliance with new requirements or directives, labor contract negotiations, and the fringe-benefit rate. The standard rate is charged to customer accounts or work orders as the work is performed. A cost variance occurs when there is a difference between the actual cost per hour and the standard rate per hour. Typically, this variance is positive during months of high fringe benefit cost (holidays and vacation) or when materials or equipment is costed by Accounts Payable. Variances are negative during months with minimal fringe benefit cost and when purchased materials that are necessary for maintenance support are charged back to customer accounts.

The "Long-Range Work Plan" (see Sect. 6) is based on estimates of impact of the long-range priorities and directions of the Laboratory. Identifiable proposed new facilities and programs provide additional basis for long-range planning. After identifying long-range initiatives, TSS planning includes future training requirements, reevaluation of qualifications for new-hires, and identification of essential test equipment needed in new work.

Although TSS has no direct responsibility for the maintenance or repair of real property, it does perform breakdown maintenance, preventive maintenance, and calibration of Laboratory, production, and experimental equipment, all of which is used for programmatic purposes. Operating expense funds from supported divisions support this type of equipment.*

*The cost of full-time equivalents (FTEs) for this effort is included in the Cross-Cut Budget under the category of "Operating Expense Support of Programmatic Equipment."

2. ANALYSIS OF PREVIOUS YEAR'S PERFORMANCE (FY 1994)

2.1 HFIR OPERATIONS

The TSS will discontinue full-time support to the High Flux Isotope Reactor (HFIR) beginning October 1, 1994. The former TSS Reactor Support Group addresses maintenance associated with reactor control systems and also calibration of over 100 instruments. Other TSS groups will continue to provide specialized support to reactor operations.

2. 2 MAINTENANCE ENGINEERING SUPPORT

The TSS maintenance engineering staff provided engineering support for a variety of small projects in many research divisions. Some of these projects included:

- Thermal Hydraulic Test Loop for the Advanced Neutron Source Reactor project.
- Control and data acquisition instrumentation for the Heavy Steel Section Irradiation experiment at the Phoenix-Ford Reactor at the University of Michigan.
- Self-cleaning Ultrasonic Sludge Blanket Monitor for the waste processing plant.

2.3 TRAINING

The training program for section personnel has continued to evolve during FY 1994. Training needs were updated to reflect the changing scientific and technological environment at ORNL. In FY 1994, a total of 183 training classes was attended by TSS personnel.

TSS has continued a policy of recognizing specialized instrument technician categories. This policy is reflected in the FY 1995 technician training program. Instrument technicians are assigned to one of the following specialized categories: Process Systems, Radiation Dectector/Monitor Systems, Computer Systems, Fabrication, Communications, Security Systems, or Analytical Instrument Systems. TSS technical training will offer a curriculum better suited to the specific training requirements of each technician.

A Baseline Evaluation Test (BET) that requires the demonstration of knowledge from various technical disciplines is administered to each technician. Scores on each section are compared to a standardized matrix, which determines whether that particular employee is knowledgeable to perform tasks required of a particular speciality. This process very quickly ascertains deficiencies in the individual's speciality so that training can be provided which addresses only those skills that the employee needs or lacks. This process avoids teaching unnecessary skills or those already possessed, assuring a cost-effective and continuously renewable qualification process.

An additional benefit is that this system contains elements necessary for determination and documentation of specific technical qualifications of technicians, greatly assisting with compliance with Department of Energy (DOE) orders such as 5480.20 and forming the baseline for accreditation as required in DOE Order 5480.18. Embodied is TSS procedure MMD/AADM1141.

This new qualification/training program will propel the process of maintaining technical currency for TSS instrument technicians into the twenty-first century.

2.4 INITIATIVES

To better serve the needs of the Laboratory, successful pilot work teams were expanded in other areas. The primary mission of these unique teams is to calibrate and to maintain safety-related instruments identified in nonreactor nuclear facilities with Operating Safety Requirements (OSRs) or Limiting Condition Documents (LCDs).

The Personal Computer Accelerated Vendor Inventory Delivery (AVID) contract is now in the third year of operation. The TSS personal computer maintenance group provides in-house maintenance and warranty repairs for equipment on the Personal Computer AVID contract. The maintenance group and AVID vendor have provided cost-efficient, timely warranty and repair of equipment. The new Pentium Personal Computers have been added to the contract to replace old technology equipment.

3. ANNUAL WORK PLAN

Each major research division was contacted to determine the projected programmatic level of funding for the next fiscal year. Most divisions projected that their funding levels would remain near those of FY 1994. Overall, FY 1995 operating-expense-funded maintenance and repair requirements for ORNL are projected to be relatively level with those of FY 1994. Analysis of DOE orders and technical training needs to evaluate training program costs, work force requirements, and types of qualifications for new-hires was performed. Routine and breakdown maintenance is expected to remain relatively stable, enabling work to be performed by current staffing levels.

4. FINANCIAL ANNUAL WORK PLAN

($ x 100)	FY94	FTE	FY95	FTE	FY96	FTE	FY97	FTE
Process Instruments	1,020	16	768	12	807	12	886	12
Environmental Monitoring	701	11	896	14	942	14	1,034	14
Radiation Monitoring	765	12	704	11	740	11	812	11
Special Electronics	574	9	640	10	673	10	738	10
Metals & Ceramics Support	1,020	16	896	14	942	14	1,034	14
Accelerator Support	446	7	256	4	269	4	295	4
Reactor Support	510	8						
Computer Maintenance	1,658	26	2,176	34	2,287	34	2,511	34
Communication/Security	893	14	832	13	874	13	960	13
Electronic Fabrication	765	12	704	11	740	11	812	11
Engineering Projects	638	10	704	11	740	11	812	11
Administration	829	13	832	13	874	13	960	13
	9,819	154	9,408	147	9,888	147	10,854	147

5. MAINTENANCE BACKLOG

$$\text{Backlog Hours} = \frac{\textit{Estimated Corrective Maintenance Backlog Hours}}{\textit{Labor Productivity (\%)}} \quad \frac{915}{1.2} = 762.50 \text{ hours}$$

Corrective Maintenance Backlog Labor Cost	=	Backlog Hours	x	Charge Out Rate		
		762.50	x	$46.36	=	$35,349.50

Total Corrective Maintenance Backlog Cost	Corrective Maintenance Backlog Labor Cost	+	Estimated Material Cost		
	$35,349.50	+	$2,990	=	$38,339.50

6. LONG-RANGE WORK PLAN

Long-range work projections of TSS are based on projections and funding levels of ORNL research divisions. Several significant research projects and programs are projected to begin within the FY 1995 to FY 1997 period. An example is the Advanced Neutron Source Project, which is estimated to provide support of two FTEs.

7. MAINTENANCE PERFORMANCE INDICES

Labor Productivity (Effectiveness) *Computers* $\frac{\text{Standard Hours Earned}}{\text{Actual Hours Expended + Delays}}$ $\frac{1.58}{1.17}$ = 1.35

RAD Monitors $\frac{\text{Standard Hours Earned}}{\text{Actual Hours Expended + Delays}}$ $\frac{0.78}{0.74}$ = 1.05

$= \frac{1.35 + 1.05}{2}$ = 1.2 Average*

Cost Per Standard Hour = $\frac{\text{Chargeout Rate}}{\text{Effectiveness}}$ $\frac{46.36}{1.2}$ = *$38.63*

Total Corrective Maintenance Backlog Cost = $\frac{\text{CM Backlog Hours}}{\text{Labor Productivity}}$ $\frac{915}{1.2}$ x $46.36 + $2990 = $38,339.50

PM Completion Rate $\frac{\text{PMs Completed}}{\text{PMs Scheduled}}$ $\frac{12241}{12793}$ = 96%

Schedule Compliance $\frac{\text{PMs + CMs Completed on Schedule}}{\text{PMs + CMs Completed}}$ $\frac{13756}{17076}$ = 81%

Corrective Maintenance Backlog = $\frac{\text{CMs Open > 3 Months}}{\text{CMs Open}}$ $\frac{48}{3009}$ = 2%

Preventive Maintenance Overdue = $\frac{2686}{12531}$ = 21%

There are no current backlogs on safety items.

*The effectiveness rate is figured using two class groups of instruments that are serviced by TSS. These two groups comprise 25% of all work requests.

INTERNAL DISTRIBUTION

1. B. P. Adkisson
2. G. T. Alley
3. K. L. Allison
4. M. E. Boren
5. T. E. Chambers
6. C. R. Cinnamon
7. L. M. Cuddy
8. D. M. Duncan
9. B. G. Eads
10. R. P. Effler
11. H. C. Ford
12. J. L. Hammontree
13-17. R. A. Hess
18. J. M. Jansen
19. B. S. Hoffheins
20. D. N. Keller
21. M. W. Kohring
22. E. H. Kreig, Jr.
23. C. W. Kunselman
24. D. W. McDonald
25. P. E. Melroy
26. L. D. Merryman
27. G. N. Miller
28. A. J. Millet
29. D. G. Prater
30. C. T. Stansberry
31. J. O. Stiegler
32. D. R. Smelcer
33. J. H. Swanks
34. C. W. Tompkins
35. R. E. Uhrig
36. R. A. Vines
37. J. D. White
38. D. F. Craig
39-40. Central Research Library
41. Y-12 Technical Reference Section
42-43. Laboratory Records
44. Laboratory Records - Record Copy
45. ORNL Patent Section
46. I&C Division Publications Office

EXTERNAL DISTRIBUTION

47. Assistant Manager for Energy Research and Development, DOE-ORO, P. O. Box 2001, Oak Ridge, TN 37831-8600
48-51. D. C. Queen, DOE-ORO, Y-12 Plant, Bldg. 9114, Oak Ridge, TN 37831-8722
52. Bindi Chexal, Electric Power Research Institute, 3412 Hillview Avenue, Palo Alto, CA 94303
53. Veljko Radeka, Brookhaven National Laboratory, Building 535-B, Upton, NY 11973
54. Robert M. Taylor, Leeds and Northup, Sunneytown Pike, North Wales, PA 19454
55. M. M. Sevrik, Caderock Division, Naval Surface Warfare Center, Code 1900, Bethesda, MD 20084-5000
56-57. Office of Scientific and Technical Information, U. S. Department of Energy, P. O. Box 62, Oak Ridge, TN 37831