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Maintenance Management Department Annual Work Plan FY 1990—1992

D. N. Keller

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Instrumentation and Controls Division

**MAINTENANCE MANAGEMENT DEPARTMENT
ANNUAL WORK PLAN
FY 1990-1992**

D. N. Keller

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ABSTRACT

The Instrumentation and Controls Division's Maintenance Management Department (MMD) provides maintenance services in the areas of fabrication, modification, installation, calibration, operation, repair, and preventive maintenance of instruments and other related equipment. The MMD annual work plan is dependent on the programmatic activities of the laboratory. As laboratory funding allocations and priorities change, the activities of the department must also adapt to provide flexible programmatic support as needed.

1. INTRODUCTION

The Instrumentation and Controls (I&C) Division's Maintenance Management Department (MMD) provides maintenance services in the areas of fabrication, modification, installation, calibration, operation, repair, and preventive maintenance of instruments and other related equipment. The majority of the work performed by MMD supports basic and applied research and development (R&D), engineering, and instrument and computer maintenance on programs for the Department of Energy (DOE) and other federal agencies. It is the mission of the I&C MMD to support the programs and policies of the Oak Ridge National Laboratory (ORNL), emphasizing safety and ensuring cost-effective support for research and development.

The MMD annual work plan depends on the programmatic activities of the laboratory. As laboratory funding allocations and priorities change, the activities of the department must also adapt to provide flexible programmatic support as needed. Our planning is based on assumptions of future maintenance needs in the ORNL divisions that we support. Several definitive trends will impact the department during this planning cycle. These trends include reductions in manpower by attrition or budget cuts, increases in manpower resulting from future requirements, aging ORNL equipment and facilities, increases in laboratory overhead costs, and proposed new facilities and programs.

MMD does not have an annual funded budget to cover the operating expenses incurred in providing instrumentation maintenance support to ORNL. Each year MMD contacts the ORNL finance managers or divisional finance officers to obtain information about projected funding levels of the programs and facilities they manage. MMD manpower and resource projections are based on the information obtained and are weighted by the percentage of support provided to each division or program. Annually, MMD sets the standard rate per hour to be charged for the following fiscal year. The standard rate is based on the annual projected inflation rate, proposed increases in manpower caused by perceived increases in program or division funding, upgrade of aging equipment or facilities, increased overhead burden, compliance with new requirements or directives, and increases in the fringe benefit rate. The standard rate is charged to customer accounts or workorders as the work is performed.

The long-range work plan is based on the long-range priorities and directions of the laboratory. Identifiable, proposed new facilities and programs provide a basis for long-range planning. After identifying long-range initiatives, MMD planning includes analyzing future training requirements, evaluation of preferable qualifications for new-hires, and identifying essential test equipment.

MMD is not involved with the maintenance or repair of real property. MMD performs breakdown maintenance, preventive maintenance, and calibration of laboratory, production, and experimental equipment, all of which is used for programmatic purposes.* Operating expense funds are used to support this type of equipment. A significant potential influence at the end of each fiscal year is the decision by the

*The cost and full-time equivalents (FTEs) for this effort are included in the cross-cut budget under the category of "Operating Expense Funded Support of Programmatic Equipment."

research divisions to request or decline routine instrument maintenance. In the R&D environment, much of the instrumentation support activities can be deferred in the event of a perceived funding deficiency. Unplanned changes in demand for work within one or more field shops is often compensated for by opposite changes in other areas and associated transfers within the department. In those unusual circumstances where the change is consistent throughout our work areas, the division overhead can accommodate most unexpected occurrences.

2. PREVIOUS YEAR'S PERFORMANCE (FY 1989)

2.1 TECHNICAL SAFETY APPRAISAL (TSA)

Although there were many accomplishments during FY 1989, the goals of the year were focused on the TSA and various other compliance issues. MMD expended much effort during FY 1989 to comply with environmental and safety regulations. The department successfully addressed the objectives and requirements of the TSA and strived to create a safer working environment for employees. Several Operational Safety Requirement (OSR) and Maintenance Procedure documents were completed to improve safety and quality control.

2.2 FIELD ENGINEERING SUPPORT

The MMD Engineering Support Group originally was formed to provide the Engineering Division with instrumentation support during construction phases of major plant projects. MMD supports other divisions by providing engineering field services for small projects that are not supported by other groups. Since 1983 this effort has increased from \$30K to ~\$400K annually. The largest involvement is support of the Nonradiological Wastewater Treatment Plant (NRWTP). The total funding for this project is \$397K. MMD efforts have concerned the installation, testing, and instrument calibration for this facility. In addition, MMD has provided engineering support for the Fusion Energy Design Center (FEDC) during the recent location of the Hazardous Waste Remedial Action Program (HAZRAP) program to the Oliver Springs Facility. Two MMD engineers assisted in the design and installation of an IBM token ring network. Other significant projects are listed in Table 1.

Table 1. Major project involvement

Project name	Funding \$(K)
1. Design basis accident simulation	230
2. 7500 bridge water quality monitor	10
3. Process waste monitoring system	50
4. Process waste segregation system	376
5. Background water monitoring system	20
6. Emergency avoidance solidification campaign	200
7. Neutron activation facility	200
8. Materials irradiation facility	180

2.3 BACKLOG OF MAINTENANCE AND REPAIR

This category does not apply to MMD since all funding for instrumentation maintenance support is derived from the operating expenses of ORNL research divisions. MMD does not have a funded maintenance or repair budget.

3. ANALYSIS OF REQUIREMENTS FOR FY 1990

3.1 NONRADIOLOGICAL WASTEWATER TREATMENT PLANT

MMD has been involved in the construction of this facility since FY 1988 and has been responsible for the design and installation of the instrumentation control systems. Specifications were met, and checkouts were completed during September of FY 1989. It is the objective of MMD to provide maintenance support for this facility as it becomes operational. To meet this objective, MMD has identified several initiatives to be completed. MMD will analyze the types of instrumentation and quantity of various instruments installed in this facility, from which the manpower and test equipment requirements can be ascertained. The instruments will be inventoried and entered into MMD's Maintenance Information and Data Acquisition System (MIDAS) job control system. This will enable MMD to set up proper preventive maintenance and calibration schedules as specified by the manufacturer. New maintenance procedures will be written as required.

3.2 MASS SPECTROMETER LABORATORY

The first phase of this facility is presently under construction. When complete it will provide a specialized research and development laboratory for the Chemical Technology Division, and MMD will meet with the facility management to ascertain the maintenance requirements at that time. The various spectrometer manufacturers and the number of each will be identified to assess training requirements. Information on training programs offered will be obtained from manufacturers. If necessary a make/buy analysis will be performed to determine whether maintaining these machines in-house or by outside contract is more feasible. Maintenance procedures will be written and implemented as necessary.

3.3 UPGRADE AND REMODELING OF THE ELECTRONIC FABRICATION FACILITY

The MMD Electronic Fabrication Facility builds instrument prototypes, makes major instrument modifications, and produces electronic instruments. This facility has not been renovated or upgraded since the early 1960s. The identified deficiencies include inadequate space for fabrication activities, no available space for expansion, and an inefficient facility layout. To correct these deficiencies, MMD plans to remodel the work area and replace the workbenches. This upgrade will create a more open facility and encourage teamwork among the technicians and supervisory personnel. It also will provide an area for the recently purchased Flow Solder Station.

3.4 MAINTENANCE SUPPORT FOR THE NEW PERSONAL COMPUTER (PC) ACCELERATED VENDOR INVENTORY DELIVERY (AVID) CONTRACT

MMD is planning to support the just-in-time PC AVID contract when it is implemented during the second quarter of FY 1990. The PC Maintenance Group has identified the necessary replacement parts to support the systems on this contract. Maintenance personnel also are receiving applicable training to support the various types of systems. The PC Maintenance Group will purchase and set up a maintenance simulator computer system for troubleshooting each class of computer. An AVID inventory data base will be created to track and monitor system spares as they are used for supporting systems at ORNL. This data base also will track the types of maintenance performed on the various systems to assist in identifying problem areas.

3.5 IMPROVEMENT OF OFFICE SPACE AND TRAINING FACILITIES

Recently MMD acquired an unused facility at ORNL to be used for office space and training. This facility had not been used for several years and required extensive remodeling to make it usable. Several rooms are being remodeled for use as offices for our expanding engineering and administrative staff. A training facility also is being designed and remodeled to enable MMD to fulfill the increased training requirements necessary to support instrumentation at ORNL. This new facility will help provide the necessary space for these activities until a new facility can be constructed in FY 1992, as per our long-range plan.

4. MMD ACCREDITATION ACTIVITIES

I&C Division accreditation activities have their roots in the 1986 Nuclear Reactor Qualification and Training Requirements for I&C Maintenance Personnel document. This was the most detailed and widely accepted training document, with Oak Ridge Operations (ORO) approval, prior to accreditation. With the appearance of accreditation and commercial reactor practice as the standard for small research reactors and hot cell operations, MMD began an aggressive effort to understand and implement this practice. During the first quarter of FY 1988, the division acquired information concerning all available guidance and existing programs. Visits to the Tennessee Valley Authority (TVA) training center and the national nuclear training conferences were made. During FY 1989 a National Utility Services (NUS) consultant performed a self-evaluation of our training program strengths and weaknesses. At the same time, MMD funds were used to perform a job/task analysis of the High-Flux Isotope Reactor (HFIR) Instrument Technician job. This analysis was published in September 1989 as ORNL Technical Manual 11335 (ORNL/TM-11335).

In November 1989, the final report from the Martin Marietta Energy Systems (MMES) Training Accreditation Review Team was released. In this report, the estimate for all HFIR related I&C accreditation activities was \$3.05M for the next three years. MMD plans to hire both NUS and Theta Technologies to assist in the next phase of I&C's accreditation activities. In the absence of formal support from DOE, these activities will proceed at a modest pace as permitted by the use of department overhead funds.

5. LONG-RANGE PLAN

To meet the future requirements of maintenance support for research activities at ORNL, a new maintenance facility is planned for construction during FY 1991–1992. This new facility, the Advanced Technology Maintenance Facility, will be ~12,000 sq ft. It will contain several maintenance shops, training rooms, offices, and material storage areas. The construction of this facility will allow the consolidation of several remote field shops, increasing the effectiveness and efficiency of field support for several research groups. The new facility will provide additional space resulting in significant improvement in the MMD's information management system. A dedicated training facility will permit improvement of the MMD training programs for meeting accreditation objectives and future DOE training requirements.

APPENDIX

Table 1.A. Financial annual work plan FY 1989-1992^a

	<u>FY89</u>	<u>FTE</u>	<u>FY90</u>	<u>FTE</u>	<u>FY91</u>	<u>FTE</u>	<u>FY92</u>	<u>FTE</u>
	(\$ × 1000)							
Process instruments	893	18	891	17	1095	20	1145	20
Environmental monitoring	794	16	996	19	1095	20	1145	20
Special electronics	496	10	472	9	548	10	572	10
Metals ceramics support	844	17	943	18	1041	19	1145	20
Accelerator support	248	5	367	7	274	5	286	5
Reactor support	347	7	367	7	383	7	401	7
Computer maintenance	1489	30	1625	31	1753	32	1832	32
Communications/Security	645	13	734	14	767	14	801	14
Electronic fabrication	595	12	629	12	657	12	687	12
Engineering projects	198	4	367	7	383	7	401	7
Administration	<u>496</u>	<u>10</u>	<u>524</u>	<u>10</u>	<u>548</u>	<u>10</u>	<u>572</u>	<u>10</u>
Total	7046	142	7915	151	8545	156	8986	15

^aBudget projections are based on a composite escalation rate of 4.5% for FY 1991-1992.

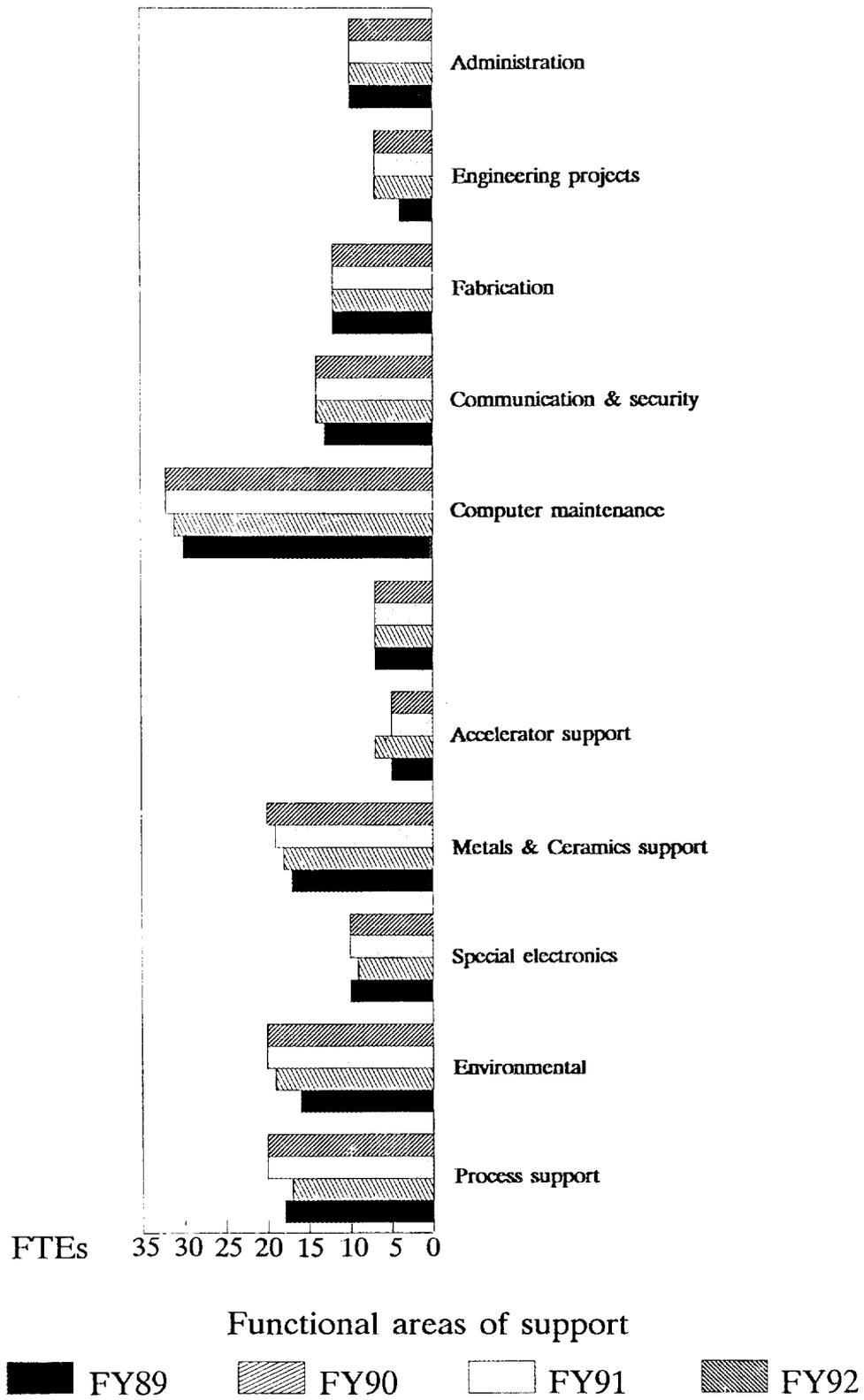


Fig. A.1. Financial annual work plan FYs 1989-92.

1990 FTEs

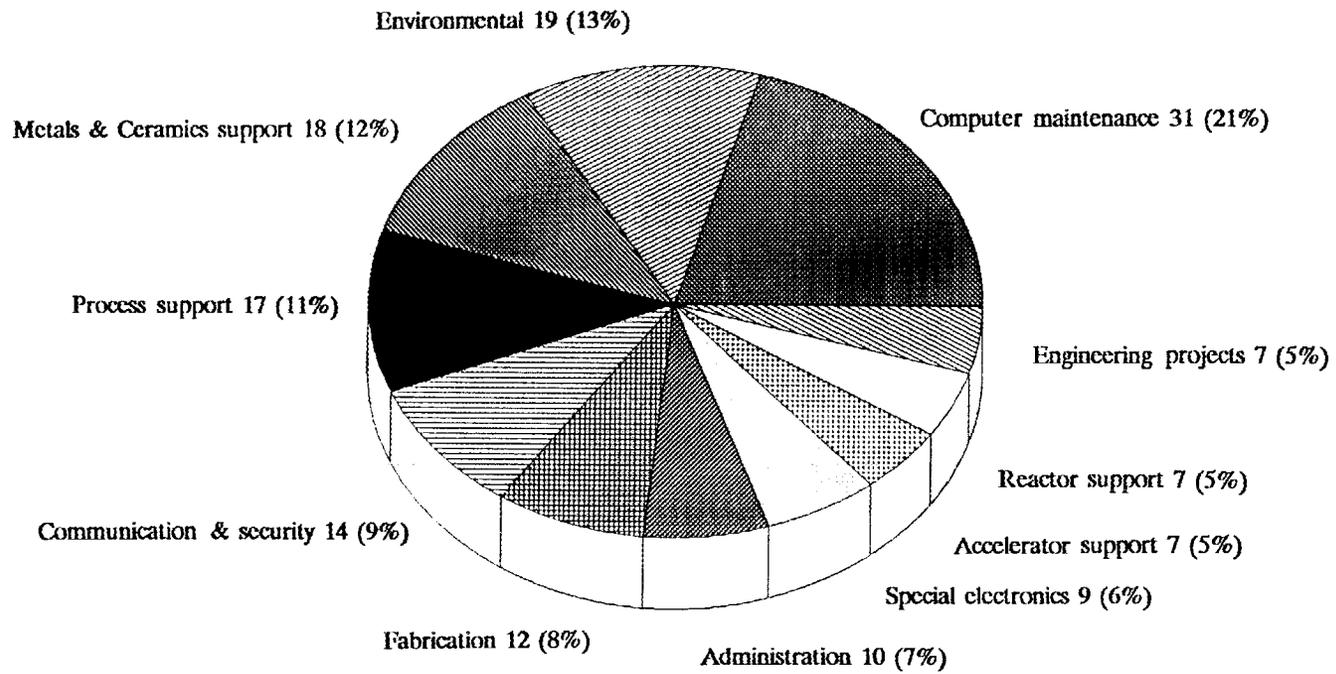


Fig. A.2. Maintenance management department areas of functional support.

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