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**OAK RIDGE
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MARTIN MARIETTA

**Maintenance Management Department
Annual Work Plan
FY 1991**

D. N. Keller

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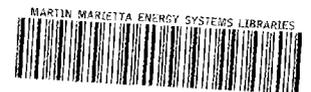
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Instrumentation and Controls Division
MAINTENANCE MANAGEMENT DEPARTMENT
ANNUAL WORK PLAN
FY 1991

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 adapt to provide flexible programmatic support as needed.

1. INTRODUCTION/OVERVIEW

The Instrumentation and Controls (I&C) Division of Oak Ridge National Laboratory (ORNL) provides maintenance services in areas of fabrication, modification, installation, calibration, operation, repair, and preventive maintenance of instruments and related equipment. Most of the work performed by the I&C Division's Maintenance Management Department (MMD) supports basic and applied research and development (R&D), engineering, and instrument and computer maintenance programs for the U.S. Department of Energy (DOE) and other federal agencies.

The mission of MMD is to support the programs and policies of ORNL, emphasizing safety and ensuring cost-effective support for R&D.

The MMD work plan for each fiscal year is dependent on the current 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. MMD planning is based on assumptions of future increases or decreases in the ORNL divisions that we support. Several definitive trends will impact the Department during the current planning cycle. These trends include staff reductions by attrition or budget cuts, personnel increases 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 ORNL finance managers or divisional finance officers to obtain information concerning the projected funding levels of the divisions, programs, and facilities they manage. MMD staff and resource projections are based on the information obtained and is weighted depending on the percentage of support provided to each division, program, and facility. 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 or decreases in personnel due to perceived changes in program or Division funding, upgrade of equipment or facilities, increased overhead burden, compliance to new requirements or directives, and increases in the fringe benefit rate. The standard rate is charged to customer accounts or work orders as work is performed. A cost variance occurs when a difference exists 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 are charged to customer accounts by providing materials necessary for maintenance support.

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. The Department performs breakdown maintenance, preventive maintenance, and calibration of

laboratory, production, and experimental equipment used for programmatic purposes.*
Operating expense funds are used to support this type of equipment.

*The costs including those for full-time employees for this effort are included in the crosscut budget under the category of Operating Expense Funded Support of Programmatic Equipment.

2. ANNUAL WORK PLAN

NARRATIVE

The director of each major research division was contacted to determine the projected level of funding for the next fiscal year. Most divisions projected that their funding levels would remain near those of FY 1990. Several divisions predicted that their funding levels would decrease or increase slightly. Overall, the FY 1991 operating expense-funded maintenance and repair requirements for ORNL are projected to be relatively level with those of FY 1990. This information provides an indication of what areas of maintenance support will increase or decrease for the next fiscal year and enables Department management to evaluate necessary training programs, personnel requirements, and types of qualifications needed for new hires.

Routine and breakdown maintenance should remain relatively stable, enabling this work to be performed by current staff levels. New reporting requirements will significantly increase the time necessary to calibrate instruments.

3. ANALYSIS OF PREVIOUS YEAR'S PERFORMANCE (FY 1990)

3.1 RESTART ACTIVITIES

The Department has been greatly involved with start-up efforts of the High Flux Isotope Reactor and the Tower Shielding Facility. The MMD Reactor Support Group addressed many persistent maintenance problems associated with the reactor control systems as well as the calibration of >100 instruments. The success of these cooperative efforts is a significant accomplishment for all divisions and groups involved and will have a positive impact on the research activities at ORNL.

Engineering Support

The Maintenance Management Department support efforts have expanded to include providing engineering support for a variety of small projects in many research divisions. Some of these projects are

- upgrade of an extrusion press heater control system for extruding irridium;
- installation of temperature safety limits by modifications on all eight portable furnaces in the Metalworking Theory and Practice laboratories in buildings 4508 and 3012;
- installation of a data acquisition system for collecting data from four balance stands and four furnace systems in Building 4500S;
- design and fabrication of a portable material test stand control cabinet that enables researchers to move the cabinet among different test stands;
- assistance in a project for monitoring surface water flow in waste burial grounds, including the installation of five data logging stations for collecting data;
- design and fabrication of an optical leak detector for detection of lithium inside a furnace;
- design and fabrication of a microwave sintering oven using a Microstar programmer and a phase-fired silicon-controlled rectifier unit (several technical publications have been written about this unique project);
- design and installation of a modification for a Nuclear Data analog-to-digital converter to convert the external data signal to a linear gate (LGT) strobe.
- design, testing, and installation of a module for the Whole Body Counting Facility to adapt the overload inhibit signal for a preamplifier to the LGT circuitry used for cosmic background rejection (two modules have been built and are now in operation);
- design, fabrication and testing of a water sampler timing circuit for sampling ground water (four circuits have been placed in operation); and

- design and modification of the temperature and recirculation pump in the Printed Circuit Board Fabrication Facility to allow an electronic timer to enable the controls to bring the plating lines up to operating temperature prior to the beginning of shift.

3.2 TRAINING

Training requirements for Department personnel continued to evolve during FY 1990. Accreditation activities resulted in additional training requirements for technical personnel. Training needs are constantly updated to reflect the changing scientific and technological environment at ORNL. In FY 1990, 43 training classes were attended by MMD personnel. Eleven off-site classes were attended by 39 persons, and 32 classes conducted on-site were attended by 153 persons.

3.3 INITIATIVES

Additional requirements have been identified in the calibration work performed by MMD. One requirement is that the calibration record for each instrument be sent to the customer or end user as calibration is completed. This mandate will significantly increase the time required for each calibration. The procedures for handling this new requirement are being reviewed.

The calibration facility was recently reorganized to improve the efficiency of calibration of instrumentation. MMD has also initiated an engineering design project to improve the calibration training and information exchange. This design work is being performed by the I&C Division's Computer Systems Development Group. Expected completion of this project is in the first quarter of FY 1991.

Beginning in June 1990, the personal computer (PC) Accelerated Vendor Inventory Delivery (AVID) contract was placed in operation. The AVID vendor has provided the PC Maintenance Group with several simulator systems to aid in the support of the different classes of systems under this contract. These classes include a 386-MHz IBM AT-compatible machine, an IBM PS/2, and an Apple Macintosh machine. The MMD PC support group will provide maintenance support for these machines as they are purchased. A one-day training class was conducted on each class of machine to enable MMD to provide cost-efficient maintenance support for these units.

3.4 LONG-RANGE WORK PLAN

The MMD long-range projections are based on the long-range projections and funding levels of ORNL research divisions. Several significant research projects and programs are projected to begin between FY 1991 and FY 1995. One such project, the Advanced Neutron Source project, is expected to have an impact on MMD by providing support for ~3-4 full-time MMD employees. MMD is also expected to provide support for a new Navy project being designed and developed within the I&C Division; this project will have a minimal effect in FY 1991, but the support activity will increase in the FY 1992-FY 1995 period.

5. FINANCIAL ANNUAL WORK PLAN

Operating Expense—Funded Maintenance of Equipment Other Than Real Property

**General Support of Program
Equipment^a**
(Values are in thousands of dollars.)

Fiscal year	Actual expense	Budget estimate
1990	7,877	
1991		8,231
1992		8,602
1993		8,989
1994		9,394
1995		10,259
1996		10,721
1997		11,203
1998		11,707

^aBudget projections are based on a composite escalation rate of 4.5% for the FY 1990–FY 1998 period.

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