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COMPTROLLER GENERAL OF THE UNITED STATES  
WASHINGTON D.C. 20548

B-202652

APRIL 3, 1981

The Honorable Joseph P. Addabbo  
Chairman, Subcommittee on Defense  
Committee on Appropriations  
House of Representatives



Dear Mr. Chairman:

Subject: Allegations of Improper Procurements by the Army Metrology and Calibration Center (PLRD-81-16)

In response to your July 22, 1980, letter and in subsequent discussions with your Office, we reviewed allegations by Julie Research Laboratories (JRL) Inc., that operations at the U.S. Army Metrology and Calibration Center, Huntsville, Alabama, are inefficient and wasteful and that the Center's procurement practices are restrictive. JRL's allegations are depicted in its 1980 cartoon booklet, "You're Not Supposed to Get Mugged By Your Own Army." Our findings and conclusions, which were discussed with your Office on March 25, 1981, are as follows:

- The Army, contrary to what it has told JRL, has both laboratory and field requirements for automated calibration equipment.
- The Army's technical evaluations of JRL's equipment appear to be based on some questionable conclusions and assumptions and largely ignore favorable impressions by Army representatives who saw the equipment in operation.
- We cannot verify the Army's nor JRL's cost analyses at this time because both used estimated workload data and other unsupported assumptions.

Our findings and conclusions are based on interviews and examinations of records at Headquarters, U.S. Army Materiel Development and Readiness Command (DARCOM), Army Metrology and Calibration Center, JRL offices, White Sands Missile Range, and a commercial user of JRL equipment.

Although we did not review each JRL allegation in detail, we believe our work has disclosed that the Departments of Defense and the Army need to reexamine the field Army requirements for calibration equipment and to test various

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equipment in the operating environment. Such tests should establish the most cost-effective equipment that will satisfy valid Army requirements.

#### BACKGROUND

The Army's calibration and repair program is designed to validate the accuracy of test equipment and to provide necessary adjustments and repairs. DARCOM is responsible for the program.

The calibration and repair program is managed and operated differently for the field Army and for industrial-type Army calibration facilities. The primary mission of the field Army program is to support tactically deployed, general-purpose test equipment in the hands of field Army troops. This is done through mobile and fixed calibration teams scattered worldwide and managed by the Army Metrology and Calibration Center. In the event of mobilization for war, some of these calibration teams are assigned and deployed with the tactical combat units they support. The Army must have full mobility for these teams. The industrial-type Army calibration facilities are fixed and provide calibration support to depots, laboratories, arsenals, proving grounds, and ranges. They are managed by the operating commands which they support.

According to 1978 Army data, the estimated calibration workload for the field Army is 570,000 calibrations a year and 270,000 for other calibration facilities. Because of the Army's recent realignment combining calibration and repair support to the tactical units, DARCOM officials explained that current workload information, showing the major categories of items calibrated and the locations where those calibrations were made, is not readily available from Army records.

#### THE ARMY HAS REQUIREMENTS FOR AUTOMATED CALIBRATION EQUIPMENT

The Army told JRL that it does not have requirements for automated calibration equipment for the field Army. Various studies and procurements show, however, that the Army has requirements for automated calibration equipment for both the field Army and other calibration facilities.

During the 1970s, the Army and the National Bureau of Standards recognized the Army's need for automated calibration equipment in both the field Army and other calibration facilities. For example, the Army bought an automated

calibration system in December 1974 and another in February 1975 to test the feasibility of using automated equipment in mobile vans for the field Army. The Army also bought five laboratory automated calibration systems in 1975 because inspections showed that laboratory calibration programs were either marginal or inadequate. In addition, in 1976 the National Bureau of Standards recommended that automation of the vans be accelerated because manual equipment may not be adequate to support future computer controlled weapon systems.

The Army's experience with automated equipment during the 1970s, however, was not very good. For example, an Army Metrology and Calibration Center May 1978 report concluded that no laboratory had fully used the five automated systems. According to laboratory reports, the systems were not fully utilized because of maintenance problems and availability of programs. Army officials told us that they believe that failure to use the laboratory automated systems was due to a lack of management emphasis and the unwillingness of laboratory technicians to use automation. Two of the five automated systems are no longer being used and one system is being phased out of operation. Also, tests to determine the feasibility of using automated equipment in mobile vans were terminated before completion because they conflicted with another Army test program for the automated test support system being developed at another Army activity.

Recent calibration equipment purchases show a continuing need for automated calibration equipment. Army officials told us the field Army does not need large automated systems, such as those used in laboratories, but it does need small automated systems. For example, as of March 1981, the Army purchased 18 automated meter calibrators from the John Fluke Manufacturing Company, Inc., to supplement manual equipment in Europe and to decrease the time required for meter calibrations. Army officials believe that because these automated meter calibrators will improve overall efficiency, the resulting productivity increases can be used to help reduce the growing backlog of equipment needing repair. Nine systems have been delivered to the Army but have not yet been sent to Europe.

Also, White Sands Missile Range bought two of JRL's LOCOST automated meter calibrators in September 1979 to replace marginally effective automated calibration equipment. The LOCOST systems were delivered in September 1980.

ARMY TECHNICAL AND COST EVALUATIONS  
OF JRL EQUIPMENT WERE INCONSISTENT

Army officials insist that JRL did not bid in response to what the Army determined its requirements to be, but instead submitted unsolicited proposals which were JRL's assessment of how its equipment could fill the Army's requirements. By submitting two unsolicited proposals, JRL caused the Army to consider using JRL automated LOCOST systems in its calibration and repair program. The first proposal, which was submitted in May 1976, projected that the Army could save \$13 million annually by establishing three high-speed automated calibration facilities using LOCOST systems. The second proposal, which was submitted in October 1979, projected that the Army could save \$200 million over a 10-year period by installing 69 leased LOCOST systems in 138 mobile vans partially equipped with manual equipment instead of completely outfitting 200 mobile vans with manual equipment.

The Army completed its technical and cost evaluations of these two unsolicited JRL proposals in March 1977 and January 1980, respectively, and reported that the LOCOST system would not perform as claimed and would not be cost effective. As discussed below, it appears that the Army based its evaluations on some questionable assumptions and ignored favorable impressions by several Army representatives who saw the LOCOST system in operation.

Technical evaluations

DARCOM, in response to JRL's May 1976 unsolicited proposal, completed the first evaluation of JRL's LOCOST system in March 1977. DARCOM concluded that equipment and programs offered by JRL were not new or unique to the industry nor were they state of the art. DARCOM based its conclusions on (1) comparisons of the technical characteristics of the LOCOST system with other systems and (2) assumptions about the LOCOST system's performance capabilities. However, DARCOM may have understated performance capabilities of the LOCOST system and overstated performance capabilities of competing systems. DARCOM also appears to have discounted favorable reports from Army representatives who observed the LOCOST system in operation. For example:

--DARCOM reported that the Modularly Equipped and Configured Calibrator/Analyzer (MECCA) would calibrate about 80 percent of the direct current/low frequency workload and about 50 percent of the total Army workload,

including meters, signal generators, oscilloscopes, counters, and pressure gages. At that time, the Army had not received a MECCA system with these capabilities, and in fact prototype MECCA equipment received at a later date did not effectively calibrate signal generators, counters, and oscilloscopes. Furthermore, the prototype MECCA meter calibrator had unacceptable problems and limitations.

--DARCOM was skeptical of JRL's claim that equipment could be programed in about 15 minutes because the Army's experience with competing systems showed an average requirement of 120 hours. Representatives of Harry Diamond Laboratories and the Army Metrology and Calibration Center, however, had reported observing program preparation for a simple test instrument in less than 3 minutes and the instrument's calibration in another 3 minutes. The Harry Diamond representatives also reported that (1) the LOCOST system could calibrate a variety of instrumentation in less than 30 minutes, as JRL claimed, (2) The simplicity of programing and using the system was evident, and (3) the system could produce significant savings at their laboratory.

The Army Metrology and Calibration Center, in response to JRL's October 1979 unsolicited proposal, completed the second evaluation of JRL's LOCOST system in January 1980. The Center also concluded that equipment and programs offered by JRL were not new or unique to the industry nor were they economically competitive with other available automated systems. The Center based its conclusions on the same data used in DARCOM's earlier review. Center officials believed that because of a lack of technical details, JRL's second proposal was not too different from its first proposal. The Center did not contact JRL to determine whether additional capability had been added to the LOCOST system or to ensure that it understood what JRL had to offer. Data provided to us by JRL, for example, shows that the LOCOST system has capability in areas where the Army reported it to be inadequate. Moreover, between the first and second evaluations, problems had surfaced with the five laboratory automated calibration systems which DARCOM had compared with LOCOST. In addition to the problems experienced with the MECCA system, for example, some laboratories were reporting significant problems with the automated calibration system.

[The Army's assertion that JRL's LOCOST system is not unique or new to the industry nor state of the art is inconsistent with

reports from LOCOST system owners. The reports suggest that the LOCOST system may indeed offer advantages because of shorter programming time and simpler operation. For example, White Sands Missile Range officials report that 100 programs were developed in about 75 hours and that average programmer training time was 24 hours. Another LOCOST system owner, an aerospace company, told us that program preparation time on the LOCOST system ranged from 15 minutes to 1 hour with most programs taking 30 minutes or less. This company also told us that it knows of no other commercial off-the-shelf calibrator that will perform as well as the LOCOST system.

#### Cost evaluation

As previously mentioned, JRL's 1976 and 1979 unsolicited proposals projected significant savings for the Army. JRL based its claimed savings in both proposals on increased productivity and decreased equipment, personnel, and training costs. In evaluating these proposals, however, DARCOM and the Army Metrology and Calibration Center neither agreed with the amounts of JRL savings nor with the concept by which JRL projected those savings. The Center, for example, reported that accepting JRL's 1979 unsolicited proposal could result in a \$42 million loss rather than a \$200 million savings.

We have been unable to fully evaluate the Center's or JRL's cost analyses because of unreliable workload data and unresolved questions about whether the LOCOST system could replace the manual equipment in mobile vans.

In performing the cost analyses, both JRL and the Center used 1976 estimates of Army workload levels and apparently used 1972 estimates of the major categories of Army test equipment that would require calibration. We have been unsuccessful in obtaining actual current workload data by major categories of Army test equipment because this information is not readily available from Army records.

Also, JRL's 1979 unsolicited proposal assumed that 69 LOCOST systems could replace 50 percent or \$100,000 of the manual equipment in each van. In evaluating this proposal, however, the Army assumed that the LOCOST system could not replace any equipment in mobile vans because of a need to retain manual equipment for other calibration and repair operations. Neither JRL nor the Army has validated its assumptions through operational testing of the LOCOST system in a mobile van.

In addition to the above unresolved issues, several other inaccuracies appear in the JRL and Army cost analyses. For example, in the 1979 unsolicited proposal and subsequent Army evaluation:

- JRL calculated the cost of each van's equipment, which the LOCOST system would replace, to be \$100,000, but an itemized listing of equipment from JRL shows the cost to be about \$35,000. The Army said JRL's equipment would not replace any equipment.
- The Army elected to delete from JRL's proposal, cost savings attributed to an oscilloscope and a signal generator that JRL had not produced, but it did not reduce the associated lease price for these deleted items from what JRL had originally proposed.
- The Army used one workload level to determine the number of LOCOST systems needed and a different workload level to determine the manual equipment needed.

In both evaluations, the Army said that the LOCOST system was more costly than other automated systems. In the second evaluation, the Army based its conclusion on estimated costs of from \$25,000 to \$30,000 for the MECCA and \$154,000 for a LOCOST system as configured for laboratory use at White Sands Missile Range. According to JRL, a LOCOST system configured for the field Army application would cost less than the LOCOST system at White Sands. The Army, however, has not asked JRL for the purchase price of a LOCOST system configured for field Army application. Both JRL's analyses supporting its unsolicited proposals and the Army's evaluations were based on paper studies.

#### CONCLUSIONS

Although we are unable to verify the accuracy of all JRL's allegations, we believe that the Army has not adequately considered JRL's LOCOST system, particularly in its evaluation of the system's ability to satisfy field Army calibration program requirements. We could not verify that using JRL's equipment would result in the amount of cost savings as claimed by JRL or that the LOCOST system could satisfy the Army's needs. Before these determinations can be made, the Army needs to completely assess its actual workload and determine what portion of that workload would benefit from automation. The question of whether the LOCOST or other automated systems can replace equipment in field Army vans should be resolved through hardware demonstrations

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by the people who will use the equipment in carrying out the calibration mission.

RECOMMENDATIONS

We recommend that the Secretary of Defense direct the Secretary of the Army to:

- Develop accurate workload data on field Army calibrations because reliable data is needed to validate equipment requirements.
- Reexamine equipment capabilities to determine the extent to which automated equipment can replace manual equipment in field Army calibration units.

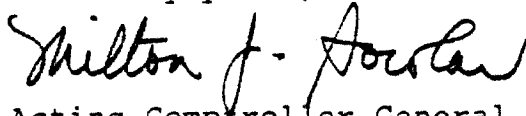
In addition, we recommend that the Secretary of Defense require that an independent hardware demonstration be conducted to establish the cost effectiveness and productivity increases that may be attributed to automating the field Army calibration functions.

Until the Army has acted on our recommendations, we plan no further work on allegations in JRL's cartoon booklet because we believe such efforts would be unproductive. We are ready to assist you, should you deem it necessary, in monitoring the Army's responses.

During our review, we saw several aspects of the Army Metrology and Calibration Center activities which appear to warrant our further examination. Accordingly, we plan to pursue these matters in a separate review to begin shortly. We will provide you with copies of reports resulting from that effort.

As requested by your Office, we have not taken the time necessary to obtain official comments from either the Army or JRL on the matters discussed in this report. As agreed with your Office, we are sending copies of this report to the Secretary of Defense, the Secretary of the Army, JRL, and interested congressional offices.

Sincerely yours,



Acting Comptroller General  
of the United States