

Re 
MAY 21 1992

KIRTLAND OPERATIONS PROGRESS REPORT

JANUARY-MARCH 1991

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, expressed or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

APPROVED FOR RELEASE BY THE NATIONAL ARCHIVES
ON 08-11-2013

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

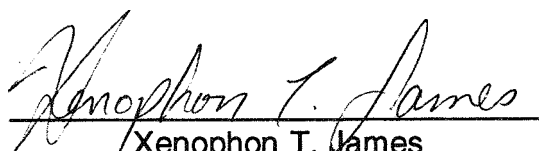
DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

KIRTLAND OPERATIONS PROGRESS REPORT

JANUARY-MARCH 1991

Reviewed by:


Xenophon T. James
Operations Manager

This Report is Unclassified:


J. David Hutton
Authorized Derivative Classifier

Work performed under Contract No. DE-AC08-88NV10617

MASTER
DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

PREFACE

Kirtland Operations (KO) is an integral part of EG&G Energy Measurements, Inc., whose primary mission is to support the U.S. Department of Energy's (DOE's) programs in weapons development and testing and in nuclear safeguards and security.

KO performs much of its work in close coordination with and often at the technical direction of Sandia National Laboratories. In addition to aiding Sandia's weapons programs, KO provides a wide spectrum of technical support to other Sandia activities, particularly their safeguards, security, and treaty verification programs. Support is also provided to other elements of the Department of Energy community and to other federal agencies, primarily in weapons testing and safeguards.

This report documents our support to these programs from January to March 1991.

CONTENTS

	<u>Page</u>
1. ORGANIZATIONAL STRUCTURE	1-1
ADMINISTRATION DEPARTMENT	1-1
ELECTRICAL ENGINEERING DEPARTMENT	1-1
ENGINEERING TECHNICAL SERVICES DEPARTMENT	1-1
MECHANICAL ENGINEERING AND SERVICES DEPARTMENT	1-3
OPERATIONAL SUPPORT DEPARTMENT	1-4
ENVIRONMENT, SAFETY, HEALTH AND FACILITIES DEPARTMENT	1-5
SCIENCES DEPARTMENT	1-5
2. PROJECT DESCRIPTIONS	2-1
SAFEGUARDS AND SECURITY	2-1
Office of Security Evaluations (OSE) Support	2-1
Safeguards: Site Surveys, Installation, and Sensor Evaluation	2-2
Security Forces Experimentation and Evaluation (SFEE) : Office of Safeguards and Security (OSS) Loaner Program	2-2
Transportation Safeguards Division	2-3
Sensor Evaluation and Design	2-5
TREATY VERIFICATION	2-6
Deployable Seismic Verification System	2-6
OTHER PROJECTS	2-6
Modular Building Block Communication System	2-6
Tactical Remote Sensor System	2-6
STRESS System Fabrication	2-7
PAMTRAK Material Tracking System	2-7
Office of Classification	2-7
Reynolds Electrical and Engineering Co., Inc.	2-7
SNL Video Support	2-7
Lockout/Tagout Video Support	2-7
WEAPONS	2-7
Sandia Digital Underground System	2-7
Diagnostic Support	2-8
Trailer Fabrication	2-8
High-Density Digital Recorder	2-8
Replacement Vacuum Effluent-Recovery System	2-8
Permanent High-Explosive Test Site Monitor System	2-8
DOE Research and Development	2-9

	<u>Page</u>
3. PROJECT HIGHLIGHTS	3-1
SAFEGUARDS AND SECURITY	3-1
Office of Security Evaluations Support	3-1
Safeguards: Site Surveys, Installation, and Sensor Evaluation	3-3
Security Forces Experimentation and Evaluation: Office of Safeguards and Security Loaner Program	3-4
Transportation Safeguards Division	3-5
Sensor Evaluation and Design	3-10
TREATY VERIFICATION	3-10
Deployable Seismic Verification System	3-10
OTHER PROJECTS	3-11
Modular Building Block Communication System	3-11
Tactical Remote Sensor System	3-11
STRESS System Fabrication	3-11
PAMTRAK Material Tracking System	3-12
Office of Classification	3-12
Reynolds Electrical and Engineering Co., Inc.	3-12
SNL Video Support	3-12
Lockout/Tagout Video Support	3-12
WEAPONS	3-12
Sandia Digital Underground System	3-12
Diagnostic Support	3-13
Trailer Fabrication	3-13
High-Density Digital Recorder	3-13
Replacement Vacuum Effluent-Recovery System	3-13
Permanent High-Explosive Test Site Monitor System	3-13
DOE Research and Development	3-14
4. SUPPORT HIGHLIGHTS	4-1
TECHNICAL SUPPORT	4-1
Electronic Fabrication Services Activities	4-1
Production Services Activities	4-1
OPERATIONS SUPPORT	4-2
Environment, Safety, Health and Facilities	4-2
Equal Employment Opportunity	4-2
Quality Assurance	4-3
Quality Control	4-3
ADMINISTRATIVE SUPPORT	4-4
Accounting Activities	4-4
Human Resources Activities	4-4
Information Services Activities	4-4
Property/Shipping and Receiving Activities	4-5
Purchasing Activities	4-5
Security Activities	4-5

ILLUSTRATIONS

<u>Figure</u>		<u>Page</u>
1	Kirtland Operations organization	1-2
2	Cindy Kindl, Video Specialist, reviews an interactive training program developed by Information Services	1-3
3	Woody Woodstra, Electrical Engineer in the Sciences Department, measures the resolution of an electrostatic intensifier	1-6
4	Steve Johnson, Production Technician, fabricates power filter units for escort vehicles	3-6

TABLES

<u>Table</u>		<u>Page</u>
1	Workforce goal review	4-2
2	Accounting activities	4-4
3	Second-quarter employment statistics	4-4
4	Second-quarter service statistics	4-5
5	Property/Shipping and Receiving activities	4-6
6	Purchasing activities	4-7
7	Purchasing awards by category through second quarter	4-7
8	Routine security processing statistics	4-8

ABBREVIATIONS AND ACRONYMS

AB	Air Base
ACC	Alternate Control Center
ACE	Alternate Common Equipment; Advisory Committee of Employers
ACS	Albuquerque Courier Section
AECS	Advanced Entry Control Systems
AFB	Air Force Base
AFCSC	Air Force Communications Systems Command
APL	Automated Position Locator
ARCESS	ARctic Experimental Seismic Array
AS	Annunciator System
ASEC	Analytical Systems Engineering Corporation
ASSP	Advanced Small Site Program
AVO	Amador Valley Operations (EG&G)
BMS	Balanced Magnetic Switch
BSI	Bit Synchronization Interface
CAD	Computer-Aided Design
CCTV	Closed Circuit TeleVision
CDP	Career Development Program
CEC	Career Enrichment Center
CMC	Craddock Modification Center
COIC	Combat Operations Intelligence Command
CPS	Capacitance Proximity Sensor
CPU	Central Processing Unit
CRREL	Cold Region Research Evaluation Laboratory
CST	Computer Security Template
CTA	Central Training Academy
DHS	Data Handling System
DNA	Defense Nuclear Agency
DOD	Department of Defense
DOE	Department of Energy
DOE/AL	Department Of Energy's Albuquerque Operations Office
DOE/NV	Department Of Energy's Nevada Operations Office
DSVS	Deployable Seismic Verification System
EBS	Emergency Braking System
ECC	Exercise Control Center
ECMC	Emergency Crisis Management Center
ECU	Environmental Control Unit
EEO	Equal Employment Opportunity
EM	Energy Measurements, Inc.
EMG	Electronic Maintenance Group

ERMA	Employee Recreation and Morale Association
ES&H	Environment, Safety, and Health
ESC	Electronic Systems Command
ESD	Electronic Systems Division
ESS	Engagement Simulation System
FACT	Facility for Acceptance Calibration and Testing
FCE	Fieldable Computer Equipment
FDB	Field Distribution Box
FPS	Findings Presentation System
HDDR	High-Density Digital Recorder
HF	High Frequency
HMMWV	High-Mobility Multipurpose Wheeled Vehicle
HPL	High-Pressure Laboratory
I&E	Inspection and Evaluation
IG	Inspector General
IVKT	Interactive Video Knowledge Test
JTE	Joint Training Exercise
KAFB	Kirtland Air Force Base
KO	Kirtland Operations
KUMSC	Kirtland Underground Munitions Storage Complex
LLNL	Lawrence Livermore National Laboratory
LVAO	Las Vegas Area Operations (EG&G)
MBB	Modular Building Block
MEMF	Mobile Electronic Maintenance Facility
MEPFU	Mobile Equipment Preparation for Use
MEPMI	Mobile Equipment Preventive Maintenance Inspection
MILES	Mobile Integrated Laser Equipment System
MILSTAR	MILitary Strategic and Tactical Relay Satellite
MIRADOR	Minefield Reconnaissance and Detection System
MMG	Mechanical Maintenance Group
MPDAL	Military Perimeter Detection and Assessment Laboratory
MTT	Mobile Training Trailers
NAC	Naval Avionics Center
NORESS	Norwegian Experimental Seismic Array
NTS	Nevada Test Site
OOP	Organizational Operating Procedure
OSB	Operations Support Branch
OSE	Office of Security Evaluations

OSHA	Occupational Safety and Health Administration
OSS	Office of Safeguards and Security
PACOM	PACific COMmand
PC	Personal Computer; Printed Circuit
PHETS	Permanent High-Explosive Test Site
PMI	Preventive Maintenance Inspection
POC/ET	Proof-Of-Concept Experimental Test-bed
QA	Quality Assurance
QC	Quality Control
QCD	Quality Control Director
QSP	Questionnaire for Sensitive Positions
RAMS	Receiving And Monitoring Station
RAMMIS	Relay and Mobile Maintenance Information System
REECo	Reynolds Electrical and Engineering Co., Inc.
RVERS	Replacement Vacuum Effluent Recovery System
SANDUS	SANDia Digital Underground System
SCC	SECOM Control Center
SECOM	SEcure COMmunications
SFEE	Security Forces Experimentation and Evaluation
SMAS	Small Annunciator System
SMS	Sensor Monitor System
SNL	Sandia National Laboratories
SNLA	Sandia National Laboratories Albuquerque
SNLL	Sandia National Laboratories Livermore
SOP	Standard Operating Procedure; Safe Operating Procedure
SPCS	Short Ported Coax System
SRTR	Short-Range Training Round
SST	Safe Secure Trailer
STRESS	Security Training and Evaluation Shooting System
STARS	Sandia Transient Acquisition and Recording System
STAS	Standard Annunciator System
STS	Survey Tracking System
TRL	Tritium Research Laboratory
TRSS	Tactical Remote Sensor System
TSB	Technical Support Branch
TSD	Transportation Safeguards Division
TSTC	Transportation Safeguards Training Center
UHF	Ultra-High Frequency

VDS	Vehicle Detection System
VIB	Vehicle Interface Box
VISDTA	Video Imaging System for Detection, Tracking, and Assessment
WSMR	White Sands Missile Range

1. ORGANIZATIONAL STRUCTURE

The major support activities of each Department of Kirtland Operations (KO) are outlined in the organization chart in Figure 1.

ADMINISTRATION DEPARTMENT

The Administration Department includes several Sections that support the day-to-day activities of KO.

The Information Services Section features a complete videotape and interactive video production laboratory, where training tapes and computer-generated instructional programs are developed for the Department of Energy and associated contractors (see Figure 2). Information Services also writes and edits technical publications, including training manuals, technical reports, newsletters, and briefings. The Section maintains a complete photographic capability and computer-graphics component.

Other Administration Department Sections provide services in purchasing, security, human resources, property management, and shipping and receiving.

ELECTRICAL ENGINEERING DEPARTMENT

The Electrical Engineering Department designs hardware for optical and electronic systems.

The Department is divided into four engineering Sections, each having the capability to design and install various digital and analog systems, including microcomputer applications. Two of the Sections have specialized missions: safeguards and security engineering support; and system engineering support for global communications systems used for battle management and other purposes. The other two are composed of personnel having broad-based electrical engineering backgrounds whose functional mission is to provide support for a wide array of projects.

The Department's engineers and technologists use personal computers running various computer-aided engineering programs to aid them in their tasks, which include schematic and mechanical drafting, logic simulation, and software development. These programs include schematic capture, mechanical design, and various microprocessor cross-assembler software packages.

Important projects include the continuing development of state-of-the-art data-acquisition and recording systems for use at both the Nevada Test Site (NTS) and the White Sands Missile Range; ongoing engineering in support of the safe, secure transport of nuclear weapons; and training of security forces for safeguarding the weapons.

Various other projects include support to the Naval Avionics Center in designing and fabricating communication shelters for battlefield perimeter security systems, and support for Sandia National Laboratories at Livermore in the design of tritium-handling glove boxes used in the design of nuclear weapons components.

Recent projects include the design and fabrication of a Minefield Reconnaissance and Detection System (MIRADOR) for the Army Belvoir Research, Development and Engineering Center. This system is capable of detecting both surface and buried anti-armor mines. A potential outgrowth from the technology developed from this project is to develop and field a prototype hazardous waste site survey system for the Los Alamos National Laboratory.

ENGINEERING TECHNICAL SERVICES DEPARTMENT

The Engineering Technical Services Department supports both the Department of Energy and the Department of Defense in several efforts involving mechanical and electronic fabrication and large system design and buildup.

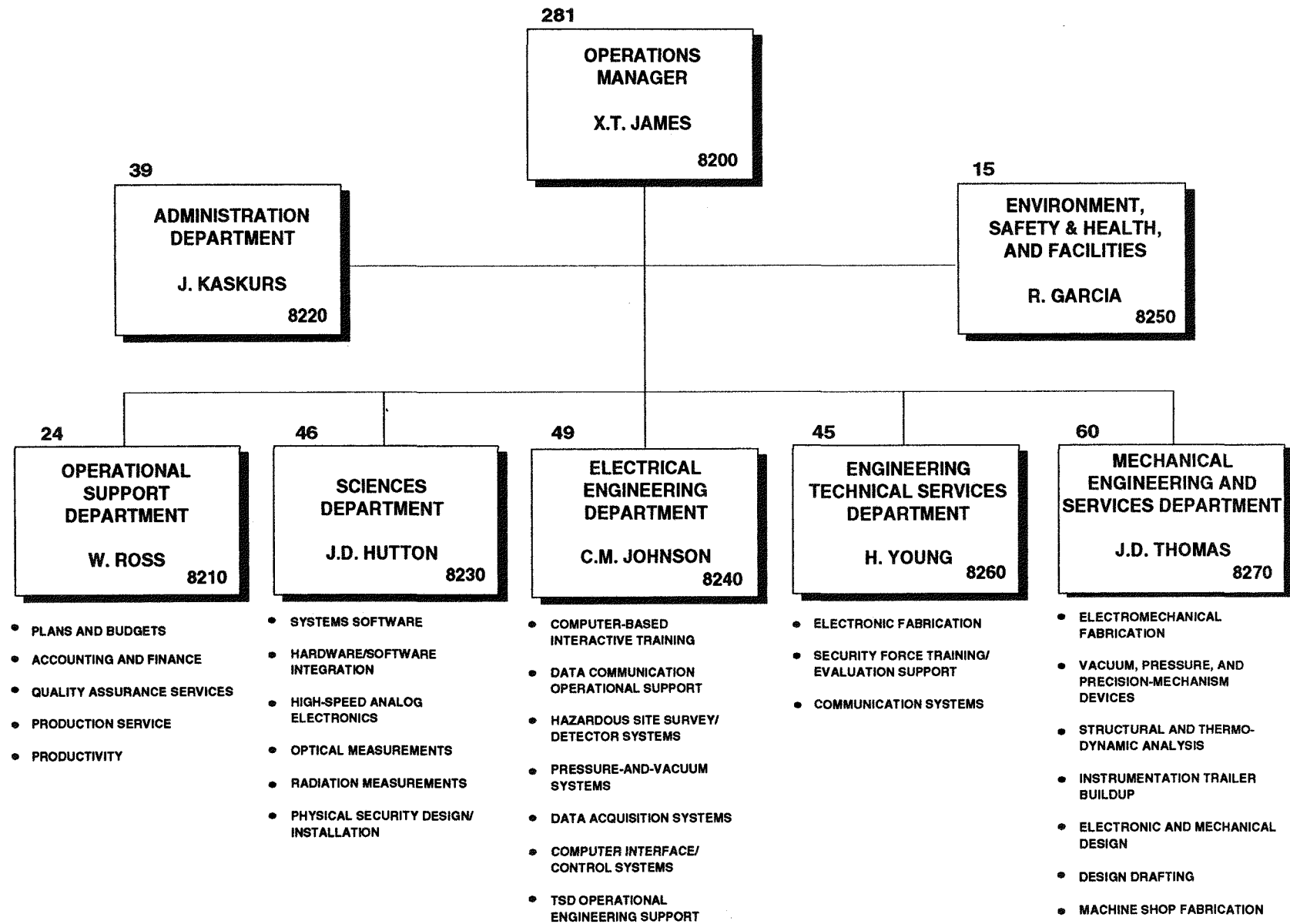


Figure 1. Kirtland Operations organization.



Figure 2. Cindy Kindl, Video Specialist, reviews an interactive training program developed by Information Services.

One of the largest projects in the Department is associated with testing and maintenance of systems required to provide a dependable communications network for the safe transport of nuclear materials throughout the continental United States. The group providing this service to the DOE/AL requires a thorough knowledge of the network, sophisticated electronic communication theory, and the operating and maintenance parameters of the equipment used in the various systems. All personnel in this Section are required to periodically undergo various levels of recertification of qualification to perform their technical tasks.

This Department also assists the DOE in training security forces responsible for protecting nuclear material on station or in transit. During these training exercises, which are sometimes simulated armed conflicts between security forces and adver-

saries, KO personnel supply and maintain sophisticated laser equipment used in the exercises. The lasers simulate weapons in the conflict with "kills" and "near misses" sensed by detectors worn by participants.

Another technical service group within the Department assembles prototypes or limited quantities of electronic printed-circuit boards, chassis, and systems. The capabilities include automated wire wrapping, cable fabrication, and complete chassis wiring.

MECHANICAL ENGINEERING AND SERVICES DEPARTMENT

The Mechanical Engineering and Services Department performs analysis, engineering, design,

and fabrication of mechanical systems or components. This capability includes standard mechanical disciplines with specialties in pressure and vacuum systems, precision mechanical devices, and structural or thermodynamic analysis.

The Department consists of four Sections: Mechanical Engineering, Design Services, Electro-Mechanical, and Shop Services. Each of these Sections functions either independently or in support of other Sections or Departments, depending on the task. The Mechanical Engineering Section performs the engineering and analysis functions for mechanical systems, and supports other parts of the organization on tasks that require integration of electronic and mechanical components or systems.

The Design Services Section provides design and drafting support to the entire organization. The Section also has some tasking on projects that do not require engineering effort, such as drawing-control and copying. All Design Services designers and draftsmen work on Computer Aided Design (CAD) workstations, including AutoCAD and InterGraph for mechanical design. InterGraph has full 3D capability and can graphically highlight component interferences. Complex design can be accomplished rapidly on these workstations and changes made with minimal effort, facilitating prototype development. Schematic capture is done using FutureNet software on the standard workstations, and printed-circuit-board design is done on SUN workstations using Dasix software.

The Electro-Mechanical Section includes electronic, electrical, and mechanical technicians. This Section works independently and in support of other parts of the organization. Projects accomplished by the Section are tasks that require integration of electrical, electronic, and mechanical disciplines. Projects such as instrumentation trailers for use at the NTS or other test ranges are in this category. These systems require HVAC systems, sophisticated power-distribution systems, electronics, and provisions for Tempest security requirements when necessary. The Section also fabricates many other types of systems using the same skills and methods.

The Shop Services Section comprises sheet metal, welding, and machine shop capabilities.

This Section is capable of fabricating complex mechanical prototype systems. The Section supports the entire organization in this type of effort. Work on chassis for electronics designed in other departments, ducts for HVAC systems, and components for horizontal line-of-sight pipes used in underground nuclear effects tests are typical of the Section's tasks. The Section has the standard complement of shop equipment including CNC programmable mills and punches. Manufacturing tasks of a repetitive nature are normally sent out for fabrication, but when time constraints require, limited-run fabrication can be accomplished.

OPERATIONAL SUPPORT DEPARTMENT

The Operational Support Department coordinates planning and budgeting, accounting, quality control, quality management assessment, and production services. This department is the focal point for KO's efforts in the implementation of EM's quality initiatives.

The Planning and Budgeting function provides support to KO for a wide variety of planning and budgeting activities, including the development of the KO operating and capital budgets.

The Accounting function provides travel services, payroll, job cost, and time accounting services.

The Quality Control Section is responsible for monitoring the control of drawings, calibration of test equipment, and inspection of all fabricated parts.

The Management Support and Assessment Section is responsible for the coordination and development of quality-related procedures and the control of procedure distribution and Quality records. This section also provides KO with quality assurance assessment of management and operational areas.

Production Services is responsible for the coordination of requirements, schedules, and procured materials between EM manufacturing shops and project personnel.

ENVIRONMENT, SAFETY, HEALTH, AND FACILITIES DEPARTMENT

The Environment, Safety, Health, and Facilities Department furnishes support to KO in the areas of environment, safety, health, and facilities.

The ES&H Office assists and advises KO line organization management, supervisors, and employees in the safety program by providing training, guidance, equipment, and reports in all aspects of environmental compliance, accident investigation, wellness, industrial safety, industrial hygiene, radiation safety, motor vehicle safety, fire protection, emergency preparedness, off-the-job safety, worker's compensation, and risk management.

The Facilities Engineering and Services Section is responsible for the management and maintenance of KO facilities. This includes facilities planning, engineering and design; construction; installation of equipment; maintenance and repair; utilities management; and other support activities.

SCIENCES DEPARTMENT

The Sciences Department provides scientific and systems software support to KO's customers. It also provides intrusion-sensor design and evaluation to several customers, as well as technical support to groups at Sandia National Laboratories

(SNL) doing weapons test diagnostics and verification technology development.

The majority of the work in Sciences is devoted to various applications of software to solve scientific and technical problems, including data-acquisition software at the NTS, analysis software for seismic treaty verification applications, computer security studies, and administrative software support to local KO users. The department maintains the local administrative and scientific computing resources at KO, and acts as liaison with other EG&G locations on matters of computer usage and security.

The Sciences Department provides expertise in high-speed analog electronic engineering, optical design and test, high-speed data-acquisition systems, and radiation measurements. The Department maintains KO's optics laboratory, where various optical measurement techniques are developed, including optical radiation measurements on Engagement Simulation System (ESS) transmitters for the safeguards program.

The Safeguards and Sensors Engineering Section provides various support services for SNL and other government customers in the design, testing, and installation of custom security systems worldwide.

A typical activity of the Sciences Department is shown in Figure 3.

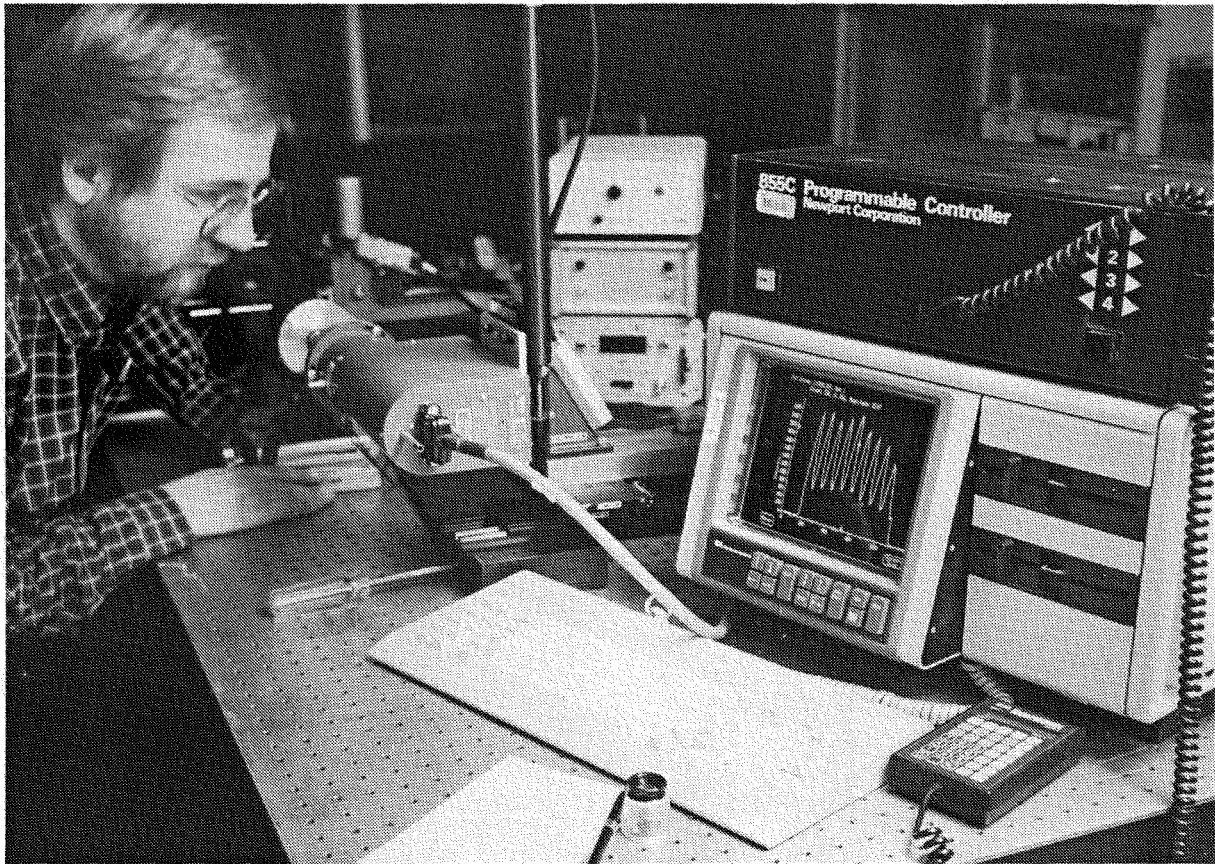


Figure 3. Woody Woodstra, Electrical Engineer in the Sciences Department, measures the resolution of an electrostatic intensifier.

2. PROJECT DESCRIPTIONS

SAFEGUARDS AND SECURITY

Office of Security Evaluations (OSE) Support

Inspection Division Support

Program Management. This support includes resource scheduling, progress reports, financial reports, budgeting, program review, and meetings to discuss the Scope of Work. This effort also includes work proposal generation and assistance to OSE personnel with presentations and reports.

Technical Support. Technical support is provided to the Inspection Division to assist in the accomplishment of field inspection activities. This support includes:

- Interactive Video Knowledge Test (IVKT) Laser Disc

The IVKT is an interactive video computer-based system for testing fundamental security knowledge of DOE security inspectors. The system's database component provides automated data gathering. In conjunction with OSE content experts, EG&G will update the current prototype test disk as well as develop tests in the area of Material, Control, and Accountability (MC&A) and classification.

- IVKT System Enhancements

EG&G will maintain the three IVKT systems, upgrade the prototype unit to match the two newer ones, and provide enhancements identified during fielding.

- Security Forces Experimentation and Evaluation (SFEE) Base Support

Tasks such as weapons inspections and maintenance and R&D are done in conjunction with the Loaner Program. Repair and

calibration of the ESS inventory is also covered under base support.

- SFEE Special Support

At the request of OSE, EG&G provides special support for inspections.

- SFEE Technical Support

Activities supported under this account would include researching technical data, locating specific items, or developing a specific item upon request for use by an OSE evaluation team during inspections or exercises. This support would also include procurement and maintenance of special electronic or mechanical equipment used solely by OSE.

- Fieldable Computer Equipment (FCE)

EG&G has been requested to provide computer equipment to support the OSE Inspection and Evaluation (I&E) teams during Safeguards and Security Readiness Reviews and field inspections at DOE facilities during FY91.

- Findings Presentation System (FPS)

The FPS is a PC-based software system that extracts, stores, and retrieves information contained in OSE Inspection Reports. The system implements a relational database working in conjunction with an indexed full-text retrieval system. Statistical data abstracted from the Inspection Reports, together with the text of the reports, reside in the database, and can be quickly accessed by menu-guided searches. The system is designed for simple and accurate data entry by OSE clerical staff without rekeying. To ensure accuracy, consistency, and retrievability, the system ensures data quality by extensive use of data dictionaries during data entry.

The FPS was completed and delivered in May 1988. Subsequent work on the system has involved editing and formatting data dictionaries, some modifications to accommodate changes in OSE requirements, and preparation of complete system support documentation.

Safeguards: Site Surveys, Installation, and Sensor Evaluation

EG&G engineers test, install, and evaluate security systems for various government agencies and military installations.

Installing a security system at a facility requires a number of activities. Site surveys are conducted to determine the most effective type of installation and specific construction requirements. Candidate sensors are temporarily installed to expose them to the environment. Testing eliminates those systems not compatible with the specified criteria. Successful systems remain candidates for the final design. Final installation involves preparing the site, installing equipment, and testing to ensure satisfactory performance. EG&G also conducts a continuous program, usually at a local test field, to evaluate sensors. This program provides data to upgrade equipment and improve installation techniques and overall performance.

Security Forces Experimentation and Evaluation (SFEE): Office of Safeguards and Security (OSS) Loaner Program

EG&G performs SFEE activities for the OSS in support of DOE field offices and their contractors in the areas described below:

Program Management

This support includes resource scheduling, ES&H issues, progress reports, financial reports, budgeting, and program reviews.

Depot Maintenance

EG&G provides depot maintenance for DOE contractors who have purchased ESS equipment, and procures spare parts for use in these repairs.

Loaner Package Support

EG&G provides Engagement Simulation Systems (ESS) equipment to DOE contractor security groups to use in their training and for security evaluations. EG&G arranges schedules based on priorities set by DOE.

Field Activity

Local DOE offices receive ESS equipment and on-site support for their field office surveys.

Common Support Engineering

EG&G provides support to design and build special items for training and audits. This includes such tasks as adapting ESS equipment to weapons not in the arsenal. EG&G is providing a technical review of attempts to develop and implement the various types of live-round inhibitors. This includes furnishing test data on failures as well as successfully developed units, when that information is available.

STRESS Support and Maintenance

This task consists primarily of maintenance of Central Training Academy's (CTA) STRESS system. This system, used by DOE, provides training in DOE policies and procedures regarding the use of deadly force.

Common Support Miscellaneous Activities

EG&G provides support as needed for a number of miscellaneous requests. This effort covers facility support activities, armorer support, maintenance of inventory, and QA and ES&H efforts. This includes special operations which consist of general support for joint exercises with DOE, DOD, and other government agencies. Another facet of support is the EG&G centralized procurement of ESS equipment for DOE area offices and contractors. This project provides a cost savings and furnishes a

focal point for purchase of ESS equipment within the DOE community.

STRESS Scenarios

This task consists of STRESS scenario development for CTA and other sites.

Central Training Academy

EG&G provides equipment and technical support as required by the training schedule. Support includes equipment evaluation, engineering modification, equipment configuration, and video production.

ESS Certification

This task is to provide training of the SFEE technicians in laser eye safety procedures as mandated by DOE Order 5480. An interactive training program will provide technicians with the procedures for calibrating ESS equipment. This program will be written and administered by the EG&G/LV Training Office.

Transportation Safeguards Division (TSD)

EG&G performs engineering, procurement, fabrication, construction, test and evaluation, maintenance, and operational support functions for the Transportation Safeguards Division at the Transportation Safeguards Training Center (TSTC), SECOM Albuquerque Mobile Electronic Maintenance Facility (MEMF), New Mexico and Maryland SECOM Relay sites, and the Kirtland Operations facilities, and during deployment for field exercises around the United States. Specific support is provided in the following areas:

Support to Division Office

Program Management. EG&G's overall management of TSD support activities includes resource allocation, budget reporting, quarterly reviews and reports, and attendance at TSD, EMG, and MMG meetings as required.

Quality. EG&G coordinates activities of Quality Planning, Assurance and Control, including internal management assessments as required.

Environment, Safety and Health (ES&H). EG&G coordinates and conducts ES&H activities in support of TSD efforts. Results of studies are provided to TSD with recommendations.

Support to Technical Support Branch (TSB)

Albuquerque MEMF. Electronic maintenance support is provided by one technical supervisor and four technicians working primarily at the DOE MEMF site. Additional temporary support is provided as required to meet peak workloads. Tasks also include daily responsibility for operations at the MEMF site, including weekly pre-trip inspections and Preventive Maintenance Inspections (PMI), and procurement as required for spare parts, maintenance equipment, and associated service contracts. Assistance with facility upgrades and modifications may also be required. Site personnel are required to input inventory and repair information into the TSD Relay and Mobile Maintenance Inventory System (RAMMIS) database.

Fleet Support. Support includes installation of SECOM III in new escort vehicles (vans and Suburbans). EG&G procures or fabricates any components necessary to complete installation, including bunks, equipment boxes, seats, gun mounts, curtains, etc. Other activities include retrofitting tractors and escort vehicles on a continuing basis, and coordinating inventory items through the TSD database. Additional support tasks, including fabrication and maintenance of components for Safe Secure Trailers, is provided as required.

Training. EG&G develops the maintenance training curriculum and technician certification for SECOM equipment and relay sites, including written and audiovisual material. Two DOE-qualified training instructors will be provided for the initial certification effort, and a certification database will be established in coordination with TSD. Additional training will be developed and outside training services procured as required, with TSD approval.

TSB Operational Engineering. Engineering support is provided for all operational aspects of TSB communications systems. Support is also provided as required to Sandia National Laboratories (SNL) R&D efforts that are related to TSB. As new systems become operational, maintenance and engineering are provided. The following task areas include:

- **MEMF Engineering**

The primary areas of concern are mobile communications equipment, operational problems, configuration, and document control.

- **Relay Site Engineering**

EG&G will provide relay system equipment retrofit design and implementation, configuration, and documentation control.

- **SCC/ACC (SECOM Control Center/Alternate Control Center Engineering**

Engineering is provided as needed for communications equipment in the SCC and ACC, and documentation control.

- **Transportation Safeguards Training Center (TSTC) Communications**

This task involves supporting OSB in engineering projects that are related to communications equipment which is the responsibility of TSB.

New Mexico Relay Site. EG&G provides SECOM relay site maintenance in New Mexico, which includes routine preventive maintenance, day-to-day site operations, assistance with upgrades, and two-hour emergency response to call-outs, with a minimum of two persons. Activities also include site and facility upgrades associated with switching, control, computer, RF and training systems for SECOM. Other tasks include site support to the SCC and ACC.

Depot Maintenance. EG&G furnishes depot maintenance of TSD-specified SECOM and relay site equipment as required. Support includes one

technologist, two technicians, one materiel handler, and additional support as required to meet peak workload situations. Personnel will establish standard operating procedures, input data into the TSD database, and adhere to TSD discrepant-material guidelines. EG&G procures spare parts, equipment for maintenance, and service contracts as required.

SECSAT. EG&G assists in the procurement of special communications services in support of SECOM, including system installation, leasing, and upgrades as required. Support includes coordination of services with other sites.

SCC/ACC Support. EG&G provides support to the SCC and ACC, including routine preventive maintenance, assistance with upgrades, and response to emergency call-outs. The services of two technicians are provided, as well as additional temporary support as required for peak work loads.

Maryland Relay Site. EG&G performs SECOM relay site maintenance in Maryland, including routine preventive maintenance, day-to-day site operations, assistance with upgrades, and emergency response to call-outs, with a minimum of two persons.

Support to Operations Support Branch (OSB)

TSTC MEMF/Communications. EG&G provides technical support for the TSTC, including electronic maintenance of the SECOM equipment for the TSTC training fleet; all TSTC communications equipment, including mobile, hand-held, and repeater radio equipment; and target radio systems. This support requires two technicians and additional temporary support as needed. Activities include installation, operation, and maintenance of communications equipment at selected locations during training exercises conducted by the TSTC.

Fleet Support. EG&G upgrades and installs SECOM III equipment in escort vehicles as required, and retrofits existing vehicles to meet the requirements of the OSB fleet.

TSTC Support. EG&G furnishes technical support for the TSTC, including equipment maintenance, repair, calibration, modification and procurement of automatic scoring and interactive

pop-up target systems, communications equipment, training equipment, ESS equipment and perimeter security equipment. This support includes the services of one technical supervisor, four technicians, and additional temporary support as required for peak workloads. Engineering support is provided as needed, and includes implementation of new vehicle systems, perimeter security systems, and advanced MILES/ESS equipment. Additional support includes assistance with facility upgrades, procurement of external repair and maintenance contracts as required, and use of the EG&G/EM NC-135 Pad for driver training.

OSB Operational Engineering. Engineering support is provided as needed for resolution of field problems identified by OSB or support personnel. The following tasks are also included:

- Exercise Control Center (ECC) Monitoring System

EG&G will design, engineer, and fabricate a portable communications system to be used for training exercise control and monitoring. The system will be capable of monitoring all exercise SECOM transmissions and providing communications with controller and logistics staff.

- Laser Measurement System

This task involves upgrading the existing laser measurement system to allow power-level measurements on all laser transmitting equipment currently in use at TSTC. This enhancement requires the design and fabrication of mounting hardware, software modification, and the establishment of measurement procedures for the various transmitters.

- Vehicle Detection System (VDS II)

This is an engineering project to upgrade a system originally designed by Sandia National Laboratories (SNL) to detect MILES hits on the vehicles used in exercises. The objective is to incorporate flexibility in the

design by using a microprocessor-based system to replace the hard-logic system. Future upgrades then would involve software changes, rather than hardware.

- SST-S2 Emergency Braking System (EBS)

EG&G will design, fabricate, and install a control circuit that will implement the EBS function. This circuit will replace the existing Controller Timer and provide all necessary Control Unit timing signals.

- Conventional Training Tractors

EG&G will design and install training equipment interface systems in five dedicated training tractors. This system will integrate all tractor, VDS-II and SST-S2 functions into one unified system.

- SST-S2 Safety Modifications

EG&G will design and install personnel safety enhancements on four SST-S2 training trailers.

- Pyrotechnic Replacement Investigation.

EG&G will investigate possible replacements for the SC-10 pyrotechnic charges currently in use at TSTC.

Security System. This is an engineering project to specify, procure, evaluate, test and install remote security alarm systems on designated trailers and fleet vehicles.

Sensor Evaluation and Design

This project provides engineering and software support to the exterior intrusion evaluation facilities and the closed-circuit television (CCTV) assessment laboratory at Sandia National Laboratories Albuquerque (SNLA). This support is directed toward the implementation of new, cost-effective, small intrusion-detection systems for SNLA customers.

TREATY VERIFICATION

Deployable Seismic Verification System

The Deployable Seismic Verification System (DSVS) is intended to provide a seismic monitoring capability that will be applicable to a wide range of in-country seismic monitoring requirements associated with underground nuclear test ban treaty verification. The DSVS is based on technology derived from the DOD National Seismic Monitoring concepts.

An operational DSVS network consists of the following functional elements: Regional Seismic Station, Data Communications Link, Receiving and Monitoring Station, and Network Data Analysis Center. In addition, during the development and evaluation phases of the program, a System Evaluation Center is available to process test results.

EG&G is responsible for the development of analytical software, hardware and testing support, documentation, and the daily operations of the Receiving and Monitoring Station.

OTHER PROJECTS

Modular Building Block Communication System

The Modular Building Block (MBB) project of the Defense Communication Agency (DCA), using the research and development resources of SNL, has funded the development of a family of modular equipment assemblies that have potential application to a wide range of survivable Command, Control, and Communication systems.

EG&G's role is to support SNLA in documentation, fabrication, assembly, engineering, and software development for the MBB baseline system (PILOT); PILOT enhancements; DOD systems Proof-of Concept/Experimental Test-Bed (POC/ET) and Emergency Crisis Management Center (ECMC); and other MBB subsystems and equipment used in support of these systems. Additionally, logistic support is provided to fielded DOD systems and includes configuration management,

inventory procurement, depot test and repair, and technical field support.

Tactical Remote Sensor System

The Engineering Department at the Naval Avionics Center (NAC) has been tasked by the United States Marine Corps to prepare the Tactical Remote Sensor System (TRSS) for a competitive procurement action. The system was prototyped by SNL and turned over to NAC.

However, the control station for the system was not prototyped by SNL. NAC has the responsibility to design and build proof-of-principle prototype control shelters and, in so doing, to prepare a documentation package sufficient to acquire the shelters in a competitive procurement action.

NAC, DOE, and EG&G managers met at the Nevada Operations Office in May 1988 to discuss the possibility of EG&G personnel performing the shelter modification tasks. Formal approval by DOE for EG&G participation was received in July 1988, as was preliminary funding from NAC.

The scope of work was revised in October 1989 and is stated in the following paragraphs.

Engineering Analysis

EG&G will conduct a study of available shelters to be used as the container unit for the Sensor Monitor System (SMS). The shelter will be of rigid construction and transportable by a High-Mobility Multipurpose Wheeled Vehicle (HMMWV).

EG&G will investigate potential power generation and environmental control systems for the above-mentioned shelter. The environmental control/power generation may be accomplished with a single integrated system or with a multi-component system.

EG&G will be responsible for the arrangement of shelter components; this task includes power distribution, lighting, and cabling. Equipment racks for two Data Handling Systems will be designed and positioned by EG&G (NAC will be responsible for the actual rack components). The shelter must be equipped with seats for operators

and their supervisor. Provisions will be made for mounting and storage of UHF and VHF antennas.

Fabrication/Assembly

EG&G will fabricate and assemble one prototype shelter. With the exception of the Data Handling System (DHS) equipment, the shelter will be complete as described above. NAC will provide two empty Gichner shelters (model S-710/M) to be used for the prototypes; however, only one prototype will be constructed..

After completion of the prototype unit, EG&G will build four engineering models. Shelter selection for this phase will be based on findings from the shelter study described earlier. As with the prototype, the engineering models will be delivered without DHS equipment and without antennas.

STRESS System Fabrication

EG&G has developed a state-of-the-art interactive video, decision-shooting system for the DOE Central Training Academy and DOE Security Inspectors (SIs). STRESS provides "real life" training using site-specific scenarios on wide-screen projection, video branching in reaction to an SI's performance, and a capability for the STRESS system to shoot back and detect a hit on the SI should the SI not take appropriate cover. Prior to FY91, EG&G fabricated systems for various DOE and DOE contractor facilities for use by security forces. All new efforts have been put on hold this year pending resolution of an ongoing IG investigation.

PAMTRAK Personnel and Material Tracking System

This project supports SNL Division 5245 in their efforts to design, build, and field a real-time personnel and material tracking system. EG&G is providing both software and hardware support to this effort.

Office of Classification

EG&G's video staff will produce a videotape on the classification process for the Department of

Energy's Office of Classification. This tape will be used to introduce DOE and contractor new employees to DOE classification policy and procedures.

Reynolds Electrical and Engineering Co., Inc. (REECO)

EG&G has been asked to convert REECO's seven-hour new-hire orientation program to interactive video. This project will include modules on AIDS in the workplace, safety, hazard communication, labor relations, environmental compliance, quality assurance, ethics, security, and general employee policy and procedures.

SNL Video Support

EG&G will develop a traveling presentation system for Sandia Division 3100 by transferring Sandia-furnished videotapes to optical disc and programming and indexing the disc to provide access to the segments.

Lockout/Tagout Video Support

EG&G is supporting the EM Training Office and ES&H Division by repurposing seven videotapes on lockout/tagout safety procedures, to make them more specific to the working environment of Energy Measurements.

WEAPONS

Sandia Digital Underground System

The Sandia Digital Underground System (SANDUS) project supports SNL (Division 9321) in the operation of digital data-acquisition systems for weapons testing at the Nevada Test Site (NTS). The SANDUS is an environmentally sealed enclosure (located in the tunnel complex) which receives sensor data, records them, and transmits them to Building 909 at Camp 12. The SANDUS can record up to 128 channels.

Diagnostic Support

EG&G provides technical support to SNL Division 9312 in building and calibrating radiation diagnostic instrumentation on tunnel events at the NTS. This support encompasses a wide variety of tasks ranging from maintenance of X-ray calibration sources to construction, measurement, and installation of X-ray filter-fluorescer systems.

Trailer Fabrication

The trailer fabrication group builds and modifies mobile equipment, trailers, and vans for Sandia National Laboratories. This equipment supports NTS events and missile tests at various missile ranges.

High-Density Digital Recorder

The High-Density Digital Recorder (HDDR) project consists of the development of three chassis for the MA167 High-Density Digital Recorder system. The chassis being developed are the TA652 HDDR Timing and Auxiliary Data Multiplexer, the TA653 HDDR Control and Auxiliary Data Demultiplexer, and the TA654 HDDR Record/Playback Timing Remote. These units are elements of the digital data-acquisition and communications system which supports underground testing at NTS.

Replacement Vacuum Effluent-Recovery System

EG&G/KO has designed an updated and improved vacuum effluent-recovery system for the Tritium Research Laboratory (TRL) at SNLL. The system takes tritium gas from various experiments and converts it to tritiated water. The tritiated water is then collected and shipped to a disposal site or reclaiming facility. The remaining gases, including minute amounts of tritium, are exhausted to the atmosphere. The system will operate continuously under the control of a computer processor.

Permanent High-Explosive Test Site Monitor System

The Permanent High-Explosive Test Site (PHETS) program at White Sands Missile Range (WSMR) is controlled by the Defense Nuclear Agency (DNA). EG&G/LV has built equipment for timing and firing and for monitoring various environmental parameters. KO was tasked to develop a monitoring system that will abort a high-explosive test via interlocks on the timing and firing system, specifically the Signal Programmer (N-SG-213). The monitoring system must be able to halt the Signal Programmer within 50 ms of observing a fault in any monitored condition in a bunker. Monitored conditions primarily comprise status of the transient digitizers. In addition, environmental conditions such as AC power stability may be monitored.

The Abort system monitors up to 200 transient digitizers per bunker (grouped 10 to a crate). Status is collected from each bunker and transmitted via individual 9600-baud channels in a large fiber multiplexer (MUX) between the Parks and the Command Center, where the Signal Programmer is located. Each bunker channel has an Abort chassis that will demultiplex the channel and compare the bunker status with the sequence from the Signal Programmer. The status of the bunker is displayed, and if a fault condition is detected, the Signal Programmer will be halted.

EG&G has been tasked to build 12 new trigger generators to replace the SG-72s and 73s, and an additional Signal Programmer. The PHETS site already has one Signal Programmer unit, which was built by Las Vegas Area Operations.

EG&G was provided funding to complete the Abort System documentation, provide system modifications, and provide three additional Abort Transmitters and Abort Controllers. In addition, modifications to Command Receivers, the design and fabrication of an Abort system simulator, and the fabrication of 100 digitizer modification kits have been funded.

DOE Research and Development

Kirtland Operations provides engineering support to the Weapons R&D Program in the following areas:

Distributed Power Amplifier

This task is to develop an amplifier with a 1- to 2-GHz bandwidth providing an output of greater than 5-V peak into 50 ohms.

Wide Bandwidth Balun

The purpose of this task is to develop an improved balun for the UHP-CRT.

Electrical Input Streak Tube

This task is to investigate the feasibility of a streak tube design comprising a direct electrical input.

Crystal Driver

This task is to develop a driver to provide the sweep signal for the crystal streak system.

Streak Crystal Mounting

The purpose of this task is to develop a means of mechanically mounting the streak crystal that serves as both a precision mechanical mounting and high-performance radiofrequency configuration.

High-Frequency Comb Generators

This task is to provide a high-frequency comb at a nominal 670-nm wavelength.

3. PROJECT HIGHLIGHTS

SAFEGUARDS AND SECURITY

Office of Security Evaluations (OSE) Support

Inspection Division Support

Program Management. Overall program costs were tracked and analyzed. The December, January, and February monthly status reports were compiled and sent to the Branch Chief of Production Research and Inspection Division. The OSE accountable inventory list was updated and forwarded in January and February; a consolidated inventory list and a comprehensive list were prepared and telecopied to the Branch Chief. The quarterly report and accompanying viewgraphs were prepared for use at the first quarter review and sent to the Branch Chief. Update letters concerning the Short Range Training Round (SRTR), which is plastic-tipped training ammunition, were prepared and telecopied. New job numbers were opened in preparation for upcoming inspections and the readiness review at Portsmouth.

Technical Support. Technical support was provided in the following areas:

- Interactive Video Knowledge Test (IVKT) Laser Disc

During this quarter EG&G wrote a task statement for the development of two new IVKT discs. This statement included the development of a second disc of questions directed toward the DOE protective force, and a disc of questions relating to material control and accountability (MC&A) procedures. In late January, EG&G met with Bill Riffle of OSE to discuss development of the interactive test questions in the subject area of MC&A. As the content expert and point-of-contact for this test, Bill was provided documentation of EG&G's efforts in developing the prototype disc. In February, EG&G contacted Tom Baca at the Central Training Academy. Tom had been identified

by OSE as the content expert and point of contact for development of the test questions for the protective force disc. There was an apparent conflict with his work assignments, and EG&G was advised by OSE that this would be resolved. EG&G has not been contacted by Bill Riffle or Tom Baca since these initial meetings and has not done any further work on these new discs.

- Interactive Video Knowledge Test (IVKT) System Enhancements

EG&G placed an order for two shipping cases, two equipment stands and three LaserVision optical disc players for use in the OSE IVKT systems. The shipping cases and disc players have not yet been received.

- SFEE Base Support

During the quarter, routine maintenance and inspection of weapons used for I&E support was provided.

- SFEE Special Support

The cellular phone bills for December, January, and February were received and telecopied to the Branch Chief for review. The cellular phone batteries and charger that were purchased at the request of the Branch Chief were mailed to him at the end of January. During March it was noted that in-house funding for paying the phone bills was slightly overspent.

- SFEE Technical Support

In January research was begun to acquire an SRTR for use in inspection activity. The study to acquire the SRTR continued during February and March, and rounds in several calibers were located. There have been problems with the vendor in the acquisition of rounds in .308 (7.62) caliber. Because of the scarcity of M2 training bolts and the ammunition used with them, a substitute bolt

has been developed by the EG&G/KO SFEE section. This bolt will require testing and a design review before it can be fielded. Weekly status reports on this project were provided to the Branch Chief. At the end of March, work ceased on this project pending additional funding and direction from OSE.

- **Fieldable Computer Equipment (FCE)**

EG&G supported the following inspections during the second quarter of FY91: DOE Headquarters - January 6-18; Nevada Operations Office (Readiness Review) - February 11-18; Strategic Petroleum Reserve Project Office (Readiness Review) - March 11-15; Portsmouth Enrichment Office - March 18-29.

Each inspection had its own unique requirements ranging from Passport media only to 13 complete computer systems. The Readiness Reviews were supported with very short notice from OSE to EG&G.

Late this quarter, at the request of OSE, EG&G reviewed an inspection report document created by Battelle to determine if that report could be printed on existing equipment at OSE. The result of that evaluation was a recommendation to OSE that while it would be possible for EG&G to create and supply OSE with the variety of fonts, special editing WordPerfect macros, etc., necessary to print this document on their current equipment, the format controls within the document have not been standardized and will likely change with each report. As a result of this evaluation, and at their request, we have supplied OSE with an HP LaserJet Series III printer with internal, scalable fonts. The printer, together with a copy of WordPerfect 5.1 (which has already been installed by Battelle), can accommodate the document format controls.

With this combination, there is still the possibility of incompatibility; for example, the WordPerfect setup options can change the appearance of the printout, or even make the document unprintable. We recommended that responsibility for software maintenance and configuration management related to the inspection report remain with Battelle.

- **Findings Presentation System (FPS)**

EG&G evaluated the modifications to the new Inspection Report format provided by Battelle for compatibility with the FPS. A report outlining the results of this evaluation was sent to OSE early in the second quarter.

During this quarter, at OSE's request, an EG&G Project Manager and the Special Projects Section Head attended a meeting at headquarters to demonstrate the report capabilities of the FPS and discuss additions which might be desired. EG&G was asked to write software that will produce additional printed reports from the Findings Presentation System (FPS) database. A list of desired reports was furnished by OSE. The reports are "canned," in the sense that they are predetermined, fixed-format reports, produced by easy to use, dedicated software.

EG&G worked with OSE to refine and prioritize the requirements for the FPS printed reports. We analyzed the requirements and submitted draft specifications. Some clarifications and modifications of the requirements were proposed by EG&G in order to resolve ambiguities and data conflicts in the original list. In addition, software which produces a draft version of two of these reports was delivered to OSE for their evaluation. EG&G continued working with Jack Craig and Dean Hickman to refine and prioritize the requirements for the FPS printed reports. We have developed a design specification for the FPS printed report software, and are writing the software.

Safeguards: Site Surveys, Installation, and Sensor Evaluation

Short Ported Coax System (SPCS)

No activity took place on this task.

Military Perimeter Detection and Assessment Lab (MPDAL)

No activity took place on this task.

Annunciator System (AS)

The ESC Kelly AFB, Texas, Standard Annunciator System (STAS) software was modified to provide the capability to troubleshoot to the single-sensor level and to provide area accessing (up to 8 sectors), allowing the operator to access the associated security zones more quickly.

A new graphics display system was also added to the ESC system. When an alarm occurs, this system enables the operator to more quickly identify the building sector where the alarm originated.

An older STAS, previously installed at Tinker AFB, Oklahoma, is being upgraded for service at Kelly AFB.

Three additional STAS have been completed, tested, and warehoused for future installations.

The last Small Annunciator System (SMAS) to be built at SNL was completed, tested and shipped to Spandahlem AB, Germany. Final installation should take place next quarter.

A STAS was completed, tested, and shipped to SESI along with a variety of spare parts. SESI is the contractor that services annunciator systems throughout Europe.

A STAS was completed, tested and shipped to Kapaun Air Station, Germany. Final installation is scheduled for June or July, 1991.

Field modification kits to correct heat dissipation problems in the UPS and EC cabinets have

been assembled and shipped to Homestead AFB, Florida, and Kelly AFB, Texas.

Video Imaging System for Detection Tracking and Assessment (VISDTA)

Minimal effort was expended on this task during this quarter.

Interior Sensor Systems Surveys and Installation

Interior systems were reinstalled at Wartsmith AFB, Michigan, and Ellsworth AFB, South Dakota.

Relocatable Sensor System

Tests were conducted at Homestead AFB, Florida, on the Southwest Microwave system. Interference problems continue which require additional study by the manufacturer.

Seven updated interface units have been assembled and tested for installation at Osan AB, Korea, in April 1991.

Units are being designed and parts ordered for systems to be installed at Salem AFB and King Salmon AFB, Alaska. These installations are scheduled for July and August 1991.

Kapaun Air Station, Germany

Mechanical and wiring diagrams have been completed. Most mechanical and electrical fabrication is complete and awaiting E-flex processors from the Air Force. Shipment to Germany will follow.

COIC (Combat Operations Intelligence Command)

Design and layout have started.

AECS (Advanced Entry Control System)

The Ellsworth AFB system installation originally scheduled for February 1991 has moved to

July 1991. The system enrollment station has been successfully installed and is currently in operation.

Comfy Safe

See the Annunciator System section for a description of the activity at Kelly AFB, Texas, on the security system related to Comfy Safe.

Miscellaneous

Two CCTV camera systems were installed at the Kirtland Underground Munitions Storage Complex (KUMSC).

Grand Forks AFB, North Dakota, Carswell AFB, Texas, and Edwards AFB, California, were visited to identify and fix existing sensor system problems. Final reports have been submitted to SNL.

An additional Field Distribution Box (FDB) was designed, fabricated, tested, and shipped to CRREL in Vermont. CRREL is conducting cold weather testing of security systems for the Electronic Systems Division (ESD) at Hansworth AFB, Massachusetts.

Security Forces Experimentation and Evaluation Office of Safeguards and Security Loaner Program

Program Management

Quarterly progress and financial reports were prepared and distributed to the CTA and DOE/NV. Reports on STRESS were prepared for transmittal to OSS Headquarters by the CTA.

Depot Maintenance

Equipment calibration and repair services were provided for Idaho National Engineering Laboratory, Nevada Test Site, Pittsburgh Naval Reactors, Pinellas Plant, Lawrence Livermore National Laboratory, and Brookhaven National Laboratory.

Power level calibrations were also completed on all depot-maintained ESS transmitters.

Loaner Package Support

ESS loaner packages were provided to Sandia National Laboratories, Strategic Petroleum Reserve, Martin Marietta Energy Systems, Brookhaven National Laboratory, Allied Signal, Bendix Kansas City, DOE/HQ, and DOE/AL.

Field Activity

ESS equipment and support staff were provided to support a large exercise at the Rocky Flats facility.

Common Support Engineering

Work to develop a live-round inhibitor for the 9mm family of weapons continued. Several of EG&G-designed MP-5SD suppressors were manufactured and installed. A blank-fire adaptor was manufactured and installed in the 9mm Colt submachine gun for use by the Transportation Safeguards Training Center (TSTC).

STRESS Support and Maintenance

No support was requested during this quarter.

Common Support Miscellaneous Activities

The "fifth order" procurement requisition was canceled in January. After several meetings it was decided that a primary specification is needed on all equipment and that long-range planning for future ESS gear is necessary. Current specifications will need revision to comply with EG&G/KO policies, procedures and rules. Selection of a vendor is not expected until FY92.

ESS equipment was furnished for special training conducted by the United States Secret Service, TSTC and local law enforcement agencies.

STRESS Scenarios

No support was provided during this quarter.

Central Training Academy

Support was provided as required by the CTA training schedule.

ESS Certification

No activity took place this quarter.

Transportation Safeguards Division

Support to Division Office

Program Management. Program management personnel participated in audits and design reviews. Progress and financial reports were prepared and distributed; in-house monthly program reviews were held. Monthly engineering meetings were started to improve communications among the various disciplines supporting TSD and also between TSB and OSB. A major presentation was presented to the DOE/AL Process Management Team investigating possible methods for bringing the EG&G/KO support under the DOE/AL umbrella.

Quality. Five internal audits were conducted: at the Craddock Modification Center (CMC), Albuquerque maintenance depot, Las Vegas Training Office, TSTC, and the Secure Communications Center (SECOM). Thirteen monthly inspections and surveillance activities were conducted and documented. The Maryland relay site was audited by DOE/AL in January; the formal report has not been received. No major problems are indicated in the information received. DOE/AL also conducted an Observation and Inspection (O&I) at the Albuquerque maintenance depot. The depot had moved to a new facility the week before the inspection, so the O&I was not an in-depth inspection. The next DOE annual audit is scheduled for June 26-28. Five design reviews were conducted: ESS equipment specification, VDS-III, CONTEL heater, safety modification of the SST-S2 and Lightning Elimination Corporation installation. The Rockwell hardness tester is due for delivery to the CMC in April 1991. This tester will enhance the inspection capabilities of raw and fabrication materials at the CMC.

Environment, Safety and Health (ES&H). The safety modifications for the SST-S2 trailers which have been approved by the DOE/TSD safety representatives are in the process of being incorporated in the respective trailers. The ladder hooks, the non-skid surfacing and the bang-box interlock are in process. EG&G/KO will initiate safety procedures for the handling, storage and local transportation of explosives for operational SSTs. Work will start when the management agreement between DOE/AL and DOE/NV is effective.

Support to Technical Support Branch (TSB)

Albuquerque MEMF. During this quarter the Albuquerque MEMF performed normal pre-trip inspections and Preventive Maintenance Inspections (PMIs). MEMF PMI and pre-trip certification training was conducted this quarter at the Albuquerque Courier Section (ACS). All MEMF personnel attended EG&G security custodian training, the technical supervisor attended OSHA training, and one technician completed solder certification training. Two MEMF staff members attended the EMG meeting in Las Vegas. Internal EG&G monthly audits and a quarterly audit were completed satisfactorily. One technician has been added to the MEMF staff.

Fleet Support. Preparation for the new escort vehicle build continued during this quarter. Bunk and net frames, equipment mounting plates, Vehicle Interface Box (VIB) locking plates, utility boxes and gun mount plates were fabricated. (Figure 3 shows a technician fabricating parts for escort vehicles.) Because of vehicle delivery schedule changes, the start of the escort vehicle build slated for this quarter will be delayed until the fourth quarter.

Two ACS tractors were fitted with Anvil antennas for evaluation. Speaker boxes were fabricated for the new tractor build. In addition, a procedure was developed with assistance from DOE/AL Security for the disposal of decommissioned tractor armor.

During the third quarter, prefabrication of parts for the new escort vehicle build should be complete.

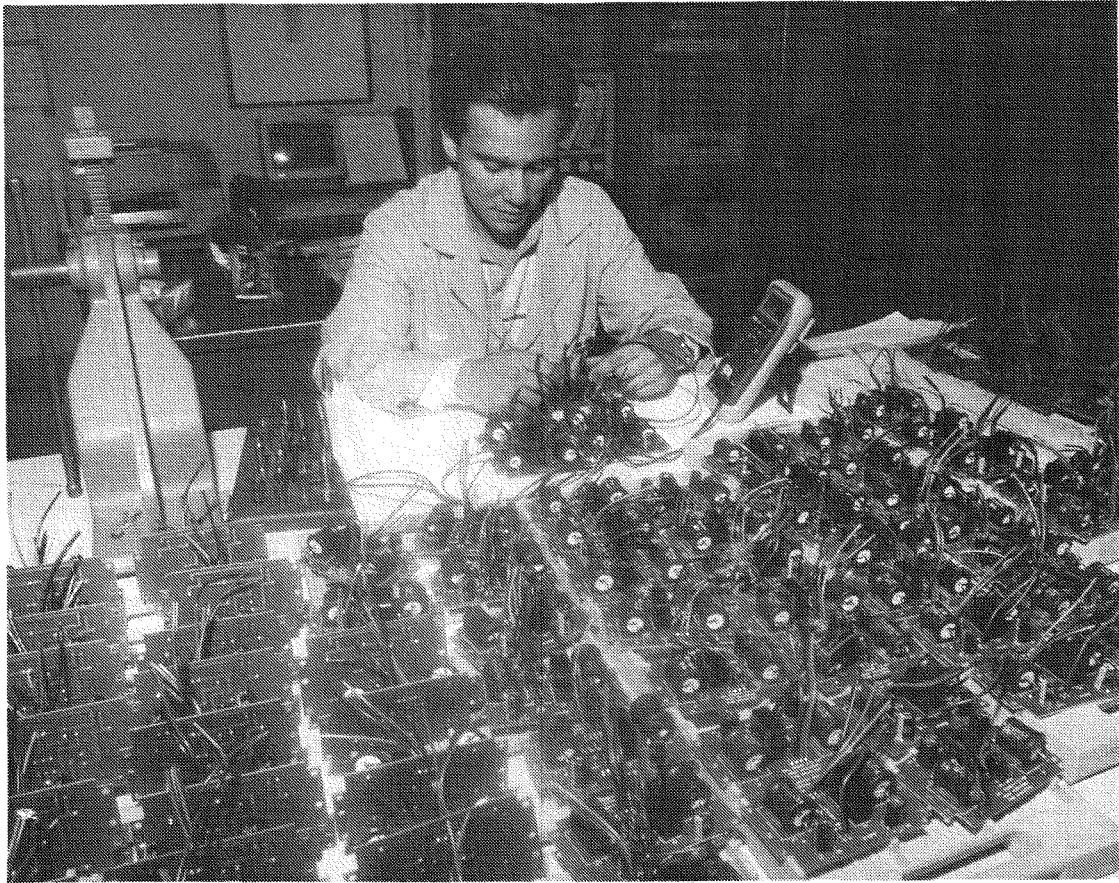


Figure 4. Steve Johnson, Production Technician, fabricates power filter units for escort vehicles.

In addition, the new tractor build will be supported with GFE shipments to Marmon.

Training. The TSD training office conducted six certification classes during this quarter, as follows:

MEPFU, Oak Ridge, February 6-8; 4 Attendees; 4 Certified

MEPMI, Oak Ridge, February 11-15; 5 Attendees; 5 Certified

MEPFU, Albuquerque, February 25-27; 6 Attendees; 5 Certified

RSPST, Albuquerque, March 6-8; 8 Attendees; 5 Certified

RSPMI, Albuquerque, March 11-15; 6 Attendees; 3 Certified

MEPMI, Albuquerque, March 18-22; 6 Attendees; 3 Certified

Both relay station courses in Albuquerque were attended by EG&G quality assurance personnel, to verify and recertify the course. No students were certified following the January MEPFU, as a result of specific issues raised by technicians during the Amarillo course. The issues have since been resolved following meetings with TSD management from DOE/AL, and the course was successfully presented in the second quarter.

Development of a relay station safety orientation module was completed during the quarter, and the module was added to the relay station courses taught in March. DOE safety personnel certified

course content, and the module will remain a permanent part of the relay station courses. Lesson plans for the third module of the SECOM Control Center computer-based training program were completed. Actual course development will begin following approval of the lesson plan by DOE in May. The video lessons used in all the relay station and mobile courses were converted from the old software to a newer version this quarter. Technical updates were also completed to reflect new equipment and procedures. Extensive rework was accomplished on procedures manuals for the RSPST, RSPMI, MEPFU, and MEPMI, to reflect new equipment and procedures, and Issue D of the MEPFU manual was released. A new annual schedule for manual revision and issue was established at the March EMG meeting. Training office personnel also attended the Orlando conference of the Society for Applied Learning Technology. The DOE TRADE organization sponsored an Advanced Technology Special Interest Group course at this conference, and training office personnel took part in delivering this course on development of interactive video and computer-based training.

The training office hosted a successful joint relay station and mobile electronics EMG meeting in March. The second module of the SECOM Control Center training program was presented to the manager of DOE/AL at the DOE managers' meeting in Albuquerque in February. The presentation was successful and the program well received. DOE/AL conducted a training office program review in February. The program received good ratings as a result of the review, and new milestones were established. All training office personnel attended the DOE Basic Instructor Training course provided by EG&G Idaho in February. This "train the trainer" course provided specific instruction in DOE training methodologies, and served to orient our many new personnel to the unique requirements of the DOE training environment.

KO provided technical support to the Las Vegas TSD training office, including repairs and modifications to the two mobile interactive training systems. The KO video technician also set up an interactive system used for a presentation by Kelly Mora to Randy Sabre and Bruce Twining. Work on

the SECOM Control Center Proficiency Training program was minimal, limited to a review of the draft content for the Communications module. Also during this quarter, a KO videographer assisted the training office by videotaping and editing video material on new communication repair and maintenance procedures.

TSB Operational Engineering. Support was in four major areas, as follows:

- MEMF Engineering

The assembly of a complete set of drawings for the Mobile System is complete. The training tractor windscreen task to determine if the windscreen has any effect on the radio equipment is complete. The operational tractor windscreen will be monitored for the electronic impact of the windscreen installation on operational tractors. Ten new TV-12 testers will now be produced in the third quarter. The vehicle alternator load capacity study for the escorts will determine if additional capacity can be added and/or if "smart load" control needs to be added.

- Relay Site Engineering

The General Station Interface will become the backbone of the relay station. It will support any equipment purchased for the stations without custom interface hardware. It will decouple the time line for implementation of station hardware and the MV7800 software being developed by Sandia. The design and definition phase of this effort is now under way. New exciters and linear amplifiers for the relay stations are needed and based on testing experience, EG&G has ordered two exciter/amplifier systems from Harris Corporation. EG&G is presently testing this exciter/amplifier system which meets the present and future plans for the relay station upgrades. EG&G Operational Engineering is distributing more tone receiver daughter boards for use at the relay stations. This will provide spares for the

system until new tone receivers can be built. Eighty-five production units have been assembled. Thirty-day operational testing occurred during the second quarter.

- SCC/ACC (SECOM Control Center/Alternate Control Center) Engineering

The delay problem in the microwave link from the relay site to the Alternate Control Center has been solved. Full operation of the microwave link will probably occur early in the third quarter. Dual HF voice has been postponed by the Ripple committee until new system software is ready. The communications status display will show the status of all the media and which media are being used. This display and other communications functions will be part of the new STAR base work station.

- TSTC Communications

The Exercise Communications Center Monitoring System manages and archives TSTC exercise radio traffic for later analysis. A block diagram has been generated with accompanying descriptive technical documentation and budgetary information. This information has been presented to DOE.

New Mexico Relay Site. During this quarter relay maintenance personnel performed the normal bi-weekly inspections and PMIs. Internal EG&G monthly and quarterly audits were completed satisfactorily. The entrance gate to the site was damaged in early January and was straightened and realigned. A concrete ramp was poured underneath the gate to improve security. Work instructions were implemented for independent verification, tagout and lockout, and trailer entry and exit procedures this quarter. Several computer repairs were accomplished and relay station personnel assisted Data General with installation of the new RSI-01 computer boards. Assistance was provided to EG&G engineering for the Harris linear amplifier development, new matrix software development and testing, revision of station drawings and documentation, and the new tone receiver bit synchronization/quality boards. Station maintenance

personnel also attended PMI recertification class and the EMG meeting at Las Vegas.

Depot Maintenance. The depot was moved this quarter. It now has over 1300 square feet of lab and office space plus several storage transportainers and the original depot trailer (now used for storage). Approximately 30 SECOM III items were repaired this quarter. In addition 32 SECOM II VIBs and VCBs were checked out and/or repaired. Six SECOM II VCBs were modified for relay station use. Ten Micor radios received preventive maintenance inspections, and 15 new Motorola Saber Handie-Talkie radios were inspected and programmed. Four depot personnel attended the EMG meeting in Las Vegas.

SECSAT. EG&G is continuing to support the operational requirements of the CONTEL communications system. Several changes to the original purchase agreement dealing with encryption management, power conditioning, and contract extension were finalized.

SECOM Control Center (SCC) Support. SCC maintenance personnel responded to 21 normal duty hours callouts and two after-hours callouts for the SECOM Control Center and Alternate Control Center (ACC). All Preventive Maintenance Inspections (PMI) and Periodic System Tests (PST) were accomplished as scheduled. The satellite system was coded on three occasions and the VHF radio once. Installation of the tower at the ACC for the microwave link between SCC and ACC is under way and is scheduled for completion early next quarter. PMI procedures for the SCC/ACC were completed this quarter. Support was provided to EG&G engineering on the microwave link, the intercom system, and the LARSE security system. One SCC maintenance person attended the EMG meeting in Las Vegas.

Maryland Relay Site. The SECOM annual QA audit was performed in January. EG&G/KO quarterly audits have been changed to semi-annual audits. DOE/TSB property management personnel visited the site to investigate possible encroachment of the property. We are awaiting their recommendations. Art Taylor attended the SMART Team meeting in Albuquerque. Chains and locks have been

installed on all the perimeter fence gates at the site. CONTEL ASC replaced the heat sensor and blower on the satellite dish. Multi-Aire performed the preventive maintenance and repair of two air conditioners, and the 180-day preventive maintenance on the fire extinguishers was completed. The installation of a central air conditioner and completion of the perimeter fence work will be accomplished during the next quarter.

Support to Operations Support Branch (OSB)

TSTC MEMF/Communications. Site surveys were completed at Savannah River Site and Camp Bullis this quarter and the necessary antennas, repeaters, and other equipment were set up and checked at Savannah River in preparation for the FY91 JTE. Communication personnel supported two training exercises at Ft. Chaffee (IST 90-6 and 90-7) this quarter and initialized training tractors 3 and 4. One technician attended the EMG meeting in Las Vegas.

Fleet Support. Conventional training tractor construction continued. Four units are now complete with the final one scheduled for delivery early in the third quarter. Training interface testing was completed successfully on three delivered tractors. All five units will be finished during the third quarter.

Two SST-S2 trailers received repairs, safety modifications and pre-trip inspections. The other SST-S2s will be done early in the third quarter.

Transportation Safeguards Training Center (TSTC). IST 90-6 and IST 90-7 training classes were supported during February and March. There were no unusual problems or occurrences. A letter of commendation for all participants was received from the TSTC staff. The EG&G/TSTC technical supervisor accompanied Essex and DOE personnel to Camp Bullis, Texas, during February, to make range and communication surveys and check the facility support logistics. An IST "Pilot Class" is scheduled for the second week of December 1991. A courier recruit training session has been sched-

uled during August at Ft. Chaffee. At present this would require only convoy support.

Work on laser calibration and the measuring bench continues. Two Colt Model 635 submachine guns were modified for MILES use by EG&G/SFEE armory personnel. The weapons were tested and returned to TSTC. Evaluation of performance criteria was conducted during IST 90-6 at Ft. Chaffee with positive results. Conversion of eight additional weapons will take place at the first opportunity. Implementation of an electronics "sound system" to replace the present pyrotechnics system was found to be either technically or economically unfeasible at this time. In conjunction with this project, the SST scaffolding system was put on hold indefinitely and a five-year supply of additional pyrotechnics was ordered. Installation of ladder stays and pyrotechnic box safety switches should be completed prior to the April JTE. EG&G/SFEE armory personnel, in conjunction with the Craddock machine shop, began installing the live-round inhibitor modification on all TSTC MILES M-16 rifle barrels. At the request of the TSD director, EG&G will attempt to FDA certify all MILES laser devices now in use by the TSTC which do not possess original manufacturer's certification. The project team for this effort includes Ron Rosul, Ron Weber, and Dave Hutton of EG&G/KO and the consulting services of Jim Johnson of Rockwell Associates of Cincinnati, Ohio. This project should be completed in early May. An effort to find a new multiple use pop-up target system was initiated at the request of the TSTC staff personnel.

OSB Operational Engineering. Support was provided in seven areas, as follows:

- **ECC Monitoring System**

All activity on this project has been suspended pending TSD instructions.

- **Laser Measurement System**

Integration of all equipment and control software into a coherent system is complete.

The system's ability to accurately measure MILES laser power levels and timing parameters has been demonstrated. Work continues on the user interface and report generation software.

- **Vehicle Detection System (VDS-II)**

Preparations for critical design review were not completed as expected due to reduced manpower availability.

- **SST-S2 Emergency Braking System (EBS)**

All activity on this project has been suspended pending the completion of a security plan by TSD.

- **Conventional Training Tractors**

Equipment installation and testing has been completed in four tractors this quarter. Two tractors were successfully used for In-Service Training at Ft. Chaffee.

- **SST-S2 Safety Modifications**

Design specifications, fabrication drawings and prototype parts were presented to a joint TSD and EG&G design review team. After a thorough review, it was decided to install the bang box arming lockouts, the tech area ladder, and non-skid paint and ladder brackets on the trailer roof. Installation was started during the last week of this quarter. Additional work is required to provide safer access to the bang boxes located on the front of the trailer.

- **Pyrotechnic Replacement Investigation**

A report detailing the results of this investigation was presented to the TSD/TSTC Logistics Manager. A suitable electromechanical pyrotechnic replacement has not been found. No further action is required on this project.

Security Systems. The security systems are operational in all trailers. Problems which were reported with several motion sensors and the battery

charging systems are currently under investigation. Preparation of the user manual and system documentation is near completion.

Sensor Evaluation and Design

Many updates and enhancements to the CDAT software have been implemented. Advanced Small Site Program (ASSP) control console documentation efforts continue. The ASSP was demonstrated to many persons, both inside and outside Sandia. The Baltimore-Washington International Airport (BWI) project is proceeding on schedule.

A data-collection system was built and shipped to Bettis Atomic Laboratory. This system will collect data on interior sensor performance for about 3 weeks and then be shipped back to Sandia.

EG&G personnel helped install a security system at a West Virginia AT&T communications satellite site.

ES&H concerns at the Area III test-bed were addressed by having EG&G electricians repair problems with wiring, and writing and implementing a new Lockout/Tagout procedure.

TREATY VERIFICATION

Deployable Seismic Verification System (DSVS)

Software development for the Deployable Seismic Verification System (DSVS) at the Receiving and Monitoring Station (RAMS) is continuing. RAMS has five data link processors and four SUN workstations which are on the Ethernet network using the Transmission Control Protocol and Internet Protocol.

Currently RAMS is involved in developing and modifying software for the DSVS project, providing hardware and software testing support, and documentation. In support of the hardware testing at the FACT site, RAMS received 14 DSVS data requests for a total of 162 events. In addition, RAMS

received 14 DSVS data requests for a total of 52 events and 9 NORESS data requests for a total of 538 events.

RAMS completed and implemented the work instructions required by the Organizational Operating Procedures (OOP) for RAMS Operations as noted in the RAMS functional manual. In addition, a Work Package manual was compiled and put in use at the work site.

OTHER PROJECTS

Modular Building Block Communication System

A request by PACOM (Pacific Command) was forwarded to Ken Powers, DOE/NV, asking for NV approval that would allow EG&G/EM personnel to renew logistics support for the ECMC system. The request was approved and funding is expected to be received in early April 1991.

A logistics users meeting was held in Las Vegas, Nevada, in January 1991. It was determined that SAC would like to continue using the services of EG&G/EM for the lifetime of the POC/ET system. Personnel from EM and SAC will discuss the requirements that must be met if this support is to continue.

All normal configuration management support and depot repair efforts continued. The support to BETAC in generating reliability data in the POC/ET system continued.

Funding for support of other MBB systems was not received by SNL. As a result, EG&G/EM did not get additional work, which has caused a significant restructuring in support requirements. Approximately eight FTEs have had to be removed from the MBB project. It is expected that funding in 1992 will be stable enough to support the remaining team members.

Tactical Remote Sensor System

Because of a strike at Brunswick, the shelter delivery will be delayed indefinitely. This problem, combined with previously mentioned problems in awarding the Brunswick contract, has caused the schedule to slip to September 30, 1991. DOE/NV has authorized a no-cost extension to the period of performance with the Naval Avionics Center.

The drawings received from NAC were reviewed and corrected. A list of materials and supplies needed for the rack installation was prepared and the purchase requisitions generated. Delivery of all parts is expected before the shelters are received.

EG&G/EM and NAC personnel continue to coordinate the project via telecommunications. Further trips to NAC and Brunswick will be necessary next quarter.

STRESS System Fabrication

One STRESS system has been delivered to Westinghouse Hanford and training for the Hanford personnel has been completed.

Two STRESS systems, for SNL and EG&G Rocky Flats, have been postponed pending additional funding for completion and delivery. The remaining effort for these systems is the final Quality Assurance of the hardware and the programming of the site-specific scenarios.

A second scenario disc has been requested from the Nevada Test Site and is waiting for the final approval of the scenario tapes. Programming the scenarios from the master laser disc will be performed when the final approval is received.

An order from Oak Ridge is pending, awaiting DOE's decision to build STRESS systems.

Lawrence Livermore National Laboratory has requested a quote for a STRESS system to have ready if there is a decision by DOE to build STRESS systems.

Letters have been sent to all DOE sites that have STRESS systems, requesting a maintenance contract budget for STRESS support. One contract has been received from Pantex, and contracts from various other sites are in process.

PAMTRAK Material Tracking System

The Software Requirements Specification is nearly complete. The Essential Model is 75% complete, and work is beginning on the Implementation Model.

Bids to design and construct prototype device controllers were solicited. No selection has been made.

Office of Classification

During February, the Office of Classification reviewed the script and the audition tape and approved both the script and the talent for the classification orientation tape for DOE new-hires. EG&G completed production planning, developed the schedule, and during March 12-20 videotaped the scenes for the production at various locations in and near Albuquerque. EG&G began editing the tape on March 25 and expects to deliver a final product in April.

Reynolds Electrical and Engineering Co., Inc. (REECO)

EG&G completed two interactive-video training modules for the REECO new-hire orientation, on AIDS in the workplace and on operational security, and delivered them in January to REECO for review. During February, EG&G completed the

changes resulting from the review and sent the modules to Phillips Co. to have the laser video disc pressed. Phillips, however, sent the modules back, indicating that their production facility was not accepting more work until they could solve significant QA problems they were experiencing. EG&G is reformatting the modules to send to another vendor and expects to deliver a master disc by the end of April. EG&G also revised the script for the QA module and sent it to REECO for review.

SNL Video Support

EG&G transferred Sandia-furnished videotapes to optical disc on March 22 and began writing the control program to access the video segments. EG&G expects to deliver the completed disc by the end of April. Sandia and EG&G have discussed a second phase of this project, to write a more elaborate control program.

Lockout/Tagout Video Support

At the end of March KO completed a preliminary review of the changes to the original scripts proposed by the Training Office. A meeting between KO and the Training Office project coordinator is scheduled for April 4 to discuss the scripts and kick off the project.

WEAPONS

Sandia Digital Underground System

Work on the electrical design of the new Sandia Transient Acquisition and Recording System (STARS) was begun this quarter. The STARS system is the next generation replacement for the SNL SANDUS system that is currently used at NTS. The design of the signal conditioner is approximately 90% complete. The electrical schematics and mechanical drawings are in drafting.

Current tasks on the gage and front-end development effort include design and implementation of a 10-channel system that includes active source couplers, amplifiers, and close-in digitizers. These are a part of an ongoing noise, grounding, and shielding program.

Both the STARS and the front-end development projects will be fielded on the upcoming DISTANT ZENITH event at NTS.

Diagnostic Support

Work this quarter consisted almost entirely of preparing for the DOE Tiger Team visit. New operating procedures were written for all of the radiation sources and peripheral hardware.

Trailer Fabrication

Miscellaneous Modification Support

SNL Division 7515 uses this order to fund the maintenance and modification of its in-service fleet of instrumentation trailers and support equipment for instrumentation systems. During the second quarter, all of the fasteners on the Twin Otter bomb rack were replaced with certified hardware. In addition, air conditioning systems were serviced on two of the Division's trailers.

Laser Tracker II Repair

This order funds the repair of the trailer's gimbal mechanism and roof platform which were damaged in a highway accident. Materials were ordered and preliminary work was begun during the second quarter. The repair will be completed during the third quarter.

High-Density Digital Recorder

The remaining operator's manuals have been completed and delivered. This project is now complete. No further activity is anticipated.

Replacement Vacuum Effluent-Recovery System

Final design, fabrication, and installation of components continue. Main activities this quarter include completion of several remaining skid hardware tasks and a general review of the remaining software tasks. Plans are being finalized for incorporating the control and monitoring functions of the Gas Purification System into the Allen-Bradley PLC-3 control computer.

The details and particulars of the operation of the room itself, the doors, and the ventilation system have been determined. Procedures for sensing and control of the pressure within the room are being written. Once they are finalized, they will be implemented within the new control software.

The new RVERS system is expected to be complete and ready for testing early in 1992. Checkout and testing is anticipated to take several months. The system is expected to be on-line and in full operation by late 1992.

Permanent High-Explosive Test Site Monitor System

To date EG&G has modified and delivered 98 digitizer crates, built and delivered 9 Abort Transmitters, built and delivered 9 Abort Controllers, built and delivered 1 Abort Controller Master, and built and delivered 4 fiber-optic modem panels.

The remaining 11 Trigger Generators are now completed and the operational documentation is under way. The Signal Programmer has been delivered and installed.

The 100 digitizer modification kits have been shipped.

Modifications to the Abort Controller System have been completed and 3 new Abort Transmitters and 3 new Abort Controllers have been delivered. A rough draft of the documentation has been supplied to the customer for comments before it is finalized.

The hardware for the Simulator for the Abort System is nearly completed and the software is about half completed.

The design changes for T&F Receiver modifications are under way. The short-circuit protection circuit has been tested and the general circuit-board layout has been checked to be sure that all the components can be accommodated.

DOE Research and Development

Three primary areas of R&D investigation were continued in this second quarter: Grant pulser modification, high-performance baluns for the AVO and WCO UHP-CRT oscilloscopes, and initial investigation of the SBO crystal growth system.

All Grant pulser modifications were completed. The modified unit provides a nominal 100-ns, 4-kV peak sweep to a 200-pf load. Sweep linearity over the center 80% of the sweep is nominally 1%. The dwell time of the sweep is nominally 100 microseconds for retrace of less than 10% of the

sweep span. This performance is about the best that the Grant-pulser elements are capable of providing to a nominal 200-pf capacitive load. This will be adequate for initial research with various crystal materials but will not be suitable for SBN research due the much higher capacitance expected with SBN. The modified pulser was returned to Mr. Spiers at Las Vegas on January 25, 1991.

Mr. Vorheis forwarded to EG&G a sample of the mechanical enclosure to be used in the AVO and WCO oscilloscope systems. KO is integrating the balun elements into that enclosure. The enclosure is substantially thinner and shorter (front to back) than the prototype. This requires considerable finessing of the transmission lines to fit everything into the enclosure.

Some initial review of the SBO crystal system has been started. The system control parameters are not well understood. The approach is to scientifically review each individual subsystem alone and bring each independently up to its best possible theoretical performance. The thermal control subsystem is the first that is to be reviewed.

4. SUPPORT HIGHLIGHTS

TECHNICAL SUPPORT

Electronic Fabrication Services

Inter-Organization Support

SNL Sensor Systems Division. Intricate cabling work was performed on 12 subminiature connective devices housed in copper tubing. Other types of fabrication work have also been provided during the last two quarters to support the organization's "Keystone Project."

NTS Field Operations Division. The buildup of three TA730 Monitor Encoder instrumentation units was completed the third week of February as scheduled. Fabrication work included the wire-wrap of six printed-wiring boards, assembly of various printed-wiring assemblies, intercabling, and complete chassis assembly.

Intra-Organizational Support

Engineering Design and Analysis. The Section assembled ten 4-channel fiber-optic transmitter/receiver printed-circuit boards and interconnected them into the chassis assembly.

Various modifications were accomplished on 120 bit-synchronization printed-circuit boards related to a DOE/TSD project.

Safeguards Sensor Engineering. Hardware installation and inter-cabling work were completed on one Cold Region Research and Evaluation Laboratory Panel, three Sensor Junctions and seven Field Distribution Panels. The Section fabricated 70 different types of interconnects and testing cables.

Sixteen two-channel alarm and 6 proximity sensor printed-wiring boards were assembled.

Modular Building Block Communications System. Cabling and printed-circuit assembly build-up are still in progress for the MILSTAR work station project. Termination of cabling is in progress.

Five system interconnect distribution panels were fabricated for the CS Shelter.

Two assemblers provided field support to the Strategic Air Command/Offut AFB in Omaha, Nebraska. The assemblers completed upgrade work on the FIBITE System.

Various modifications on 11 trigger generators chassis were accomplished.

Ten multi-layer printed-wiring boards were assembled.

Security Systems. Fifteen interconnect cables were fabricated for the Transportation Safeguards Safe Secure Training Tractors

Communications Services. Rework, modification, and cabling work continued for the Albuquerque TSD SECOM Depot.

The Section rewired a SECOM III tester for the Albuquerque MEMF.

Production Services Activities

The Production Services Section processed Work Order Requests and Purchase Requisitions as follows. Work Order Requests initiated totaled 269; Work Order Requests Closed, 231; Purchase Requisitions, 77.

The fabrication activities were at a lower level than anticipated; however, the second half of March showed a considerable increase over the previous months.

The computer database has been updated to accept the recently modified Work Order Request Form; therefore, the implementation of the new form has been completed.

The Work Instructions draft, which covers the activities of the Production Services Section, has been turned over to Information Services for final

editing and printing. It should be formally published by May 1, 1991.

Work is in progress to improve the Paint Shop's work and storage areas. Options are being considered to improve paint storage and paint mixing operations. Our primary goal is to make this area safer and more environmentally friendly by the end of the third quarter of FY91.

OPERATIONS SUPPORT

Environment, Safety, Health, and Facilities

A safety compliance inspection of KO was performed January 7-11 and February 13-15 by Frank Reilly, Jim Foley, and Nelson Ledbetter of LVAO. An OSHA compliance inspection was conducted by Hugh Erwin, formerly an OSHA compliance officer. An Occupational Medical appraisal was conducted on March 27 and 28 by Pat Collins and Victoria Perkins of LVAO. Also, several internal inspections of the Craddock and Kirtland facilities were conducted by the KO safety officer.

The Annual Summary of Industrial Fire and Other Property Damage Experience report was completed and forwarded to LVAO. This included fire protection accomplishments in CY90 and objectives for CY91.

Several ES&H training courses were completed during this quarter. Courses included CPR/First Aid Training; OSHA Compliance Train-

ing; Occurrence Reporting and Processing System; Respirator Training; Spill Control Training; New Mexico Workers' Compensation Workshop; Environmentally Conscious Manufacturing Technology Workshop; Relay Station Safety; Incidental Spills Response; Mort-Based Root Cause; Explosive Safety; Radioactive Material Transport; and DOE Firearms Safety.

No reportable environmental incidents occurred this quarter.

The annual Site Environmental Report was completed and forwarded to the Environmental Compliance Section in LVAO to satisfy DOE/NV reporting requirements.

Equal Employment Opportunity

Workforce figures at the end of the January-March quarter show a slight percentage point improvement for female and minority representation in the workforce over the figures for the beginning of the fiscal year (see Table 1). This improvement is slight (0.2 and 0.1 respectively) and is significant only in that the trend is positive. With such small figures, the loss or gain of one person in the workforce can represent a large percentage point change.

Of the 25 promotions granted through this quarter, 52% were awarded to females and 48% to minorities. The majority of them occurred in the annual January wage and salary actions.

Training activities through March show that of 584 sessions, the female representation was 25.9% (1.7 percentage points less than their workforce representation) and the minority representation was

Table 1. Workforce goal review.

	Total	Females	Minorities
Workforce at 10/1/90	268	74	103
Percent of Workforce		27.6	38.4
Workforce at 03/31/91	273	76	105
Percent of Workforce		27.8	38.5

35.6% (2.7 percentage points less than their workforce representation).

Career Development Program (CDP)

Twenty members of the CDP Group II presented team evaluations of their experiences in the 18-month program. The audience was composed of managers and supervisors, and the presentations were videotaped for use in planning the third wave of the program scheduled to begin later this year.

Educational Outreach

1. Two engineers participated on a career panel at the Career Enrichment Center (CEC) answering questions for parents and students. One of them followed up with some teaching sessions in the pre-electrical engineering course taught at the school.

2. Two sessions on how to interview for a job were taught by one of our Human Resources staff members.

3. The Toastmasters group which meets weekly at KO held one of their meetings at the CEC, and the students enthusiastically requested their assistance in forming a student chapter of Toastmasters.

4. Six third-grade students from Georgia O'Keeffe Elementary School, members of a creative writing class called the "Write Crowd," came to KO to read their compositions to an audience of the Equal Employment Opportunity Specialist and a computer operator. The students then interviewed our employees and watched the demonstrated editing capabilities of the video section. A second group of four students read their work for one of KO's technical writers and the Sciences Department manager, interviewed them, and then watched a demonstration of computer-aided design.

Blood Drive

Seventeen employees donated blood for the first United Services Blood Drive of CY91.

Black Heritage Month

Four KO employees attended a luncheon on Kirtland AFB to celebrate Black Heritage Month.

Quality Assurance

A meeting among Sandia Program, KO, and Quality Assurance Office representatives was held to discuss how to handle quality assurance internal audits directed by customers. SOP 14-181, Quality Assurance Audits, does not address internal audits, so it was agreed that KO would write an Organizational Operating Procedure (OOP) documenting how internal audits are being performed.

Quality Control

A draft copy of SOP 41-073, Control of High-Strength Fasteners, was distributed by the Quality Control Director (QCD) to the users of such fasteners, for their review and concurrence. Concern over the method proposed for ordering fasteners (that is, distributors will no longer be considered suppliers), cost of fasteners, and timeliness of delivery were expressed by reviewers. A summary of these concerns was returned to the QCD office.

TSD requested information on what KO has done and is doing to address the control measures used to ensure that counterfeit fasteners are not used in assembly. This information was compiled and forwarded to the TSD program manager for issuance.

Meetings between inspectors, line organization personnel, and the QC section head have brought to light concerns over inspection methods and interpretations. Areas of concern will be addressed through training, procedures, and clear communications with the line organizations.

Five audits and 13 inspections were conducted on TSD operations. Primary areas of concern were in following existing procedures and implementing required procedures.

ADMINISTRATIVE SUPPORT

Accounting Activities

Accounting Section activities for the first quarter are shown in Table 2.

Human Resources Activities

Employment statistics for the second quarter are shown in Table 3, and service statistics are listed in Table 4.

Information Services Activities

The publications staff of Information Services (INS) completed a total of 79 projects during the quarter: 28 documents, 38 graphics jobs, 8 presentations, and 5 miscellaneous projects. Of the 28 documents, 14 were OOPs and Work Instructions, 6 were quality program plans for TSD SECOM programs, and 1 was the KO Security Plan. The 38 graphics projects included designing or redesigning a number of forms, making revisions to the organizational chart, and producing 6 flyers for ERMA and wellness events. Two of the 8 presentations

Table 2. Accounting activities.

	Second Qtr FY90	Second Qtr FY91	Change (%)
Average gross payroll (weekly)	\$ 184,174	\$ 199,390	+ 08
Average number of employees paid weekly	280	284	+ 01
Number of accounts payable checks prepared	1,226	1,086	- 11
Amount of accounts payable disbursements	\$ 1,306,783	\$ 1,030,505	- 21
Number of travel expense reports	202	261	+ 29
Amount of travel expenses	\$ 97,814	\$ 95,428	- 02

Table 3. Second-quarter employment statistics.

Hires	0
Terminations*	7
Applications/Resumes Processed	151
Relocations/Transfers	2
Open Requisitions at End of Quarter	3
* Includes employees placed on leave of absence	

Table 4. Second-quarter service statistics.

JAQ's Reviewed	0
Promotions Processed	3
Physicals	32
EETAP Courses Completed	38
External Training	50
Internal Training	103

were for the Sandia Program Manager, and 1 a major presentation to all Sandia Program supervisors. INS also completed 3 presentations for TSD/TSB program reviews.

The INS video staff continued work on modules for the EM new-hire orientation. The overview and security modules are scheduled for completion in April and will be sent for management review. The video staff also began production on a recruiting tape for the Career Enrichment Center (CEC). The CEC is an Albuquerque magnet high school offering advanced courses in subjects such as physics, mathematics, and languages, and occupational courses such as cosmetology, aviation science, and nursing. It is anticipated that the recruiting tape will be completed by the end of the fourth quarter.

Property/Shipping and Receiving Activities

Activities of the Property/Shipping and Receiving Section for the fourth quarter are shown in Table 5.

Purchasing Activities

Purchasing activities for the first quarter are shown in Table 6, and purchasing awards by category through first quarter are shown in Table 7.

Security Activities

Routine security processing was accomplished as shown in Table 8.

Table 5. Property/Shipping and Receiving activities.

	Second Qtr <u>FY 90</u>	Second Qtr <u>FY 91</u>	Change <u>(%)</u>
Number of outgoing shipments	482	366	- 24
Number of hazardous shipments	4	3	- 25
Number of incoming shipments	1,587	1,372	- 14
Number of incoming items	2,546	2,194	- 14
Number of vendor pickups/dropoffs	370	350	- 5
Number of data entries to property files	740	1,095	+ 48
Number of items ordered from Las Vegas stockroom	631	189	- 70
Number of items received from Las Vegas stockroom	518	164	- 68
Number of items issued from KO bench stock	582	210	- 64
Number of items in property files	3,762	3,726	- 1
Total value of property files	\$ 9,404,798	\$ 9,467,497	+ 1

Table 6. Purchasing activities.

	Second Quarter	
	<u>FY90</u>	<u>FY91</u>
Actions (KO)*	1,090	1,031
Actions (KO Support)	31	43
Expenditures (KO)	\$ 703,693	\$ 539,091
Expenditures (KO Support)	\$ 128,662	\$ 248,344
* Includes petty cash, publications, and releases against basic order agreements.		

Table 7. Purchasing awards by category through 2nd quarter.

	FY90		FY91	
	<u>Goal (%)</u>	<u>Actual (%)*</u>	<u>Goal (%)</u>	<u>Actual (%)*</u>
Small Business	62.0	67.60	62.0	63.74
Disadvantaged Business	6.5	15.03	6.5	9.30
Woman-Owned Business	4.7	15.29	4.7	8.08
Competitive	48.0	49.14	48.0	74.34
Labor Surplus	5.0	1.81	5.0	13.26
* Includes KO Support				

Table 8. Routine Security processing statistics.

	Second Qtr <u>FY90</u>	Second Qtr <u>FY91</u>	Change <u>(%)</u>
Classified visits:			
Outgoing (KO employee)	104	102	- 2
Allen	0	0	0
Incoming	8	9	+ 11
QSP packets:			
New	6	3	- 50
Extensions	0	2	N/A
Reinstatements	0	1	N/A
Five-year Reinvestigations	6	10	+ 40
Badges:			
Cleared	13	16	+ 19
Uncleared	14	10	- 29
Clearances Granted	2	2	0
Classified material control:			
Received	51	15	- 71
Transferred	20	18	- 10
Destroyed	8	4	- 50
Originated	2	1	- 50
Security Education Briefings	--	27	--
(Includes Foreign Travel, New Hire Orientation, Clearance Grant, Contractor, Refresher, and Termination Briefings)			
Keys Issued	--	25	--
Keys Returned	--	16	--
Cardkeys Issued	--	0	--
Cardkeys Returned	--	17	--

DISTRIBUTION

DOE/NV

K. Powers
C. King

EG&G/EM

M. Blaylock
P. Zavattaro

EG&G/LLNL Program

T. Edwards

EG&G/Los Alamos Program

J. Trabert

EG&G/NV Program

H. Lamonds

EG&G Special Technologies Program

R. Lynn

EG&G/Sandia Program

S. Gamsby
J. Jekowski
C. Lewis
D. Lewis
S. Orrell

EG&G/SRD Program

C. Hagen

EG&G/Administrative Services

J. Fisk

EG&G/Facility Management Office

H. Claus

EG&G/SBO

L. Hocker

EG&G/LAO

J. Manning

EG&G/SDO

D. Atkins
G. Dahlberg
R. Kitchen
D. Langston
B. Murphy
G. Percy
R. Starbird
G. Younghans

EG&G/KO

R. Garcia
D. Hutton
T. James
M. Johnson
J. Kaskurs
W. Ross
E. Thomas
H. Young