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MANUFACTURING METHODS AND TECHNOLOGY (MMT) PROGRAM FOR FY 80 LARGE CALIBER WEAPONS SYSTEM LABORATORY, ARRADCOM

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18. SUPPLEMENTARY NOTES

This project was accomplished as part of the U.S. Army's Manufacturing Methods and Technology Program. The primary objective of this program is to develop, on a timely basis, manufacturing processes, techniques, and equipment for use in production of Army materiel.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

MMT - Ammunition Program
MMT - Weapons Program

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The Manufacturing Methods and Technology (MMT) Program serves the U.S. Army Materiel Development and Readiness Command (DARCOM) as a link between research and development activities and production. The primary aim of the program is to reduce the cost of weapon systems acquisition by improving the efficiency of manufacturing processes and implementing new technology. Although cost reduction is a primary concern, emphasis is also focused on reducing air and water pollution, increasing safety, conserving energy, and reducing dependence on critical materials.

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INTRODUCTION

The Manufacturing Methods and Technology (MMT) Program serves the United States Army Materiel Development and Readiness Command (DARCOM) as a link between research and development activities and production. The program is designed to reduce the cost of acquiring weapon systems by improving the efficiency of manufacturing processes and implementing new technology. Cost reduction is a primary concern, but reducing air and water pollution, increasing safety, conserving energy, and reducing dependence on critical materials are also emphasized.

The Army's production needs span the full range of modern technology, from the high speed production of millions of small arms to the forging of tank turrets and the production of integrated circuits. Product testing, material handling, and computer-aided design and manufacturing are all within the scope of the MMT Program.

This report presents an overview of ARRADCOM's Large Caliber Weapon Systems Laboratory, MMT Program for FY 80. It contains both the ammunition and weapons appropriations, broken down by responsible division and specific technical area supported.

The definition, scope, items supported, status, and funding are presented. Program management procedures, both internal and external, are also discussed.

The MMT Program Plan is an attempt to provide a single source summary of current and near-term efforts in the DARCOM MMT Program. Since weapon systems requirements and the technology for these systems are constantly changing, inclusion in the plan is not a guarantee that a program will be fully funded or completed. The MMT Program Plan, however, does serve as an indicator of the areas toward which DARCOM's resources will be directed and the magnitude of the Army's commitment to this program.

The MMT Program Plan contains a section for each element which has projects. Each section includes a summary of the activity, its responsibilities, and its major MMT areas. Following the summary is a listing of each project proposed by that activity.

DEFINITION AND SCOPE

An MMT project is one involving the evolution of manufacturing processes, techniques, and equipment by the Government or private industry to provide for timely, reliable, economical, and high quality mass production of DoD-required materiel. Its objective is to bridge the gap between prototype production and mass production by the application of practical new production processes or techniques. It is production oriented, accomplished on a production or pilot production scale, and is expected to result in a practical process for mass application. It does not normally include the application of existing processes, techniques, or equipment to the manufacture of specific systems, components, or end items and is not applicable to a specific weapon system development nor product improvement program (i.e., one which is undertaken to assure that a specific system, subsystem, or component is capable of mass production). Such effort will be normally funded as part of the specific program involved.

MMT projects expand manufacturing technology and translate new technology into practical production processes. They provide advanced manufacturing techniques and processes to support modernization of the industrial base. MMT projects are production-oriented and are expected to result in a practical process for production. They may reduce procurement lead time and costs, provide state-of-the-art production processes and techniques, investigate alternative methods of manufacturing components which limit production (cause bottlenecks), develop new and/or improved processes to facilitate competitive procurement, and/or ensure economic availability of end items. In exceptional cases, they may establish prototype production lines. MMT projects may involve technical or management studies that are related to timely establishment and improvement of manufacturing processes or techniques. These projects have a corollary effect by stimulating and encouraging increased productivity by private industry.

MMT Requirements

The criteria used to select projects for MMT financing are described below:

1. Each project will satisfy a requirement, current or anticipated for specific manufacturing techniques. Future requirements, normally qualitative in nature, will be directed toward the development of manufacturing technology which will increase general productivity.

2. Solutions to the problem will not be available on a timely basis from other programs in either Government or private industry.

3. Feasibility of the effort will have been sufficiently demonstrated by research or laboratory work.

4. The program will create new, significantly improved, or more economical manufacturing processes, techniques, or equipment rather than merely employing existing processes, techniques, equipment or facilities.

5. The program will result in one or more of the following:

a. An improved responsiveness to current and projected requirements.

b. A more effective and efficient industrial base that will reflect modern manufacturing techniques.

c. A cost effective manufacturing technique or process which will ensure economic availability of end items.

d. Enhance safety or anti-pollution measures to meet statutory requirements.

6. The application of the resulting processes, techniques or equipment is generic in nature, i.e., applicable to more than one end item.

Private industry will be encouraged to undertake with its own capital as much of the manufacturing technology effort as possible. When qualified segments of industry will not commit private capital and the program is needed to support Army requirements on an economic and timely basis, then (and only then) will Procurement Appropriation funds be allocated.

To ensure timely MMT developments responsive to Army requirements, process controllers [excluding general purpose automatic data processing equipment (ADPE)] and allied equipment used solely in the manufacturing process will become an integral and inseparable part of the industrial base. Benefits derived from the MMT program, e.g. reduced manufacturing and end-item costs and reduced production lead time, will be such that the program must be actively pursued to optimize the results. MMT projects should be initiated whenever the technical opportunity becomes manifest. MMT

projects which may benefit end items which will be funded initially by Procurement Appropriations should be started in sufficient time to be used in establishing the Initial Production Facilities.

Program Monitoring

Monitoring the MMT Program consists of both formal reports mandated by regulation and informal Laboratory meetings to review specific projects.

Semi-Annual Report

AR 700-90 requires that semi-annual project reports be submitted until the project has been either completed or terminated, at which time the report is considered final. All reports are bound into a series of books for Government distribution and incorporated into a data bank maintained for IBEA. The format for the report is included in appendix A.

Presentation

Approximately every six months, the Munitions Production Base Modernization Agency (MPBM) is briefed on selected projects. Four charts are prepared to MPBM's prescribed format and the presentations are sharply focused on the charts' data. A lengthy technical discussion is not required, but accomplishments and problem areas, as well as the funding status are looked at closely. The charts (app B) consist of:

1. Key Project Information

2. Milestone Schedule

3. Financial Status

Computer Program

Three computer programs (app C) have been developed within the LCWS Laboratory for internal management. These consist of:

1. MMT projects broken down by responsible Division, engineering starting date, and funding distribution.

2. Obligation status of contracts, OGA, and GOCO funds for FY 79 and FY 80.

3. Milestones and monthly starting and completion schedules. Examples of each are inclosed in appendix C.

Additional sources such as the RADMIS Data Bank in System 2000 form and the APARS Report from ARRCOM can be used to extract data on the project status.

Regulations

The regulations governing the MMT progam consist of:

1. AR 700-90, Logistics
2. Army Industrial Preparedness Program
3. AR 32-100

MMT AMMUNITION PROGRAM

Background

The Ammunition Program spans the technology gap, particularly in those areas which have no counterpart in private industry. Almost all current manufacturing processes involve manual operations which must be efficiently automated. Batch processes must be converted to continuous processes to accommodate new materials-handling techniques and improve safety.

The Ammunition Program presents unique problems which require innovative solutions. New systems must be capable of economic layaway for periods of ten years or more, a stipulation which is rare in private industry. Manufacturing technology is the foundation of the modern ammunition production facility, whether it is derived from industry or developed through Defense supported projects.

The primary objective of the MMT Program is to improve existing manufacturing processes, techniques, and equipment. The second objective is to bridge the gap between development and full-scale production. The third objective is to solve technological problems.

Current planning requires that, in the event of mobilization, production facilities be activated within three months and reach maximum production in four. This objective requires that equipment design, layaway techniques, and control technology be oriented to achieve the quick-reaction capability desired.

Through advances achieved in automated inspection techniques, loading systems, and assembly systems, the uniformity and quality of the end product has been improved. The munitions MMT program includes several projects oriented toward improving quality control and test technology, and others toward development of explosive loading and assembly techniques and equipment.

MMT projects must be cost effective within the framework and economics of the Five Year Defense Plan. This presents a unique fiscal management challenge in the design and fabrication of equipment and systems required for the loading and assembly of components and end items. This challenge is being met by developing systems with the flexibility to produce any items, establishing an optimum balance between system simplicity and process operational requirements, and providing equipment designs capable of high efficiency operation to achieve cost effective system operations.

Technical Areas

LAP

The MMT effort in the Load, Assemble and Pack (LAP) area is guided by four major program goals: improved economy of operation, improved safety of operating personnel, establishment of a rapid response production capability, and improvements in the quality of the end product. All of these goals must be accomplished within the standards and criteria established for pollution abatement and energy conservation.

Safety

Due to the inherently hazardous nature of munitions production, an extensive program has been undertaken to upgrade the safety of explosive preparation equipment, loading equipment and assembly systems. The MMT program relating to the upgrading of the operational safety of loading lines is a continuation of current efforts. This program will define and investigate specific operational safety hazards and develop equipment and systems to reduce operator exposure and risk.

Metal Parts

The Metal Parts MMT Program has as its goal optimization of manufacturing processes. Projects are included for improving maintainability and readiness through computer integrated manufacturing, computer-aided modeling of forming operations, and storage techniques for production machinery. Enhancing reliability and quality control efforts include analysis for predicting tool failure, improving projectile surface quality, and processing high-frag steel.

Additional Emphasis

Primary program emphasis in energetic materials is being placed on the development of manufacturing technology for new munition items. Recent enactment of the Clean Air Act Amendment and Toxic Substances Control Act has resulted in the requirement for continuous MMT effort to meet mandatory compliance dates. Conserving production base utilities, energy and resources, as well as identifying and using alternate energy sources, are the broad areas of major concern. The development and design of safe, cost effective production processes are major goals of the munitions MMT program. In the supportive technology areas, the primary thrusts continue to be pollution abatement engineering, energy technology development, and explosives and occupational safety.

MMT AMMUNITION PROJECTS

ARRADCOM's FY 80 MMT ammunition projects are itemized in table 1 and discussed below. The specific Division in the Large Caliber Weapon Systems Laboratory responsible for each project is also identified in table 1.

Table 1. FY 80 MMT ammunition projects

Responsible LCWSL division	No.	Project	Cost ($K)
Energetic Systems Process Division (EPSD)	4000	MMT: Automated M55 Detonator Production Equipment, LAP	250
	4062	Automated Manufacture System for Mortar Increment Containers, LAP	895
	4137	Automated Loading of Center Core Igniters, LAP	67
	4236	Automated Lace Jackets for Center Core Charges, LAP	612
	4312	Injection Molding for Production Explosive Loading, LAP	279
	4469	Automated Insertion of Grenade Layers, LAP	350
	4027	Combined Solvent Recovery /Drying of S-B Propellant, P&E	236
	4033	Caustic Recovery from Sodium Nitrate Sludge, P&E	153
	4037	Process Improvement for Plastic-Bonded Explosives, P&E	236
	4061	Nitroguanidine Process Optimization, P&E	260
	4200	TNT Crystallizer for Large Caliber Munitions, P&E	29
	4210	Jet Cutting of Energetic Materials, P&E	450

Table 1 (cont)

Responsible LCWSL division	No.	Project	Cost ($K)
ESPD (cont)	4310	DMSO: Recrystallization of HMX/RDX, P&E	278
	4341	Improved Nitrocellulose Purification Process, P&E	583
	4462	Modified FAD for Multi-Base Propellant, P&E	850
	4508	Process Improvement of Pressable RDX Comps, P&E	506
	4285	TNT Equivalency Testing for Safety Engineering, Safety	408
	4288	Explosive Safe Separation & Sensitivity Criteria, Safety	767
	4291	Blast Effects in Munitions Plant Environment, Safety	100
	4281	Conservation of Energy at Army Ammo Plants,Conservation of Energy	1234
	4225	Red Water Pollution Abatement System, Pollution Abatement	155
	4226	On-Line Monitors for Water Pollutants, Pollution Abatement	100
	4231	In-House Reuse of Pollution Abated Waters,Pollution Abatement	250

Table 1 (cont)

Responsible LCWSL division	No.	Project	Cost ($K)
ESPD (cont)	4309	Ammunition for 120mm Tank Main Armament	3726
Applied Sciences Division	4322	Design Criteria and System Characterization of Electronically Controlled Production Facilities	502
Nuclear and Fuze Division	4266	Manufacturing, Inspection & Test Equipment for Magnetic Power Supply, Fuze	345
Munitions System	4084	Opacity/Mass Emission Correlation, P.A.	111
	4189	High Fragmentation Steel Production Process, MPTS	1048
	4498	Develop Method for Consoli- & Auto Assy of SmallMines, LAP	392
	6736	Technical Readiness Accel erated Through Computer Integrated Mfg (TRACOM) CD/CIM, MPTS	315
	6738	Ultra High Speed Metal Removal, Artillery Shell, MPTS	297

4000 - MMT: Automated M55 Detonator Production Equipment (LAP) ($K250)

This is a production engineering measure to develop an automated M55 detonator production capability which will also be adaptable to the production of other initiating devices.

Items Supported

Cartridge, 40 mm: HEDP, M433
Projectile, 155 mm: HE(ICM), M483A1
Projectile, 8 in.: ICM, M509
Detonator, Stab: M55
(Air Force items) CBU2, 25A/A, 46/A, 52/B and 71.

The XM14E6 ADEN/DEFA FA fuze requires a detonator which may be produced on the multi-tooled loader.

Present Status

This is the 10th year of a multi-year project. At the conclusion of this project, an operating prototype will be available for the basic multi-tool loader, automated detonator cup and assembled detonator inspection equipment, automated packaging and pack-out equipment, the automated explosives resupply system, improved powder metering and dispensing devices, an auto-mated detonator painting mechanism, and an improved vacuum system. In addition, final technical reports on the development efforts, RAM data and analysis, and drawings and specifications suitable for the follow-on procurement of equipment will be provided.

Funding

Fiscal year	Funding ($K)
71	333
73	396
74	549
75	100
76	1000
7T	250
77	1000
78	1250
79	1600
81	604 (Tentative)

4062 - MMT: Auto Manufacture System for Mortar Increment Containers (LAP) ($K 895)

This program will develop an automated system for manufacturing 60 mm M204 and 81 mm M205 propelling charge increment containers. A complete TDP for an automated manufacturing process will be provided enabling the Army to establish mass production capability at either private or GOCO facilities.

Items supported

Cartridge, 60 mm: HE, F/LWCMS, M720
Cartridge, 81 mm: M374A3
Cartridge, Smoke, 81MM: WP, M375A3
Charge, Propelling, 8 in.: WB (Zone 9), M188

Present Status

This is the second year of a three year program. The end products of this project are a pilot production system for manufacture of 60 mm M204 and 81 mm M205 propelling charge increment containers, equipment drawings to complete this system as a prototype and procure additional systems, a complete TDP, hazards analysis, production qualification and technical reports.

Funding

Fiscal year	Funding ($K)
79	507
81	330 (tentative)

4137 - MMT: Automated Loading of Center Core Igniters (LAP) ($K67)

This project will automate the loading operations of the 155mm M203 and the 8-inch M188 propelling charge igniters with black powder.

Items Supported

Charge, Propelling, 155mm M203

Charge, Propelling, 8 in. M188

Present Status

This is the second year of a two-year program. The end products of this project are a prototype loading machine, a technical data package, including requirements for quality acceptance, and a final technical report.

Funding

Fiscal year	Funding ($K)
FY 79	$205

4236 - MMT: Auto Lace Jackets for Center Core Charges (LAP) ($K 612)

Large propelling charges such as the 155mm and 8 in. employ laced jackets to maintain their configurations. The manual threading and tightening of the lacing is a time consuming operation which results in poor quality, non-uniformity, high cost and personnel hazards. The automation/mechanization of the lacing operation would improve quality and greatly lower production costs and hazards.

Items Supported

Charge, Propelling: 155 mm, XM203
Charge, Propelling: 155 mm, XM201 and M119A1
Charge, Propelling, 8 in.: M188

Present Status

This project will result in a prototype production machine with appropriate installation, operation and maintenance manuals for use at an x-facility. Also provided will be a complete set of fabrication drawings and purchase and performance specifications in order to replicate the machine as required. A summary engineering report will provide full developmental data including performance tests, RAM data and hazards analysis.

4312 - MMT: Injection Molding for Production Explosive Loading (LAP) ($K 279)

This program is intended to develop an injection molding process that will provide an alternative to melt loading of small caliber munitions. The injection molding system will eliminate the

large quantities of riser scrap generated by the current melt loading process. The results of this project will be used to define the base line requirements of an automated injection molding system for on mass production of small caliber munitions on LAP lines.

Items Supported:

BLU 61A/B
BLU 63B
BLU 86
BLU 66B

Present Status

This is the second year of a two-year program.

Funding

Fiscal year	Funding ($K)
79	$261

4469 - MMT: Automated Insertion of Grenade Layers (LAP) ($K 350)

This project covers development of an automated system for assembling grenade layers in the M483 ring pack and includes a prove-out plan, preliminary acceptance testing at the contractor's facility, shipment of the equipment to the GOCO, installation and final acceptance testing at the GOCO, preparation of all manuals, and completion of the technical data package.

Items Supported:

Projectile, 155mm: HE, M483A1

Projectile, 8 in.: HE, M509E1

Present Status

This is the last year of a three-year program. The end products of this project will be a component ring pack assembly equipment for M42/M46 grenades contained in the M483/M509 projectiles and automated prototype production equipment which will insert these grenade layers into the M483 projectile and perform all required inspections. In addition, technical data packages for the manufacture of replicate systems will be completed along with a hazards analysis, operation and maintenance manuals and final

reports. Design features which will permit the addition of tooling for the M509 projectile will be included.

Funding

Fiscal year	Funding ($K)
78	$ 502
79	$1150

4027 - MMT: Combined Solvent Recovery/Drying of SB Propellant (P&E) ($K 236)

This project will establish equipment and methods for a combined solvent recovery/drying process with a rapid steeping-water drying method and the use of dehumidified air with partial recycle in the air drying operation.

Items Supported

All single base, solvent-type propellants which are dried with heated air at Radford AAP and at other Government installations. Prominent examples are:

Charge, Propelling, 175mm: WB, M86A2, M6MP Propellant for
Charge, Propelling, 155 mm: WB, M4A2, M1MP Propellant for
Charge, Propelling, 8 in.: M1, M1SP Propellant for

Present Status

This is the first year of a two-year program.

Funding

Fiscal year	Funding ($K)
81	$383 (tentative)

4033 - MMT: Caustic Recovery from Sodium Nitrate Sludge (P&E) ($K 153)

The objective of this project is to thermally convert sodium nitrate, formate, and acetate to the oxide which, upon hydrolysis, forms the hydroxide with the evolution of large quantities of heat.

The heat evolved can be used in various phases of production and the hydroxide reused to neutralize the excess nitric acid.

Items Supported

All items containing RDX/HMX and composition explosive thereof, such as

Cartridge 165 mm: HEP
Projectile, 155 mm: HE, ADAM
Rocket, 66 mm: HEAT, 1 LAW (VIPER) Mine, Ground Emplaced, Scatter, AP, XM74

Present Status

This is the first year of a three-year program.

Funding

Fiscal year	Funding ($K)
81	$282 (tentative)

4037 - MMT: Process Improvement for Plastic-Bonded Explosives (P&E) ($K 236)

This project will generate complete design criteria for processes adaptable to the manufacture of PBX compositions at mobilization levels. This project will include the investigation of present processing methods, as well as the application of new technology to coating, drying, and furnishing PBX compositions.

Items Supported

Warhead Guided Missiles
Torpedo Warheads
Burster Charges
Boosters
SOFAR Sound Signal Assembly

Present Status

This is the first year of a three-year project.

4061 - MMT: Nitroguanidine Process Optimization (P&E) ($K 260)

This project will provide: improved operating conditions; proposed modifications to the existing facility; improved design for future plants; plant operating personnel trained in evolutionary operation; and a functioning EVOP for continued process improvement. Application of EVOP techniques will lead to reduced pollution and energy consumption and more economical operation while maintaining product quality and production requirements.

Items Supported

Prop type	Chg No.	Systems	Code
M30	M490	105mm	A
M30	M353A11	90mm	A
M30	M452A1	105mm	A
M30	M431	90mm	A
M30A1	M203A1	155mm	A

Present Status

This is the first year of a multi-year project. The end products will be applied to existing and future nitroguanidine plants. The EVOP technique may be applied to other facilities.

Funding

Fiscal year	Funding ($K)
81	$953 (tentative)

4200 - MMT: TNT Crystallizer for Large Caliber Munitions (P&E) ($K 29)

This program will develop a continuous TNT crystallizer system for processing slurry of molten TNT containing up to 20% solids. The system will have the capability to closely control the percentage of solids incorporated into the molten TNT and the temperature of the explosive prior to the pour operation. This system will also eliminate double probing and top off operations which are required for processing TNT on a batch basis. The project will identify new crystallizer systems. Process parameters will be defined for the Army's alternate preferred filler in high-explosive loaded artillery ammunition.

Items Supported

Projectile, 155mm, HE: RA, M549A1
Projectile, 155mm, HE: XM795
Projectile, 8 in., HE: M106
Projectile, 8 in., HE: RAP, M650

Present Status

This is the first year of a two-year program. The result of this PEM program will be used to define the procedures for processing TNT explosives on a continuous basis in the melt-pour system for mass production LAP Lines.

Funding

Fiscal year	Funding ($K)
FY 81	$448 (tentative)

4210 - MMT: Jet Cutting of Energetic Materials (P&E) ($K 450)

This project will include the procurement, installation, and evaluation of an optimum jet cutter comprised of several components. Auxiliary safety interlocks, sprinkler protection, safety fire doors, and feed and take-away conveyor systems will be designed and debugged. Use of common drying trays is planned to reduce the number of operations. Strand chipping will be greatly reduced, probably eliminating hand sorting. Redrying will be minimized or eliminated. Elimination of these time consuming hand operations will result in cost savings. The proposed process will be inherently safer than the existing process, since it is conducted remotely and the sharpness of the "tool" is no longer a factor.

Items Supported:

Cartridge, 105 mm, APDS-T: M728/M392A2
Cartridge, 105 mm, TP-T: M490
Cartridge, 105 mm, TPDS-T: M724A1
Cartridge, 105 mm, APFSDS-T: M735
Cartridge, 105 mm: M119

Present Status

The end products of the program are a prototype jet cutting facility for benite production. In addition, a final report will be issued which will include a hazard analysis study, the results

of acceptance and non-ballistic qualification tests of a pilot lot of benite, and a summary of findings of reliability, acceptability, and maintainability (RAM) studies.

4310 - MMT: DMSO Recrystallization of HMX/RDX (P&E) ($K 278)

Dimethylsulfoxide (DMSO) has significantly greater solvating power than the presently used solvents, cyclohexanone and acetone, and, therefore, can be used very efficiently in recrystallizing large quantities of RDX and HMX in minimal time, by yielding a significantly greater throughput of product. From preliminary results and analysis of laboratory-produced material, DMSO recrystallized RDX and HMX crystals are chemically and physically equivalent to those obtained with the presently used production solvents. Work to be conducted under the FY 80 segment of this multi-year funded project will involve interim qualifications, loading studies, and end item testing of explosives formulated from DMSO-recrystallized RDX/HMX produced in HSAAP's pilot-scale continuous recrystallization plant.

Items Supported

All end items containing RDX and/or HMX, or compositions thereof, of which the following are examples:

Projectile, 155mm, HE, ICM, ADAM: XM731
Cartridge, 165mm, HEP
Rocket, 66mm, HEP
Rocket, 66mm, HEAT: ILAW (VIPER)
Mine, Ground Emplaced, Scatter, AP: XM74

Present Status

This is the last year of a six-year program. The end product is a pilot plant for the development of improved recrystallization procedures to be built at HSAAP. A Technical Data Package will be generated by ARRADCOM and Holston AAP.

Funding

Fiscal year	Funding ($K)
75	465
76	400
77	200
78	196
79	483

4341 - MMT: Improved Nitrocellulose Purification Process (P&E) ($K 583)

This project will evaluate the prototype equipment in the poaching and acid boil operations. The production of pilot lots followed by ballistic evaluation will be made. Process design criteria will be established and the final report prepared.

Items Supported

Nitrocellulose and all single- and multi-base propellants.

Present Status

This is the last year of a four-year project. This project will provide preliminary design criteria for modernized purification processes and a technical report detailing results, hazards analysis, RAM assessment, Quality Assurance Plan and a prototype 2000 lb/hr continuous purification process. This work will be implemented in follow-on facility projects.

Funding

Fiscal year	Funding ($K)
77	165
78	664.9
79	742
81	765 (tentative)

4462 - MMT: Modernized FAD for Multi-Base Propellants (P&E) ($K 850)

Prior funding for this project provided for an engineering data review, hazards analysis, quality assurance, procurement of prototype equipment, building modification, process data acquisition, and installation and evaluation of equipment. This funding will provide for additional equipment, procurement, installation and evaluation, preliminary facility design criteria, documentation and final report and Control System Functional Criteria.

Items Supported:

Propellant	Round	System
M30A1	Cartridge, 155 mm: M203A1	105 mm Gun
M26E1	Cartridge, 152 mm, TP-T: M411A3	152 mm
M330HBD	Cartridge, 105 mm, HEAT-T (FFAIS): M456A1E2 and M496	105 mm Gun
M30	Cartridge, 105 mm, HEAT-T (FFAIS): M456A1	105 mm Gun
M30MOD	Charge, Propelling, 8 in.: XM188E3	8 in. Howitzer

Present Status

This is the last year of a four-year program. End items of this project will be technical reports, test data, prototype equipment, technical data package and preliminary design criteria, including Control System Functional Criteria for modernizing other forced air drying houses.

Funding

Fiscal year	Funding ($K)
77	163
78	592
79	528

4508 - MMT: Process Improvement of Pressable RDX Compositions (P&E) ($K 506)

This project will generate complete design criteria for incorporation of facilities with processes sufficiently adjustable for the manufacture of pressable RDX compositions (A3, A4, A5) at mobilization levels. This project will include the investigation of present methods of incorporating RDX compositions.

Items Supported

All items containing pressable RDX compositions, of which the following are examples:

Projectile, 8 in.: HE
Projectile, 155mm: HE, RAP
Cartridge, 20mm: All Types
Cartridge, 165mm: HEP
Rocket, 66mm: HEAT-T

Present Status

This is the last year of a three-year project. The end results will include a final technical report containing all the results gained from this project and sufficient engineering information to design new improved production facilities and a complete description of new methods, equipment, and technology for processing these explosives.

Funding

Fiscal year	Funding ($K)
78	300
79	357
81	263 (tentative)

4285 - MMT: TNT Equivalency Testing for Safety Engineering (Safety) ($K 408)

The only currently available design criteria for structures which can resist the effects of HE explosions is based on surface bursts of hemispherical TNT. When designing a structure to withstand the blast output of some other energetic material or charge shape, the designer must be able to convert the loading given in the TNT design manual into information which is pertinent for the material in question. Testing to generate peak pressure and positive impulse data from blast measurements of a variety of high energy materials (propellants and explosives) will solve this problem. These results will be compared with the blast output of surface bursts of hemispherical TNT in order to determine the TNT equivalency of the material. Work to be performed under this project includes: analytical studies, test plan development, testing, evaluation, and safety echelon approval of the TNT equivalency of various high energy materials (propellants and explosives).

Items Supported

This project is applicable to explosives, propellants, high-energy systems and munition end-items (projectiles, warheads, fuzes, missiles, etc.).

Present Status

This project is in the sixth year of an eight-year program. The end products are: TNT equivalencies, design data, test methods, and technical reports.

Funding

Fiscal year	Funding ($K)
76	325
7T	81
77	377.6
78	394.6
79	420
81	441 (tentative)

4288 - MMT: Explosive Safe Separation and Sensitivity Criteria (Safety) ($K767)

Tests will be designed for various explosives and explosive end items and the results will be used to establish:

1. Safe separation distances for explosives, end items, and in-process materials.

2. Critical and safe depths of bulk explosives on a conveyor or storage vessel.

3. Sensitivity of explosives at various stages of the manufacturing process to primary and secondary fragment impact.

The program involves test plan development, testing, test data evaluation, and report preparation prior to modifying regulatory documents.

Items Supported

This project is applicable to the manufacture of all explosives, propellants, and explosive end items.

Present Status

This is the sixth year of a seven-year program. The data generated, with safety echelon approval, will be used to modify or supplement present regulatory manuals TM 5-1300 and AMCR 385-100.

Funding

Fiscal year	Funding ($K)
76	592.8
7T	139.3
77	600
78	816.3
79	643
81	720 (tentative)

4291 - MMT: Blast Effects in the Munition Plant Environment (Safety) ($K 100)

This project is divided into two tasks. In Task 1, Blast Effects and Loadings, the characteristics of the blast environment which affect a structure's response are studied. In Task 2, Structural Response and Design, the response of various structural materials and elements subjected to the loadings determined in Task 1 are determined. This project will facilitate the design of blast resistant protective structures.

Items Supported

This project is applicable to all explosives and explosives-like hazardous materials, manufacturing, LAP and storage facilities. The following near-term projects will be supported:

Project 823142W, Mississippi, 155 mm: LCM Complex
Project 83B043, Government Facility, 30 mm: GAU-8 Cartridge, equipment and building
Project 833556, Government Facility, 155 mm/8 inch, 3D Propellant Charge Bog LAP
Project 83B053, Sunflower, AAP Projectile, 155 mm, RAP: M549
Project 832607, Badger AAP, Semi-Auto single base line
Project 83B053, Holson AAP, Granular Composition B
Project 832665, Radford AAP, Continuous NC MFG Unit

Present Status: This is the fourth year of a five-year program. The end product of this project will be design guidance and construction techniques that will establish a capability to design acceptable structures that will provide protection to workers from blast and fragment damage resulting from an accidental explosion at an ammunition plant.

Funding

Fiscal year	Funding ($K)
76	700
77	350
79	235

4281 - MMT: Conservation of Energy at Army Ammunition Plants (Conservation of Energy) ($K 1,234)

Methods for more efficient energy utilization at Army Ammunition Plants will be determined. These measures will be immediate or short-term applications of current technology to the various industrial processes at the plants. This effect will also determine technology requirements as it relates to explosives and propellant operations where immediate or short-term technology is not considered adequate. Efforts will be conducted to develop advanced technology in discrete segments based on potential economic payback to develop energy conservation methods.

Items Supported

This program will support all munitions items containing propellants, explosives and/or pyrotechnic materials and all related manufacturing, loading, and assembly plants.

Present Status

This program, which is in its sixth year, will produce energy inventories/balances of specific unit processes, technical reports on the various subprojects, and recommendations stating where, what, and how much energy can be conserved.

Funding

Fiscal year	Funding ($K)
75	191
76	875
77	997.7
78	1059.5
79	1285
81	1207 (tentative)

4225 - MMT: Red Water Pollution Abatement System (Pollution Abatement) ($K 155)

Based assessment of current technologies, the Sonoco Sulfite Recovery Process (SSRP) was selected to eliminate pollution in streams and recover sodium sulfite from red water for reuse in the purification of TNT. Feasibility of this process has been demonstrated; however, additional MMT efforts are required to establish the optimum operating parameters of critical components such as the pelletizer, reduction kiln and scrubber, and to develop and optimize methods for clarifying and purifying the final product. These efforts will directly support an MCA project for Radford Army Ammunition Plant.

Items Supported

This project will support production of TNT.

Present Status

The end products of this project are:

1. Design data for MCA project at Radford Army Ammunition Plant, and plans for implementation at other TNT facilities containing, in addition to design data, hazard, and economic analysis.

2. A final technical report, which will produce the technical data for an optimum modular system for use at all TNT plants.

Funding

Fiscal year	Funding ($K)
79	350
81	160 (tentative)

4226 - MMT: On-Line Monitors for Water Pollutants (Pollution Abatement) ($K 100)

This program will rank instruments for suitability in monitoring a particular pollutant in a particular waste stream, demonstrate the capabilities of the alternatives, consider the cost benefit ratios, develop design parameters for a simpler, more economical instrument dedicated to monitoring a specific pollutant, and evaluate the feasibility of using the instruments for automatic control of pollution abatement equipment.

Items Supported

This project will support all explosives and propellant items whose manufacture requires the monitoring of water pollution.

Present Status

This is the first year of a two-year program. The end products will be the selection of monitoring instruments for military pollutants in the waste waters from ammunition plants; designs for more economical instruments for monitoring a particular pollutant in a particular waste stream.

Funding

Fiscal year	Funding ($K)
81	379 (tentative)

4231 - In-Plant Reuse of Pollution Abated Waters (Pollution Abatement) ($K 250)

The most direct way to achieve zero discharge of pollutants is not to discharge plant effluent in the first place. This concept combines abatement of waste water contamination by current state-of-the-art treatment with recycle and reuse of the abated waste water within the plant itself. The treatment plant (secondary) would be reduced as a result of the application of the water management principles or recycle, reuse and product recovery to the manufacturing processes. The abated effluent would be recycled within the plant wherever the pollutant level will not adversely affect the manufacturing process. Any remaining effluent would get tertiary treatment (carbon adsorption or ion exchange) in a unit of greatly diminished size and would be recycled within the plant.

Items Supported

This project will support all munition items containing propellants and/or explosives and related LAP operations.

Present Status

This is the first year of a two-year program. The end products technical reports and technical data in support of design criteria for the establishment of cost effective pollution abatement systems based on in-plant reuse of pollution abated waters.

Funding

Fiscal year	Funding ($K)
81	465 (tentative)

4309 - MMT: Ammunition for 120 mm tank Main Armament ($K 3726)

This MMT effort involves the application of new and/or more efficient manufacturing methods, techniques, and processes developed under laboratory conditions and techniques in practice now in Germany's production of 120 mm ammunition. This project will assist in adapting the the 120 mm tank main gun systems based on a German design for use as the future main armament on the SM1 tank. The tasks to be accomplished are: (1) the transfer of design technology from the German to the American form for use in (2) fabrication and testing the 120 mm tank gun and ammunition system in the United States, and (3) mass production of ammunition to meet mobilization requirements.

Items Supported:

Cartridge, 120 mm, APFSDS-T: XM827
Cartridge, 120 mm, FSMP-T: XM828
Cartridge, 120 mm, APFSDS-T: XM829
Cartridge, 120 mm, HEAT-MP-T: XM830
Cartridge, 120 mm, TP-T: XM831
Cartridge, 120 mm, TPDS-T: XM 832

Present Status

The end products of this project are the technology, procedures and manufacturing knowledge to make the manufacture of the 120mm Tank Gun Ammunition to Unites States production standards in American industrial facilities.

This is the second year of a multi-year project. The tasks which are to be accomplished during FY 80 in order of priority are:

Task	Subject
1	Develop Manufacturing Methods for Stick and JA-2 Propellant
2	Explosive Loading of 120mm HEAT-MP Projectile
9	Investigation of Forming and Heat Treatment
10	Precision Forming of Tail Fin
6	Molding of Rear Seal
3	Development of Assembly Process

Funding

Fiscal year	Funding ($K)
79	795.5
81	3988 (tentative)

4322 - MMT: Design/Criteria and System Characterization of Electronically Controlled Production Facilities (MPTS) ($K 502)

Characterization data and design criteria must be generated to define the effects of dormant degradation on the reliability and safety of industrial electronic systems, in use or being designed, for modern ammunition facilities. The required engineering data will reflect degradation and failure mechanisms in MMT pilot facilities and full scale production systems acquired under the Ammunition Production Base Program, and through contacts with industry and other Government sources. In addition, advanced technology components and sub-systems will be procured and evaluated to fill data gaps left by the study of existing systems. Complementary data will be acquired from the ammunition facility proveout and maintenance of laid-away facilities programs. These data will be used as the basis for designing future systems and retrofitting existing systems which cannot meet production lead-time schedules. Maintenance engineering data generated by the program will be incorporated in documents for those systems now under construction or being designed, and will serve as source data for improved maintenance of fielded systems.

Items Supported

The data generated will be invaluable to a broad range of current and projected electronic and electro/optic controlled production systems. Over 85% of all ammunition facilities planned for construction during FY 80 through 84 time frame will use the technology developed in this project.

Funding

Fiscal year	Funding ($K)
78	185
79	609

Items Supported

Examples of items being produced or scheduled for procurement are:

FASCAM Munitions
COMP B
Multi-Base Propellants
ICM Munitions
XM650/M549 RAP
TNT
Single Base Propellant
Tank Ammo (all types)
20 mm, 30 mm, and 40 mm Ammo
XM795, XM711 Conventional HE Projectiles
Solventless Propellant
5.56 mm and 7.62 mm Cartridges

Present Status

This is the last year of a three-year program. The source data and technology developed on this program are directed at non-operating environments on the class of industrial hardware used in electronic and electro-optic production control systems in the plant modernization program. Primary products are: (1) A technology base which assures that the manufacturing capability is not degraded by dormancy; (2) Documentation of design requirements and procedural guidelines which ensure readiness of present and future modernization projects; (3) A test program which can be conducted at existing Army facilities on hardware tht is not in use to enhance early development of technology; and (4) A base for adjusting and/or verifying current spare parts provisioning.

4266 - MMT: Manufacturing, Inspection and Test Equipment for Magnetic Power Supply (Fuze) ($K 345)

The improvement of the M456A1 HEAT cartridge includes changing the location of the power supply from the projectile nose to the PIBD fuze housing and changing it to a magnetic pulse, generating-type power supply which is unaffected by shock vibrations. The manufacturing, inspection, and test methods, and the technology required to produce the magnetic power supply will be developed during a two-year MMT program. This type of power supply, which is used in other munitions such as guided missiles (larger and withstanding relatively lower gravitational forces), has never been produced in the size and quantity required for artillery, tank, and mortar ammunition. The methods and technology developed will

accommodate full or partial automation as quantity and costs dictate. The MMT program will also be applicable to future generation HEAT ammunition such as 105 mm cartridge HEAT-MP-T XM815.

Items Supported

PIBD Fuze for HEAT Ammunition

Present Status

This is the first year of a two-year program. The GOCO hardware and equipment acquired under this project will provide for automated or semi-automated production of magnetic power supplies at a cycle rate of 10 seconds. Additional end products will be manufacturing, inspection and testing data, and a final report. This power supply can be used for other products, and incorporated in future designs. Its adaptable size and modular construction make it an "off-the-shelf" item for a multitude of applications. Ease in manufacturing, resulting from this effort, will increase its potential for future use.

Funding

Fiscal year	Funding ($K)
81	759 (tentative)

4084 - MMT: Opacity/Mass Emission Correlation (Pollution Abatement) ($K 111)

Given the proper development, there is a reasonable expectation that an available and inexpensive opacity monitor can be used to measure and record mass as well as opacity. What is needed is the correlation between opacity reading and the mass emission rate. With this correlation and an opacity monitor, AAP's will be well suited to meet the new EPA regulations.

Items Supported

Large Caliber Production.

Present Status

This is the last year of a two-year program. The end products of this project will be correlation charts developed on site at the AAP's which will convert opacity readings to mass emission rates. A report will be prepared and published. The major effort of this

project will, therefore, be evaluation and correlation of available equipment to monitor opacity and mass emissions.

Funding

Fiscal year	Funding ($K)
75	465
76	400
77	200
78	196
79	483

4189 - MMT: High Fragmentation Steel Production Process (MPTS) ($K 1048)

New and improved production processes and techniques will be examined and refined relative to the manufacture of high fragmentation steel projectile parts. General areas of study will include reduction of starting multi-weight via forge tooling designs, optimizing of machining techniques, determining necessity to spheroidize anneal forgings, refining of hot nosing process with follow-up stress relief of nosed bodies, examining various heat treatments, and determining of new fracture toughness test. All projectile metal parts will be processed to their finished state in order to evaluate all fabrication processes and inspectability with investigation of problems encountered and improvements made where possible. The 155mm XM795 will be the test vehicle for this work.

Items Supported

All large caliber ammunition from 120 mm to 8 in., with components manufactured from high fragmentation steel.

Present Status

This is the second year of a four-year program. The end products of this project are: (1) Improved, economical processes for manufacturing high-fragmentation steel parts which have generic application to 120 mm through 8-in. projectiles; (2) comprehensive data bank on processing high-fragmentation steel; (3) reliable, economical fracture-toughness test for incorporation into TDP's of high fragmentation-steel parts.

Funding

Fiscal year	Funding ($K)
79	533
81	1153 (tentative)

4498 - MMT: Develop Method for Consolidatio and Automated Assembly of Small Mines (LAPS) ($K 392)

A study will be made of the LAP procedures for each of the three mine systems (RAAM, GEMSS, GATOR) to determine the extent of automation for each operation. A technical review will be conducted after the study phase before the detail design. Prototype equipment will be developed, built, installed, and proved out at Iowa AAP.

Items Supported

RAAM M70 AT Mine Program
GEMSS Scatterable Mine System XM74 (AP) and XM75 (AT) Mines
GATOR CBU78; CBU84

Present Status

This is the last year of a three-year project. This project will provide technical data packages, LAP process procedures, automated inspections, and prototype equipment for LAP operations.

Funding

Fiscal year	Funding ($K)
78	325
79	572

6736 - MMT: Technical Readiness Accelerated through Computer Integrated Manufacturing (TRACIM) CAD/CIM (MPTS) ($K 315)

The development and implementation of a Computer Integrated Manufacturing (CIM) system involving interactive graphics and numerical control machine tools will significantly reduce the requirement for highly skilled manufacturing craftsmen. Also, a computer data bank, based on Group Technology techniques and maintained in a ready status, will provide management and engineers

immediate access to the very latest data required for a rapid build-up to maximum planned schedules.

Items Supported

155 mm family of artillery ammunition, 8-in. family of artillery ammunition, 105 mm tank round. This technology may be extended later to small arms and other artillery systems.

Present Status

This is the last year of a four-year program. A comprehensive CIM system will be developed and demonstrated on samples of ongoing metal parts and items in the planning stage. The system will be suitable for application to the entire spectrum of ammunition design and manufacture.

Funding

Fiscal year	Funding ($K)
76	400
78	100
79	256

6738 - MMT: Ultra High-Speed Metal Removal, Artillery Shell (MPTS) ($K 297)

Removal of metal at high rates of speed requires large quantities of equipment to accomplish a particular machining operation. The solution to this problem is to investigate another technique for high speed metal removal. Achieving increased metal removal, which will be investigated under this project, has been limited to plasma-arc-assisted machining which increases productivity significantly.

Items Supported

This project will support all artillery and mortar projectile metal parts.

Present Status

This is the last year of a two-year program. The end product will be the development of a manufacturing method and technology that can be used for machining steel at metal removal rates significantly higher than current rates and at reduced production costs.

Funding

Fiscal year	Funding ($K)
79	181

MMT WEAPONS PROGRAM

The main emphasis of the MMT weapons program is the modernization and upgrading of operations. The purpose is to reduce costs and improve product quality by taking advantage of advances in metal working technology.

Since most items produced at Watervliet Arsenal are complex and/or require close tolerances, the setup and movement time are important cost factors. While it is not economical or practical to develop an integrated material handling system for Watervliet, extensive savings can be realized through improvement of present methods.

Another major cost factor is the machining of items to final shape. Since the alloys used in weapons are expensive and difficult to work with, producing components close to final shape will reduce the cost and time required for finishing. Projects are also proposed to improve the metal removal process.

Improved metal working methods and increased use of computer-aided manufacturing are major production trends. The results of the projects in this area are expected to hold significant interest for other producers, in both government and private industry. These projects will also be important in modernizing and upgrading contractor facilities, many of which are seriously outdated.

MMT WEAPONS PROJECTS

ARRADCOM's FY 80 MMT weapons projects are itemized in table 2 and discussed below.

Table 2. FY 80 MMT weapons projects

Responsible LCWSL division	No.	Project	Cost ($K)
Benet Weapons Laboratory	7730	Manufacture of Split Ring Breech Seals, MPTS	453
	7920	Conservation of Critical Materials for Gun Tubes, MPTS	236
	7925	MMT: Bore Evacuator Boring, MPTS	111
	7926	MMT: Hot Isostatic Pressing (HIP) of Large Ordnance Components, MPTS	216
	7927	MMT: Generation of Base Machining Surfaces, MPTS	86
	7928	MMT: Robotized Benching Operations (CAM), MPTS	113
	8024	MMT: High Speed Abrasive Belt Grinding, MPTS	324
	8026	MMT: Application of Synthetic Quenchants to Gun Tubes and Heavy Weapon Components, MPTS	143
	8047	MMT: Pass Through Steady Rests for Tube Turning, MPTS	269
	8105	MMT: Establish Rough Thread Blanks, 8 in. M201 Bushing, MPTS	88
	8106	MMT: Large Caliber Powder Chamber Boring, MPTS	59
	8107	MMT: Creep Feed Crush Form Grinding, MPTS	348
	8208	MMT: Material Handling, MPTS	113
	8341	MMT: Hollow Cylinder Cut Off Machine, MPTS	69
	8342	MMT: Keyway Milling Machine, MPTS	242
	8057	MMT: Dual Rifling Broach Removal System, MPTS	215
	8059	MMT: Salvage of Cannon Components by Electrodeposition, MPTS	152
	8060	MMT: Improved Manufacturing Processes Related to Final Inspection of Cannon Tubes, MPTS	268

7730 - MMT: Manufacture of Split Ring Breech Seals (MPTS) ($K 453)

Automated and improved procedures will be adopted which will minimize hand finishing operations negate the need of highly skilled operators, and reduce cost. This project will perfect up-to-date automated machinery, tooling, and modern techniques to manufacture split rings to design specifications with little or no rejection. Split rings cannot be made in PEP lines at this time since the present procedures require highly skilled personnel. The proposed solution would resolve this problem.

Items Supported

Item	Weapons system
Cannon, 155 mm Howitzer: M185	Howitzer, Medium S.P., 155 mm: M109A1
Cannon, 175 mm GUN: M113E1	Gun, Field Artillery S.P., 175 mm: MWT
Cannon, 155mm Howitzer: M199	Howitzer, Medium Towed, 155 mm:
Cannon, 155mm Howitzer: M1A1	Howitzer, Medium Towed, 155 mm: M114, M114A1
Cannon, 8 in. Howitzer: M201	Howitzer, Heavy S.P., 8 in.: M110A1

Present Status

The end products will consist of new automated manufacturing equipment, tooling, and techniques to manufacture split rings at a reduced cost. In addition, designs of machinery, operating conditions, i.e., speeds, feeds, tooling and all the necessary information to implement the newly developed techniques will be compiled into a complete package.

Funding

Fiscal year	Funding ($K)
79	148

7920-MMT: Conservation of Critical Materials for Gun Tubes (MPTS) ($K 236)

The implementation of this project will reduce reliance on foreign sources for critical materials. This is especially important since it is predicted that the use of chromium for stainless

steel will increase in the future, while supplies decrease. Decreasing reliance on the critical alloys will ensure a steady supply of material for tubes, and decrease their cost. This project will generate the necessary processing modifications to allow the use of alloy steels with lower critical alloys.

Items Supported

Item	Weapons system
Cannon, 81 mm Mortar: M29A1	Mortar, Infantry, 81 mm: M29A1, W/E
Cannon, 90 mm Gun: M41	Tank, Combat F.T., 90 mm: M48, M48A3
Cannon, 105 mm Howitzer: M2A1-M2A2	Howitzer, Lt. Towed, 105 mm: M101, M101A1
Cannon, 105 mm Howitzer: M137-M137A1	Howitzer, Lt. Towed, 105 mm: M102
Cannon, 105 mm, Gun: M68	Tank, Combat F.T., 105 mm: M60, M60A1
Cannon, 105 mm, Howitzer: XM205	Howitzer, Lt. Towed, 105 mm: XM204
Cannon, 4.2 in. Mortar: M30	Mortar, 5.2 in.: M30, W/E (Cannon, M30/Mount M24 or M24A1
Cannon, 152 mm, Gun Launcher: M81E1	ARAAV
Cannon, 155 mm, Howitzer: M185	Howitzer, Med, S.P, 155 mm: M109A1
Cannon, 155 mm, Howitzer: M1-M1A1	Howitzer, Med Towed, 155 mm: M114, M114A1
Cannon, 155 mm, Howitzer: M199	Howitzer, Med Towed, 155 mm: M198
Cannon, 152 mm, Gun, Launcher: M162	Tank, Combat F.T., 152 mm Gun: M60A2
Cannon, 175 mm, Gun: M113-M113A1	Gun, Field Artillery S.P, 175 mm: M107
Cannon, 8 in. Howitzer: M2A2/M201	Howitzer, Heavy S.P., 8 in.: M110/M110A1
Rifle, Recoil, 90 mm: M67	Rifle, 90 mm: M67, W/E
Rifle, Recoil, 106 mm: M40A2, M40A4	Cannon, 106 mm, Rifle, Recoil: M206
Rifle, Recoil, 106 mm, M40A3, M40A5	Cannon, 106 mm, Rifle, Recoil, M206A1

Present Status

Processing parameters will be established which allow the use of alloy steels with less critical alloying material.

7925 - MMT: Bore Evacuator Boring (MPTS) ($K 111)

A special purpose machine and tooling package providing a head for each end of the evacuator chamber will be developed to produce both bores simultaneously. If both surfaces were produced from the same setup, orientation of the centerlines would be automatically assured. A form mill similar to a hob is envisioned as the tooling so that, when the bore diameter is complete, all other features of the bore will meet their dimensional requirements.

Items Supported

Item	Weapons system
Cannon, 105 mm Gun: M68	Tank, Combat F.T., 105 mm Gun: M60 and M60A1
Cannon, 155mm, Howitzer: M185	Howitzer, Med S.P., 155 mm: M109A1

Present Status

The end product of this project will be the design, testing, and procurement of a special purpose machine for the 105mm, M68 bore evacuator and a machine capable of accepting tooling for all in-line bore chambers.

Funding

Fiscal year	Funding ($K)
81	248 (tentative)

7926 - MMT: Hot Isostatic Pressing (HIP) of Large Ordnance Components (MPTS) ($K 216)

By using HIP, it is possible to fabricate breech blocks closer to the final shape than the currently used forging. This method has been in use since the 1950's, but for many years the equipment required discouraged production use of the process. Improvements in pressure vessel and furnace design have now brought the HIP process to a very practical production process.

Items Supported

Item	Weapons system
Cannon, 8 in. Howitzer: M201	Howitzer, Hy S.P., 8 in.: M110A1
Cannon, 175mm, Gun: M113	Gun, F.A., S.P., 175mm: M107
Cannon, 8 in. Howitzer: M2A2	Howitzer, Hy, S.P., 8 in.: M110

Present Status

The end products of this effort will be a complete production technique capable of producing a step thread type breech block using the HIP process and a technical report.

7927 - MMT: Generation of Base Machining Surfaces (MPTS) ($K 86)

A procedure will be developed to combine a setup technique with an efficient machining process for rough forgings and castings. The new process will replace the present method of setting up and laying out the work in one area, then performing an equivalent setup on a machine and the conventional machining of working surfaces to layout lines in another area. Preset optical comparator layouts and/or preset height gaging will be employed to set up the first cuts directly on the machine on a one time basis. On evaluation of these processes, the advantages will be adopted and the necessary fixtures and tools purchased and applied to the 105mm M68 breech ring production line.

Items Supported

Item	Weapons system
Cannon, 175mm, Gun: M113A1	Gun, Field Artillery, S.P., 175 mm, M107
Cannon, 8 in. Howitzer: M201	Howitzer, Heavy S.P.: M110E2
Cannon 155mm Howitzer: M185	Howitzer, Med, S.P., 155 mm: M109A1
Cannon, 105mm, Gun: M68	Tank, Combat, F.T., 105 mm, Gun: M60 and M60A1

Present Status

The primary end product will be equipment capable of generating first cut surfaces. In addition, a formal technical report

showing complete economic and technical results will be written and circulated to responsible manufacturing operating personnel.

Funding

Fiscal year	Funding ($K)
81	137 (tentative)

7928 - MMT: Robotized Benching Operations (CAM) (MPTS) ($K 113)

In benching operations, breech rings and breech blocks in particular, an industrial robot will be used in manufacturing operations that are too hazardous, boring, or uneconomical for humans. With a robot in control, the hazardous aspect of benching operations will be eliminated and metal grinding time will be reduced to 50% or less. The effort will draw upon experience gained within the Government as well as in private industry. The first year's effort of pre-engineering associated with various manufacturing applications will determine the areas of potential robot use and the type(s) of equipment necessary. Specifications will be drawn up accordingly. Detailed in-house and out-of-house studies will be performed to aid in application and equipment selection. Subsequently, material acquisition and installation will be implemented. Material acquisition and installation will follow the first year's pre-engineering associated with various manufacturing applications and equipment selection.

Items Supported: The following items are examples of the types of items supported:

Item	Weapons system
Cannon, 105 mm Howitzer: M2A1-M2A2	Howitzer, Lt Towed, 105 mm: M101, M101A1
Cannon, 105 mm Howitzer: M137 M137A1	Howitzer, Lt Towed, 105 mm: M102
Canon, 105 mm Gun: M68	Tank, Combat F.T., 105 mm: M60, M60A1
Cannon, 90 mm Gun: M41	Tank, Combat F.T., 90 mm: M48, M48A3
Cannon, 105 mm Howitzer: M205	Howitzer, Lt Towed, 105 mm: M204
Cannon, 152 mm Gun Launcher: M81E1	ARAAV: M551
Cannon, 155 mm Howitzer: M185	Howitzer, Med S.P., 155 mm: M109A1

Item	Weapons system
Cannon, 155 mm Howitzer: M1, M1A1	Howitzer,Med Towed, 155 mm: M114, M114A1
Cannon, 155 mm Howitzer: M199	Howitzer Med Towed, 155 mm M198

Present Status

The end product will be an industrial robot capable of performing hazardous benching operations in a minimum amount of time. A second robot will be considered to perform the mundane, error prone task of bore inspection. In both cases, "movements" will be programmed and stored for immediate retrieval, implementing the use of the robots on the production lines. Trained operators will oversee the various operations. A final technical report will be written.

Funding

Fiscal year	Funding ($K)
81	287 (tentative)

8024 - MMT: High Speed Abrasive Belt Grinding (MPTS) ($K 324)

This two-year funding effort will be used to introduce a new machining technology to the Arsenal. Abrasive belt sanding has, over many years, been used to polish cylindrical pieces in lathe setups or in hand applied machines; belts were used to polish various shapes and forms. Recent advancements in belt grits and bonds have improved belts, and machines have been designed so that abrasive belt use has developed from polishing into an abrasive metal removal process. FY 80 funding will be used to procure the equipment required to apply this technology to canon components.

Items Supported

Item	Weapons system
Cannon, 105 mm, Gun: M68	Tank, Combat, F.T., 105 mm Gun: M60 and M60A1
Cannon, 155 mm, Howitzer: M185	Howitzer, Med S.P., 155 mm M109A1
Cannon, 8 in. Howitzer: M201	Howitzer, Heavy S.P., 8 in.: M110A1

Present Status

The end product of this program will be a new machine with a capacity to drive a wide abrasive belt for metal removal on gun tube hoop zones. A final report will be written.

8026 - MMT: Application of Synthetic Quenchants to Gun Tubes and Heavy Weapon Components (MPTS) ($K 143)

Quenching mediums for large alloy steel components consist primarily of water and oil. Often these quenchants are not satisfactory from either the thermal phenomena or the safety standpoint. As a result, problems such as incomplete transformation, cracking, distortion, residual stress, occasional fires, and noxious fumes frequently occur. Current manufacturing technology has not significantly alleviated this problem.

Recently, polymeric materials have become available that are water soluble and favorably influence the heat transfer properties of the quenching medium. These additions alter the quench power of the bath and allow the heat treater to obtain a range of cooling rates while eliminating the hazards associated with oil quenching.

Items Supported

Item	Weapons system
Cannon, 105 mm Gun: M68	Tank, F.T., 105 mm Gun: M60
Cannon, 155 mm Gun: M1A1	Howitzer, Med Towed, 155 mm: M114A1
Mortar, 4.2 in.: M30	Mortar, 4.2 in.: M30

Present Status: The end product of this project will be a comprehensive technique to quench components, generally requiring oil, in water based synthetic quenchants. Prototype parts will be available for testing and service.

8047 - MMT: Pass Through Steady Rests for Tube Turning (MPTS) ($K 269)

Machining of cannon tubes exerts a transverse force greater than the full length tube can withstand. Dimensional and surface finish requirements are impossible to obtain when the tube is unsupported at its longitudinal center. A roller steady rest currently provides the required support, but it also becomes an

obstacle to turning the full length of the tube in one setup. Currently, in order to turn gun tubes, either the lathe must have two carriages or two separate lathes must be provided and the tube moved from machine to machine. There is no supplier of this type of equipment.

A pass through rest is needed which will allow the carriage to move from one supported area of the tube to the other without disturbing the setup. The design will be applicable to currently available equipment, but will have even greater impact on new equipment aquisitions.

In FY 80, a complete investigation of tube turning problems will be reviewed to determine anticipated loads and pressures that will be encountered in tube support. Depending on the outcome of this investigation, an in-house design or a specification for a rest attachment will be prepared.

Items Supported

Item	Weapons system
Cannon, 155 mm, Howitzer: M199	Howitzer, Med Towed, 105 mm: M198
Cannon, 105 mm, Gun: M68	Tank, Combat F.T., 105 mm Gun: M60 and M60A1
Cannon, 155 mm Howitzer: M185	Howitzer, Med S.P., 155 mm: M109A1
Cannon, 175mm Gun: M113	Gun, Field Artillery, S.P., 175 mm: M107
Cannon, 8 in. Howitzer: M201	Howitzer, Heavy S.P., 8 in.: M110A1

Present Status

The end product of this project will be the design and fabrication of a universal design of a pass-through rest. This unit will be adaptable to a wide variety of in-place equipment and will be specified so that it can be included in new equipment acquisitions. The equipment obtained as a result of this project will be installed on a production machine.

Funding

Fiscal year	Funding ($K)
78	80

8105 - MMT: Establish Rough Thread Blanks, 8 in. M201 Bushing (MPTS) ($K 88)

Single point slotting tools are currently being used to produce the configuration of the 8 in. M201 bushing step thread blanks. The steps are produced on an inside diameter and are somewhat inaccessible. The cubic volume of metal to be removed is high and the configuration is intricate so we require a new process that will remove the material at an accelerated rate. The mating component also has the same configuration but, because the threads are on the outside diameter, they are more accessible. Again, the metal volume to be removed is high. A machining process is needed to reduce machining time for both of these components.

There are a number of possible solutions to this problem. Some are applicable to both commponents, while others are limited to one or the other component. On first glance, multiple slotting tools, an extension of the present method, would increase productivity. Alternate solutions include EDM traveling wire, ECM blanking, and a combination of milling and multiple slotting.

Items supported:

Item	Weapons system
Cannon, 8 in. Howitzer: M201	Howitzer, Heavy S.P., 8 in.: M110A1
Cannon, 175 mm Gun: M113	Gun, Field Artillery, S.P., 175 mm: M107

Present Status

The end products of this project will be a special purpose machine dedicated to preparation of step thread blanks, a selection of the most advantageous approaches to the problem and execution of that selection in the form of equipment acquisition.

Funding

Fiscal year	Funding ($K)
81	307 (tentative)

8106 - MMT: Large Caliber Powder Chamber Boring (MPTS) ($K 59)

Powder chamber contours are currently bored with a single point tool attached to one end of a bar, while the other end is

supported by the machine carriage. Chamber depths are often 3 feet. Tool pressure deflects the bar, reducing the accuracy of the boring operation and making it necessary to semifinish grinding the contour.

Application of a balance tool system will eliminate the deflection problem, thereby improving the accuracy of the bored hole, making the rough grinding operation unnecessary. An added benefit is that two tools will penetrate the workpiece faster and reduce boring operation time.

The thrust of this project will be the development of an hydraulically powered cutting tool system. The system will be unique in that, in current contour boring systems, the contour is developed by cross movement of the machine carriage while, in the system to be developed, the bar must be centered and the tools moved equally, but independently, from the bar to produce the contour. Since this is a major deviation from known systems, a reasonable amount of development work will be required.

Items Supported

Item	Weapons system
Cannon, 155 mm Howitzer: M185	Howitzer, Med, S.P., 155 mm: M109A1
Cannon, 155 mm Howitzer: M199	Howitzer, Med, Towed, 155 mm: M198
Cannon, 8 in. Howitzer: M201	Howitzer, Heavy, S.P., 8 in.: M110A1

Present Status

This is the first year of a three-year program. The end product of the FY 80 effort will be a systems design of a hydraulically controlled boring technique adaptable to current powder chamber boring equipment.

Funding

Fiscal year	Funding ($K)
81	159 (tentative)

8107 - MMT: Creep Feed Crush Form Grinding (MPTS) ($K 348)

Despite recent adaption of NC machining centers, the cost of producing certain intricate straight forms on components remains a

bottleneck operation. The availability of these machining centers is limited and most are working at near maximum capacity. Conventional grinding operations have a different limitation in their metal removal capacity when applied to intricate configuration development.

An FY 79 program successfully demonstrated the adaptability of creep feed grinding and a machine specification will be prepared. Equipment acquisition is now necessary. Two areas of application have been verified as candidates for creep feed crush form grinding: the bracket slot on the 105 mm M68 breechblock and the rack teeth on the 152 mm M162 coupling. In FY 79, a specification for a creep grinder was also prepared. To aid in the prove-out, the tooling package will also be specified.

The work to be performed with FY 80 funding will be to buy the equipment specified. The funding will also support installation and initial testing of the equipment.

Items Supported

Item	Weapons system
Cannon, 105 mm Gun: M68	Tank, Combat, F.T., 105 mm Gun M60
Cannon, 152 mm Gun: M162	Tank, Combat, F.T., 152 mm Gun M60A2

Present Status

The end product of the FY 80 project will be a creep feed crush form grinding machine tooled for the production of at least one component.

Funding

Fiscal year	Funding ($K)
79	82
81	73 (tentative)

8208 - MMT: Material Handling (MPTS) ($K 113)

The movement of large gun tubes 12 in. in diameter, 20 feet long, weighing 2 to 4 tons, through the shops as well as positioning the pieces in machines for metal removal presents a materials handling problem. Presently, gun tubes are handled primarily

through large rail-mounted overhead cranes. The cranes provide longitudinal in-bay movement, but not cross-bay movement, and require costly and time consuming manpower to rope and position pieces in the machines and on the floor.

Positioning equipment (such as Heppenstall tongs), will be evaluated and side-mounted fork lights, monorail cross-bay transfers with floor controls, and other material moving equipment will be checked for application to the unique problems and material mix (breech rings, breech blocks, and small as well as large components) peculiar to large tubes.

Items Supported

Item	Weapons system
Cannon, 105 mm, Howitzer: M2A1-M2A2	Howitzer, Lt Towed, 105 mm: M101, M101A1
Cannon, 105 mm Howitzer: M137, M137A1	Howitzer, Lt Towed, 105 mm: M101
Cannon, 105 mm Gun: M68	Tank, Combat, F.T., 105 mm: M60
Cannon, 90 mm Gun: M41	Tank, Combat, F.T., 90 mm: M58, M48A3
Cannon, 105 mm Howitzer: XM205	Howitzer, Lt Towed, 105 mm: XM205
Cannon, 152 mm Gun Launcher: M81E1	ARAAV: M551
Cannon, 155 mm Howitzer: M185	Howitzer, Med S.P., 155 mm: M109A1
Cannon, 155 mm Howitzer: M1, M1A1	Howitzer, Med Towed, 15 mm: M109A1
Cannon, 155 mm Howitzer: M199	Howitzer, Med Towed, 155 mm: M198
Cannon, 81 Mortar: M29A1	Mortar, Infantry, 81 mm: M29A1 W/E (Cannon: M29A1/ Mount: M23A1/Baseplate: M3
Cannon, 4.2 in. Mortar: M30	Mortar, 4.2 in.: M30, W/E (Cannon: M30/Mount: M24 or M24A1)
Rifle, Recoil, 90 mm: M67	Rifle, 90 mm: M67, W/E
Rifle, Recoil, 106mm: M40A2, M40A4	Cannon, 106 mm Rifle, Recoil: M206
Rifle, Recoil, 106mm: M40A3, M40A5	Cannon, 106 mm Rifle, Recoil: M206A1

Present Status

Recommendations will be made for the purchase of specific types of equipment for specific manufacturing areas and a technical report will be written.

8341 - MMT: Hollow Cylinder Cutoff Machine (MPTS) ($K 69)

Establishing the length of an item is accomplished in one of two ways: It is either parted off in a lathe and faced to length or it is rough sawed and set up in a lathe for facing to finish length dimension. In either case, the operation requires double measuring, double handling, and slow operating procedures. A new approach is required that will establish exact length, produce an acceptable finish, and eliminate redundant operations.

A new technology is being developed whereby a set of rotating cutters mills the cylinder to exact length, leaving a surface finish within that specified for cannon requirements. Currently available machines will not accommodate the forgings, but the technology is applicable.

The objective of this program is to develop a machine that will adjust tube position to establish overall component length and apply modern cutoff techniques to improve production efficiency.

Items Supported

Item	Weapons system
Cannon, 105 mm Howitzer: M2A2	Howitzer, Light Towed, 105 mm: M101 and M101A1
Cannon, 105 mm Gun: M68	Tank, Combat, F.T., 105 mm Gun: M60A1
Cannon, 155 mm Howitzer: M185	Howitzer, Med S.P., 155 mm: M109A1
Cannon, 155 mm Howitzer: M199	Howitzer, Med Towed, 155 mm: M198

Present Status

The end product of this project will be a tube cut-off machine that will combine a length control capability with an efficient cutoff technique to replace sawing procedures.

Funding

Fiscal year	Funding ($K)
81	164 (tentative)

8342 - MMT: Keyway Milling Machine (MPTS) ($K 242)

The 155 mm M185 gun tube requires 3 keyways be milled on centerline to close location and tolerances. Currently, these keyways are milled in three different machines requiring three material moves, three machine sites and three setups. Material handling, floor space, and operational time are all critical commodities in production areas.

A special purpose keyway milling machine will be developed to hold the tube on location while all three keyways are milled simultaneously. This would assure accuracy of all keyways to the proper centerline location and eliminate moving the tube from machine to machine, reduce operational time, and save floor space. Floor space savings would accrue from the reduction of required machines and from a reduction in tube storage while tubes are awaiting various operations.

This is a one-year funded effort. A single purpose milling machine, composed mainly of building block modules, will be designed and constructed. The machine will be equipped to automatically locate the cylindrical gun tube to the correct centerline position and to the non-symmetrical features of thread location. Approximately 50% of the funding will be used for material acquisition, and the remaining 50% will be used to support in-house fabrication and assembly.

Items Supported

Item	Weapons system
Cannon, 155 mm Howitzer: M185	Howitzer, Med S.P., 155 mm

Present Status

The end product of this project will be a special purpose milling machine. The design will consider automatic self-alignment of keyway positions so that, while the machine will be designed basically for the 155 mm tube: M185, it will also have the capablity of producing keyways on centerline location on any size tube within the confines of the base design.

8057 - MMT: Dual Rifling Broach Removal System (MPTS) ($K 215)

Removing the broaches automatically and concurrently after complete penetration through the bore will reduce operational time, the operator's contact time with the cutter, and fatigue, thereby reducing the safety hazard.

A rifling machine that produces two gun tubes simultaneously will be equipped with an automatic broach removal device. While broach removal systems are not entirely new, the systems currently available infringe on the space used by the second tube in the dual rifling system. The work effort then is to design and construct a removal system that will be compatible with the dual rifler. FY 80 funding will be used to design the equipment necessary to interface with existing production equipment and to build, install, and test the equipment.

Items Supported

Item	Weapons system
Cannon, 105 mm Gun: M68	Tank, Combat F.T., 105 mm M60 and M60A1

Present Status

The end product will be a production-worthy dual broach removal system that will also serve as a model for REARM specifications which identify dual rifling as a future machine requirement. A final report describing the operation and maintenance of the system will be prepared.

8059 - MMT: Salvage of Cannon Components by Electrodeposition (MPTS) ($K 152)

Some components and full gun tubes have been rejected and condemned due to excess stock removal or mismachining. Many of these items could be restored to an acceptable condition if a metal deposition system could be designed to salvage these components.

A process which deposits additional metal to specific areas to compensate for excess stock removal would resolve the problem. The system would use plating solutions such as nickel or iron or, possibly, chromium. The deposition would be accomplished by immersing of the component in the plating solution by use of a selective or brush plating system or, for internal areas, a pump through system.

The proposed investigation will involve evaluating the component, the area of excess stock removal, and the function of the component. The selection of the method of metal deposition will follow with importance placed on the adaptability by operations personnel.

Items Supported

Item	Weapons system
Cannon, 105 mm Gun: M68	Tank, Combat, F.T., 105 mm Gun: M48A4, M48A5, and M48A6
Cannon, 105 mm Howitzer: M137/M137A1	Howitzer, Lt Towed, 105 mm: M102
Cannon, 105 mm Howitzer: M2A2	
Cannon, 152 mm Gun Launcher: M162	Tank, Combat, F.T., 152 mm Gun: M60A2
Cannon, 155 mm Howitzer: M1A1	Howitzer, Med Towed, 155 mm: M114A1
Cannon, 155 mm Howitzer: M185	Howitzer, Med S.P., 155 mm: M109A1, M109A1B
Cannon, 155 mm Howitzer: M199	Howitzer, Med Towed, 155 mm: M198
Cannon, 175 mm Gun: M113	Gun, F.A. S.P., 175 mm: M107
Cannon, 8 in. Howitzer: M2A2	Howitzer, Heavy S.P., 8 in.: M110
Cannon, 8 in. Howitzer: M201	Howitzer, Heavy S.P., 8 in.: M110A1

Present Status

End products from project:

1. Test Data and Systems Design

2. Prototype Processing Equipment

3. Plans for Implementing the Equipment into the Production Line

4. Operating Instructions

5. Final Report

The end product will be a metal deposition system capable of restoring components to an acceptable condition.

8060 - MMT: Improved Manufacturng Processes Related to Final Inspection of Cannon Tubes (MPTS) ($K 268)

An in-depth analysis will be undertaken to incorporate the latest materials handling technology to fully mechanize the final inspection line. In addition, new technology will be employed to improve the cleaning and magnetizing processes. Procurement action will be undertaken to acquire the equipment. This equipment will be installed, fixtured and tested. Production data will be gathered and evaluated. Improvements in the inspection process will be made.

Items Supported

Item	Weapons system
Cannon, 155 mm Howitzer: M185	Howitzer, Med S.P., 155 mm: M109A1
Cannon, 105 mm Gun: M68	Tank, Combat F.T.: M60A1
Cannon, 120 mm Gun	Tank, Combat: XM1

Present Status

The end product will consist of new mechanized manufacturing equipment for magnetizing gun tubes, a new cleaning unit and a fully engineered system for loading and unloading gun tubes through the various inspection operations.

APPENDIX A

FORMAT FOR SEMI-ANNUAL REPORT

FORMAT FOR

SEMI-ANNUAL REPORTING

MANUFACTURING TECHNOLOGY (MANTECH) PROGRAM
PROJECT STATUS REPORT (RCS DRCMT-301)

USA ARMAMENT RESEARCH & DEVELOPMENT COMMAND
DOVER, NJ 07801

(If final report, so state here) Report Date:

1. Project Number. Insert the DARCOM seven digit project number. Also include in parentheses the four digit budget code from AR 37-100. (For multi year funded projects, list budget codes as shown in the example.)

2. Project Title. Enter the title of the project exactly as stated on the approved P-16 format.

3. Period Covered. Insert the dates of the period covered by the report. (See body of report for dates.)

4. Location of Work. List the name and address of the Government installation and contractor facility where the work is being accomplished.

5. Project Officer. Insert the name and telephone number (AUTOVON) of the individual responsible for technical supervision of the project.

6. Funding Status. a. Insert the total funds authorized and the date funds were made available to the action command.

b. Insert a cost breakout in the format below.

(1) In-House Effort	FYXX Obligation	FYXX Expenditure
Labor		
Materials		

(2) Other Government Agencies (OGA)

(3) Contractor	Contract No.	Date of Award	Contract Value	Expenditure
(4) GOCO				

(List by contractor for each contract let. Include contract number. If a contract is still to be let, enter "Contract to be let," estimate the contract value, and leave the remaining two columns blank.)

7. Milestone Chart. Include the Exhibit P-16 milestone chart that delineates the time phases and the major events of the project. This chart will be updated as necessary with each status report. Current position on the milestone chart will be noted. Slippage will be measured in terms of the original chart. Enter the fiscal year of funding for each milestone.

8. Item(s) Supported. (Use only applicable subparagraphs)

a. Major End Items:	List all families of items that will benefit from successful completion of the project.
b. Components Supported:	List individual components of the mission item that this effort directly supports.
c. Facilities Supported:	For MMT in support of modernization of facilities give the name of the facility and the technical area(s) supported. Identify facilities as GOGO, GOCO, COCO.
d. Technical Area(s) Supported:	For MMT projects, list the particular manufacturing processes, techniques, or methods that this project is addressing.

e. Requirement Supported: Identify for MACI projects only, the requirement being addressed using the CARDS reference number and a brief summary sentence of the approved requirement.

9. Task. Identify the task. State why a solution is necessary.

10. Project Objective. Identify the major and minor objectives of the effort (not end products).

11. Work Accomplished. Insert a brief technical discussion of the work accomplished during the reporting period or, if this is a final report, a summary of the technical work accomplished. Highlight the technical achievements of this effort; include principal features, capabilities, and specifications. Include photographs and illustrations suitable for reproduction. Group by fiscal year of funding.

12. Benefits. This item needs to be completed only in the final status report. ie; in the event of a multi year funded project, fill this item in only for the last fiscal year to be completed.

a. Discuss the benefits derived from this project and explain their value to the Army.

b. Identify all areas for application of project results.

c. Include proven cost reductions.

d. Indicate whether or not patent rights are involved.

13. Implementation Procedures. This item needs to be completed only in the final status report. Provide a detailed description of the action that will be, or has been, taken by the organization to implement the results of this project. ie - same as above

14. Remarks. This space is for entering all other information deemed pertinent by the project engineer. Describe any problems encountered in this section. Include any milestone slippages with reasons for slippage and length of slippage.

ARRADCOM Project Officer

APPENDIX B

FORMAT CHARTS FOR SEMI-ANNUAL BRIEFING

CHART 1 — KEY PROJECT INFORMATION

DATE:

CODE:

CATEGORY: FUNCTIONAL—
TECHNOLOGY—

MMT PROJECT:

PROJECT TITLE:

INITIATION DATE:

COMPLETION DATE:

PROJECT OFFICER:

PROJECT ENGINEER:

DESCRIPTION:

BENEFITS:

IMPLEMENTATION:

FACILITY PROJECTS SUPPORTED:

MAJOR ITEMS SUPPORTED:

CODE:

MILESTONE SCHEDULES

MMT PROJECT:

DATE:

PROJECT TITLE:

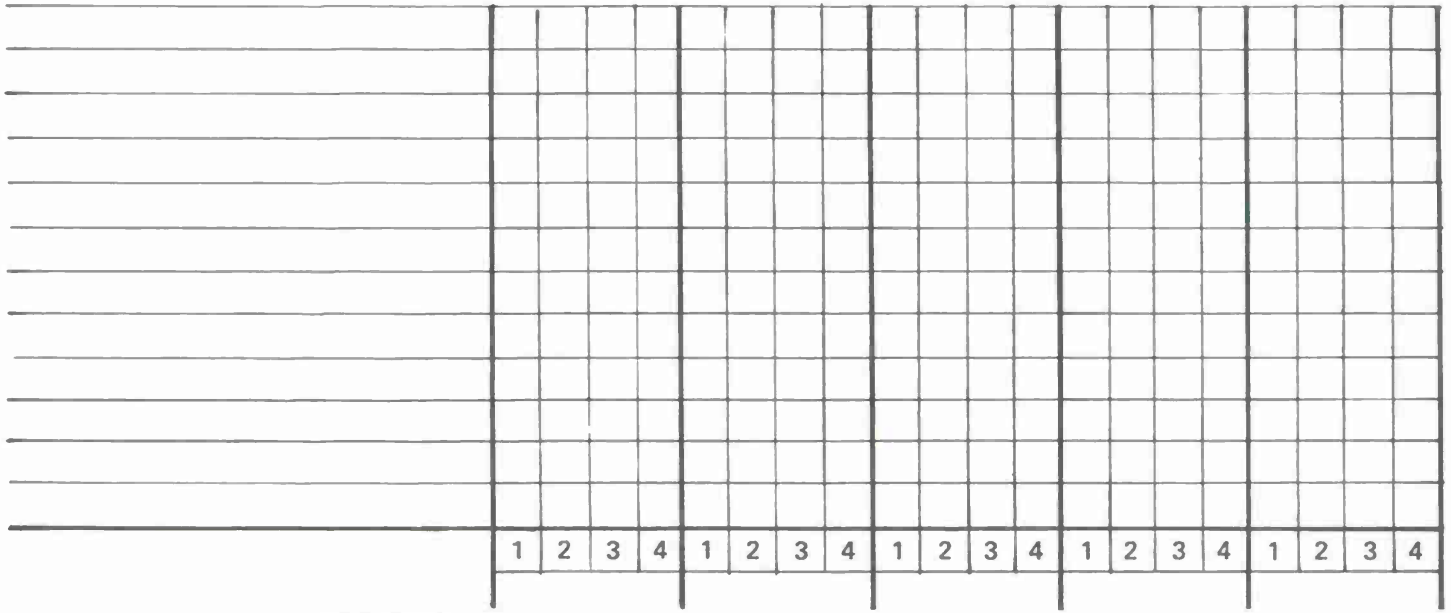
% PHYSICAL COMPLETION

% FORECAST
% ACTUAL

▽ ORIGINAL MILESTONE

▼ MILESTONE ACCOMPLISHED

▽1 REVISED MILESTONE (REVISION NO.)



EXPENDITURES: FORECAST
ACTUAL

LOCATION CODE: ( )	UNITS: $ THOUSANDS	FY	PROG	EXPEND	BAL	IN-HOUSE EFFORT MAN YEARS
I = IN-HOUSE C = CONTRACTOR A = GOGO G = GOCO						

CHART 2

CODE:

FINANCIAL STATUS

MMT PROJECT:

DATE:

PROJECT TITLE:

KEY:
EXPEND
OBLIG
UNOBLIG

UNITS: $ MILLIONS

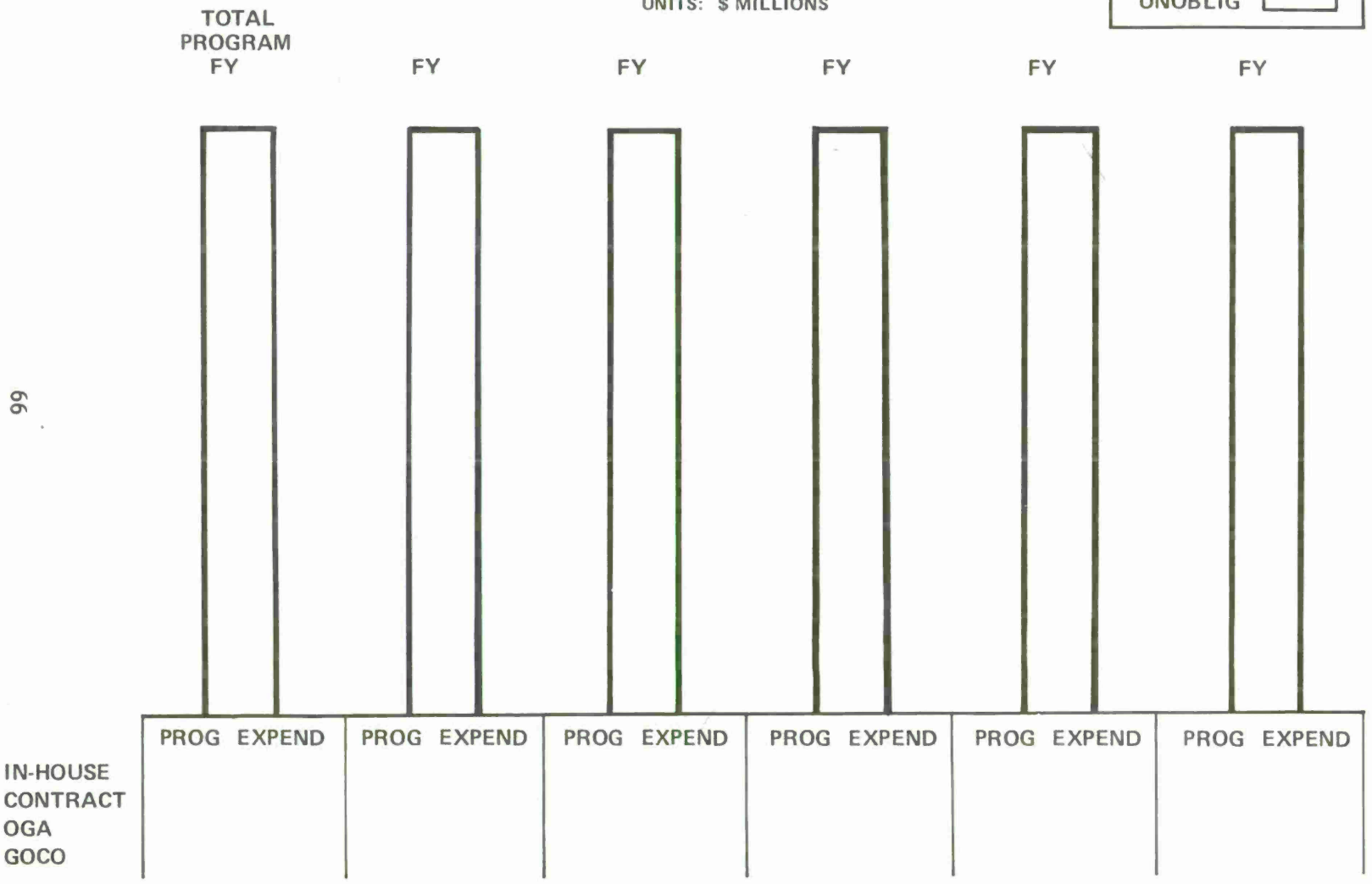


CHART 3

PROJECT SUMMARY

MMT PROJECT:

CODE: DATE:

PROJECT TITLE: _____

ACCOMPLISHMENTS:

PROBLEM AREAS:

RECOMMENDATIONS/ACTIONS:

ACTION RESPONSIBILITY:

CHART 4

APPENDIX C

COMPUTER PROGRAM

FY75 IN MILLIONS OF DOLLARS

PN	PROJECT TITLE	ENGINEER	EXT	DIV	START	IN H	GOCO	CONT	OGA
1264	ADVTECHFORSUPPRESSIVESHIELDINGOFHAZARDOUSPRODSUPOP	JRMARSICOVETE	3906	ESPD	19AUG75	0.000	0.000	0.000	0.000
TOTAL =	0. TECH AREA IS SAFETY								
4000	AUTOMATEDMSSDETONATORPRODUCTIONEQUIPMENT	PMONTELEONE	5389	ESPD	NOV72	.100	0.000	0.000	0.000
TOTAL =	.100 TECH AREA IS LAP								
4009	AUTOMATIONOFEQUIPFORA/POFSMALLSHAPEDCHGROCKETS	DHUBBARD	5609	ESPD	23AUG73	.260	.006	.384	0.000
TOTAL =	.650 TECH AREA IS LAP								
4012	ESTABOFPROTOTYPEOFCONTFINALROLLMILL+PADMAKEUPMACH	EPHUSELTON	4243	ESPD	AUG72	.093	.597	0.000	.009
TOTAL =	.699 TECH AREA IS PROP+EXP								
4013	CONTINUOUSNITROCELLULOSEBYMAGNESIUMNITRATEPROCESS	CWLEWIS	3637	ESPD	AUG71	.110	.003	0.000	0.000
TOTAL =	.113 TECH AREA IS PROP+EXP								
4015	ESTABOFPROTOSYSTFORCONTPROCOFBENITE	EPHUSELTON	3814	ESPD	AUG71	.082	.108	0.000	0.000
TOTAL =	.190 TECH AREA IS PROP+EXP								
4032	AUTOMATEDEQUIPMENT(M739FUZE)	RDEBARI	5468	NFD	JAN75	0.000	0.000	.750	0.000
TOTAL =	.750 TECH AREA IS FUZE								
4041	AUTOMATEDEQUIPMENTFORMOTARCOMPONENTS	DANDERSON	6279	ESPD	21SEPT71	.228	0.000	.199	0.000
TOTAL =	.427 TECH AREA IS LAP								
4050	AUTOMATEDLOADINGOFPROPELLANTFLASHREDUCERS	DSDAVIS	3122	ESPD	SEPT73	.219	.135	.713	0.000
TOTAL =	1.07 TECH AREA IS LAP								
4073	PHOTOFLASHCOMPSDESENSITIZEDBYCOATANTS	BWERBEL	3961	ESPD	SEPT73	.150	0.000	0.000	0.000
TOTAL =	.150 TECH AREA IS SAFETY								
4105	AUTOINCRLDG+ASSYOFPROPCHGSW/CENICOREIGN	CJCARNALI	4162	ESPD	SEPT72	.071	.025	.429	0.000
TOTAL =	.525 TECH AREA IS LAP								
4114	POLUTIONABATEMENTMETHODSFORP+E	IFORSTEN	2138	ESPD	27DEC68	.612	.078	.271	.004
TOTAL =	.365 TECH AREA IS POLLUTION								
4165	PROTOTYPEFACFORRECOVERYOFHMXFRRDX/HMXADMIXTURES	HRICCI	2160	ESPD	19AUG70	.015	0.000	.450	0.000
TOTAL =	.465 TECH AREA IS PROP+EXP								
4201	SAFETYENGRINSUPPORTOFAMMOPLANTS	JRMARSICOVETE	3906	ESPD	FY71	.213	.149	.353	.285
TOTAL =	1.00 TECH AREA IS SAFETY								
4202	PROTOEQUIPCONTAUTOPRODOFSOLVENTTYPEMULTIBASEDNPROP	LPLEMPICKI	3637	ESPD	DEC70	.070	.272	0.000	0.000
TOTAL =	.342 TECH AREA IS PROP+EXP								
4240	INVESTIGATIONOFLOADINGAMATEX20	PSKERCHOCK	4252	ESPD	FY74	2.230	.487	.161	.372
TOTAL =	3.27 TECH AREA IS PROP+EXP								
4249	SEPOFFINEEXPLFROSPENTACID+/ORWATERSLURRIES	SDOLLMAN	3717	ESPD	SEPT73	.025	0.000	0.000	0.000
TOTAL =	.250E-01 TECH AREA IS PROP+EXP								
4252	IMPROVEPRESENTPROCFORMFGOFRDX+HMX	SDOLLMAN	3717	ESPD	SEPT73	.014	.171	.331	0.000
TOTAL =	.916 TECH AREA IS PROP+EXP								
4263	AUTOPILOTLINEF/CONTCOOL+PROCHELOGPROJ	CJANDERSON	3162	ESPD	19NOV73	.765	0.000	.570	.025
TOTAL =	1.30 TECH AREA IS LAP								
4267	CONTPROCESSFORGRANULARCOMPB	LSOTSKY	2161	ESPD	OCT74	.040	.043	0.000	0.000

TOTAL = .800E-01 TECH AREA IS PROP+EXP								
4271 IMPOPROCFORPOLISHORY+GLAZINGOFBLACKPOWDER	BDSTRAUSS	3014 ESPD	90CT74	.019	.140	0.000	0.000	
TOTAL = .159 TECH AREA IS PROP+EXP								
4277 NEWDAONPROCFORHMXMFG	SDOLLMAN	3717 ESPD	JUN75	.063	.003	.351	0.000	
TOTAL = .417 TECH AREA IS PROP+EXP								
4281 METHODSFORCONSERVATIONOFENERGYATARMYAMMOPLANTS	JMSWOTINSKY	3998 ESPD	22SEPT75	0.000	0.000	.191	0.000	
TOTAL = .191 TECH AREA IS ENERGY								
4310 DMSORECRYSTALLIZATIONOFHMX/RDX	MRICCI	2160 ESPD	FEB75	.170	.285	0.000	.010	
TOTAL = .465 TECH AREA IS PROP+EXP								
6211 SINTEREDSTEELPREFORMFORHORKINTOFRAGTYPESHELLBODIES	JWBURLINGAME	2596 M+MTD	SEPT73	.165	.002	0.000	.055	
TOTAL = .222 TECH AREA IS MPTS								
6329 AUTONDTFORSOUNDNESSOFMATLFORFRES+FUTGENARTPROJS	KIYER	3679 MSD	OCT74	.085	0.000	0.000	0.000	
TOTAL = .850E-01 TECH AREA IS MPTS								
6472 APPLOFALTPROCFORFABOFPREGISIGNPINIONSUSEDINMTFUZES	DJREAP	4389 MSD	FY74	.054	0.000	.346	0.000	
TOTAL = .406 TECH AREA IS FUZE								
6558 (CAMRELATED)ADAPTATIONOFAUTOFUZEREGULATION	TMCKIMM	3265 NFD	FY74	.225	0.000	.069	.021	
TOTAL = .315 TECH AREA IS FUZE								
6562 FEASIBILITYOFUSINGGUNTGASTSTEELFORAMMOMETALPISMFG	GSALLADE	2522 MSD	NOV73	.150	0.000	0.000	0.000	
TOTAL = .150 TECH AREA IS MPTS								
7550 DEVOFPROTOPRODESRFACILITIES	VCOLANGELO	5517 BWL	SEPT74	.139	0.000	.111	0.000	
TOTAL = .250 TECH AREA IS MPTS								

**********TOTALS MILLIONS OF DOLLARS**********

IN HOUSE =	6.307
GOCO =	2.501
CONTRACTS =	5.699
OTHER AGENCY =	.781
TOTAL =	15.288

DIVISION

ESPD	MSD	ASD	NUC+FUZE	BWL	M+MTD	
5.489	.289	0.000	.225	.139	.165	IN HOUSE
2.499	0.000	0.000	0.000	0.000	.002	CONTRACTS
5.173	.346	0.000	.069	.111	0.000	GOCO
.705	0.000	0.000	.021	0.000	.055	OGA
13.866	.635	0.000	.315	.250	.222	TOTAL

TECH AREAS					
IN HOUSE	CONTRACTS	GOCO	OGA	TOTAL	
1.583	.166	2.295	.025	4.069	LAP
.539	.082	.111	.055	.787	MPIS
.612	.078	.271	.004	.965	POLLUTION
.363	.149	.353	.285	1.150	SAFETY
2.931	2.106	1.313	.391	6.741	PROP+EXP
.279	0.000	1.165	.021	1.465	FUZE
0.000	0.000	.191	0.000	.191	ENERGY
0.000	0.000	0.000	0.000	0.000	OTHER

LCMSL MMT

FY76 IN MILLIONS OF DOLLARS

FN	PROJECT TITLE	ENGINEER	EXT	DIV	START	IN H	GOCO	CONT	OGA
1264	ADVTECHFORSUPPRESSIVESHIELDINGOFHAZARDOUSPRODSUPOP	JRMARSIGOVETE	3906	ESPD	19AUG75	.638	0.000	.169	.643
	TOTAL = 1.45 TECH AREA IS SAFETY								
4000	AUTOMATEDM55DETONATORPRODUCTIONEQUIPMENT	PMONTELONE	5389	ESPD	NOV72	.409	.001	.590	0.000
	TOTAL = 1.00 TECH AREA IS LAP								
4009	AUTOOPEQUIPFORA/POFSMALLSHAPEDCHARGEROCKETS	DHUBBARD	5609	ESPD	23AUG73	.261	.030	.489	0.000
	TOTAL = .780 TECH AREA IS LAP								
4013	CONTNITROCELLULOSEBYMAGNESIUMNITRATEPROCESS	CWLEWIS	3637	ESPD	AUG71	.008	0.000	0.000	0.000
	TOTAL = .800E-02 TECH AREA IS PROP+EXP								
4032	AUTOMATEDEQUIPMENT(M739FUZE)	PDEBARI	5468	NFO	JAN75	.153	0.000	.462	0.000
	TOTAL = .615 TECH AREA IS FUZE								
4041	AUTOMATEDEQUIPMENTFORMORTARCOMPONENTS	OANDERSON	6279	ESPD	21SEPT71	.221	.010	.192	0.000
	TOTAL = .423 TECH AREA IS LAP								
4073	PHOTOFLASHCOMPOSITICNSDESENSITIZEDBYCOATANTS	BWERBEL	3961	ESPD	OCT75	.200	0.000	0.000	0.000
	TOTAL = .200 TECH AREA IS SAFETY								
4105	AUTOINCRLDG+ASSYOFPROPCHGSW/CENTCOREIGN	CJCARNALI	4162	ESPD	SEPT72	.147	.020	.518	0.000
	TOTAL = .685 TECH AREA IS LAP								
4114	POLUTIONABATEMENTMETHODSFORP+E	IFORSTEN	2138	ESPD	27DEC68	2.151	1.422	.403	.354
	TOTAL = 4.33 TECH AREA IS POLLUTION								
4165	PROTOTYPEFACILITYFORRECOVERYOFHMXFRRDX/HMXADMIX	HRICCI	2160	ESPD	19AUG70	0.000	0.000	.475	0.000
	TOTAL = .475 TECH AREA IS PROP+EXP								
4202	PROTOEQUIPFORCONTAUTOPRODOFSOLVENTTYPEMULTIBASECNP	LPLEMPICKI	3637	ESPD	DEC70	.040	.100	0.000	0.000
	TOTAL = .140 TECH AREA IS PROP+EXP								
4211	MODOFPROCESSCONTROLOFEXPLOSIVECOMPOSITIONS	MHALIK	4123	ESPD	SEPT75	.173	.002	0.000	0.000
	TOTAL = .175 TECH AREA IS PROP+EXP								
4228	AUTOBAGLDGCMGASSY+PACKOUT(155MM+8)	JSMARZ	2758	ESPD	21AUG71	1.178	.025	.057	0.000
	TOTAL = 1.26 TECH AREA IS LAP								
4237	CONTINUOUSTNTPROCESSENGINEERING	RWOLFF	4122	ESPD	SEPT72	.288	.042	.620	0.000
	TOTAL = .950 TECH AREA IS PROP+EXP								
4246	INVESTIGATIONOFLOADINGAMATEX20	PSKERCHOCK	4252	ESPD	FY74	.637	0.000	.112	0.000
	TOTAL = .749 TECH AREA IS PROP+EXP								
4263	AUTCPILOTLINEF/CONTCOOL+PROCHELDGPROJ	CJANDERSON	3162	ESPD	19NOV73	.337	0.000	.693	.115
	TOTAL = 1.15 TECH AREA IS LAP								
4271	IMPVDPROCFORPOLISHORY+GLAZINGOFBLACKPOWDER	BOSTRAUSS	3014	ESPD	90CT74	.116	.132	0.000	0.000
	TOTAL = .248 TECH AREA IS PROP+EXP								
4280	M577FUZESAUTOPROCESSCONTROLPROTOTYPEEQUIP	JLUBA	2644	NFO	SEPT75	.042	0.000	.166	0.000
	TOTAL = .208 TECH AREA IS FUZE								
4281	METHODSFORCONSERVATIONOFENERGYATARMYAMMOPLANTS	JMSMOTINSKY	3998	ESPD	22SEPT75	.413	.174	.247	.841
	TOTAL = .675 TECH AREA IS ENERGY								
4284	PROGRAMFLUIDICCONTROLSYSTFORLAPMACHINERY	SJBERNHARDT	6507	ESPD	OCT75	.168	0.000	.052	0.000

TOTAL = .160 TECH AREA IS LAP									
4285 INTEQUIVALENCYTESTINSUPPORTOFSAFETYENGRFORAMMOPLAN	JRMARSICOVETE	3906	ESPD	17SEPT75	.140	.001	.130	.055
TOTAL = .326 TECH AREA IS SAFETY									
4288 EXPLOSIVESAFESEPARATION+SENSITIVITYCRITERIA	JRMARSICOVETE	3906	ESPD	27JAN77	.164	.020	.167	.229
TOTAL = .580 TECH AREA IS SAFETY									
4289 HAZARDCLASSIFICATIONSUTDIESOFPROPELLANTS+EXPLOSIVE	JRMARSICOVETE	3906	ESPD	11SEPT75	.054	.071	.125	0.000
TOTAL = .250 TECH AREA IS SAFETY									
4310 DMSORECRYSTALLIZATICNOFHMX/RDX	HRICCI	2160	ESPD	FEB75	.088	.310	0.000	.002
TOTAL = .400 TECH AREA IS PROP+EXP									
4311 DEVINITIALAUTOPRODEQUIPFORLAPOFXM692MINEDISPSYSTEM	LWEINER	6506	ESPD	20NOV75	.185	.050	.995	0.000
TOTAL = 1.23 TECH AREA IS LAP									
4337 CURING/MOLDINGPROCESSFORADAM	BFSELITTO	4536	MSD	AUG76	.436	0.000	.061	.007
TOTAL = .504 TECH AREA IS MPTS									
4338 PROJFORDEVOFAUTOPROC+PROTOEQUIPFORLAPOFM483155MMPR	MFIELD	4422	MSD	19MAY76	.104	.017	.638	0.000
TOTAL = .759 TECH AREA IS LAP									
4456 COMPUTERIZEDMATERIALPROPERTYDATAINFOSYSTEM	HEPEBLY	4222	ASD	FY76	.030	0.000	.070	0.000
TOTAL = .100E+00 TECH AREA IS OTHER									
6472 APPLOFALTPROCFORFABOFPRECISIONPINIONSUSEDINMTFUZES	DJREAD	4389	MSD	FY74	.054	0.000	.346	0.000
TOTAL = .400 TECH AREA IS FUZE									
6625 ESTABOFAUTOASSY+INSPECTLINEFORBEEHIVEFUZEMMTS	DJREAP	4389	MSD	OCT75	.003	0.000	.218	.007
TOTAL = .228 TECH AREA IS FUZE									
6628 AUTOINSPOFMTFUZECOMPONENTS(MOVEMENTPLATES)	IMCKIMM	3265	NFD	OCT75	.046	0.000	.199	.005
TOTAL = .250 TECH AREA IS FUZE									
6634 ARMORPENETRATORSFORMAINTANKGUN	CESALLADE	2522	MSD	NOV75	.097	0.000	0.000	.403
TOTAL = .560 TECH AREA IS MPTS									
6640 PRODCONTROL+QAOFSHAPEDCHGLINERSBYAUTOX-RAYANALYSIS	FWITT	6345	M+MTD	OCT75	.077	0.000	.056	0.000
TOTAL = .133 TECH AREA IS MPTS									
6642 INERTIAWELDEDROTATINGBANDSFORPROJBODIES	WSHARPE	3742	MSD	JULY76	.197	0.000	.194	.056
TOTAL = .447 TECH AREA IS MPTS									
6716 DEVOFMATHMODELOFFORMOPERSFORCUR/FUTARIMPTSDESIGNS	FLEE	3679	MSD	APR76	.145	0.000	.150	0.000
TOTAL = .295 TECH AREA IS MPTS									
6736 TECHRLADINESSACCELTHRUCOMPUTERINTEGMFG(TRACIM)	SSHART	3721	MSD	OCT76	.028	0.000	.012	0.000
TOTAL = .400E-01 TECH AREA IS MPTS									
6759 INVESOFFEASOFUTILAUTOTRANS+HOTFORMPRESSESFORMORTAR	RJSTOCK	3790	MSD	1NOV77	.015	.117	0.000	0.000
TOTAL = .132 TECH AREA IS MPTS									
7203 APPLPRODGUNCOMPOFLEASTCOSTTOL+FINISHESRELATED	JRODD	5946	BWL	26AUG7	.052	0.000	0.000	0.000
TOTAL = .520E-01 TECH AREA IS MPTS									
7236 APPLOFRAPIDHEATTREATTOCANNONTUBES	PATHORNTON	5243	BWL	OCT75	.152	0.000	.026	0.000
TOTAL = .178 TECH AREA IS MPTS									
7241 IMPVMNTOFHONINGEQUIPAPROCEDURES	CHROSE	5611	BWL	26AUG7	.107	0.000	.055	0.000
TOTAL = .162 TECH AREA IS MPTS									
7588 ROTARYFORGEINTEGRATEDPRODTECH	LLIUZZI	5827	BWL	AUG75	.300	0.000	.082	0.000
TOTAL = .382 TECH AREA IS MPTS									

TOTALS MILLIONS OF DOLLARS

IN-HOUSE = 9.994

GOCO = 2.544

CONTRACTS = 8.769

OTHER AGENCY = 1.917

TOTAL = 23.224

DIVISION

ESPD	MSO	ASD	NUC+FUZE	BWL	M+MTO	
7.956	1.079	.030	.241	.611	.077	IN HOUSE
2.418	.134	0.000	0.000	0.006	0.000	CONTRACTS
6.634	1.619	.070	.827	.163	.056	GOCO
1.439	.473	0.000	.605	0.000	0.000	OGA
17.839	3.305	.100	1.073	.774	.133	TOTAL

TECH AREAS

IN HOUSE	CONTRACTS	GOCO	OGA	TOTAL	
2.956	.153	4.224	.115	7.442	LAP
1.606	.117	.636	.466	2.825	MPTS
2.151	1.422	.483	.354	4.330	POLLUTION
1.190	.092	.591	.927	2.806	SAFETY
1.356	.366	1.207	.602	3.145	PROP+EXP
.296	0.000	1.391	.012	1.701	FUZE
.413	.174	.247	.041	.875	ENERGY
.63.	0.000	.07J	0.000	.100	OTHER

FY7T IN MILLIONS OF DOLLARS

PN	PROJECT TITLE	ENGINEER	EXT	DIV	START	IN H	GOCO	CONT	OGA
1264	ADVTECHFORSUPPRESSIVESHIELDINGOFHAZARDOUSPRCOSUPOP	JRMARSICOVETE	3906	ESPD	19AUG75	.038	0.000	0.000	.070
TOTAL =	.108E+00 TECH AREA IS SAFETY								
4000	AUTOMATEDM55DETONATORPRODUCTIONEQUIPMENT	PMONTELEONE	5389	ESPD	NOV72	.242	.008	0.000	0.000
TOTAL =	.250 TECH AREA IS LAP								
4105	AUTOINCRLOG+ASSYOFPROPCHGW/CENTCOREIGN	CJCARNALI	4162	ESPD	SEPT72	.225	0.000	0.000	0.000
TOTAL =	.225 TECH AREA IS LAP								
4114	POLLUTIONABATEMENTMETHODSFORP+E	IFORSTEN	2138	ESPD	27DEC68	.225	0.000	0.000	.025
TOTAL =	.250 TECH AREA IS POLLUTION								
4165	PROTOFACEORRECOVERYOFHMXFROX/HMXADMIXTURE	HRICCI	2166	ESPD	19AUG70	0.000	0.000	.400	0.000
TOTAL =	.400 TECH AREA IS PROP+EXP								
4202	PROTOLQUIPFORCONTAUTOPRODSOLVENTTYPEMULTIBASEGPROP	LPLEMPICKI	3637	ESPD	DEC70	.063	.219	0.000	0.000
TOTAL =	.282 TECH AREA IS PROP+EXP								
4243	SEPOFFINEEXPLERSPENTACID+/ORWATERSLURRIES	SDOLLMAN	3717	ESPD	SEPT73	.078	.280	0.000	0.000
TOTAL =	.358 TECH AREA IS PROP+EXP								
4252	IMPROVEPRESPROCFORMFGOFRDX+HMX	SDOLLMAN	3717	ESPD	SEPT73	.054	.315	.020	0.000
TOTAL =	.389 TECH AREA IS PROP+EXP								
4285	INTEQUIVTESTINSUPPORTOFSAFETYENGFORAMMOPLANTS	JRMARSICOVETE	3906	ESPD	17SEPT75	.081	0.000	0.000	0.000
TOTAL =	.810E-01 TECH AREA IS SAFETY								
4288	EXPLOSIVESAFESEPARATION+SENSITIVITYCRITERIA	JRMARSICOVETE	3906	ESPD	27JAN77	.139	0.000	0.000	0.000
TOTAL =	.139 TECH AREA IS SAFETY								
4289	HAZARDCLASSIFICATIONSTUDIESOFPROP+EXPLOSIVES	JRMARSICOVETE	3906	ESPD	11SEPT75	.051	.014	0.000	0.000
TOTAL =	.653E-01 TECH AREA IS SAFETY								
4435	OPERATEPROTOSYSTFORM67PROPCHGE	EDCRANE	5727	ESPD	SEPT76	.125	.375	0.000	0.000
TOTAL =	.500 TECH AREA IS LAP								
4444	BODYFORM42/M46GRENADE	WFIELD	4422	MSD	JAN78	.086	.003	.447	0.000
TOTAL =	.536 TECH AREA IS MPTS								
4457	MULTITOOLEDIOWALOADER(CLIN0037+AV)	PMONTELEONE	5389	ESPD	18AUG76	.025	.616	0.000	0.000
TOTAL =	.641 TECH AREA IS LAP								

**********TOTALS MILLIONS OF DOLLARS**********

IN HOUSE = 1.416

GOCO = 1.830

CONTRACTS = .867

OTHER AGENCY = .095

TOTAL = 4.208

DIVISION

ESPO	MSD	ASD	NUC+FUZE	BWL	M+MTD	
1.336	.086	0.000	0.000	0.000	0.000	IN HOUSE
1.827	.003	0.000	0.000	0.000	0.000	CONTRACTS
.426	.447	0.000	0.000	0.000	0.000	GOCO
.095	0.000	0.000	0.000	0.000	0.000	OGA
3.672	.536	0.000	0.000	0.000	0.000	TOTAL

TECH AREAS

IN HOUSE	CONTRACTS	GOCO	OGA	TOTAL	
.617	.999	0.000	0.000	1.616	LAP
.086	.003	.447	0.000	.536	MPTS
.225	1.000	0.000	.025	.250	POLLUTION
.301	.014	0.000	.070	.385	SAFETY
.187	.814	.420	0.000	1.421	PROP+EXP
0.000	0.000	0.000	0.000	0.000	FUZE
0.101	0.000	0.000	0.000	0.100	ENERGY
0.000	0.000	0.000	0.000	0.000	OTHER

FY77 IN MILLIONS OF DOLLARS

PN	PROJECT TITLE	ENGINEER	EXT	DIV	START	IN H	GOCO	CONT	OGA
4000	AUTOMATEDMSSDETONATORPRODUCTIONEQUIPMENT	PMONTELEONE	5389	ESPD	NOV72	.558	.417	.025	0.000
TOTAL =	1.00 TECH AREA IS LAP								
4105	AUTOINCRLDG+ASSYOFPROPCHGSW/CENTCOREIGN	CJCARNALI	4162	ESPD	SEPT72	.390	.139	.856	0.000
TOTAL =	1.39 TECH AREA IS LAP								
4114	POLUTIONABATEMENTMETHODSFORP+E	IFORSTEN	2138	ESPD	27DEC68	.756	.143	.001	.097
TOTAL =	.997 TECH AREA IS POLLUTION								
4202	PROTOEQUIPFORCONTAUTOPRODSOLVENTTYPEMULTIBASECPROP	LPLEMPICKI	3637	ESPD	DEC70	.161	.308	0.000	.016
TOTAL =	.505 TECH AREA IS PROP+EXP								
4211	MODERNIZATIONOFPROCCNTRLOFEXPLOSIVECOMPS	MHALIK	4123	ESPD	SEPT75	.197	0.000	.230	0.000
TOTAL =	.427 TECH AREA IS PROP+EXP								
4223	APPLULTRASONICENERGYTODOUBLEBASEPROPEXTRPROCESSES	EPHUSELTON	3014	ESPD	AUG72	.282	.013	.035	0.000
TOTAL =	.338 TECH AREA IS PROP+EXP								
4228	AUTOBAGLOGCHGEASSY+PACKOUT(155MM+8)	JSMARZ	2758	ESPD	21AUG71	.253	.147	0.000	0.000
TOTAL =	.400 TECH AREA IS LAP								
4237	CONTINUOUSTNTPROCESSENGINEERING	RWOLFF	4122	ESPD	SEPT72	.257	0.000	.008	0.000
TOTAL =	.265 TECH AREA IS PROP+EXP								
4252	IMPROVEPRESPROCFORMFGOFRDX+HMX	SDOLLMAN	3717	ESPD	SEPT73	.206	.414	.264	0.000
TOTAL =	.884 TECH AREA IS PROP+EXP								
4263	AUTOPILOTLINEF/CONTCOOL+PROCHELDGPROJ	CJANDERSON	3162	ESPD	19NOV73	.725	0.000	.150	.025
TOTAL =	.900 TECH AREA IS LAP								
4267	CONTPROCESSFORGRANULARCOMPB	LSOTSKY	2160	ESPD	OCT74	.071	.429	0.000	0.000
TOTAL =	.600 TECH AREA IS PROP+EXP								
4280	M577FUZEAUTOPROC+CONTROLPROTOEQUIP	JLUBA	2644	NFD	SEPT75	.155	0.000	.745	0.000
TOTAL =	.900 TECH AREA IS FUZE								
4281	METHODSFORCONSERVATIONOFENERGYATARMYAMMOPLANTS	JMSMOTINSKY	3998	ESPD	22SEPT75	.354	.318	.263	.065
TOTAL =	1.00 TECH AREA IS ENERGY								
4285	TNTEQUIVTESTINSUPPORTOFSAFETYENGRFORAMMOPLANTS	JRMARSICOVETE	3906	ESPD	17SEPT	.169	.002	.088	.101
TOTAL =	.380 TECH AREA IS SAFETY								
4288	EXPLOSIVESAFESEPARATION+SENSITIVITYCRITERIA	JRMARSICOVETE	3906	ESPD	27JAN77	.145	0.000	.385	.070
TOTAL =	.600 TECH AREA IS SAFETY								
4289	HAZARDCLASSIFICATIONSTUDIESOFPROP+EXPLOSIVES	JRMARSICOVETE	3906	ESPD	11SEPT75	.118	0.000	.182	.006
TOTAL =	.306 TECH AREA IS SAFETY								
4291	BLASTEFFECTSINMUNITIONPLANTENVIRONMENT	JRMARSICOVETE	3906	ESPD	17OCT75	.069	0.000	.176	.105
TOTAL =	.350 TECH AREA IS SAFETY								
4310	OMSORECRYSTALLIZATIONOFHMX/RDX	HRICCI	2160	ESPD	FE875	0.000	0.000	.200	0.000
TOTAL =	.200 TECH AREA IS PROP+EXP								
4311	DEVINITIALAUTOPROOFCRLAPXM592MINEDISPSYST	LWEINER	6506	ESPD	20NOV75	.261	.157	1.035	0.000
TOTAL =	1.45 TECH AREA IS LAP								
4341	IMPROVEDNITROCELLULOSEPURIFICATION PROCESS	BOSTRAUSS	3014	ESPD	APR77	.070	.095	0.000	0.000

TOTAL = .165 TECH AREA IS PROP+EXP									
4343 IMPROVENITROCELLULOSEPROCESSCONTROL	JWLEACH	3836	ESPD	MAY77	.165	.117	0.000	0.000	
TOTAL = .382 TECH AREA IS PROP+EXP									
4362 CONTAUTOPOSTCYCLICCONCTFACFORLCCOMPBLOADEDPROJS	CJANDERSON	3162	ESPD	11MAY77	.339	.029	.032	0.000	
TOTAL = .400 TECH AREA IS LAP									
4410 MFSTUNGSTENPENETRATORSBYTAPERSWAGING	RHULBERT	5291	M+MTD	28MAR77	.025	0.000	.247	.125	
TOTAL = .397 TECH AREA IS MPTS									
4416 DEVAPROVEOUTOFALTMFGPROCFORSAA(GEMSS)	ILMCKECHNIE	5459	MSD	APR77	.002	0.000	.115	0.000	
TOTAL = .120 TECH AREA IS LAP									
4431 AUTOEQUIPFORMORTARIGNITIONCTGS	VJGRASSO	4545	ESPD	15JAN77	.258	.607	.647	0.000	
TOTAL = .912 TECH AREA IS LAP									
4462 MODERNIZEDFADFORMULTIBASEPROP	LPLEMPICKI	3637	ESPD	JUL77	.030	.133	0.000	0.000	
TOTAL = .163 TECH AREA IS PROP+EXP									
4481 PYROLYSISOFARMYAMMOPLANTSOLIDWASTE	RSCOLA	3360	ESPD	18AUG77	.089	.001	.010	0.000	
TOTAL = .100E+00 TECH AREA IS ENERGY									
4719 MCIEVALOFELECTRICALCOMPONENTDETECTORS	AJOHLSEN	2980	MSD	22FEB77	.100	0.000	0.000	0.000	
TOTAL = .100 TECH AREA IS OTHER									
6634 ARMORPENETRATORSFORMAINTANKGUN	CESALLADE	2522	MSD	NOV75	.092	0.000	.241	.374	
TOTAL = .767 TECH AREA IS MPTS									
6640 PRODCONTROL+QASHAPEDCHGELINERBYAUTOX-RAYANALYSIS	FWITT	6345	M+MTD	OCT75	.075	0.000	.061	.029	
TOTAL = .165 TECH AREA IS MPTS									
6670 EVALOFAQUAQUENCHUNDERPRODCONDITIONS	DOGUSTAD	2522	MSD	JAN77	.024	.276	0.000	0.000	
TOTAL = .368 TECH AREA IS MPTS									
6683 PRODOFTUNGSTENBASEHEAVYALLOYPENETRATORSFORAPHUNIT	RRHULBERT	6291	M+MTD	MAR77	.154	0.000	0.000	.346	
TOTAL = .500 TECH AREA IS MPTS									
6716 DEVOFMATHMODELSOFFORMOPERSFORCUR/FUTAMTMPTSDESIGNS	FLEE	3679	MSD	APR76	.145	0.000	.150	0.000	
TOTAL = .295 TECH AREA IS MPTS									
6777 DEVOFPRODPROCFOR105MMXM710E1	RPOHL	3121	MSD	MAY77	.350	0.000	.050	0.000	
TOTAL = .400 TECH AREA IS MPTS									
7213 HIGHSPEEDCHROMIUMPLATINGTECHNIQUE	VPGRECO	5717	BWL	FEB77	.027	0.000	.100	0.000	
TOTAL = .127 TECH AREA IS MPTS									
7485 APPLOFCHEMICALPROCTCIMPVDSURFACEFINISH	TPOCHILY	5717	BWL	FEB77	.147	0.000	0.000	0.000	
TOTAL = .147 TECH AREA IS MPTS									
7586 ROTARYFORGEINTERATEOPRODTECH	FAHEISER	5507	BWL	OCT77	.155	0.000	.005	0.000	
TOTAL = .164 TECH AREA IS MPTS									
7722 ROTARYFORGINGOF8AM201	RMEINHART	5703	BWL	7FEB77	.207	0.000	.041	0.000	
TOTAL = .248 TECH AREA IS MPTS									
7725 AUTFETTAGEARTYBARRELSPRODBYROTARYFORGING	LLIUZZI	5827	BWL	MAR77	.165	0.000	0.000	0.000	
TOTAL = .165 TECH AREA IS MPTS									
7726 APPLROTARYFORGEINTGOPRODTECHBYCOLDFORGWARMFORGPFSH	LLIUZZI	5827	BWL	MAR77	.415	0.000	.177	0.000	
TOTAL = .592 TECH AREA IS MPTS									
7727 RECYCLINGOFSCRAPGUNTUBESBYROTARYFORGING	CCALDERONE	4179	BWL	MAR77	.215	0.000	.009	0.000	
TOTAL = .224 TECH AREA IS MPTS									
7733 ELIMOFEXITTUBEMACHPRIORTOSHAPEAUTOFETTAGE	MGOODHEIM	5849	BWL	JAN77	.045	0.000	.032	0.000	

TOTAL = .470E-01 TECH AREA IS MPTS

**********TOTALS MILLIONS OF DOLLARS**********

IN HOUSE =	8.481
GOCO =	3.145
CONTRACTS =	6.533
OTHER AGENCY =	1.359
TOTAL =	19.518

DIVISION

ESPO	MSD	ASD	NUC+FUZE	BWL	M+MTD	
5.983	.713	0.000	.155	1.376	.254	IN HOUSE
2.869	.276	0.000	0.000	0.000	0.000	CONTRACTS
4.587	.559	0.000	.745	.334	.388	GOCO
.485	.374	0.000	0.000	0.000	.500	OGA
13.524	1.922	0.000	.900	1.710	1.062	TOTAL

TECH AREAS

IN HOUSE	CONTRACTS	GOCO	OGA	TOTAL	
2.786	.896	2.863	.025	6.570	LAP
2.241	.276	1.083	.874	4.474	MPTS
.756	.143	.001	.097	.937	POLLUTION
.521	.002	.831	.282	1.636	SAFETY
1.479	1.509	.737	.016	3.741	PROP+EXP
.155	0.000	.745	0.000	.900	FUZE
.443	.319	.273	.065	1.100	ENERGY
.100	0.000	0.000	0.000	.100	OTHER

LCMSL MNT

PN	PROJECT TITLE	ENGINEER	EXT	DIV	START	IN H	GOCO	CONT	OGA
		FY78 IN MILLIONS OF DOLLARS							
4000	AUTOMATEDM55DETONATORPRODUCTIONEQUIPMENT	PMONTELEONE	5389	ESPD	NOV72	.690	.134	.574	.002
	TOTAL = 1.40 TECH AREA IS LAP								
4041	AUTOEQUIPFORMORTARCMPS	OANDERSON	4582	ESPD	21SEPT71	.152	.056	.552	0.000
	TOTAL = .760 TECH AREA IS LAP								
4148	REDUCEDWTFORGINGFOR8 MOTOR300YXM650	GKOBIALKA	5361	MSD	27APR78	.002	0.000	.078	0.000
	TOTAL = .666E-01 TECH AREA IS MPTS								
4153	DEVFAHAMETERSFORINERTIAWELDROTATINGBANDS	WSHARPE	2809	MSD	MAY78	.127	0.000	.223	0.000
	TOTAL = .350 TECH AREA IS MPTS								
4163	CONTROLLEDPRODLOGSYSTFOR105MMHEAT-TM456A1	PSKERCHOCK	4252	ESPD	30MAY78	.074	.125	0.000	0.000
	TOTAL = .199 TECH AREA IS LAP								
4214	POLLUTIONENGRFOR1983-85REQUIREMENTS	IFORSTEN	2138	ESPD	15DEC77	.664	.483	.033	0.000
	TOTAL = 1.18 TECH AREA IS POLLUTION								
4228	AUTOBAGLOGCHGEASSY+PACK(155MM+8)	JSHARZ	2758	ESPD	21AUG71	.404	0.000	0.000	0.000
	TOTAL = .484 TECH AREA IS LAP								
4237	CONTINTPROCENGINEERING	RWOLFF	4122	ESPD	SEPT72	.121	0.000	.009	0.000
	TOTAL = .130 TECH AREA IS PROP+EXP								
4249	SEPOFFINEEXPLOSIVEFRACIDWATERSLURRIES	SDOLLMAN	3717	ESPD	SEPT73	.038	.220	0.000	0.000
	TOTAL = .256 TECH AREA IS PROP+EXP								
4252	IMPROVEPRESPROCFORMFGOFRDX+HMX	SDOLLMAN	3717	ESPD	SEPT73	.491	.057	0.000	0.000
	TOTAL = .548 TECH AREA IS PROP+EXP								
4263	AUTOPILOTLINEF/CONTCOCL+PROCOFHELOGPROJS	CJANDERSON	3162	ESPD	19NOV73	.201	0.000	.056	0.000
	TOTAL = .257 TECH AREA IS LAP								
4267	IMPROVEDPROCFORGRANULARCOMPB	LSOTSKY	2160	ESPD	OCT74	.047	.009	.288	0.000
	TOTAL = .344 TECH AREA IS PROP+EXP								
4281	METHODSFORCONSERVATIONATARMYAMMOPLANTS	JMSHOTINSKY	3998	ESPD	22SEPT75	.239	.681	.139	0.000
	TOTAL = 1.06 TECH AREA IS ENERGY								
4285	TNTEQUIVTESTFORSAFETYENGRFORAMMOPLANTS	JRMARSICOVETE	3906	ESPD	17SEPT75	.235	.044	0.000	.121
	TOTAL = .400 TECH AREA IS SAFETY								
4286	EXPLOSIVESAFESEPARATION+SENSITIVITYCRITERIA	JRMARSICOVETE	3906	ESPD	27JAN77	.459	.017	.134	.216
	TOTAL = .826 TECH AREA IS SAFETY								
4289	HAZARDCLASSIFICATIONOFPROF/EXPLOSIVES	JRMARSICOVETE	3906	ESPD	11SEP75	.893	.005	.111	.005
	TOTAL = .214 TECH AREA IS SAFETY								
4310	DMSORECRYSTALLIZATIONOFHMX/RDX	MRICCI	2166	ESPD	FE375	.026	.170	0.000	0.000
	TOTAL = .196 TECH AREA IS PROP+EXP								
4322	DSGNCRITERIA+SYSTCHARACTEROFELECTCONTLPRODFAC	LWOOREMUS	3084	ASD	SEPT78	.098	.380	.007	0.000
	TOTAL = .185 TECH AREA IS MPTS								
4328	BULKPROFSHIPPINGCONTR	NSEPPELL	5358	MSD	10JUL78	.161	0.000	.040	0.000
	TOTAL = .201 TECH AREA IS OTHER								
4341	IMPROVEDNITROCELLULOSEPURIFICATIONPROC	BDSTRAUSS	3014	ESPD	APR77	.098	.575	0.000	0.000

TOTAL = .665 TECH AREA IS PROP+EXP								
4143 IMPROVEDNITROCELLULOSEPROCCONTL	JWLEACH	3836 ESPD	MAY77	.015	0.000	0.000	0.000	
TOTAL = .150E-01 TECH AREA IS LAP								
4431 AUTOEQUIPFORMORTARIGNGTGS	VJGRASSO	4545 ESPD	15JAN77	.061	.048	.549	0.000	
TOTAL = .656 TECH AREA IS LAP								
4444 BODYFORM42/M46GRENADE	WFIELD	4422 MSD	JAN78	.326	0.000	.330	0.000	
TOTAL = .626 TECH AREA IS MPTS								
4447 NITROGUANIDINEPROCCONTLANALYTICALSYSTS	CWLEWIS	3637 ESPD	18JAN78	.346	.020	.024	0.000	
TOTAL = .390 TECH AREA IS PROP+EXP								
4449 PROCIMPROVEMENTFORCOMPC4	MRICCI	3760 ESPD	17JAN78	.137	.780	0.000	0.000	
TOTAL = .917 TECH AREA IS PROP+EXP								
4462 MODERNIZEOFADFORMULTIBASEPROP	LPLEMPICKI	3637 ESPD	JUL77	.090	.502	0.000	0.000	
TOTAL = .592 TECH AREA IS PROP+EXP								
4466 EVALOFTNTCYCLOTOLOCTOLW/ARRADCONMELTPOURFAC	CBPIPER	6144 ESPD	JAN78	.169	.031	0.000	0.000	
TOTAL = .200 TECH AREA IS LAP								
4469 AUTOINSERTIONOFGRENADELAYERS	RHAUSCHILD	4545 ESPD	JAN78	.216	.011	.275	0.000	
TOTAL = .502 TECH AREA IS LAP								
4472 DEVOFLQUIPFORAUTO/MECHFABOFCENTCOREPROPBAGS	GCHEN	5727 ESPD	DEC77	.067	.013	.135	0.000	
TOTAL = .215 TECH AREA IS LAP								
4498 DEVMETHODFORCONSOL+AUTOASSYOFSMALLMINES	SLOMBARDO	5459 MSD	DEC77	.195	.130	0.000	0.000	
TOTAL = .325 TECH AREA IS LAP								
4508 PROCIMPROVEMENTOFPRESSRDXCOMPS	SDOLLMAN	3717 ESPD	22DEC77	.059	.241	0.000	0.000	
TOTAL = .300 TECH AREA IS PROP+EXP								
6634 MFGPROCF/DUALLOYS-LGCALARMORDEFEATPROJ	CESALLADE	2522 MSD	NOV75	.160	0.000	0.000	.240	
TOTAL = .400 TECH AREA IS MPTS								
6681 PROCPARAMETERFORPRODFORMOFPROJS	DOGUSTAD	2522 MSD	JAN78	.403	0.000	.195	.002	
TOTAL = .600 TECH AREA IS MPTS								
6683 PRODOFTUNGSTENBASEHEAVYALLOYPENETRATORSFORAPMUNIT	RRHULBERT	6291 M+MTD	MAR77	.197	0.000	0.000	.330	
TOTAL = .527 TECH AREA IS MPTS								
6725 AUTOINERTIABANDMACHFORARTMUNITION	RSTANTON	5752 M+MTD	JAN78	.075	0.000	.250	0.000	
TOTAL = .325 TECH AREA IS MPTS								
6736 TECHREADINESSACCELTHRUCOMPUTERINTEGRATEDMFG(TRACM)	SSHART	3721 MSD	OCT76	.069	.022	.009	0.000	
TOTAL = .100E+00 TECH AREA IS MPTS								
7213 HIGHSPEEDCHROMIUMPLATINGTECHNIQUE	VGRECO	5717 BWL	FEB77	.027	0.000	.100	0.000	
TOTAL = .127 TECH AREA IS MPTS								
7825 ELIMINATIONOFFACILITATINGHONINGOPERATIONS	HGOODHEIM	5849 BWL	JAN78	.133	0.000	0.000	0.000	
TOTAL = .133 TECH AREA IS MPTS								

**********TOTALS MILLIONS OF DOLLARS**********

IN HOUSE = 7.149

GOCO = 4.454

CONTRACTS = 4.081

OTHER AGENCY = .916

TOTAL = 16.600

DIVISION

ESPO	MSD	ASD	NUC+FUZE	BWL	M+MTO	
5.176	1.443	.698	0.000	.160	.272	IN HOUSE
4.222	.152	.080	0.000	0.000	0.000	CONTRACTS
2.879	.845	.307	0.000	.100	.250	GOCO
.344	.242	0.000	0.000	0.000	.330	OGA
12.621	2.682	.185	0.000	.260	.852	TOTAL

TECH AREAS

IN HOUSE	CONTRACTS	GOCO	OGA	TOTAL	
2.244	.548	2.141	.002	4.935	LAP
1.617	.192	1.162	.572	3.453	MPTS
.664	.483	.333	0.000	1.180	POLLUTION
.787	.066	.245	.342	1.440	SAFETY
1.437	2.574	.321	0.000	4.332	PROP+EXP
.130	0.000	0.000	0.000	0.300	FUZE
.239	.681	.139	0.000	1.059	ENERGY
.161	0.000	.040	0.000	.201	OTHER

FY79 IN MILLIONS OF DOLLARS

PN	PROJECT TITLE	ENGINEER	EXT	OIV	START	IN H	GOCO CONT	OGA
4000	AUTOMSDETONATORPRODUCTIONEQUIPMENT	PMONTELEONE	5389	ESPD	NOV72	1.159	.351	.090	0.000
	TOTAL = 1.60 TECH AREA IS LAP								
4007	EVALOFACETICACIDANHYDRIDERECYCLE	DFREEMAN	6349	ESPD	FY79	.062	.254	0.000	0.000
	TOTAL = .316 TECH AREA IS POLLUTION								
4024	DESIGNDEVBUILDPROTOAUTOASSYMACHM223FUZE	JSHADE	4757	MSD	FY79	.111	0.000	1.021	0.000
	TOTAL = 1.13 TECH AREA IS MPTS								
4046	DEVAUTOMETHTOPREFQUANANALOFBLENDEDEXPLSP	PMONTELEONE	5389	ESPD	1JUN79	.237	.070	0.000	0.000
	TOTAL = .307 TECH AREA IS LAP								
4051	IMPVDINSTRUMENTATION+CONTF/ACIDPLANT	CMCINTOSH	4123	ESPD	FY79	.157	0.000	0.000	0.000
	TOTAL = .157 TECH AREA IS PROP+EXP								
4062	AUTOMFGSYSF/MORTARINCRCONTAINERS	PBONNETT	3162	ESPD	DEC78	.126	.011	.370	0.000
	TOTAL = .507 TECH AREA IS LAP								
4064	AUTOLAPCPNSF/105MMTANKCARTRIDGES	KELISCHICK	4162	ESPD	DEC78	.181	.085	.996	0.000
	TOTAL = 1.26 TECH AREA IS LAP								
4084	OPACITY/MASSEMISSIONSCORRELATIONS	JCLANCY	3404	MSD	DEC78	.017	.010	.094	0.000
	TOTAL = .121 TECH AREA IS POLLUTION								
4124	FABOFCONTACTUATIONSYSHOUSINGS	MWEBSTER	5749	MSD	DEC78	0.000	.799	0.000	0.000
	TOTAL = .799 TECH AREA IS MPTS								
4137	AUTOLOGOFCTRCOREIGNITERS	ODAVIS	2758	ESPD	DEC78	.079	.006	.120	0.000
	TOTAL = .205 TECH AREA IS LAP								
4163	CONTROLLEDPRODLOGSYSTFOR105MMHEAT-TM456A1	PSKERCHOCK	4252	ESPD	30MAY78	.387	0.000	.032	0.000
	TOTAL = .419 TECH AREA IS LAP								
4189	HIGHFRAGSTEELPRODPROCESS	WSHARPE	2809	MSD	FY79	.058	0.000	.242	.100
	TOTAL = .400 TECH AREA IS MPTS								
4194	IMPVDPROCFORPRESSLXL4EXPLCHGS	APALLINGSTON	4464	MSD	FY79	.259	0.000	.068	0.000
	TOTAL = .327 TECH AREA IS PROP+EXP								
4214	POLLUTIONENGRF/1983-85REQUIREMENTS	JCANAVAN	4284	ESPD	15DEC77	.716	.533	.020	0.000
	TOTAL = 1.27 TECH AREA IS POLLUTION								
4225	REDWATERPOLABATEMENTSYST	JCARRAZZA	3544	ESPD	FY79	.120	.230	0.000	0.000
	TOTAL = .350 TECH AREA IS POLLUTION								
4258						0.000	0.050	0.000	0.000
	TOTAL = 0. TECH AREA IS POLLUTION								
4263	AUTOPILOTLINEF/CONTCOOL+PROCOFHELDGPROJS	CJANDERSON	3162	ESPD	19NOV73	.329	0.000	0.000	0.000
	TOTAL = .329 TECH AREA IS LAP								
4281	CONSERVATIONOFENERGYATARMYAMMOPLANTS	JSWOTINSKY	3998	ESPD	22SEPT75	.562	.713	.010	0.000
	TOTAL = 1.29 TECH AREA IS ENERGY								
4285	INTEQUIVTESTF/SAFETYENGRG	PPRICE	3022	ESPD	17SEPT75	.420	0.000	0.000	0.000
	TOTAL = .420 TECH AREA IS SAFETY								
4288	EXPLOSAFESEPARATION+SENSITIVITYCRITERIA	RRINDNER	3906	ESPD	27JAN77	.581	.037	.055	0.000

TOTAL = .643 TECH AREA IS SAFETY								
4291 BLASTEFFECTSINMUNITIONPLANTENVIRONMENT	PPRICE	3022	ESPD	17OCT75	.155	0.000	.080	0.000
TOTAL = .235 TECH AREA IS SAFETY								
4309 TANKAMMO120MM,PROCESSDEV	LLEMPICKI	363	ESPD	FY79	.384	.464	0.000	0.000
TOTAL = .848 TECH AREA IS PROP+EXP								
4310 DMSORLGRYSTALLIZATIONOFHMX/RDX	LSIBERMAN	2160	ESPD	FE875	.389	.894	0.000	0.000
TOTAL = .483 TECH AREA IS PROP+EXP								
4312 INJECTIONMOLDINGF/PINEXPLOLOG	BPIPER	4252	ESPD	DEC78	.166	0.000	.095	0.000
TOTAL = .261 TECH AREA IS LAP								
4335 TITANIUMGYROFORCOPPERHEAD	BPERLMUTTER	5749	MSD	FY79	.081	0.000	.330	0.000
TOTAL = .411 TECH AREA IS MPTS								
4341 IMPNITROCPURIFPROC	RBOWMAN	6226	ESPD	FY77	.136	.606	0.000	0.000
TOTAL = .742 TECH AREA IS PROP+EXP								
4332 IMPROVFORPOTTINGELECTRONICASSYFORGATOR	SPOLANSKI	5569	MSD	1FE879	.005	0.000	.078	0.000
TOTAL = .838E-01 TECH AREA IS MPTS								
4444 BOOYFORM42/M46GRENADE	WFIELD	4422	MSD	DEC78	.082	.231	.025	.225
TOTAL = .563 TECH AREA IS MPTS								
4459 OPTOFNITROQPARTICLESIZE	CLEWIS	5572	ESPD	FY79	.025	.225	0.000	0.000
TOTAL = .250 TECH AREA IS PROP+EXP								
4460 CONTMIXER-ILLUMINATCOMPANAL+CONTSYS	RWOLFE	4122	ESPD	FY79	.086	.150	0.000	0.000
TOTAL = .236 TECH AREA IS PROP+EXP								
4462 MODFACF/MULTIBASEPROPELLANT	LPLEMPICKI	3637	ESPD	JUL77	.132	.396	0.000	0.000
TOTAL = .528 TECH AREA IS PROP+EXP								
4466 EVALTNTCYCLOTOLOCTOLINMELT-POURFAC	CBPIPER	6144	ESPD	JAN78	.335	0.000	.126	0.000
TOTAL = .461 TECH AREA IS PROP+EXP								
4469 AUTOINSERTIONOFGRENADELAYERS	RHAUSCHILD	4545	ESPD	JAN78	.075	0.000	.325	0.000
TOTAL = .400 TECH AREA IS LAP								
4474 DEHUMIDSBPROP	EBOZZA	3241	ESPD	FY79	.075	.100	0.000	0.000
TOTAL = .175 TECH AREA IS ENERGY								
4498 DEVMETHF/CONSOL+AUTOASSYOFSMALLMINES	SLOMBARDO	5348	MSD	DEC77	.068	1.055	.024	0.000
TOTAL = 1.15 TECH AREA IS LAP								
4508 PROCIMPVMTOFPRESSABLERDXCOMP	SDOLLMAN	2160	ESPD	22DEC77	.068	.289	0.000	0.000
TOTAL = .357 TECH AREA IS PROP+EXP								
6553 ACOUSTICINSPECTSYST	DSEBASTIAN	3527	MSD	FY73	.067	0.000	.028	0.000
TOTAL = .950E-01 TECH AREA IS MPTS								
6634 MFGPROCF/DU-LGCALARMORDEFEATINGPROP	CSALLADE	2522	MSD	NOV75	.242	0.000	.300	0.000
TOTAL = .542 TECH AREA IS MPTS								
6682 SIMULATIONOFAMMOPONLINES	WONEILL	3121	MSD	DEC78	.170	0.000	0.000	0.000
TOTAL = .176 TECH AREA IS MPTS								
6683 PDNOFTUNGSTENBASEHEAVYALLOYPENETRATORF/APMUNITIONS	RHULBERT	6291	MSD	MAR77	.146	0.000	0.000	0.000
TOTAL = .146 TECH AREA IS MPTS								
6716 DEVOFCOMPUTERAIDEDMODOFFORMOPNSF/CUR/FUTMPTSDESIGN	FLEE	3679	MSD	APR76	.026	0.000	.283	0.000
TOTAL = .366 TECH AREA IS MPTS								
6736 TECHREADINESSACCELTHRUCOMPUTERINTGRDMFG(TRACIM)	SSHART	3721	MSD	OCT76	.081	0.000	.175	0.000

TOTAL = .256 TECH AREA IS MPTS									
6738 USEOFULTRAHIGHSURFACESPOSF/MILREMOVALARTYSHELL	RPOHL	6240	MSD	FY79	.132	0.000	.049	0.000
TOTAL = .181 TECH AREA IS MPTS									
7213 HIGHSPEEDCHROMIUMPLATINGTECHNIQUE	VGRECO	5717	BWL	FEB77	.153	0.000	.051	0.000
TOTAL = .204 TECH AREA IS MPTS									
7246 SIMPLIFICATIONOFBREECHRINGMFG&HANDLING	JRODD	5737	BWL	9MAR79	.058	0.000	.003	0.000
TOTAL = .610E-01 TECH AREA IS MPTS									
7313 17OPTIMIZATIONOFSTEPTHEADTOOLING	PCASEY	5737	BWL	9MAR79	.061	0.000	.016	0.000
TOTAL = .770E-01 TECH AREA IS MPTS									
7482 MODIFIEDRIBBONRIFLINGGENERATINGMACHINE	PCASEY	5737	BWL	9MAR79	.091	0.000	.048	0.000
TOTAL = .139 TECH AREA IS MPTS									
7724 GROUPTECHNOLOGYOFWEAPONS	HGOODHEIM	5849	BWL	9MAR79	.085	0.000	0.000	0.000
TOTAL = .850E-01 TECH AREA IS MPTS									
7726 APPLROTARYFORGEINTGCPRODTECHBYCOLDFORGEWARMFORGPFS	HLLIUZZI	5827	BWL	MAR77	.349	0.000	.124	0.000
TOTAL = .473 TECH AREA IS MPTS									
7727 RECYCLINGOFSCRAPGUNTUBESBYROTARYFORGING	CCALDERONE	5443	BWL	MAR77	.221	0.000	.033	0.000
TOTAL = .254 TECH AREA IS MPTS									
7730 MANUFACTUREOFSPLITRINGBREECHSEALS	JRODD	5737	BWL	9MAR77	.118	0.000	.022	0.000
TOTAL = .146 TECH AREA IS MPTS									
8025 ELECPROFILEREADOUTGAGEFORPOWDERCATAMBERCONTROL	PCASEY	5737	BWL	9MAR79	.069	0.000	.037	0.000
TOTAL = .106 TECH AREA IS MPTS									
8107 CREEPFEEDCRUSHFORMGRINDING	PCASEY	573	BWL	9MAR79	.066	0.000	.016	0.000
TOTAL = .820E-01 TECH AREA IS MPTS									

**********TOTALS MILLIONS OF DOLLARS**********

IN HOUSE = 9.958

GOCO = 6.670

CONTRACTS = 5.383

OTHER AGENCY = .325

TOTAL = 22.336

DIVISION

ESPD	MSD	ASD	NUC+FUZE	BWL	M+MTD	
7.142	1.545	0.000	0.000	1.271	0.000	IN HOUSE
4.584	2.086	0.000	0.000	0.000	0.000	CONTRACTS
2.319	2.714	0.000	0.000	.350	0.000	GOCO
0.000	.325	0.000	0.000	0.000	0.000	OGA

14.045	6.670	0.000	0.000	1.621	0.000TOTAL

TECH AREAS

IN HOUSE	CONTRACTS	GOCO	OGA	TOTAL	
2.807	1.578	2.052	0.000	6.437	LAP
2.472	1.021	2.878	.325	6.696	MPTS
.915	1.027	.114	0.000	2.056	POLLUTION
1.156	.007	.135	0.000	1.298	SAFETY
1.971	2.224	.194	0.000	4.389	PROP+EXP
0.000	0.000	0.000	0.000	0.000	FUZE
.637	.813	.010	0.000	1.460	ENERGY
0.000	0.000	0.000	0.000	0.000	OTHER

FY80 IN MILLIONS OF DOLLARS

PN	PROJECT TITLE	ENGINEER	EXT	DIV	START	IN H	GOCO	CONT	OGA
4006	AUTOMATEDMSSDETONATORPRODUCTIONEQUIP	RMONTELEONE	5389	ESPD	FY71	.230	.020	0.000	0.000
TOTAL = .250 TECH AREA IS LAP									
4033	CAUSTICRECOVERYFRSODIUMNITRATESLUDGE	HRICCI	2160	ESPD	FY80	.153	0.000	0.000	0.000
TOTAL = .153 TECH AREA IS PROP+EXP									
4037	PROCIMPROVEFORPLASTICBONDEDEXPLS	SOOLLMAN	3717	ESPD	FY80	.030	.206	0.000	0.000
TOTAL = .236 TECH AREA IS PROP+EXP									
4061	NITROGUANIDINEPROCOPT	ALITTY	4496	ESPD	FY80	.063	.197	0.000	0.000
TOTAL = .260 TECH AREA IS PROP+EXP									
4062	AUTCMFGSYSF/MORTARINCREMENTCONTAINER	PBONNETT	4496	ESPD	FY79	.009	0.000	.875	0.000
TOTAL = .884 TECH AREA IS PROP+EXP									
4084	OPACITY/MASSEMISSIONCORRELATION	AFRIEDMAN	4497	MSD	FY79	.111	0.000	0.000	0.000
TOTAL = .111 TECH AREA IS PROP+EXP									
4137	AUTOMATEDLOADINGOFCENTERCOREIGNITERS	EMREZ	4162	ESPD	FY79	.670	0.000	0.000	0.000
TOTAL = .670 TECH AREA IS PROP+EXP									
4189	HIGHFRAGSTEELPRODUCTIONPROCESS	WSHARPE	3742	MSD	FY79	.404	.644	0.000	.200
TOTAL = 1.25 TECH AREA IS PROP+EXP									
4200	INTCRYSTALLIZERFORLARGECALMUNITIONS	PBONNETT	4496	ESPD	FY80	.829	0.000	0.000	0.000
TOTAL = .290E-01 TECH AREA IS PROP+EXP									
4210	JETCUTTINGOFENERGETICMATERIELS	B STRAUSS	3014	ESPD	FY80	.112	.338	0.000	0.000
TOTAL = .450 TECH AREA IS PROP+EXP									
4225	REDWATERPOLLUTIONABATEMENTSYSTEM	JCARRAZZA	3544	ESPD	FY79	.884	.071	0.000	0.000
TOTAL = .155 TECH AREA IS POLLUTION									
4226	ONLINEMONITORSFORWATERPOLLUTANTS	RWESTERDAHL	3749	ESPD	FY80	.050	.050	0.000	0.000
TOTAL = .100 TECH AREA IS POLLUTION									
4231	INHOUSEREUSEOFPOLLUTIONABATEDWATERS	DFREEMAN	4256	ESPD	FY80	.088	.162	0.000	0.000
TOTAL = .250 TECH AREA IS POLLUTION									
4236	AUTOLACEJACKETSFORCENTERCORECHARGES	ELISCHICK	4162	ESPD	FY80	.130	.023	.459	0.000
TOTAL = .612 TECH AREA IS LAP									
4266	MEGINSPECIATESTEQUIPF/MAGPOWERSUPPLY	WHOLLEY	5378	NED	FY80	.345	0.000	0.000	0.000
TOTAL = .345 TECH AREA IS FUZE									
4281	CONSERVATIONOFENERGYATARMYAMMOPLANTS	JSWOTINSKY	3998	ESPD	FY75	.315	.919	0.000	0.000
TOTAL = 1.23 TECH AREA IS ENERGY									
4285	INTEQUIVTESTFORSAFETYENGINEERING	PPRICE	3822	ESPD	FY76	.408	0.000	0.000	0.000
TOTAL = .408 TECH AREA IS SAFETY									
4288	EXPLOSIVESAFESEPASENSITIVITYCRITERIA	RRINDNER	3828	ESPD	FY76	.767	0.000	0.000	0.000
TOTAL = .767 TECH AREA IS SAFETY									
4291	BLASTEFFECTSINMUNPLANTENVIRON	PPRICE	3822	ESPD	FY76	.100	0.000	0.000	0.000
TOTAL = .100 TECH AREA IS SAFETY									
4508	PROCESSIMPROVEOFPRESSABLERDXCOMPS	SOOLLMAN	3717	ESPD	FY78	.172	.334	0.000	0.000

TOTAL = .506 TECH AREA IS PROP+EXP								
4312 INJECTMOLDINGFORPRODUCTIONEXPLOSIVELDG	LMANASSAY	6144 ESPD	FY79	.153	.126	0.000	0.000
TOTAL = .279 TECH AREA IS LAP								
4322 DESIGN/CHAROFELECTCONTSYSFORPROOFAC	WDOREMUS	3084 ASD	FY78	.257	.237	.008	0.000
TOTAL = .502 TECH AREA IS MPTS								
4341 IMPROVENITROCELLULOSEPURIFICATIONPROC	MBLAIS	3637 ESPD	FY77	.178	.413	0.000	0.000
TOTAL = .583 TECH AREA IS PROP+EXP								
4493 DEVMETHFORCONSOL+AUTOASSYOFSMALLMINES	SLOMBARDO	5348 MSD	FY78	.110	.100	.182	0.000
TOTAL = .392 TECH AREA IS LAP								
6736 TECHREDACQELTHROUGHCOMPUTERINTEGRATEDMFG	SHART	3721 MSD	FY76	.155	0.000	.160	.025
TOTAL = .348 TECH AREA IS MPTS								
6738 ULTRAHIGHSPEEDMETALREMOVERARTILLERYSHELL	RPOHL	3121 MSD	FY79	.117	0.000	.180	0.000
TOTAL = .297 TECH AREA IS MPTS								
4389 AMMUNITIONFORTHE120MMTANKMAINARMAMENT	JMOLA	3320 ESPD	FY79	.347	.983	2.396	0.000
TOTAL = 3.73 TECH AREA IS OTHER								
4462 MODIFIEDFADF/MULTIBASEPROPELLANT	LLIMPICKI	3637 ESPD	FY77	.341	.509	0.000	0.000
TOTAL = .650 TECH AREA IS PROP+EXP								
4469 AUTOINSERTIONOFGRENADELAYERS	RHAUSCHILD	4545 ESPD	FY78	.225	.125	0.000	0.000
TOTAL = .350 TECH AREA IS LAP								
4310 DMSORLCRYSTALLIZATIONOFHMX/RDX	LSILBERMAN	2160 ESPD	FY75	.278	0.000	0.000	0.000
TOTAL = .278 TECH AREA IS PROP+EXP								
7730 MFGOFSLITRINGBREECHSEALS	P CASEY	5611 BWL	FY79	.453	0.000	0.000	0.000
TOTAL = .453 TECH AREA IS MPTS								
7920 CONSOFCRITMATLSFORGUNTUBES	PTHORNTON	5517 BWL	FY80	.236	0.000	0.000	0.000
TOTAL = .236 TECH AREA IS MPTS								
7925 BOREEVACUATORGORING	P CASEY	5611 BWL	FY80	.111	0.000	0.000	0.000
TOTAL = .111 TECH AREA IS MPTS								
7926 HOTISOSTATICPRESSCFLGROCOMP	PTHORNTON	5517 BWL	FY80	.216	0.000	0.000	0.000
TOTAL = .216 TECH AREA IS MPTS								
7927 GENOFBASEMACHSURFACES	P CASEY	5611 BWL	FY80	.086	0.000	0.000	0.000
TOTAL = .860E-01 TECH AREA IS MPTS								
7928 ROBTIZEDBENCHOPERS	VMONTUORI	5224 BWL	FY80	.113	0.000	0.000	0.000
TOTAL = .113 TECH AREA IS MPTS								
8024 HIGHSPEED+BRASIVEBELTGRIND	P CASEY	5611 BWL	FY80	.324	0.000	0.000	0.000
TOTAL = .324 TECH AREA IS MPTS								
8026 APPLSYNTHQUENCHANTSTOGUNTUBE	PTHORTON	5517 BWL	FY80	.143	0.000	0.000	0.000
TOTAL = .143 TECH AREA IS MPTS								
8047 PASSTHRUSTEADYRESTFORTUBETURN	P CASEY	5611 BWL	FY78	.269	0.000	0.000	0.000
TOTAL = .269 TECH AREA IS MPTS								
8057 DUALRIFLINGBROACHREMOVALSYST	P CASEY	5611 BWL	FY80	.215	0.000	0.000	0.000
TOTAL = .215 TECH AREA IS MPTS								
8059 SALVAGECANNONCOMPSBYELECTRODEPOS	TPOCHILY	5717 BWL	FY80	.152	0.000	0.000	0.000
TOTAL = .152 TECH AREA IS MPTS								
8060 IMPMFGPROCRELTOFINALINSPOFCNTUBES	G GALLO	5453 BWL	FY80	.268	0.000	0.000	0.000

TOTAL = .268 TECH AREA IS MPTS									
8165 ESTPOUGHTHOULANKS	P CASEY	5611 BWL	FY80	.088	0.000	0.000	0.000		
TOTAL = .88.E-01 TECH AREA IS MPTS									
8186 LOCALPOWERCHAMBERBORING	P CASEY	5611 BWL	FY80	.059	0.000	0.000	0.000		
TOTAL = .59.E-01 TECH AREA IS MPTS									
8187 CREEPFEEDBRUSHFORMGRINDING	P CASEY	5611 BWL	FY79	.348	0.000	0.000	0.000		
TOTAL = .348 TECH AREA IS MPTS									
8208 MATERIAL HANDLING	HGOODHEIM	5507 BWL	FY80	.113	0.000	0.000	0.000		
TOTAL = .113 TECH AREA IS MPTS									
8341 HALLOWCYLCUTOFFMACH	P CASEY	5611 BWL	FY80	.069	0.000	0.000	0.000		
TOTAL = .06E-01 TECH AREA IS MPTS									
8342 KEYWAYMILLINGMACH	P CASY	5611 BWL	FY80	.242	0.000	0.000	0.000		
TOTAL = .242 TECH AREA IS MPTS									

TOTALS MILLIONS OF DOLLARS

IN HOUSE = 9.928

GOCO = 5.457

CONTRACTS = 4.260

OTHER AGENCY = .225

TOTAL = 19.870

DIVISION

ESPD	MSD	ASD	NUC+FUZE	BWL	M+MTO	
4.524	.897	.257	.345	3.905	0.000	IN HOUSE
4.478	.744	.237	0.000	0.000	0.000	CONTRACTS
3.736	.522	.008	0.000	0.000	0.000	GOCO
0.000	.225	0.000	0.000	0.000	0.000	OGA
12.738	2.388	.502	.345	3.905	0.000	TOTAL

TECH AREAS

IN HOUSE	CONTRACTS	GOCO	OGA	TOTAL	
2.824	1.038	1.916	.200	5.578	LAP
3.252	.237	.348	.325	3.562	MPTS
.222	.283	0.000	0.000	.505	POLLUTION
1.275	0.000	0.000	0.000	1.275	SAFETY
1.348	1.997	0.000	0.000	3.345	PROP+EXP
.345	0.000	0.000	0.000	.345	FUZE
.315	.919	0.000	0.000	1.234	ENERGY
.347	.953	2.396	0.000	3.726	OTHER

LOWSL MMT

FY81 IN MILLIONS OF DOLLARS

PN	PROJECT TITLE	ENGINEER	EXT	DIV	START	IN H	GOCO	CONT	OGA
0976	NONTOXICPRESERVATIVEFORWOOD	MSTROUKOFF	2770	MSD	FY80	.344	0.000	0.000	0.000
	TOTAL = .344 TECH AREA IS OTHER								
4000	AUTOMATEDM55DETONATORPRODUCTIONEQUIP	PMONTELEONE	5389	ESPD	FY71	.131	.473	0.000	0.000
	TOTAL = .604 TECH AREA IS LAP								
4027	COMBINEDSOLVENTRECOVERY/DRYINGS-BPROP	EBOZZA	3241	ESPD	FY80	.119	.264	0.000	0.000
	TOTAL = .383 TECH AREA IS PROP+EXP								
4059	OPTOFNITROQPARTICLESSIZE	CLEWIS	5572	ESPD	FY79	.226	.657	0.000	0.000
	TOTAL = .883 TECH AREA IS PROP+EXP								
4061	NITROGUANINDINEPROCOPT	ALITTY	4496	ESPD	FY80	.220	.700	0.000	0.000
	TOTAL = .920 TECH AREA IS PROP+EXP								
4062	AUTOMFGSYSF/MORTARINCREMENTCONTAINER	PBONNETT	4496	ESPD	FY79	1.575	0.000	0.000	0.000
	TOTAL = 1.58 TECH AREA IS LAP								
4137	AUTOMATEDLOADINGOFCENTERCOREIGNITERS	EMEREZ	4162	ESPD	FY79	.916	.184	0.000	0.000
	TOTAL = 1.10 TECH AREA IS LAP								
4145	CONTROLDRYINGINAUTOSBPROPMFG	RMANNO	6522	ESPD	FY81	.333	.219	0.000	0.000
	TOTAL = .552 TECH AREA IS PROP+EXP								
4189	HIGHFRAGSTEELPRODUCTIONPROCESS	WSHARPE	3742	MSD	FY79	.220	.933	0.000	0.000
	TOTAL = 1.15 TECH AREA IS MPTS								
4203	TNTCRYSTALLIZERFORLARGECALMUNITION	PBONNETT	4496	ESPD	FY80	.302	0.000	0.000	0.000
	TOTAL = .302 TECH AREA IS PROP+EXP								
4210	JETCUTTINGOFENERGETICMATERIELS	BSTRAUSS	3014	ESPD	FY80	.052	0.000	0.000	0.000
	TOTAL = .520E-01 TECH AREA IS PROP+EXP								
4225	REDWATERPOLLUTIONABATEMENTSYSTEM	JCARRAZZA	3544	ESPD	FY79	.160	0.000	0.000	0.000
	TOTAL = .160 TECH AREA IS POLLUTION								
4226	ONLINEMONITORSFORWATERPOLLUTANTS	RWESTERDAHL	3749	ESPD	FY80	.064	.315	0.000	0.000
	TOTAL = .379 TECH AREA IS POLLUTION								
4231	INHOUSEREUSEOFPOLLUTIONABATEDWATERS	DFREEMAN	4256	ESPD	FY80	.272	.192	0.000	0.000
	TOTAL = .464 TECH AREA IS POLLUTION								
4266	MFGINSPECTIESTEQUIPF/MAGPOWERSUPPLY	WHOLLEY	6378	NED	FY80	.759	0.000	0.000	0.000
	TOTAL = .759 TECH AREA IS FUZE								
4281	CONSERVATIONOFENERGYATARMYAMMOPLANTS	JSHOTINSKY	3998	ESPD	FY75	.537	.634	0.000	0.000
	TOTAL = 1.17 TECH AREA IS ENERGY								
4285	INTEQUIVTESTFORSAFETYENGRMINEERING	PPRICE	3022	ESPD	FY76	.441	0.000	0.000	0.000
	TOTAL = .441 TECH AREA IS SAFETY								
4288	EXPLOSIVESAFESEP&SENSITIVITYCRITERIA	RRINDER	3828	ESPD	FY76	.720	0.000	0.000	0.000
	TOTAL = .720 TECH AREA IS SAFETY								
4298	EVALOFMEXAMINERECYCLEONHAAP8-LINE	DFREEMAN	4256	ESPD	FY81	.443	.029	0.000	0.000
	TOTAL = .472 TECH AREA IS PROP+EXP								
4309	AMMUNITIONFORTHE120MMTANKMAINARMAMENT	JMOLA	3320	ESPD	FY79	3.071	.917	0.000	0.000

TOTAL = 3.99 TECH AREA IS OTHER								
4328 BULKPROPSHIPPINGCONTAINER	DDOYLE	5358	MSD	FY78	.323	0.000	0.000	0.000
TOTAL = .323 TECH AREA IS OTHER								
4341 IMPROVENITROCELLULOSEPURIFICATIONPROC	MBLAIS	3637	ESPD	FY77	.519	.246	0.000	0.000
TOTAL = .765 TECH AREA IS PROP+EXP								
4449 PROCESSIMPROVEMNTSFORCOMPC-X	HRICCI	3760	ESPD	FY78	.051	.546	0.000	0.000
TOTAL = .597 TECH AREA IS PROP+EXP								
4508 PROCESSIMPROVEOFPRESSABLERDXCOMPS	SDOLLMAN	3717	ESPD	FY78	.050	.213	0.000	0.000
TOTAL = .263 TECH AREA IS PROP+EXP								
6716 DEVOFCOMPUTERAIDEDMODOFFORMOPNSF/CUR/FUTMPTSDSGN	FLEE	3679	MSD		.157	0.000	0.000	0.000
TOTAL = .157 TECH AREA IS MPTS								
6738 ULTRAHIGHSPEEDMETALREMOVERARTILLERYSHELL	RPOHL	3121	MSD	FY79	.057	0.000	0.000	0.000
TOTAL = .570E-01 TECH AREA IS MPTS								
7724 GROUPTECHNOLOGYOFWEAPONS	HGOODHEIM	5849	BWL	FY79	.224	0.000	0.000	0.000
TOTAL = .224 TECH AREA IS MPTS								
7916 APPLOFLOWCOSTMANDRELMATLS	HGOODHEIM	5849	BWL	FY79	.168	0.000	0.000	0.000
TOTAL = .168 TECH AREA IS MPTS								
7925 BOREEVACUATORBORING	PCASEY	5611	BWL	FY80	.248	0.000	0.000	0.000
TOTAL = .248 TECH AREA IS MPTS								
7927 GENOFBASEMACHSURFACES	PCASEY	5611	BWL	FY80	.137	0.000	0.000	0.000
TOTAL = .137 TECH AREA IS MPTS								
7928 ROBTIZEOBENGHOPRS	VMONTUORI	5224	BWL	FY80	.287	0.000	0.000	0.000
TOTAL = .287 TECH AREA IS MPTS								
7948 ESTABCUTTINGFLUIDCNTLSYST			BWL	FY81	.163	0.000	0.000	0.000
TOTAL = .163 TECH AREA IS MPTS								
8030 MFGGUIDEFORELASTOMERICSEALS			BWL	FY81	.085	0.000	0.000	0.000
TOTAL = .850E-01 TECH AREA IS MPTS								
8034 MFGSHOPFLOORFEEDBACKSYS			BWL	FY81	.296	0.000	0.000	0.000
TOTAL = .296 TECH AREA IS MPTS								
8035 COATTUBESUPPORTSLEEVESW/BEADINGMATLS			BWL	FY81	.200	0.000	0.000	0.000
TOTAL = .200 TECH AREA IS MPTS								
8102 APPLOFOWDERMETALFORGETOWPNSCOMPS	PTHORNTON	5249	BWL	FY81	.163	0.000	0.000	0.000
TOTAL = .163 TECH AREA IS MPTS								
8103 HIGHVELOCITYMACHING	HGOODHEIM	5849	BWL	FY81	.068	0.000	0.000	0.000
TOTAL = .68EE-01 TECH AREA IS MPTS								
8105 ESTROUGHTHDBLANKS	P CASEY	5611	BWL	FY80	.307	0.000	0.000	0.000
TOTAL = .307 TECH AREA IS MPTS								
8106 LGGALPOWDERGHAMBERBORING	PCASEY	5611	BWL	FY80	.159	0.000	0.000	0.000
TOTAL = .159 TECH AREA IS MPTS								
8107 CREEPFEEDCRUSHFORMGRINDIND	PCASEY	5611	BWL	FY79	.073	0.000	0.000	0.000
TOTAL = .730E-01 TECH AREA IS MPTS								
8116 SQUEEZECASTOFCANNONCOMPS	MPOWIS	5443	BWL	FY81	.280	0.000	0.000	0.000
TOTAL = .280 TECH AREA IS MPTS								
8119 DIMSTABILITYOFVIBRATORYENERGY	RFARRARA	5507	BWL	FY81	.099	0.000	0.000	0.000

TOTAL = .99&E-01 TECH AREA IS MPTS								
8120 APPLOFADATRIVECONTROLTECH	RMEINHART	5872	BWL	FY81	.225	0.000	0.000	0.000
TOTAL = .225 TECH AREA IS MPTS								
8135 2NDCRUEXMFGFORMPNSCOMPS			BWL	FY81	.750	0.000	0.000	0.000
TOTAL = .750 TECH AREA IS MPTS								
8136 IMPVDIMPULSEPROGMRSFORMYDRAULICSIMULATORS			BWL	FY81	.080	0.000	0.000	0.000
TOTAL = .800E-01 TECH AREA IS MPTS								
8151 PORTABLEENGRAVINGSYS	VMONTUORI	5224	BWL	FY81	.084	0.000	0.000	0.000
TOTAL = .84&E-01 TECH AREA IS MPTS								
8152 IMPVDANODESTRAIGHTNERSFORCHROMIUMPLTG	TPOCHILY	5717	BWL	FY81	.268	0.000	0.000	0.000
TOTAL = .268 TECH AREA IS MPTS								
8153 IMPVDGUNTUBEMTCAPFORROTARYFORG	FMEISER	5849	BWL	FY81	.336	0.000	0.000	0.000
TOTAL = .336 TECH AREA IS MPTS								
8154 DISTRIBUTEDNC	GANDERSON	5719	BWL	FY81	.337	0.000	0.000	0.000
TOTAL = .337 TECH AREA IS MPTS								
8341 HOLLOWCYLCUTOFFMACH	P CASEY	5611	BWL	FY80	.164	0.000	0.000	0.000
TOTAL = .164 TECH AREA IS MPTS								

TOTALS MILLIONS OF DOLLARS

IN HOUSE =	17.275
GOCO =	6.522
CONTRACTS =	0.000
OTHER AGENCY =	0.000
TOTAL =	23.797

DIVISION

ESPO	MSD	ASD	NUC+FUZE	BWL	M+MTD	
10.282	1.181	0.000	.759	5.213	0.000	IN HOUSE
5.589	.933	0.000	0.000	0.000	0.000	CONTRACTS
0.000	0.000	0.000	0.000	0.000	0.000	GOCO
0.000	0.000	0.000	0.000	0.000	0.000	OGA
15.791	2.034	0.000	.759	5.213	0.000	TOTAL

TECH AREAS

IN HOUSE	CONTRACTS	GOCO	OGA	TOTAL	
2.848	1.314	0.000	0.000	4.162	LAP
5.647	.933	0.000	0.000	6.580	MPTS
.496	.507	0.000	0.000	1.003	POLLUTION
1.161	0.000	0.000	0.000	1.161	SAFETY
2.889	2.217	0.000	0.000	4.306	PROP+EXP
.759	0.000	0.000	0.000	.759	FUZE
.537	.634	0.000	0.000	1.171	ENERGY
3.738	.917	0.000	0.000	4.655	OTHER

LCWSL MMT

FY82 IN MILLIONS OF DOLLARS

PN	PROJECT TITLE	ENGINEER	EXT	DIV	START	IN H	GOCO CONT	OGA
4027	COMBINOSOLVENTRECIVERY/DRYINGS-8PROP	EBOZZA	3241	ESDP	FY80	.423	0.000	0.000	0.000
TOTAL = .423 TECH AREA IS PROP+EXP								
4033	CAUSTICRECOVERYFRSODIUMNITRATESLUDGE	HRICCI	2160	ESPD	FY80	.286	0.000	0.000	0.000
TOTAL = .286 TECH AREA IS PROP+EXP								
4061	NITROGUANIDINEPROCOPT	ALITTY	4496	ESPD	FY80	.944	0.000	0.000	0.000
TOTAL = .944 TECH AREA IS PROP+EXP								
4062	AUTOMFGSYSF/MOTARINCREMENTCONTAINER	PBONNETT	4496	ESPD	FY79	1.439	0.000	0.000	0.000
TOTAL = 1.44 TECH AREA IS LAP								
4071	EXPLOSIVEDUSTHAZARDSINMUNITIONSPLANTS	RRINDNER	4469	ESPD	FY80	.322	0.000	0.000	0.000
TOTAL = .322 TECH AREA IS SAFETY								
4078	UPGRADEMELTPOURSAFETY/READINESS/PROD	PSKERCHOCK	4252	ESPD	FY82	.875	0.000	0.000	0.000
TOTAL = .875 TECH AREA IS PROP+EXP								
4086	REPROCESSINGEXPLOSIVEFINES+DRILLSCRAP	CANDERSON	5839	ESPD	FY80	.633	0.000	0.000	0.000
TOTAL = .633 TECH AREA IS PROP+EXP								
4138	EQUIPF/AUTOPROCOFADDITIVELINER	RHAND	2756	ESPD	FY82	.379	0.000	0.000	0.000
TOTAL = .379 TECH AREA IS LAP								
4145	CONTLORYINGINAUTOSBPROPMFG	RMANNO	6522	ESPD	FY82	.272	0.000	0.000	0.000
TOTAL = .272 TECH AREA IS PROP+EXP								
4189	HIGHFRAGSTEELPRODUCTIONPROCESS	WSHARPE	3742	MSD	FY79	.493	0.000	0.000	0.000
TOTAL = .493 TECH AREA IS MPTS								
4224	ENERGYCONSINSOLRECOVERYOPERATIONS	EKRAJKOWSKI	3241	ESPD	FY82	.229	0.000	0.000	0.000
TOTAL = .229 TECH AREA IS POLLUTION								
4227	DISPOSALOFWASTEWATERTREATMENTSLUDGE	OCOLITTI	3544	ESPD	FY82	.431	0.000	0.000	0.000
TOTAL = .431 TECH AREA IS POLLUTION								
4229	ADVANCEDPINKWATERTREATMENT	BJACKSON	3749	ESPD	FY82	.379	0.000	0.000	0.000
TOTAL = .379 TECH AREA IS POLLUTION								
4231	INHOUSEREUSEOFPOLLUTIONABATEDWATERS	DFREEMAN	4256	ESPD	FY80	.303	0.000	0.000	0.000
TOTAL = .303 TECH AREA IS POLLUTION								
4237	CONTINTPROCENGINEERING	RWOLFF	4122	ESPD	FY73	.354	0.000	0.000	0.000
TOTAL = .354 TECH AREA IS PROP+EXP								
4251	AUTOMFGOFDELAYASSYF/M549	LWEINER	5538	ESPD	FY82	.993	0.000	0.000	0.000
TOTAL = .993 TECH AREA IS LAP								
4253	PACK/UNPACKMORTARPROPCHARGES	DANDERSON	4626	ESPD	FY80	.614	0.000	0.000	0.000
TOTAL = .614 TECH AREA IS PROP+EXP								
4267	IMPROVEDPROCFORGRANULARCOMPB	LSOTSKY	2160	ESPD	FY75	.757	0.000	0.000	0.000
TOTAL = .757 TECH AREA IS PROP+EXP								
4281	CONSERVATIONOFENERGYAIARMYAMMOPLANTS	JSWOTINSKY	3998	ESPD	FY75	1.690	0.000	0.000	0.000
TOTAL = 1.69 TECH AREA IS ENERGY								
4285	TNTEQUIVTESTFORSAFETYENGINEERING	PPRICE	3022	ESPD	FY76	.251	0.000	0.000	0.000

TOTAL = .251 TECH AREA IS SAFETY								
4291 BLASTEFFECTSINMUNPLANTENVIRONMENT	PPRICE	1622 ESPD	FY76	.359	0.000	0.000	0.000
TOTAL = .359 TECH AREA IS SAFETY								
4295 TERTIARYTREATMENT	BJACKSON	4488 ESPD	FY82	.152	0.000	0.000	0.000
TOTAL = .152 TECH AREA IS POLLUTION								
4298 EDALOFHEXAMINERECYCLEONHAAP9-LINE	DFREEMAN	4256 ESPD	FY82	.399	0.000	0.000	0.000
TOTAL = .399 TECH AREA IS PROP+EXP								
4309 AMMUNITIONFORTHE120MMTANKMAUNARMAMENT	JMOLA	3320 ESPD	FY79	3.948	0.000	0.000	0.000
TOTAL = 3.95 TECH AREA IS OTHER								
4311 DEVINITIALAUTOPRODFORLAPM692MINEDISPSYST	LWEINER	6586 ESPD	FY76	.466	0.000	0.000	0.000
TOTAL = .466 TECH AREA IS LAP								
4318 NITRATEESTERSENVIRONMENTIMPACT	RRINDNER	6119 ESPD	FY82	.218	0.000	0.000	0.000
TOTAL = .218 TECH AREA IS POLLUTION								
4368 DEVAUTOPRODEQUIPF/SEALM55	PMONTELEONE	5389 ESPD	FY82	.672	0.000	0.000	0.000
TOTAL = .672 TECH AREA IS LAP								
4369 IMPVDPROJCAVITYSURFACE	DGUSTAD	2522 MSD	FY82	.557	0.000	0.000	0.000
TOTAL = .557 TECH AREA IS MPTS								
4374 EXPLSAFETYSHIELDS	JCALTAGIRONE	6119 ESPD	FY82	.197	0.000	0.000	0.000
TOTAL = .197 TECH AREA IS SAFETY								
4385 CENTERCOREIGNITER	ELISCHICK	4162 ESPD	FY82	.542	0.000	0.000	0.000
TOTAL = .542 TECH AREA IS LAP								
4399 INSTRUIN-PROCESSMEASSOLIDLIQUIDTNT	RMANNO	6522 ESPD	FY82	.166	0.000	0.000	0.000
TOTAL = .166 TECH AREA IS PROP+EXP								
4404 IMPVDRECOFACETICACIDINRDXMFG	IWEISMAN	3859 ESPD	FY82	.250	0.000	0.000	0.000
TOTAL = .250 TECH AREA IS PROP+EXP								
4406 INPVDYEILDOFHMX	RGOLDSTEIN	6622 ESPD	FY82	.655	0.000	0.000	0.000
TOTAL = .655 TECH AREA IS PROP+EXP								
4422 L/APROTOEQUIPCOMBEFFECTSMUN	JSMARZ	5727 ESPD	FY82	1.162	0.000	0.000	0.000
TOTAL = 1.16 TECH AREA IS LAP								
4429 IMPRS4F/USEOFCOMAVAILCOMPSOFHGHTEQUIP	OANDERSON	4626 ESPD	FY82	.379	0.000	0.000	0.000
TOTAL = .379 TECH AREA IS SAFETY								
4445 DETONATERWASTETREATMENT	OCOLITTI	3544 ESPD	FY82	.428	0.000	0.000	0.000
TOTAL = .428 TECH AREA IS POLLUTION								
4446 AQVAIREMISSIONABATEMENT	JCARRAZZA	6349 ESPD	FY82	.418	0.000	0.000	0.000
TOTAL = .418 TECH AREA IS POLLUTION								
4449 PROCIMPROVEMENTFORCOMPC4	HRICCI	3760 ESPD	FY78	.531	0.000	0.000	0.000
TOTAL = .531 TECH AREA IS PROP+EXP								
4452 REPROCESSALOGDEMILEXPL	LHONABLEH	3239 ESPD	FY82	.278	0.000	0.000	0.000
TOTAL = .278 TECH AREA IS PROP+EXP								
4453 DETPROPAGATIONAVOIDF/ENERGETICMATLS		ESPD	FY82	.201	0.000	0.000	0.000
TOTAL = .201 TECH AREA IS SAFETY								
4492 WATERDELUGSYSAAPLINMUNPLANTS	RRINDNER	6119 ESPD	FY82	.303	0.000	0.000	0.000
TOTAL = .303 TECH AREA IS POLLUTION								
7730 MFGOFSPLITRINGBREECHSEALS	PCASEY	5611 SWL	FY79	.106	0.000	0.000	0.000

TOTAL = .106 TECH AREA IS MPTS								
7926 HOTISOSTATICPRESSOFLGORDCOMP	PTHORNTON	5617 BWL	FY80	.290	0.000	0.000	0.000	
TOTAL = .290 TECH AREA IS MPTS								
8024 HIGHSPEEDABRASIVEBELTGRIND	PCASEY	5611 BWL	FY80	.140	0.000	0.000	0.000	
TOTAL = .140 TECH AREA IS MPTS								
8050 RECYCLEOFSCRAPTUBESBYESR	VCOLANGELO	5517 BWL	FY82	.201	0.000	0.000	0.000	
TOTAL = .201 TECH AREA IS MPTS								
8062 RAPIDINTERNALTHREDING	JRODD	5946 BWL	FY80	.338	0.000	0.000	0.000	
TOTAL = .338 TECH AREA IS MPTS								
8102 POWDERMETALLURGYFORGMPNSCOMPS	PTHORTON	4129 BWL	FY81	.131	0.000	0.000	0.000	
TOTAL = .131 TECH AREA IS MPTS								
8103 HIGHVELOCITYMACHINING	HGOODHEIN	5507 BWL	FY82	.036	0.000	0.000	0.000	
TOTAL = .360E-01 TECH AREA IS MPTS								
8106 LOCALPOWDERCHAMBERBCRING	GCONLON	5611 BWL	FY80	.071	0.000	0.000	0.000	
TOTAL = .710E-01 TECH AREA IS MPTS								
8117 SHAPEDCASTINGSOFESRSTEEL	VCOLANGELO	5517 BWL	FY82	.204	0.000	0.000	0.000	
TOTAL = .204 TECH AREA IS MPTS								
8151 PORTABLEENGRAVINGSYS	VMONTUORI	5224 BWL	FY81	.168	0.000	0.000	0.000	
TOTAL = .168 TECH AREA IS MPTS								
8237 CARRIERHOUSINDMACHININGOFFIVOTHOLES	RDEMEO	5737 BWL	FY82	.101	0.000	0.000	0.000	
TOTAL = .101 TECH AREA IS MPTS								
8238 BORINGBREECHRINGLUGS	AMAKEULENKO	5611 BWL	FY82	.200	0.000	0.000	0.000	
TOTAL = .200 TECH AREA IS MPTS								
8239 IMPVDMACHININGOFRAILS	GCONLON	5737 BWL	FY82	.250	0.000	0.000	0.000	
TOTAL = .250 TECH AREA IS MPTS								
8241 COMPUTERDIAGACONTLFORBOREGUIDANCE	MSULLIVAN	5517 BWL	FY82	.303	0.000	0.000	0.000	
TOTAL = .303 TECH AREA IS MPTS								
8242 DUALPRESSSTRAIGHTENINGGUNTUBE	RFARRARA	5507 BWL	FY82	.118	0.000	0.000	0.000	
TOTAL = .118 TECH AREA IS MPTS								
8243 COMPUTRCNTLFORELECTRODEPOSITIONSYS	TPOCHILY	5187 BWL	FY82	.296	0.000	0.000	0.000	
TOTAL = .296 TECH AREA IS MPTS								
8244 OPTHEATTREATMENTOFROTARYFORGEDTUBES	CCALDERONE	4179 BWL	FY82	.286	0.000	0.000	0.000	
TOTAL = .286 TECH AREA IS MPTS								
8245 APPLOFEROSIONRESISTLCCHROMIUMPLATE	GDeANDREA	5003 BWL	FY82	.237	0.000	0.000	0.000	
TOTAL = .237 TECH AREA IS MPTS								
8246 GASCHECKSEATFINISHING	CLAROSS	5590 BWL	FY82	.151	0.000	0.000	0.000	
TOTAL = .151 TECH AREA IS MPTS								
8252 INDUCTIONHEATINGOFVARYINGDIAPREFORM	DCONCORDIA	5872 BWL	FY82	.237	0.000	0.000	0.000	
TOTAL = .237 TECH AREA IS MPTS								
8253 MACHTOOLDYNMEASADIAG	RWHARTON	5872 BWL	FY82	.187	0.000	0.000	0.000	
TOTAL = .187 TECH AREA IS MPTS								
8256 IMPVDNFGPROCFORFIRECNTLREG	BROSE	5611 BWL	FY82	.257	0.000	0.000	0.000	
TOTAL = .257 TECH AREA IS MPTS								
8341 HALLOWCYCLCUTOFFMACH	JRODD	5946 BWL	FY80	.600	0.000	0.000	0.000	

TOTAL = .600 TECH AREA IS MPTS

**********TOTALS MILLIONS OF DOLLARS**********

IN HOUSE =	29.256
GOCO =	0.000
CONTRACTS =	0.000
OTHER AGENCY =	0.000
TOTAL =	29.256

DIVISION

ESPD	MSD	ASD	NUC+FUZE	BWL	M+MTD	
23.298	1.050	0.000	0.000	4.908	0.000	IN HOUSE
0.000	0.000	0.000	0.000	0.000	0.000	CONTRACTS
0.000	0.000	0.000	0.000	0.000	0.000	GOCO
0.000	0.000	0.000	0.000	0.000	0.000	OGA
23.298	1.050	0.000	0.000	4.908	0.000	TOTAL

TECH AREAS

IN HOUSE	CONTRACTS	GOCO	OGA	TOTAL	
5.724	0.000	0.000	0.000	5.724	LAP
5.887	0.000	0.000	0.000	5.887	MPTS
2.861	0.000	0.000	0.000	2.861	POLLUTION
1.709	0.000	0.000	0.000	1.709	SAFETY
7.437	0.000	0.000	0.000	7.437	PROP+EXP
0.000	0.000	0.000	0.000	0.000	FUZE
1.690	0.000	0.000	0.000	1.690	ENERGY
3.948	0.000	0.000	0.000	3.948	OTHER

07/29/00

126476	1BLASTENVIR(APPLTECH)	JAN76/JAN76	JUN76/JUN76			E
126476	2BLASTSUPPRESSION	JAN76/JAN76	JUL76/JUL76			E
126476	3FRAGENVIR	JAN76/JAN76	DEC76/DEC76			E
126476	4FRAGSUPPRESSION	JAN76/JAN76	DEC76/DEC76			E
126476	5ANALOFGROUPSHIELDDATA	JAN76/JAN76	OCT77/JAN78			E
126476	6STRUCTURALRESPONSE	JAN76/JAN76	DEC76/DEC76			E
126476	1FINISHES(SUPPORTENGR)	JAN76/JAN76	MAR76/MAR76			E
126476	2LINERS	JAN76/JAN76	MAR77/MAR77			E
126476	3UTILITIES	JAN76/JAN76	SEP76/DEC76			E
126476	4REHABILITATION+REPAIR	JAN76/JAN76	SEP76/DEC76			E
126476	5ENVIRONMENTFACTORS	JAN76/JAN76	SEP76/DEC76			E
126476	1PLANTSTUDY(OPERAPPLS)	DEC76/DEC76	OCT76/OCT76			E
126476	2ECOANAL	MAR75/MAR75	DEC76/DEC76			E
126476	3APPLANAL	MAR75/MAR75	SEP77/MAR77			E
126476	1PREPAREPLANS(HDBK)	JUL76/JUL76	JUL76/JUL76			E
126476	2PREPDRAFT	AUG76/SEP76	MAY77/MAY77			E
126476	3REVIEWDRAFT	JUN77/AUG77	JUL77/AUG77			E
126476	4SAFETYAPPVSUBMISSION	SEP77/SEP77	OCT77/OCT77			E
126477	1MODGROUP3SHIELD(OPERAPPLS)	DEC76/DEC76	JUN77/AUG77			E
126477	2DSGNGROUP1SHIFLD	DEC76/DEC76	JUN77/SEP77			E
126477	1PROPTESTSGROUP5SHIELD(SUPPORTENGR)	FEB77/FEB77	JUN77/FEB78			E
400071	STUDYOFAVAILTECH+EQUIPFORDETPROD	NOV72/NOV72	JUN73/JUN73			E
400071,73	CONCEPTOFNEWTECHNIQUES+EQUIP	MAR73/MAR73	JUN74/JUN74			E
400073,74	EVALUATECONCEPTPROOFMODELS	AUG73/AUG73	DEC74/DEC74			E
400074,77	CONDUCTFREEFLOWNOLQUALTESTPROG	AUG76/AUG76	JUL78/MAR78	(ADD)		E
400074,77	LODELETW/PA13ONSHIPSTORE+TEST	MAR79/MAR79	DEC80/	(DEL)		E
400075,76	AWARDCONTRACT	FEB75/JAN75	AUG75/DEC75			E
400076	DEVELOPSYSTEMCONCEPT	JAN76/JAN76	APR76/NOV76			E
400076	DEVELOPPROTOTYPECONCEPT	SEP75/JUN76	DEC75/MAY76	(ADD)		E
400076	APPVSYSTEMCONCEPT			(DEL)		E
400076	APPVCONCEPT	NOV75/MAY76	APR76/MAY76			E
400076	DESIGNPILOTLINE	APR76/JUN76	OCT76/DEC76			E
400076	APPVPILOTLINEDESIGN	JUL76/MAR77	OCT76/MAR77			E
400076	PREPARESCOPEOFWORK(PHASE1)	SEP76/SEP76	DEC76/DEC76	(ADD)		E
400076,77	DESGNBUILD+TESTINSPCTEQUIP	JUL78/	DEC78/	(DEL)		E
400076,77	BUILDPILOTLINE	OCT76/	MAR78	(DEL)		E
400076,77	COMPIOWACHARACTERIZATIONPROG	MAR76/MAR76	OCT77/NOV77	(ADD)		E
400077,76	APPVDESIGN	JUL76/MAR77	OCT76/MAR77	(ADD)		E
400077	LOADERCONCEPTCOMPARISON	OCT76/OCT76	MAR77/MAR77	(ADD)		E
400077	AWARDCONTRACT(PHASE1)		JUN78	(DEL)		E
400077	CONC+DSGNAUTOINSPCTEQUIPFOREMPTDETCUP	SEP77/SEP77	MAR78/MAR78	(ADD)		E
400077,78,79	FAB+TESTAUTOINSPCTEQUIPFOREMPTYCUPS	MAR78/MAR78	SEP80/	(ADD)		E
400077	CONC+DSGNAUTOINSPCTEQUIPFORASSEMBDET	SEP77/SEP77	MAR78/JAN79	(ADD)		E
400077,78,79	FAB+TESTAUTOINSPCTFORASSEMBDET	MAR78/APR79	DEC80/	(ADD)		E
400077	CONC+DSGNAUTOPKG+PACKEQUIP	OCT77/NOV77	MAR79/	(DEL)		E
400077,78,79	FAB+TESTAUTOPKG+PACKEQUIP	MAR79/	SEP80/	(DEL)		E
400077	INITIATEMOTMELTSEALOFDETSPROGRAM	OCT77/	APR78/	(DEL)		E
400077,78,79	LOADSEAL+TESTHOTMELTSEALDET+REV+DP	APR78/	FEB80/	(DEL)		E
400077	MONITORMULTITOOLLOADERPROG	JUL77/JUL77	DEC79/DEC79	(ADD)		E
400077	CONDMETERACCURLIFE+HZDTESTOFIOWABALL	OCT77/	OCT78/	(DEL)		E
400077,78,79	DEVPROCTOOL+EQUIPFORULTRASONICSEALDET	NOV78/SEP78	SEP80/	(ADD)		E
400077,78	FAB+TESTAUTODETLACQUERMECHANISM	SEP77/SEP77	MAR80/	(DEL)		E
400077,78	FAB+TESTIMPVDVACUUMSYST	SEP77/SEP77	AUG79/AUG79	(ADD)		E
400078	REVISEPILOTLINEDESIGN	SEP78/	FEB79	(DEL)		E
400078	AWARDCONTRACT(PHASE2)		NOV78/	(DEL)		E
400078	TEST+DEBUG	APR78/	AUG78/	(DEL)		E
400078	AWARDCONTRACT(PHASE3)		NOV79/	(DEL)		E
400078	ACCEPTTEST	AUG78/	SEP78/	(DEL)		E
400078	ASSEMTEST+MODIFY	SEP79/	DEC79/	(DEL)		E
400078	SHIP+INSTALLATARRADCOM	SEP78/	MAR79/	(DEL)		E
400078,79	TEST+EVALATARRADCOM	APR79/	AUG79/	(DEL)		E
400078	PROTOTYPETECHDATAPACK	SEP78/	OCT78/	(DEL)		E
400078,79	FAB+TESTAUTOEXPLOSIVES+RESUPPLYSYST	SEP77/SEP77	JUL78/	(DEL)		E
400078	FAB+TESTIMPVDMACHUNLOAD+TRAYDEVICE	SEP77/	JUL78/	(DEL)		E
400078	FINALREPORT/TDP	APR79/	MAR81/	(DEL)		E
400079,80,81	FINALREPORT/TDP	APR79/APR79	SEP81/	(ADD)		E

400080	FINALREPORT	AUG79/	NOV79/	(DEL)	E
400080.81	SYSTEMINTEGRATION	MAR80/	MAR81/	(ADD)	E
400079.80	METERINGACCURACY	FEB79/FEB79	APR80/MAR80	(ADD)	E
400077	FINAL301RPT		SEP80/	(ADD)	E
400078	FINAL301RPT		SEP80/	(ADD)	E
400079	FINAL301RPT		DEC80/	(ADD)	E
400080	FINAL301RPT		JUN81/	(ADD)	E
400081	OVERALLPROJFINAL301RPT		SEP81/	(ADD)	E
400779	RECEIPTOFFUNDS	JAN79/	JAN79/		E
400779	ENGINEERINGDESIGN	JAN79/	APR79/		E
400779	EQUIPPROCUREMENT	MAR79/	JUN79/		E
400779	SOPPREPARATION	MAY79/	JUN79/		E
400779	EQUIPINSTALLATION	JUN79/	JUL79/		E
400779.80	EQUIPOPERATION	AUG79/	FEB80/		E
400780	DATAEVALUATION	OCT79/	FEB80/		E
400780	ECONOMICEVALUATION	JAN80/	FEB80/		E
400780	DESIGNREVIEW	FEB80/	APR80/		E
400780	PREPAREFINALENGINEERINGREPORT	FEB80/	APR80/		E
400974	ANAL*DEFASSY*PACKCRITERIA	AUG73/SEP73	OCT73/OCT73		E
400974	PROJSYSTCONCEPTCOMP*APPVD	SEP73/SEP73	NOV73/NOV73		E
423680	DELTOLOADPLANT	MAY81/	JUN81/		E
423680	DELTDP^FINALTECHRPT		SEP81/		E
400974	PREPAREINITIALSCOPEOFWORK	NOV73/NOV73	JAN74/JAN74		E
400974	PREPARESCOPESOFWORKFORTASKS1,2*3	NOV73/NOV73	MAR74/MAR74	(ADD)	E
400974	HIGHERAUTHORITYPROCEEDDECISION	JAN74/JAN74	FEB74/FEB74		E
400974	MODIFYSCOPEOFWORK	FEB74/FEB74	MAR74/MAR74		E
400974	AWARDCONTRACT	FEB74/	JUN74/	(DEL)	E
400974	AWARDCONTRACTFORTASK1	FEB74/FEB74	OCT74/NOV74	(ADD)	E
400974	MODIFYSCOPEOFWORKFORTASK2	JUL74/JUN74	SEP74/SEP74	(ADD)	E
400974	PROTOTYPEDESIGNSUBMITTED	AUG74/	SEP74/	(DEL)	E
400974.75	AWARDCONTRACTFORTASK2	SEP74/SEP74	JUL75/JUN75	(ADD)	E
400974	PROTOTYPEDESIGNAPPVD	SEP74/	OCT74/	(DEL)	E
400974	DSGN*BUILDPROTOEQUIP	OCT74/	MAY75/	(DEL)	E
400974	TESTPROTOEQUIP	MAY75/	JUN75/	(DEL)	E
400974	INSTALLPROTOEQUIPONASSYLINE	JUN75/	AUG75/	(DEL)	E
400974	TEST*EVALUATEPROTOEQUIP	AUG75/	DEC75/	(DEL)	E
400974	TECHDATAPACKAGECOMPLETE	OCT74/	JUN76/	(DEL)	E
400974.75	DSGNFAB*TESTPROTOEQUIPFORTASK2	JUL75/JUN75	NOV77/JUN78	(ADD)	E
400974.75	TECHDATAPKGFORTASK2	OCT74/NOV74	FEB78/OCT79	(ADD)	E
400974.75.76	INSTALLCOMPLETE	NOV77/	DEC77/	(DEL)	E
400974.75.76	PROTOTYPEACCEPTED	DEC77/JAN78	JAN78/AUG78	(ADD)	E
400974.75.76	ALLWORKCOMPLETE	JAN78/DEC78	MAR78/FEB80	(ADD)	E
401273	DSGNEQUIP	DEC72/DEC72	SEP73/AUG73		E
401273	PROCUREEQUIP	JUN73/NOV73	JUN74/FEB76		E
401273	MODBUILDING	MAR74/JAN75	JUN74/NOV75		E
401273	INSTALLEQUIP	JUN74/OCT76	SEP74/FEB76		E
401273	HAZARDSANAL	FEB73/FEB73	DEC74/FEB76		E
401275	RCPTOFADDFUND	NA/NA	MAR75/MAR75		E
401275	INSTALLEQUIP	JUL75/FEB76	DEC75/DEC76		E
401275	DEBUGSYST	SEP76/SEP76	SEP77/NOV79	(ADD)	E
401275	EVALSYST(INERT)	SEP76/AUG78	AUG79/DEC79	(ADD)	E
401275	EVALSYST(LIVE)	DEC79/	DEC79/	(DEL)	E
401275	PREPPRELIMDSGNCRITERIA	JAN79/JAN79	DEC77/MAY80	(ADD)	E
401275	HAZARDSANALYSIS	FEB76/FEB76	JUN76/JUN80		E
401275	GUNFIRINGS	DEC79/	MAR79/	(DEL)	E
401275	FINALRPT	APR76/APR76	JUN76/JUN80		E
402477	CONSTOT155MMM483PROJ	OCT77/OCT77	JUN79/		M
402479	PREPSCOPEOFWORK	AUG78/AUG78	SEP78/MAR79		M
402479	RECEIVEFUNDS	OCT78/DEC78	OCT78/DEC78		M
402479	AWARDCONT	APR79/APR79	SEP79/SEP79		M
402479	BUILDMOCKUPS*PROVEOUT	FEB79/	APR79/	(DEL)	M
402479	MAKEDETAILDWGS*SPECS	SEP79/SEP79	JUN80/		M
402479	REVIEWDWGS*SPECS	FEB80/FEB80	JUL80/		M
402479	BUILDPROTO*DEBUGG	JUL80/	FEB81/		M
402479	ACCEPTOFPROTO	FEB81/	JUN81/		M
402479	PREPTDP	MAY81/	AUG81/		M

402479	REVIEWTOP	AUG81/	SEP81/		M
403380	DETTHERMALDECOMPDSGNPAR	JAN80/FEB80	APR80/APR80		E
403380	DETENGRPARFORCONVNO2NITRICACID	MAR80/APR80	JUN80/		E
403380	SUROFINDUSTRIALEQUIP	APR80/APR80	JUN80/		E
403380	DSGNCRIT	JUN80/	OCT80/		E
403380	DSGNPILOTPLANT	JUL80/	OCT80/		E
403380	PROJPHYSCOMPL	OCT80/	OCT80/		E
403380	PROJFISCALCOMPL	NOV80/	NOV80/		E
403380	PROJCLOSEOUT	JAN81/	JAN81/		E
404171	ESTABEQUIPDSGNPREPSCOPEINTGW/AUTOLINE	APR72/JAN72	SEP72/JUN74		E
404171,75,76	AWARDCONTRACT(60MM+81MM)	JUN72/OCT75	JUN72/MAR76		E
404171	TESTPROTOATCONTRACTOR(60MM)	FEB73/	MAR73/	(DEL)	E
404171	DSGNMODIFICATIONS(81MM)	MAR73/	APR73/	(DEL)	E
404174	INSTALLPROTOATAOCO(60MM)	APR73/	MAY73/	(DEL)	E
404174	TESTDSGNMOD+EVALRESULTS(60MM)	JUN73/	JUL73/JAN80	(DEL)	E
404174	APPROVEFINALREPORT(60MM+81MM)	AUG73/	AUG73/	(DEL)	E
404174	FINALIZETOP(60MM)	SEP73/	OCT73/	(DEL)	E
404174	FINALIZETOP(81MM)	OCT73/	NOV73/	(DEL)	E
404175,76	DSGNEQUIP(60MM)	JUN72/MAR76	SEP72/	(DEL)	E
404175,76	CONCEPT/DSGNEQUIP(60MM+81MM)	APR76/MAR76	DEC77/JUL78	(ADD)	E
404176	BUILDEQUIP(60MM)PWDRWEIGHFILLHISPUSC	NOV77/DEC77	JAN79/MAY79	(ADD)	E
404178	AMENDCONTRACTFORBUILDREMAINSTASPACKO	JAN78/JAN78	JUN78/JUL78	(ADD)	E
404178	BUILDREMAINPROTOSTASPACKOUT	JUL78/JUL78	JUL80/	(ADD)	E
404178	TESTPROTOSTASATMAAP	AUG80/	SEP80/	(ADD)	E
404178	FINALIZETOP	JUL80/	SEP80/	(ADD)	E
404679	RECEIPTOFFUNDS	JUN79/JUN79	JUN79/JUN79		E
404679	PROJECTPREPARATION	JUN79/JUN79	JUL79/JUL79		E
404679	INITAUTOANALEQUIPMENTCONCEPTS	JUL79/JUL79	AUG79/AUG79		E
404679	AUTOEQUIPMODELS</DEMO	AUG79/AUG79	SEP79/SEP79		E
404679	CONTRACTAWARDTOEQUIPMFGRS	AUG79/AUG79	JAN80/JAN80		E
404679	DESIGNREVIEW	FEB80/FEB80	FEB80/FEB80		E
404680	SHIP	FEB80/FEB80	MAR80/MAR80		E
404680	INSTALLEQUIPATRAINATLSAAP	MAR80/MAR80	APR80/APR80		E
404680	DEVELOPMENTOFPROCEDURE	MAR80/MAR80	APR80/APR80		E
404680	DEBUG	APR80/APR80	MAY80/MAY80		E
404680	TESTS	MAY80/MAY80	SEP80/		E
404680	ACCEPTATLONESTAR	SEP80/	OCT80/		E
404680	PROJPHYSICALCOMPLETION	OCT80/	OCT80/		E
404680	PROJFISCALCOMPLETION	OCT80/	NOV80/		E
404680	FINANICALCLOSEOUT/FINALRPT	SEP80/	NOV80/		E
404680	FINALRPT301		DEC80/	(ADD)	E
405074	PHASE1FEASSTUDYDESIGN	OCT73/OCT73	MAR74/MAR74		E
405074	AWARDCONTRACT	MAR74/MAR74	APR74/APR74		E
405074	FEASIBILITYSTUDY	MAY74/SEP74	NOV74/MAY75		E
405074	PHASE2FLASHREDUCELOADPROTOEQUIP	OCT74/DEC74	NOV74/MAY75		E
405075	AWARDCONTRACTFORPROTOEQUIPFORDSGNTEST	FEB75/JAN76	MAY75/MAR76		E
405075	PROTOEQUIPFABATCONTRACTORPLANT	MAY75/MAR76	MAR79/APR79		E
405075	DELAVERYINSTALL+PROVEPROTOEQUIPATLP	DEC79/	JUN80/	(DEL)	E
405075	FINALIZETECHDATAPKG	DEC79/	SEP80/		E
405075	MODIFYCONTRACTFORPROTOCOMPLETION	MAY78/MAY78	JUL78/JUL78	(ADD)	E
405075	DELPROTOTOINAAP	APR80/MAY80	MAY80/MAY80	(ADD)	E
405075	FINALTECHRPT	JUN80/	SEP80/	(ADD)	E
405075	FINAL301RPT		DEC80/	(ADD)	E
405179	RECPTOFFUNDING		OCT78/DEC78		E
405179	TECHREV+INDSURVEY	JAN79/JAN79	SEP79/SEP79		E
405179	EVALOFINSTRUMENTATION	SEP79/NOV79	NOV79/NOV79		E
405179	DOC+FINALRPT	NOV79/NOV79	JAN80/JUN80		E
405179	PROJPHYSCOMPL		JUN80/JAN80		E
405179	PROJFISCCOMPL		JUL80/JAN80		E
405179	PROJCLOSEOUT		AUG80/MAR80		E
405472	FEASSTUDY		APR72/APR72		E
405472	MOCKUPDSGN	APR72/APR72	APR72/APR73		E
405472	MOCKUPFAB	MAY72/JUN73	AUG72/JUN73		E
405472	DSGNTEST	APR72/JUN73	SEP72/JUN73		E
405472	LOADPLANTTEST	SEP72/JUL73	OCT72/OCT73		E
405474	AWARDCONTR(PRINTSYS)	MAY74/MAY74	MAY74/MAY74		E

405474	PROTODSGN(PRINTSYS)	MAY74/MAY74	SEP74/OCT74			E
405474	PROTOFAB(PRINTSYS)	JUN74/JUN74	NOV74/FEB75			E
405474	DSGNTEST(PRINTSYS)	NOV74/OCT76	DEC76/NOV76			E
405474	AWARDCONTR(DEFECTSYS)	JUL76/JUL76	JUL76/JUL76			E
405474	PROTODSGN(DEFECTSYS)	AUG76/AUG76	SEP76/SEP76			E
405474	PROTOTEST(DEFECTSYS)	JAN77/APR77	FEB77/MAY77			E
405474	MERGEBOTHSYS	FEB77/MAY77	FEB77/MAY77			E
405474	OVERALLSYSTEST	MAR77/JUN77	MAR77/SEP77			E
405474	TDPRELTOARRCOM					E
405472	FEASTDY		OCT71/JAN72			E
405472	PROTODSGN	DEC71/SEP72	JAN72/SEP74			E
405472	PROTOFAB	JUN72/JUL73	SEP72/			E
405472	PROTODSGNTEST	SEP72/	OCT72/			E
405472	PROTOLOADPLANTTEST	OCT72/	NOV72/		(DEL)	E
405472	TDPRELTOARRCOM	JAN73/	JAN73/			E
405474	PROTOFAB		JAN75/JAN75			E
405474	PROTOMOD	JAN78/MAY78	AUG78/DEC78		(ADD)	E
405474	PROTODSGNTEST	FEB73/MAR73	NOV75/DEC78			E
405474	TDPRELTOARRCOM	JAN75/	JAN75/		(DEL)	E
405474	SHIPMACHTOARRADCOM	JUN79/MAR80	JUN79/MAR80		(ADD)	E
126476	1BLASTENVIR(APPLTECH)	JAN76/JAN76	JUN76/JUN76			E
126476	2BLASTSUPPRESSION	JAN76/JAN76	JUL76/JUL76			E
126476	3FRAGENVIR	JAN76/JAN76	DEC76/DEC76			E
126476	4FRAGSUPPRESSION	JAN76/JAN76	DEC76/DEC76			E
126476	5ANALOFGROUPSHIELDDATA	JAN76/JAN76	OCT77/JAN78			E
126476	6STRUCTURALRESPONSE	JAN76/JAN76	DEC76/DEC76			E
126476	1FINISHES(SUPPORTENGR)	JAN76/JAN76	MAR76/MAR76			E
126476	2LINERS	JAN76/JAN76	MAR77/MAR77			E
126476	3UTILITIES	JAN76/JAN76	SEP76/DEC76			E
126476	4REHABILITATION+REPAIR	JAN76/JAN76	SEP76/DEC76			E
126476	5ENVIRONMENTFACTORS	JAN76/JAN76	SEP76/DEC76			E
126476	1PLANTSTUDY(OPERAPPLS)	DEC76/DEC76	OCT76/OCT76			E
126476	2ECOANAL	MAR75/MAR75	DEC76/DEC76			E
126476	3APPLANAL	MAR75/MAR75	SEP77/MAR77			E
126476	1PREPAREPLANSTHDBK)	JUL76/JUL76	JUL76/JUL76			E
126476	2PREPDRAFT	AUG76/SEP76	MAY77/MAY77			E
126476	3REVIEWDRAFT	JUN77/AUG77	JUL77/AUG77			E
126476	4SAFETYAPPVSUBMISSION	SEP77/SEP77	OCT77/OCT77			E
126477	1MODGROUP3SHIELD(OPERAPPLS)	DEC76/DEC76	JUN77/AUG77			E
126477	2DSGNGROUP1SHIFLD	DEC76/DEC76	JUN77/SEP77			E
126477	1PROPTESTSGROUP5SHIELD(SUPPORTENGR)	FEB77/FEB77	JUN77/FEB78			E
400779	RECEIPTOFFUNDS	JAN79/	JAN79/			E
400779	ENGINEERINGDESIGN	JAN79/	APR79/			E
400779	EQUIPPROCUREMENT	MAR79/	JUN79/			E
400779	SUPPREPARATION	MAY79/	JUN79/			E
400779	EQUIPINSTALLATION	JUN79/	JUL79/			E
400779,80	EQUIPOPERATION	AUG79/	FEB80/			E
400780	DATAEVALUATION	OCT79/	FEB80/			E
400780	ECO[illegible]CEVALUATION	JAN80/	FEB80/			E
400780	DESIGNREVIEW	FEB80/	APR80/			E
400780	PREPAREFINAL [illegible]INEERINGREPORT	FEB80/	APR80/			E
402477	CONDSTDY155MM&83PROJ	OCT77/OCT77	JUN79/			M
402479	PREPSCOPEOFWORK	AUG78/AUG78	SEP78/MAR79			M
402479	RECEIVEFUNDS	OCT78/DEC78	OCT78/DEC78			M
402479	AWARDCONT	APR79/APR79	SEP79/SEP79			M
402479	BUILDMOCKUPS+PROVEOUT	FEB79/	APR79/		(DEL)	M
402479	MAKEDETAILDWGS+SPECS	SEP79/SEP79	FEB80/			M
402479	REVIEWDWGS+SPECS	FEB80/	APR80/			M
402479	BUILDPROTO+DEBUGG	FEB80/	FEB81/			M
402479	ACCEPTOFPROTO	FEB81/	JUN81/			M
402479	PREPTDP	MAY81/	AUG81/			M
402479	REVIEWTDP	AUG81/	SEP81/			M
402479	FINALTECHRPT	OCT81/	OCT81/			M
402479	FINAL3081RTP	OCT81/	OCT81/			M
405979	SELOFPARTICLESIZEMONITOR	JUL79/JUL79	AUG79/AUG79			E
405979	PROCUREMENT	AUG79/AUG79	OCT79/NOV79			E

405979	HAZARDSANALYLSIS	JUL79/JUL79	OCT79/APR80	E
405979	EQUIPMOD	SEP79/SEP79	JUL80/	E
405979	INSTALLATION	DEC79/FEB80	JUN80/	E
405979	OPERAEVAL	FEB80/FEB80	OCT80/	E
405979	FINAL3U1RPT	NOV80/	DEC80/	E
405979	FISCALCOMPLETION	AUG80/	FEB81/	E
405979	PROJECTCLOSEOUT	FEB81/	MAR81/	E
406180	REVPROCPAR	MAY80/MAY80	JUL80/	E
406180	REVNSEOPER	AUG80/	OCT80/	E
406180	PREPINTRIMTESTPLAN	MAY80/MAY80	NOV80/	E
406180	PREPFINALTESTPLAN	NOV80/	FEB81/	E
406180	CONDUCTHAZARDSANALYSIS	AUG80/	MAY81/	E
406180	APPVFINALTESTPLAN	FEB81/	MAY81/	E
406279	PROCREV	OCT78/OCT78	MAR79/DEC79	E
406279-80	CONTRAWARDS	MAY80/MAY80	OCT80/	E
406279-80	PROTODSGNCOMPL	OCT80/	JUN81/	E
406279	FINAL3U1RPT	JUL81/	AUG81/	E
406280	SITESEL	OCT80/	MAR81	E
406281-82	EXERCONTROPT	APR80/	JUN81/	E
406280	FINAL3U1RPT	SEP81/	OCT81/	E
406281	PROTOCOMPL	JUL81/	DEC81/	E
406281	VENDORTESTCOMPL	JAN81/	APR82/	E
406281	FINAL3U1RPT	MAY82/	JUN82/	E
406282	PROTOINSTALL	MAY82/	SEP82/	E
406282	PROTOACCEPT	OCT82/	JAN83/	E
406282	TDP	JAN83/	FEB83/	E
406280-82	HAZARDSANAL	OCT80/	FEB83/	E
406282	FINALRPT	JAN83/	MAY83/	E
406282	FINAL3U1RPT	JUN83/	JUL83/	E
406479	RECEIPTOFFUNDS		OCT78/DEC78	E
406479	PREPARESCOPEOFWORK	OCT78/OCT78	DEC78/DEC78	E
406479	PLACECONTRACT	DEC78/JAN79	MAR79/SEP79	E
406479	DESIGNSYSTEM	SEP79/OCT79	NOV79/MAY80	E
406479	HAZARDSANALYSIS	SEP79/OCT79	JUN80/	E
406479	SAFETYTESTSYSTEM	DEC79/FEB80	AUG80/	E
406479	GFMFORDEVELOPMENT	SEP79/SEP79	SEP79/MAR80	E
406479	TDP+DOCUMENTATION	SEP79/SEP79	SEP80/	E
406479	SOWFORPRODUCTIONLINE	JUN80/	SEP80/	E
406479	FINAL3U1RTP		(ADD)	E
408479	PROCROST	OCT78/OCT78	DEC78/DEC78 (ADD)	M
408479	CONTRACTAWARD	JAN79/JAN79	JUN79/MAY79 (ADD)	M
408479	SURVEY+SAMPLECOLLECTION	JUL79/JUL79	SEP79/NOV79	M
408479	LABEVAL+CORRELATION	OCT79/OCT79	JUN80/ (DEL)	M
408479	ONSITECORRELATIONATGOCOPLANT	JUL80/	DEC80/ (DEL)	M
408479	FINALRPTDRAFT	JAN81/	MAY81/	M
408479	FINALRPTPUBLISHED	APR81/	JUN81/	M
410573	PREPCONCEPTOFWORKFEASENGRSTUD/DEFS	OCT72/OCT72	OCT73/OCT73	E
4105 74	PREPSCOPEOFWORK	JAN73/JAN74	MAR73/MAR74	E
4105 74	AWARDCONTRACT	APR73/APR73	SEP73/APR74	E
4105 74	FEASSTUDYCOMPLETED	OCT73/JUN74	MAR74/MAY74	E
4105 74	PREPARESCOPEOFWORKPHASE2	SEP73/SEP74	OCT73/OCT75	E
4105 75	AWARDCONTRACT	DEC74/FEB75	FEB75/JUN75	E
4105 75	COMPLETEDSGNFABPROVEOUTPHASE2	MAR75/JUN75	OCT75/JUL76	E
4105 76	AWARDCONTRACTPHASE3	JUL75/JUL75	DEC75/FEB76	E
4105 76	DSGNASSYINCRMTEQUIP	DEC75/FEB76	MAR76/DEC76	E
4105 76	FAB+PROVEOUTINCRMTASSYEQUIP	APR76/APR76	NOV76/FEB79	E
4105 77	INSTALL+PROVEOUTASSYINCRMT	DEC76/MAY79	MAR77/AUG79	E
4105 77	DEL+TESTINCRMTLOAD+ASSYEQUIP	JUN79/MAY79	AUG79/AUG79 (ADD)	E
4105 77	AWARDCONTRACTPHASE4	JUL76/JAN77	MAR76/JUN77	E
4105 77	DSGNINCRMTPKOUTEQUIP	OCT76/JUN77	DEC76/MAR79	E
4105 77	FAB+PROVEOUTINCRMTPKOUTEQUIP	DEC77/APR78	AUG80/	E
4105 77	INSTALL+PROVEOUTINCRMTPKOUTEQUIP	JUN77/	SEP77/	E
4105 77	INSTALL+PROVEOUTINCRMTW/INCRMTLDGEQ	JUL77/	SEP77/ (DEL)	E
4105 77	DELIVER+TESTINCRMTPKOUTEQUIPATLDPLANT	JUL80/	SEP80/ (ADD)	E
4105 77	FINALIZETDP	FEB79/FEB79	FEB81/	E
410577	FINALPROJSTATRPT	FEB80/MAY80	FEB80/JUN80 (ADD)	E

411469	PROCCNTLCOORDINATE+SUPPORT(TASK1)	JUL68/JUL68	E
411470,73	EVALINCINERATIONMETHODS/EQUIP(VERT)	FEB72/FEB72MAR73/MAR73	E
411470,71	ANALOFVENDORSEQUIP+PROCUREMENT(RAAP)	MAY70/MAY70JUN71/JUN71	E
411470	LITSEARCH+VENDCONTACT(REDWATERDISP)	JAN70/JAN70JUN71/JUN71	E
411470	LABEVAL	DEC70/DEC70JUL71/JUL71	E
411470,71	ID+QUANTOFPROPWASTES	JUL70/JUL70DEC71/DEC71 (ADD)	E
411471	ASSEMTEAMDEFEFFORTWKPLAN+SCHEDULES	OCT70/OCT70JUN71/MAY71	E
411471	INITINVEST+BACKGROUNDSTUDY	NOV70/NOV70SEP71/AUG71	E
411471	PRELIM+FIELDDATAACQUISSURVEYS	MAR71/MAR71NOV72/NOV72	E
411471THRU77	COORD+SUPTACTFORIMPLOFABATEPROGS	OCT70/OCT70SEP79/	E
411471	LITSURVEY(PA,IAT)	DEC70/DEC70MAR71/MAR71	E
411471	SELTECHFORCONTSTUDY	APR71/APR71JUN71/JUN71	E
411471	LABSTUDIES	SEP71/FEB72JUN72/DEC72	E
411471	BENCHSCALEDEMO	JUN72/ JUN73/ (DEL)	E
411471	PROC+INSTALLOFPROTOEQUIP(RAAP)	DEC71/DEC71JUN72/MAY72	E
411471	EVALOFPROTOEQUIP	FEB72/MAY72MAY72/DEC72	E
411471	FINALRPT	MAY72/ JUN72/ (DEL)	E
411471	INTERIMRPT	DEC72/JAN73APR73/APR73 (ADD)	E
411471	ENGRSTUDY+REVIEWINCINERATORTECH(PA)	SEP70/SEP70JUN71/JUN71	E
411471	ACTPILOTSCALEINCINERATOR(VERT)	JAN71/JAN71SEP71/SEP71	E
411471	LITSEARCH(VAAP)	DEC70/DEC70JUN71/JUN71	E
411471	PUROFINSTRUFORANAL	DEC70/DEC70JUN71/APR71	E
411471	STUDYMTHDFORSED+MEAS	SEP70/SEP70JUN71/JUN71	E
411471	ANALEXISTDATAOFCLASSPOLLUTANTS	JAN71/JAN71JUN71/JUN71	E
411471-73	EVALCOMMERAVAILEQUIP	JAN71/JAN71DEC72/DEC72	E
411471-73	INSTALL+EVALPROTO	JAN71/JAN71MAR73/MAR73	E
411471-73	ISSUEINTERIMRPTS	JAN71/JAN71JUN73/JUN73	E
411471	FIELDSTUDYAMBNOX+SO2MONITOR(MONITINS)	DEC71/DEC71JUN72/JUN72 (ADD)	E
411472	ARRDOCUMSELPLANTSURVEYRPTS	SEP71/SEP71OCT72/SEP72	E
411472,73	ANALPROG+ABATETECHS	APR72/MAY72JUL72/JUL73	E
411472,73	FINALRPT	AUG73/SEP73SEP73/MAY74 (ADD)	E
411472,73	PERSMALLSCALEFLUIDBEDFEASSTUDY	APR72/APR72JUN73/JUN73	E
411472,73	INSTALL+EVALOFINCINERATORSYST	JUL71/JUL71DEC73/DEC73	E
411472,73,74	SAFETYHAZARDSSTUDY+ASSOCOPEREVAL	JUL71/JUL71DEC73/DEC73	E
411472	PROGFUND	SEP71/SEP71NOV71/NOV71	E
411472	EVALOFREVERSEOSMOSIS	SEP71/SEP71MAY72/MAY72	E
411472	FINALRPT	MAY72/MAY72JUN72/JUN72	E
411472	CONTPROC(BMI)	MAR72/MAR72AUG72/AUG72	E
411472	PILOTSTDYTOEVALMTHD	JUL71/JUN71DEC71/DEC71	E
411472	STATANALDATA	JAN72/JAN72JUN72/	E
411472,73	TREATOFNITROCELLULOSEWASTES	SEP71/SEP71JUN73/JUN73 (ADD)	E
411472,73,74	DEGRADATIONOFCOLLAGENWASTES	JUL72/JUL72FEB75/FEB75 (ADD)	E
411472,73	PREPDSGNPAR+FINALRPT(RAAP)	JUN73/JUN73SEP73/DEC73	E
411472,73	RPTW/RECFORWATERRECY+CONTAMREC(INAAP)	NOV72/FEB73DEC72/MAR73	E
411472,73	ANALDATAW/INFOONUSEOFWASTEWATER(BAAP)	OCT73/DEC73NOV73/FEB74	E
411472,73	FINALRPTFORWATERRECY/REUSE(HAAP)	SEP73/DEC73DEC73/MAR74	E
411472	IDENTOFSPLINSTOUNEEDS(INSTMUTECH)	JAN72/JAN72JUN73/JUN73 (ADD)	E
411472	LABSTUDYAMBNOX+SO2MONITOR	DEC71/DEC71MAR73/MAR73 (ADD)	E
411472	EMMISCHARDFEXPLWASTEINCR(FREEMAN)	NOV71/NOV71JUN72/JUN72 (ADD)	E
411472	SFTYCNTLUSGNOFEXPLINCR(DUGWAYPG)	JAN73/JAN73JUN73/JUN73 (ADD)	E
411472	INTERIMRPTS	JUN72/JUN72MAY73/MAY73 (ADD)	E
411472	FISCOBLIG	SEP71/SEP71SEP71/SEP71	E
411472	SURVEYSPLANNED(WATERSURVEYS)	SEP71/SEP71DEC71/DEC71	E
411472,73	SURVEYSCOND	SEP71/SEP71JUN73/JUN73	E
411472,74	AEMARPTS	DEC71/DEC71JUN74/JUN74	E
411472,75	DATAEVAL	DEC71/DEC71SEP74/SEP74	E
411473,74	DATAGAPANALPOLLUTEMEMOFR7SELGOCOPLANT	NOV72/NOV72DEC75/DEC75	E
411473	DSGNCRITERIA+SPECS(HAAP)	JUL72/JUL72DEC72/JAN73	E
411473	SELCONTRACTOR+ISSUECONTRACT	OCT72/OCT72MAY73/APR73	E
411473	PILOTPLANTDSGN+FAB	MAY73/MAY73OCT73/NOV73	E
411473	PILOTPLANTINSTALL+TIE-IN	NOV73/DEC73DEC73/MAY74	E
411473	PILOTPLANTEVAL	JAN74/AUG74APR75/JAN78	E
411473	FINALRPT	JAN75/FEB78APR75/DEC79	E
411473THRU76	DSGNPROCINSTALLEQUIP	APR73/APR73AUG78/ (DEL)	E
411473THRU76	DSGNPROCINSTALLREVEQUIP	DEC77/DEC77JUN80/ (ADD)	E
411473	ENGRAPPL	MAR73/MAR73JUL73/AUG73 (ADD)	E

411473	DSGN+INSTALLPILOTPLANT(TNTLINE)	APR73/APR73JUN74/	(DEL)	E
411473	DSGN+INSTALLEQUIP(VAAP)	MAR73/MAR73DEC73/JUL74		E
411473	INTERMRPT-TOTINCINERATIONEFFORT	APR72/APR73SEP73/SEP73		E
411473THRU76	FLUIDBEDMODOFPILOTSCALEINCINERATOR	APR73/APR73MAY76/MAY76		E
411473,75,76	ANAL+EVALOFFLUIDPILOTSCALEINCINERATOR	JUN76/JUN76JUL77/JUN77		E
411473,74,75	MERDECOCOSTANAL	JAN74/JAN74OCT75/MAY78		E
411473	ANALSTUDY	SEP72/SEP72NOV72/NOV72		E
411473	BENCH+INTERMEDSCALEDEMO	DEC72/DEC72JUL73/JAN74		E
411473	FINALRPT	AUG73/FEB74SEP73/MAY74		E
411473	PROGFUND(RAAP)	NOV72/NOV72NOV72/AUG73		E
411473	BENCH-SCALETEST	DEC72/AUG73JUN73/APR74		E
411473	FINALRPT	JUN74/JUN74JUL74/AUG74		E
411473	PROGFUND(VAAP)	NOV72/NOV72NOV72/JAN73		E
411473	PHASEILABSTUDIES	JAN73/JAN73MAY73/MAY73		E
411473	PHASEIIEXPERCONTRIBSTUDYFURNACEMOD	JUN73/JUN73SEP73/NOV73		E
411473	PILOTPLANTTEST+EVAL	OCT73/DEC73NOV73/JAN74		E
411473	FINALRPT	NOV73/FEB74DEC73/MAR74		E
411473	OPTPILOTOPER+SELPROTO	JUN72/ MAR73/	(DEL)	E
411473,74	ON-LINEDEMO	APR73/ DEC74/	(DEL)	E
411473	BENCHSCALESTUDIES(REUSESCRAPPROP)	JUN73/JUN73JAN74/JAN74		E
411473	LABSTUDY(BAAP)	JUN73/JUN73AUG73/AUG73		E
411473	PRELIMRPT	AUG73/SEP73SEP73/NOV73		E
411473	DETSPECSOURCESOFBENZENE+ETHYLACE(BAP)	JUL73/JUL73MAY74/MAY74		E
411473	PROCBENCHSCALEQUIP	NOV73/NOV73MAY74/MAY74		E
411473	EVALEQUIP	FEB74/FEB74JUL74/JUL74		E
411473	EVALPOTMTHDOFELIMSOLVENTS	JUN74/JUN74OCT74/OCT74		E
411473	FINALRPT	SEP74/SEP74JUN75/JUN75		E
411473	INTERIMRPTFOREAPROCSTUDYATHAAP	MAY73/MAY73JAN74/JAN74		E
411473	IDENTOFSPLINSTRUMNEEDS	JUL73/JUL73JUN74/JUN74	(ADD)	E
411473	DEVOFENGRTCSLUBRYMONITOR(OPTICPROBE)	DEC72/DEC72JUL73/JUL73	(ADD)	E
411473	OPTICPROBELAB+PILOTSCALE	DEC72/DEC72DEC73/DEC73	(ADD)	E
411473	EVALOFAMBAIRMONITOR	AUG72/AUG72JUL73/JUL73	(ADD)	E
411473	EVALOFNOXSOURCEMONITORS	SEP72/SEP72AUG73/AUG73	(ADD)	E
411473	EVALOFWATERMONITORSYSTS	JUN73/JUN73MAY74/MAY74	(ADD)	E
411473	DEVPOLAROGRAPHICTYPEMONITOR(NITRO)	SEP72/SEP72JAN74/JAN74	(ADD)	E
411473	FEASSTUYFORRAMANSPECTRO(TETRANITRO)	JUN73/JUN73SEP73/SEP73	(ADD)	E
411473	FEASSTUYFORCOLORIMETRY	JUN73/MAY73SEP73/DEC73	(ADD)	E
411473	DEVPIEZOELECTTYPEMONITOR	SEP72/SEP72SEP74/SEP74	(ADD)	E
411473	DEVINFRAREDTYPEMONIT(METHYLNITRATE)	FEB73/FEB73JAN74/JAN74	(ADD)	E
411473	EVALOFPINKWATERMONITOR	APR73/APR73DEC73/DEC73	(ADD)	E
411473	INTERIMRPTS	JUN73/JUN73MAY74/MAY74	(ADD)	E
411473	BKGNDACQUIS	JUL72/JUL72JUN73/JUN73		E
411473	PRELIMDSGNFORMOBILITYTESTSYST	APR73/ SEP73/		E
411473,74	BENCHSCALETESTOFPROMISAPPROACHES	JUL73/MAR73JUN74/		E
411473	SURVEYSPLANNED(AIRSURVEY)	SEP72/MAY72DEC72/DEC72		E
411473,74	SURVEYCOND	NOV72/NOV72JUN74/JUN74		E
411473,74	FEASSTUDYNOSEPPROCESS(WATERBASELUBES)	MAY73/MAY73JUL73/JUL73		E
411473	ACQPERS	DEC72/DEC72JUN73/JUN73		E
411473	PROCEQUIP	DEC72/DEC72JUN73/JUN73		E
411473	ENVIRASSESS	DEC72/JAN73MAY73/JUN73		E
411473	QUARTERLYSURVEY	JAN73/JAN73JAN73/APR73		E
411473	ANNUALPROGRPT	JUN73/JUN73JUN74/DEC74		E
411474,75	POLLUTEREMOFRPMPLANTS+FINALENGRRPT	SEP74/SEP74DEC76/DEC76		E
411474	OPEN+EVALEQUIP	DEC73/AUG74MAR74/JAN75		E
411474	INTERIMRPT	MAR74/APR75MAY75/MAY75		E
411474	FINALRPT	JAN74/JAN74APR74/FEB75		E
411474,75	HYBRIDEMMISSIONSTUDIES	NOV75/ FEB77/		E
411474	EQUIPMOD(VAAP)	MAY74/MAY74JUL74/JUL74		E
411474	FURNACEEVALTESTS	JUL74/JUL74AUG74/AUG74		E
411474	FINALRPT	SEP74/OCT74OCT74/NOV74		E
411474	PILOTPLANTTESTPLAN(RAAP,MERDC)	FEB74?FEB74APR74/MAR74		E
411474,75	PILOTPLANTINSTALL+EVAL	APR74/APR74OCT75/OCT75		E
411474	PILOTPLANTINSTALL+EVAL	SEP73/SEP73OCT75/OCT75		E
411474	EQUIPPROC(PHASEII)	SEP73/SEP73OCT73/OCT73		E
411474	EQUIPDEL	OCT73/OCT73NOV73/NOV73		E
411474	EQUIPEVAL	NOV73/NOV73JUN74/JUN74		E

411474	FINALRPT	MAR74/MAR74OCT74/OCT74		E
411474,75,76	ACIDWATERRECYFINALRPTDSGN(RAAP)	JUN76/OCT76NOV76/NOV76		E
411474	FINALRPTWATERUTILSTUDY(RAAP-INTERLN)	AUG74/AUG74DEC74/DEC74		E
411474	EVALPILOTPLANT(MODAC2OMFG)	SEP74/FEB75APR76/MAY76		E
411474	FINALRPT	APR76/APR76JUN76/JUN76		E
411474	ECOANALOFRECY/REUSEFORHAAPA+BPROC	JAN74/JAN74JAN75/JAN75		E
411474	IDENTOFSPLINSTRUNEEDS	JUL74/JUL74JUN75/JUN75	(ADD)	E
411474	RPT	AUG73/AUG73OCT73/OCT73	(ADD)	E
411474	DEVOLTMAVIOLETTYPEMONITOR(MONONITRO)	FEB73/FEB73JAN74/JAN74	(ADD)	E
411474	RPT	JAN74/JAN74JUN75/JUN75	(ADD)	E
411474	OPTICPROBELAB+PILOTSCALE	JAN74/JAN74DEC74/DEC74	(ADD)	E
411474	OPTICPROBELAB+PILOTSCALE	JAN75/JAN75DEC75/NOV75	(ADD)	E
411474	EVALOFNOXSOURCEMONITORS	SEP73/SEP73AUG74/AUG74	(ADD)	E
411474	RPT	FEB74/FEB74MAY74/MAY74	(ADD)	E
411474	EVALPOLAROGRAPHICTYPEMONITOR	FEB74/FEB74JUL76/AUG76	(ADD)	E
411474	RPT	OCT73/OCT73JAN74/JAN74	(ADD)	E
411474	RPT	OCT73/JAN74MAR74/MAR74	(ADD)	E
411474	RPT	JUL74/JUL74OCT74/OCT74	(ADD)	E
411474	RPT	JAN74/JAN74JUN75/JAN75	(ADD)	E
411474	EVALINFRAREDTYPEMONIT	FEB73/FEB74JUN75/JUN75	(ADD)	E
411474	DEVOPRAMANTYPEMONITOR(ROX/HMX)	DEC73/DEC73JUN77/JUN77	(ADD)	E
411474	EVALOFWATERMONITORSYSTS(EVALMONITINS)	JUN74/JUN74FEB75/FEB75	(ADD)	E
411474	INTERIMRPTS	JUN74/JUN74MAY75/MAY75	(ADD)	E
411474	CNTLSYSTDSGN(CNTFGFORNITROCELLULOSE)	JUL73/JUL73DEC73/DEC73	(ADD)	E
411474	INSTALLCNTLSYST	JUN74/MAY74DEC74/NOV74	(ADD)	E
411474	INSTALLCNTLSYST	JUL74/MAY74SEP74/SEP74	(ADD)	E
411474	INITTESTUNDERPLANTCONDITIONS	OCT73/ SEP74/		E
411474	PILOTFACDSGN	JUN74/ DEC74/		E
411474,75	EVALOFRESULTS+RPT	NOV74/NOV74APR75/APR75	(ADD)	E
411474	RESURVEYPLANNED	APR74/APR74OCT74/OCT74		E
411474,75	REMARPTS	OCT73/OCT73DEC74/DEC74		E
411474	DATAEVAL	DEC73/DEC73MAR74/MAR74		E
411474THRU77	COORDW/MOD/EXPPROGS	DEC73/DEC73SEP77/SEP77		E
411474	FEASSTUDYCABBAGE+PIERCE	MAR74/MAR74MAY74/MAY74		E
411474	FUNDSRECVD	JUL73/SEP73JUL73/SEP73		E
411474	FISCALOBLIG	JUL73/SEP73JUL73/SEP73		E
411474	LITSEARCH	JUL73/JUL73SEP73/SEP73		E
411474	AUTOEQUIPSTUDYFORWATERANAL(WATENINST)	OCT73/OCT73FEB74/FEB74		E
411474	PUROFWATERANALEQUIP	FEB74/FEB74JUN74/JUN74		E
411474	AUTOEQUIPSTUDYFORAIRANAL(AIRINSTRU)	APR74/APR74AUG74/AUG74		E
411474	ANNUALPROGRPT	JUN74/JUN74JUL74/JUL74		E
411475	BENCHSCALESUPPORTSTUDIES(RAAP)	APR76/APR76AUG76/NOV77		E
411475	PROCEVAL+PILOTPLANTSEL	OCT74/OCT74MAY75/MAY75		E
411475	PROGFUND(VAAP)	MAY75/MAY75JUN75/JUN75		E
411475	IDENTOFSMELTIMPURITIES(B+W)	SEP75/NOV75DEC75/DEC75		E
411475	EVALOFREMOVALTECH(B+W)	DEC75/JUN76DEC76/DEC76		E
411475	SSRP(VAAP)	FEB77/FEB77JUN77/JUN77		E
411475	ASSESS+RPT	NOV77/NOV77MAR78/APR78		E
411475	AIRECOVERYSTUDIES	JAN78/JAN78MAR78/MAR78		E
411475,76	SSRP(VAAP,RAAP)	SEP77/NOV77OCT79/OCT79		E
411475	RPT	MAR74/MAR74JAN77/JAN77		E
411475	DEFPROGPLANS+OBJ(BAAP)	JUN76/JUN76SEP76/SEP76		E
411475	BENCHSCALEEVAL	SEP76/SEP76FEB77/FEB77		E
411475	EQUIPEVAL	DEC76/DEC76APR77/APR77		E
411475	PILOTPLANTDSGN	APR77/APR77JUN77/JUL77	(ADD)	E
411475,76	PILOTPLANTINSTALL+EVAL	OCT77/NOV77DEC79/	(ADD)	E
411475	DEVTECHFORREC+RECYIOFETHACE+NITROPI)	MAR75/MAR75MAY75/JUL75		E
411475	BENCHSCALEEVALOFBESTMTHD+EQUIP	MAR75/MAR75MAY75/JUL75		E
411475	FINALRPT	FEB76/FEB76OCT76/OCT76		E
411475	ORDEQUIP+CMPLD+ADSGNPILOT(VAAP-SAR)	FEB75/FEB75JUN75/	(DEL)	E
411475	CONST+EVALOFPILOTEQUIP	JUL75/ NOV75/	(DEL)	E
411475	FINALRPT	NOV75/ DEC75/	(DEL)	E
411475	VAAPSEGCOOL+PROCRECECUANALFINRPT(EWA)	JUN75/JUN75DEC76/MAR77	(ADD)	E
411475	IAAPMAAPLAPOPERPI+IIFINALRPTS	APR75/APR75JAN77/FEB77	(ADD)	E
411475	BENCHSCALEVALPHIIIFINALRPT	APR75/APR75MAY76/MAY77	(ADD)	E
411475	IAAPBLACKPOWDRMFGPHIIFINALRPT	APR75/APR75JAN77/FEB77	(ADD)	E

411475.76	RAAPPYRO+RISSTLECASEPROPPHI+IIFINRPT	FEB75/	JUN75/	(DEL)	E
411475.76	JAAPSELLITEMEGPHI+IIFINALRPT	APR75/	AUG75/	(DEL)	E
411475.76	JAAPMFGOFDNT+TETRYLPHI+IIFINALRPT	JUN75/	NOV75/	(DEL)	E
411475.76	RAAPSEGCOOL+PROCWATERSURFINALRPT	AUG75/	JAN76/	(DEL)	E
411475.76	SFEEWATERMGTTASKASASSGN	FEB75/FEB75	SEP77/SEP77		E
411475	USGN(NITROCNTLSYST)	MAR75/MAR75	JUN75/MAR76	(ADD)	E
411475	PROC+INSTALL	AUG75/JAN76	SEP76/AUG77	(ADD)	E
411475	EVAL	SEP77/SEP77	MAY79/MAY79	(ADD)	E
411475	RPT	JAN78/JUN79	MAY78/DEC79	(ADD)	E
411475	USGN(TETHANITROMETHANECNTLSYST)	JUL75/JUL75	JAN76/JAN76	(ADD)	E
411475	PROC+INSTALL	FEB76/FEB76	DEC76/MAR77	(ADD)	E
411475	RPT	JAN77/JAN77	APR77/JUL77	(ADD)	E
411475	LITSEARCH(NOXCNTLSYST)	MAY75/MAY75	JUL75/JUL75	(ADD)	E
411475	USGN	SEP75/SEP75	DEC75/APR78	(ADD)	E
411475	PROC	JAN76/JAN76	DEC77/APR78	(ADD)	E
411475	INSTALL	JAN78/JAN78	JAN80/	(ADD)	E
411475	HAZARDSEVAL+ONLINEEVAL	MAY80/	JUL80/	(ADD)	E
411475	RPT	AUG80/	OCT80/	(ADD)	E
411475	IDENTOFSPLINSTRUNEEDS	JUL75/JUL75	OCT77/	(DEL)	E
411475	EVALOFULTRAVIOLETTYPEMONITOR	FEB74/FEB74	JUN75/JUN75	(ADD)	E
411475	EVALOFAIRBAIRMONITOR	AUG74/AUG74	JUN75/JUN75	(ADD)	E
411475	EVALOFNOXSOURCEMONITORS	SEP74/SEP74	NOV75/MAY76	(ADD)	E
411475	RPT	AUG76/AUG76	NOV76/OCT76	(ADD)	E
411475	EXTPULAROGRAPHICPRINCIPLE	NOV75/NOV75	DEC76/DEC76	(ADD)	E
411475	EVALOFPIEZOELECTTYPEMONITOR	OCT74/OCT74	APR77/APR77	(ADD)	E
411475	RPT	JUL75/NOV77	OCT75/DEC77	(ADD)	E
411475	RPT	MAY75/MAY75	AUG75/AUG75	(ADD)	E
411475	RPT	JUL77/	SEP77/	(DEL)	E
411475	EVALOFHUMANTYPEMONITOR	OCT77/	MAR78/	(DEL)	E
411475	RPT	APR78/	JUN78/	(DEL)	E
411475	EVALOFWATERMONITORSYSTS	MAR75/MAR75	DEC75/MAY76	(ADD)	E
411475	EVALOFBACIDMTSTMONITOR	MAR75/MAR75	DEC75/APR76	(ADD)	E
411475	INTERIMRPTS	JUN75/JUN75	DEC75/DEC75	(ADD)	E
411475	EVALCNTLSYST	DEC74/DEC74	JUL75/JUL75	(ADD)	E
411475	RPT	AUG75/AUG75	OCT75/OCT75	(ADD)	E
411475	USGNSLURRYCNTLSYST(EXPL+PROPWASTEINC)	SEP74/SEP74	DEC74/DEC74	(ADD)	E
411475	EVALSLURRYCNTLSYST	JUL75/JUL75	DEC75/NOV75	(ADD)	E
411475	RPT	JAN76/JAN76	APR76/APR76	(ADD)	E
411475	EVALCNTLSYST	OCT74/OCT74	JUN75/JUN75	(ADD)	E
411475	EXCIPPROC	JAN75/	JUN75/		E
411475	PREPOFPILOTPLANT+BLDG	JUL75/	JUN76/	(DEL)	E
411475.76	PILOTREACTEST+EVAL	JUL75/	MAR76/		E
411475	RAAPRESURVEY	SEP74/SEP74	OCT74/OCT74		E
411475	AUTOADAPTOFWATERANALEQUIP	JUN74/JUN74	FEB75/FEB75		E
411475	PURGOFAIRANALEQUIP	AUG74/AUG74	DEC74/FEB75		E
411475.76	AUTOADAPTOFAIRANALEQUIP	DEC74/MAR75	OCT75/JAN76		E
411475	FIELDSURVEY(PRA)	SEP74/JUN75	JUN75/		E
411475	ANNUALPROGRPT	JUN75/MAY75	JUL75/JUN75		E
411475	CONTRNEG+AWARD	JAN75/JAN75	MAR75/DEC75		E
411475	REVDATAFRPOLSURVEY	MAR75/MAR75	APR75/APR75		E
411475	SELTECHFORSTUDY+PLANPROG	MAY75/MAY75	JUN75/JUN75		E
411476	SULFURICACIDSCRUBEVAL	AUG78/	FEB79/	(DEL)	E
411476	NITRICACIDSCRUBEVAL	FEB79/	AUG79/	(DEL)	E
411476	EVALOFREVPROC	MAY80/	FEB80/	(ADD)	E
411476	FINALRPT	MAR80/	JUN80/		E
411476.77	INTERIMRPTONFLUIDBEDPILOTSCALEINCR	MAY76/MAY76	MAR77/	(DEL)	E
411476.77	FINALRPT	JAN77/JAN77	JUN77/JUN78		E
411476	RPT+TDP	JUN75/AUG75	JUL76/AUG76		E
411476	EVALOFTERTIARYTREAT	MAR76/MAR76	MAR77/APR77		E
411476	FINALRPT	DEC79/	APR80/	(ADD)	E
411476	PILOTPLANTDSGN+INSTALL(PII)	FEB76/FEB76	OCT76/OCT76		E
411476	PILOTPLANTEVAL	SEP76/SEP76	MAR76/JUN76		E
411476	PROTOSYSTDSGN+INSTALL	OCT76/OCT76	JUL77/		E
411476	FINALRPT	JUN77/JUN77	APR79/APR79		E
411476	REV+PUBOFFINALRPT	MAY79/MAY79	JUL79/SEP79		E
411476	RECPROPSAMPFORAAP(ARHADCUM)	AUG76/AUG76	AUG76/AUG76		E

411476	PERFSHT-TERMSTOR/STABTESTS	SEP76/SEP76JAN77/FEB77	E
411476	PERLONG-TERMSTOR/STABTESTS	SEP76/SEP76SEP77/SEP77	E
411476	PREPFINALRPT	SEP77/SEP77AUG78/AUG78	E
411476.77	INFL+EFFLWATERQUALQUANT(CSL/ARRADCOM)	OCT77/OCT77JAN78/JAN78	E
411476.77	EVALDATA	FEB78/FEB78MAY78/MAY78	E
411476.77	FINALRPTRECOMFORRECY/REUSE	JUN78/JUN78JUL79/AUG79	E
411476.77	FINALRPTRECOMFORRECY/REUSE(DSN)	JUN78/JUN78JUL78/AUG78	E
411476.77	FINALRPTRECOMFORRECY/REUSE(NGU)	JUN78/JUN78OCT78/AUG79	E
411476	RPT	JAN77/JAN77SEP77/SEP77(ADD)	E
411476	EVALOFWATERMONITORSYSTS	JUN76/JUN76JUL77/JUL77(ADD)	E
411476	EVALOFSULFIDEMONITOR	MAR76/MAR76JAN80/ (ADD)	E
411476	EVALOFTOTCARBONMONITOR	MAR76/MAR76JAN80/ (ADD)	E
411476	EVALOFNITROMONITOR(AIR)	JAN76/JAN76MAR80/ (ADD)	E
411476	EVALOFHYDROCARBONMONITOR	JUN76/JUN76DEC76/JUN78(ADD)	E
411476	INTERIMRPTS	JAN76/JAN76JUL77/JUL77(ADD)	E
411476	FINALRPT	APR76/ MAY76/	E
411476	ASSTOPPILOT+EQUIPBLDG	JAN76/ APR76/ (DEL)	E
411476	IDENT+EVALOFINYCOMPOSTPROD	MAR76/ NOV76/ (DEL)	E
411476	INSTALLCOMPOSTEQUIP(PHASEII)	MAY77/MAY77JUN77/JUL77(ADD)	E
411476	ESTABACTCOMPOST	MAR78/MAR78JUL78/AUG78(ADD)	E
411476	ANALSAMPLES	JUL78/NOV78SEP78/FEB79(ADD)	E
411476	REPEATCOMPOST	MAR79/MAR79APR79/APR79(ADD)	E
411476	REPEATANAL	APR79/APR79JUN79/JUN79(ADD)	E
411476	FINALRPT	JUN79/JUN79SEP79/SEP79	E
411476	TOXICITYSTUDIES(PHASEII	MAY79/MAY79APR80/	E
411476	LCAAPRESURVEY	JUL75/JUL75AUG75/AUG75	E
411476	ONSITEINSTALL+TESTEQUIPWATER	FEB75/JUL75APR77/APR77	E
411476	FINALRPTWATER	APR77/APR77MAY77/JUL77	E
411476	ONSITEINSTALL+TESTEQUIP-AIR	OCT75/JUL75MAR79/MAR79	E
411476	FINALRPT-AIR	MAR79/MAR79APR79/MAY79	E
411476	FINALRPT-PROG	APR79/MAY79MAY79/MAY79	E
411476	SAAP(FIELDSURVEY)	AUG75/AUG75SEP75/SEP75	E
411476	PBA	OCT75/OCT75NOV75/NOV75	E
411476	PBA	MAY76/MAY76MAY76/MAY76	E
411476	SAAP-PES	MAR75/MAR75AUG75/MAR76	E
411476	RAAP-PES	AUG74/SEP74SEP75/JAN76	E
411476	PBA-SUNOPTIC	JUL75/AUG75MAR76/APR76	E
411476	PBA-P4	JAN76/JAN76NOV76/MAR77	E
411476	SAAP-BENTHOS	JAN76/JAN76OCT76/AUG77	E
411476	MAAP-PES	MAR76/JAN76DEC76/JUL77	E
411476	VAAP-PES	MAR76/JAN76DEC76/AUG77	E
411476	RMA-BIOL	JAN76/JAN76SEP76/JUL77	E
411476	DPG-BIOL	JAN76/JAN76SEP76/AUG77	E
411476	PROJEQUIPCONS+INSTALL	DEC75/DEC75AUG76/DEC76	E
411476	DEVENGRDATA	MAY75/MAY75SEP75/SEP75	E
411476	PRELIMSTDY+EVALSELTECH	DEC75/DEC75JAN76/JAN76	E
411476	PILOTSTDY	FEB76/MAR76MAY77/DEC77	E
411477	FINALTASKRPT	JAN80/ MAR80/ (ADD)	E
411477	ANALFORMAXCONTPRIORTOFILTER(MAAP)	MAY77/MAY77JUL77/JUL77	E
411477	WATERBALVSPROC+PROD	MAY77/MAY77NOV77/NOV77	E
411477	COLSTEAMCONDFRMELTKETTLE+ANAL	AUG77/AUG77AUG77/AUG77(ADD)	E
411477	PROPWAXREMMTHDPRIORTOFILTERSTEP	AUG77/AUG77OCT78/OCT78	E
411477	DEFSTEAMCOND+RECREUSE	NOV77/ JAN78/	E
411477	FINALRPT	OCT78/OCT78DEC78/DEC78	E
411477	EVALREUSEOFSTEAMCOND	JUL78/JUL78AUG78/AUG78(ADD)	E
411477	EVALREUSEOFTREATEDWATER	JUL78/JUL78OCT78/OCT78(ADD)	E
411477	CALCWATERBALVSWATERQUALRELTOUSE(IOAP)	MAY77/MAY77JUL77/JUL77	E
411477	IDENTRECY/REUSEMEAS	JUL77/JUL77SEP77/SEP77	E
411477	FINALRPTDRUGSRECOM	OCT77/OCT77NOV77/MAY78	E
411477	COMP+EVALPILOTPLANTMTHDSFORNITROREM	APR77/APR77JUN78/JUN78	E
411477	PERCOANALONESTAB+PROPMTHDS	JUN77/JUN77JUN78/FEB79	E
411477	FINALRPT	JUN78/SEP78JUL79/AUG79	E
411477	SAAPRESURVEY	OCT76/OCT76NOV76/FEB76	E
411477	AIRPERMIT(MAAP)	FEB78/FEB78SEP78/SEP78	E
411477	WATERPERMIT	APR78/APR78APR79/OCT78	E
411477	SOLIDWASTEPERMIT	JUN78/JUN78JUN79/JUN79	E

411477	PBA(FIELDSURVEY)	MAR77/APR77	APR77/MAY77		E
411477	PBA-PRODAREACREEK(SURVEYRPTS)	SEP77/NOV77	JAN78/JAN78		E
411477	PHASEIPROGRPT	NOV76/DEC76	SEP77/NOV77		E
411477	EXPCAPTESTEFFLUENTS	JUL77/OCT77	DEC77/DEC77		E
411477	REVDATA+DEVPROG	JAN77/JUL77	MAR77/DEC77		E
411477	IMPLPROG	SEP77/AUG78	DEC79/		E
411478	FINALRPT	JUN79/			E
411478	TOAU(FIELDSURVEY)	MAY78/MAY78	JUN78/JUN78		E
411478	AAD	MAY78/MAY78	AUG78/AUG78		E
411478	TOAD(SURVEYRPTS)	JUL78/JUL78	DEC78/DEC78		E
411478	AAP	SEP78/SEP78	DEC78/DEC78		E
411478	PHASEIIPROGRPT	JAN78/JAN78	FEB78/MAR78		E
411478	SHAKEDOWN+ONLINETESTPHASEIII	MAR78/MAY78	FEB79/FEB79		E
411478	PHASEIII	NOV78/NOV78	FEB79/FEB79		E
412479	MASTERPLANREVIEW	DEC79/FEB80	DEC79/FEB80		M
412479	PROCESSMACHENG+STUDIES	FEB80/DEC79	JUL80/		M
412479	PRELIMCYCLESTUDIES	APR80/APR80	AUG80/		M
412479	FINALPROCESS	MAR80/	APR80/		M
412479	TOOL+FIXTURESPECS	JUN80/	SEP80/		M
412479	PROGRAMMING	SEP80/	NOV80/		M
412479	FINALPKGDESIGN	OCT80/	SEP80/		M
412479	TOOL+FIXTUREPURCHASE(BUILD)	NOV80/	MAY81/		M
412479	INSTALL+TRYOUT	JUN81/	JUL81/		M
412479	RUNOFF(200)PCSTOTAL(5 +8)	SEP80/	SEP80/		M
412479	FINALIZEDATAPKG	JUN81/	JUN81/		M
412479	SUBMITFINALREPTDATAPKG+TOOLS+FIXTURES	OCT80/	OCT80/		M
412479	SUPOFPROCOPT	MAY80/	SEP80/		M
412479	RUNOFF30PCS	JUN81/	JUL81/		M
412479	FINALRPT	JUL81/	SEP81/		M
413779	RELEASEPROGRAMAUTHORIZATION	OCT78/DEC78	OCT78/DEC78		E
413779	REVIEW+ESTABEQUIPDSGNPARAMETERS	NOV78/DEC78	NOV78/JAN79		E
413779	PREPARESCOPEOFWORKTODETERMINEFEAS	NOV78/JAN79	MAR79/MAR79		E
413779	AWARDFEASCONTRACT	APR79/APR79	JUN79/	(DEL)	E
413779	FEASSTUDY	OCT79/OCT79	JUN80/		E
413779	SELCONCEPTSFORDEV	OCT79/OCT79	DEC79/FEB80	(ADD)	E
413779	DEVCONCEPTS	DEC79/FEB80	JAN80/MAR80	(ADD)	E
413779	PRELIMANALYSIS	JAN80/MAR80	MAR80/MAY80	(ADD)	E
413779	FINALENGREVAL	JUN80/	JUN80/	(ADD)	E
413779	FINALTECHRPT	JUN80/	SEP80/	(ADD)	E
413779	FINAL30IRPT		DEC80/	(ADD)	E
414770	PROJAPPVL	N/A	OCT70/OCT70		E
414770	PREPOFRFQ	DEC70/DEC70	JAN71/JAN71		E
414770	EVALOFTECHPROP+SEL	MAR71/MAR71	APR71/APR71		E
414770	PLACECONTRACT	N/A	JUL71/JUL71		E
414770	DETDSGNCNTLSYST			(DEL)	E
414770	DSGN+SPECREV	JUL71/JUL71	MAR72/MAR72		E
414770	EQUIPDSGN+FAB	OCT71/OCT71	JUL72/JUL72	(ADD)	E
414770	FLOWCHART+DETSOFTWAREDSGN+CODING	OCT71/OCT71	NOV72/JAN73	(ADD)	E
414770	INSTALLFIELDEQUIP	AUG72/AUG72	NOV72/JUN73		E
414770	FACTTESTCOMPHDWR+SOFTWARE	JUL72/AUG72	NOV72/JUN73		E
414770	SHPMTCOMPTOVAAP	DEC72/JUL73	DEC72/JUL73		E
414770	INSTALLCOMPINCNTLHOUSE	JAN73/JUL73	MAR73/AUG73		E
414770	CNTLSYSTONSITECHECKOUTEVAL	FEB73/AUG73	SEP73/NOV78		E
414770	FINALPROJRPT	SEP73/FEB75	OCT73/JUN79		E
414774	VAAPFINSECTSTDY+SUPCNTLSFTWRIMPLE	JUN74/	AUG74/	(DEL)	E
414774	SUPCNTLSFTWRIMPLE	JAN74/	JUN74/	(DEL)	E
414774	PREPRAAPSYSTSPEC	JAN74/MAY74	APR75/MAR76	(DEL)	E
414774	EVALOFPROP+VENDSEL	JUL74/JUN75	AUG74/	(DEL)	E
414774	PREP+ISSINVFORBIDDONANALOGSYST	APR76/APR76	JUN76/AUG76	(ADD)	E
414774	EVALBIDS+VENDSELFORANALOGSYST	OCT76/OCT76	NOV76/JAN77	(ADD)	E
414774	CNTRNEG+AWARD	FEB77/FEB77	APR77/JUL77	(ADD)	E
414774	HDWRDSGN+FAB	SEP74/AUG77	OCT75/NOV78		E
414774	SOFTWAREDSGN+PROG	SEP74/	OCT75/	(DEL)	E
414774	INSTALLANALOGEQUIP+PRESTARTUPCHECKOUT	JUL75/AUG79	OCT75/MAY80		E
414774	OPER+EVALOFCLINEUNDERCNTLOFA ANALOGSYN	NOV75/	JAN76/		E
414774	PRESHPMTCHECKOUTOFDIGITALSYST	AUG75/	NOV75/	(DEL)	E

414774	SHPMTOFDIGSYSTTORAAP	DEC75/	DEC75/	(DEL)	E
414774	INSTALLDIGEQUIP+CHKOUTOFINTEGSYST	JAN76/	FEB76/	(DEL)	E
414774	DDACSYSTPEREVAL	MAR76/	MAY76/	(DEL)	E
414774	SUP SOFTWARE IMPL	JUN74/	JUN74/	(DEL)	E
414774	PREPFINALRPT	JAN76/	JUN76/	(DEL)	E
414774	PRE-START-UP CHECK-OUT	APR80/	APR80	AUG80/	(ADD) E
414774	FINALTECHRPT	AUG80/	NOV80/	(ADD)	E
414774	FY74FISCALFINAL301RPT	DEC80/	DEC80/	(ADD)	E
414774	OVERALLPROJFINAL301RPT	DEC80/	DEC80/	(ADD)	E
415378	RECEIPTOFFUNDS	MAY78/MAY78	MAY78/MAY78		M
415378	AWARDOFCONTRACT	JUL78/MAY78	SEP78/FEB79		M
415378	CORRULTRASONICDATA	OCT78/MAR79	JAN79/AUG79		M
415378	ESTABPROD	JUN79/	AUG79/		M
415378	CLEANPROC	AUG79/AUG79	JAN80/		M
415378	BAND155MMH483PROJ	JUL80/	JUL80/		M
415378	BAND8INXM509PROJ	AUG80/	SEP80/		M
415378	BALLISTICEVAL	MAR80/MAY80	SEP80/		M
415378	FINALRPT	SEP80/	NOV80/		M
415378	FINALRTPJ01	OCT80/	OCT80/		M
416378	ENGRREVIEW+ANALYSIS	APR78/APR78	OCT78/OCT78		E
416378	PREPARESCOPEOFWORK	MAR78/MAR78	MAR78/MAR78		E
416378	REVIEWSCOPEOFWORK(IAAP)	APR78/APR78	APR78/APR78		E
416378	DESIGNTESTPLAN	APR78/APR78	APR78/APR78		E
416378	APPROVESCOPEOFWORK+TESTPLAN	APR78/APR78	APR78/APR78		E
416378	ALLOCATIONOFFUNDS	MAY78/MAY78	MAY78/MAY78		E
416378	DSGN+FABEQUIP	JUN78/JUL78	AUG78/AUG78		E
416378	EXECUTIONOFTESTPLAN	AUG78/SEP78	JAN79/FEB79		E
416378	REVIEWOFTESTRESULTS	SEP78/SEP78	JAN79/FEB79		E
416378	PROCESS+EQUIPDSGNS	SEP78/SEP78	APR79/APR79		E
416378	STUDYREPORT	NOV78/NOV78	MAY79/MAY79		E
416379	ESTABENGRAPPROACH	NOV78/MAR79	NOV78/MAR79		E
416379	DSGNTESTPLN	DEC78/MAR79	DEC78/APR79		E
416379	DSGNFABOFEQUIP	DEC78/APR79	APR79/MAY79		E
416379	INSTALLOFEQUIP	APR79/MAY79	MAY79/MAY79		E
416379	EXECUTIONOFTESTPLN	JUN79/JUN79	AUG79/NOV79		E
416379	FIRINGTEST(PROVGRD)	AUG79/DEC79	SEP79/MAR80		E
416379	PRODPROCDSGNS	NOV79/NOV79	SEP79/DEC79		E
416379	FINALRPTARRADCOM	DEC79/JAN80	SEP80/		E
416379	FINAL301RPT		SEP80/	(ADD)	E
418979	RECEIPTFUNDS	AUG79/AUG79	AUG79/AUG79		M
418979	AWARDCONTRACT	APR79/APR79	SEP79/SEP79		M
418979	PURCHASESTEEL	OCT79/OCT79	FEB80/MAR80		M
418979	CHARSTEEL	FEB80/FEB80	JUN80/		M
418979	FINALRPT	JUL80/	AUG80/		M
418980	RECEIPT FUNDS	NOV79/NOV79	NOV79/NOV79	(ADD)	M
418980	AWARD OF CONTRACT	NOV79/NOV79	JUL80/		M
418980	PROCOPT	JUL80/	FEB81/		M
418980	OPTFORGINGPRESS	APR80/	JUL80/	(ADD)	M
418980	EVALMULTPARTING	JUL80/	SEP80/	(ADD)	M
418980	DETNEEDFORSPHEROIDIZEANNEAL	SEP80/	NOV80/	(ADD)	M
418980	EVALMACHINETOOLS	OCT80/	DEC80/	(ADD)	M
418980	FINAL REPORT	MAR81/	APR81/	(ADD)	M
418980	FINALRPTJ01	APR81/	APR81/	(ADD)	M
419479	FISCALOBLIGATION	MAY79/MAY79	JUL79/JUL79		M
419479	PRELIMSTUDY	JUN79/JUN79	SEP79/SEP79		M
4194	PROC/FABOFTSTEQUIP	DEC79/AUG79	OCT80/		M
419479	STUYPROCSAEQUIPPARMETERS	DEC79/DEC79	JAN81/		M
419479	HAZARDANAL	SEP79/	NOV80/		M
419479	PERFTECHAECONANAL	NOV80/	JAN81/		M
419479	PREPRTPAMAKERECOMM	JAN81/	MAY81/		M
420080	PROTOSOWCOMPL	NOV80/NOV80	MAR80/MAR80		E
420080	SYSEVAL	JAN80/JAN80	SEP80/		E
420080	FINAL301RPT	SEP80/	FEB81/		E
420270	LABSTUDY	DEC70/DEC70	APR71/JUN74		E
420270	PROC+INSTALLBENCHSCALEEQUIP	MAR71/MAR71	JUN71/JUN71		E
420271	LABSTUDY	DEC70/DEC70	AUG71/AUG71		E

420271	PROC•INSTALLBENCHSCALEEQUIP	MAR71/MAR71	SEP71/JAN72		E
420271	PERBENCHSCALESTUDY•COMPILEDATA	JUN71/JUN71	JUL72/JUL72		E
420271	SELPROC	JUN71/JUN71	NOV71/NOV71		E
420271	ESTABPILOTLINEDSGN	NOV71/OCT71	DEC71/DEC71		E
420272	MODBLDGSFORPILOTLINE	JAN72/DEC71	JUN72/JUN72		E
420272	PROC•INSTALLPILOTLINEEQUIP	JAN72/JAN73	SEP72/OCT73		E
420272	PERPILOTSCALESTUDY•COMPILEDATA	OCT72/OCT72	JUN73/OCT73		E
420272	ESTABFACDSGNCRITERIAFORCORPSOFENGRS	MAR73/JAN73	JUN73/OCT73		E
420272	MODBLDGFORTHERMALDEMY	JAN73/JAN73	JUN73/JUN73		E
420273	PROC•INSTALLTHERMALDEMY	JAN73/JAN73	SEP73/SEP75		E
420273	PROC•INSTALLPILOTLINEEQUIP	JAN72/JAN72	JUL74/JUL74		E
420273	PERPILOTSCALESTUDY	OCT72/OCT72	JUL74/MAR75		E
420273	ESTABFACDSGNCRITERIAFORCORPSOFENGRS	MAR73/JAN73	AUG74/DEC74		E
420273	INITIATEFINALRPT	MAR74/JUN74	MAR75/MAR75		E
420273THRU75	PROC•INSTALLSFGSCREWS	MAY75/MAY75	AUG75/AUG75		E
420273THRU75	PERDSGNIMPVTENGR	JUN75/JUN75	MAR76/JUN76		E
420273THRU75	PERPILOTSCALESTUDY•COMPILEDATA	JUL75/JUL75	DEC75/APR76		E
420275	MFGPILOTLOTSFORBALLISTICTEST	NOV75/MAR76	DEC75/APR76		E
420275	CONDUCTBALLISTICTEST	DEC75/JUN76	JUN76/JUN76		E
420276	PERDSGNIMPVMTENGR	MAY76/JUN76	JUN76/JUN76		E
420276	PERPILOTLOTSTDY•COMPILEDATA	MAY76/JUN76	DEC76/SEP76		E
420277	PERDSGNIMPVMTENGR	SEP76/SEP76	FEB77/FEB77		E
420277	PERM30A1PROCDEV	JAN77/FEB77	JUN77/JUN77		E
420277	PERPILOTSCALESTUDY•COMPILEDATA	SEP76/SEP76	JUN77/	(DEL)	E
420277	MFGM30A1PILOTLOT	JUN77/	JUN77/	(DEL)	E
420277	CONDUCTBALLISTICTESTOFM30A1	JUL77/	SEP77/	(DEL)	E
420277	MFGM26E1PILOTLOTFORBALLISTICTEST	OCT76/	DEC76/	(DEL)	E
420277	CONDUCTBALLISTICTESTOFM26E1	JAN77/	MAR77/	(DEL)	E
420277	PILOTLINESCALESTDY•COMPILEDATA	SEP76/SEP76	DEC77/JAN78		E
420277	MFGM30A1PILOTLOT	JUN77/JUN77	AUG77/AUG77		E
420277	CONDUCTBALLISTICTESTOFM30A1	SEP77/SEP77	DEC77/SEP78		E
420277	COMPLPROCPARFORM26E1•CONDLABTEST	SEP77/SEP77	NOV77/JUN78		E
420277	PREPFINALTECHRPT	SEP77/SEP77	APR80/		E
420277	FINAL30IRPT	MAY80/MAY80	JUN80/JUN80		E
421080	FUNDINGRECVDGOGO	NOV79/DEC79	NOV79/DEC79		E
421080	FUNDINGRECVDGOCO	SEP80/	SEP80/		E
421080	ENGRDSGN	SEP80/	JAN81/		E
421080	BLDGMOD	JAN81/	JUL81/		E
421080	PROC/FABEQUIP	FEB81/	JUL81/		E
421080	INSTALLEQUIP	JUL81/	SEP81/		E
421080	EQUIPDEBUG	SEP81/	DEC81/		E
421080	EVAL/PILOTLOTMFG	DEC81/	MAR82/		E
421080	HAZARDSANALYSIS	SEP80/	MAR82/		E
421080	PILOTLOTTEST	FEB82/	MAR82/		E
421080	FINALRPT	MAR82/	MAY82/		E
421176	COMP•EVALDATACONCPTTECHAUTOCNT(TASKI)	SEP75/SEP75	DEC75/MAR76		E
421176.77	DEVDSGNCRIT•PREPSCOPEFORPROCPROTOSYST	JAN76/JAN76	JUN76/OCT76		E
421176.77	PROCPROTOCNTLSYST	JUN76/JUL76	MAR79/MAR79		E
421177	INSTALLPROTOCNTLSYSTFOREVAL	DEC78/DEC78	JUN80/		E
421177	COMPL•EVALDATAFRONLINEPROCCNTLOPER	FEB80/MAY80	JUN80/		E
421177	PREPFINALRTP (TASKI)	JUN80/	AUG80/		E
421177	LITSER•REVOFPRIORART(TASKII)	SEP78/SEP78	SEP78/SEP78		E
421177	EVALTESTMTHDTYPEJ•TYPE12IMPACTDEVICE	SEP78/SEP78	SEP78/SEP78		E
421177	REPEATABOVEW/MODS	SEP78/SEP78	OCT78/OCT78		E
421177	CONTFORMULATION•REV	OCT78/OCT78	MAR79/APR79		E
421177	SELOFCONTR•AWARDOFCONTRACT	FEB79/FEB79	OCT79/	(DEL)	E
421177	DSGN•FABOFAUTOIMPCTINSTRU	OCT79/	JUN80/	(DEL)	E
421177	COMPTRPROG	OCT79/	JAN81/	(DEL)	E
421177	PRELSAFTEYAPPVLDSGNPRIORTOFAB	JAN80/	OCT80/	(DEL)	E
421177	ENGRREVSITEMODPRODFORMACHINSTALL	DEC79/	JUN80/		E
421177	FINALSAFETYINSPCTS•APPVL	APR80/	JUN80/	(DEL)	E
421177	PREPSITE•INSTALLAUTOIMPACTMACH	MAY80/	JUL80/	(DEL)	E
421177	EVAL•TESTAUTOIMPACTMACH	AUG80/	FEB81/	(DEL)	E
421177	STATANALOFDATA	JAN80/	JUL80/		E
421177	WRITE•ISSUEFINALENGRRPT	APR80/	JUL80/		E
421177	PARTS FAB.	NOV79/NOV79	JUN80/	(ADD)	E

421177	MACHINE CONSTRUCTION	NOV79/NOV79	JUN80/	(ADD)	E
421177	MACHINE DEBUG	FEB80/FEB80	JUL80/	(ADD)	E
421177	PROGRAM PROCESSOR	NOV79/NOV79	JUL80/	(ADD)	E
421177	INTERFACE PROCESS W/MACH.	FEB80/FEB80	JUL80/	(ADD)	E
421177	DEMO TEST SPEC	JUN80/	JUN80/	(ADD)	E
421177	DEBUG AUTO SYS	JUN80/	SEP80/	(ADD)	E
421177	DEMO TEST	SEP80/	OCT80/	(ADD)	E
421177	REPORT	MAR80/	AUG80/	(ADD)	E
421177	ENGR DRAWINGS	AUG80/	AUG80/	(ADD)	E
421177	DUP FAB	JUN80/	SEP80/	(ADD)	E
421177	INSTALL+DEBUG PLANT	OCT80/	OCT80/	(ADD)	E
421177	CALIBRATE	OCT80/	NOV80/	(ADD)	E
421177	IMPLEMENTATION	DEC80/	DEC80/	(ADD)	E
421177	FINAL301RPT	NOV80/	DEC80/		E
421478,79	ANALPROGABATETECHCHOSTUS+OPERSTATUS	OCT77/MAY78	SEP79/		E
421478,79	CNDITMTGS+MAINLIAISONW/OGAASSESSENVIR	OCT77/MAR78	SEP79/		E
421478,79	SUSTECHREQACT	OCT77/MAR78	SEP79/		E
421478	ESTABPROCWATERSPECSQUAL+QUANT(RAAP)	MAY78/MAY78	JUL78/JUL78		E
421478	QUAL+QUANTPOLLABATEWATERS	AUG78/AUG78	SEP78/SEP78		E
421478	EVALPRACTECON+ENGY	OCT78/OCT78	JAN79/JAN79		E
421478	DETMINREQDTREAT	FEB79/FEB79	MAR79/MAR79		E
421478	FINALRPTRECSCHOFPROPREUSEMEAS	APR79/APR79	OCT79/NOV79		E
421478	ESTABPROCWATERSPECSQUAL+QUANT(HAAP)	SEP78/SEP78	FEB79/FEB79		E
421478	QUAL+QUANTPOLLABATEWATERS	FEB79/FEB79	APR79/APR79		E
421478	EVALPRACTECON+ENGY	MAY79/MAY79	JUL79/JUL79		E
421478	DETMINREQDTREAT	AUG79/AUG79	SEP79/NOV79		E
421478	FINALRPTRECSCHOFPROPREUSEMEAS	OCT79/OCT79	DEC79/DEC79		E
421478	DSGN+ENGRSMALLSCALETESTMODULES	JUN78/	AUG78/		E
421478	PROC+ASSYOFEQUIP	JUL78/	DEC78/		E
421478	PROCEQUIP(PHASEI)	AUG78/AUG78	OCT78/FEB79		E
421478	INSTALL+ASSY	NOV78/NOV78	APR79/APR79		E
421478	PROCEQUIP(PHASE2)	DEC78/DEC78	APR79/		E
421478	PROGFUNDING	OCT77/OCT77	MAR78/MAY78		E
421478	ENGRSTUDIES	MAY78/MAY78	JUL78/JUL78		E
421478	BENCHSCALEEVAL	JUL78/JUL78	JAN80/		E
421478	HAZARDSANAL	JUN78/JUN78	JAN80/		E
421478	PILOTPLANTINSTALL	JAN80/	JUL80/		E
421479	PROCPILOTPLANTFAC(RAAP)	NOV79/NOV79	JAN80/	(ADD)	E
421479	INSTALLPILOTPLANTSYST	JAN80/	FEB80/	(ADD)	E
421479	PILOTPLANTEVAL	FEB80/	JUL80/	(ADD)	E
421479	ECO+ENGYEVAL	JUL80/	AUG80/	(ADD)	E
421479	PREPOFDATAFORDSGNCRIT	JUL80/	SEP80/	(ADD)	E
421479	DOC+FINALRPT	AUG80/	NOV80/	(ADD)	E
421479	ETABPROCWATERSPECSQUAL+QUANT(KAAP)	AUG79/AUG79	DEC79/	(ADD)	E
421479	QUALQUANTPOLLABATEDWATERS	DEC79/	MAR80/	(ADD)	E
421479	EVALPRACTECO+ENGRY	MAR80/	JUL80/	(ADD)	E
421479	DETMINREQDTREAT	AUG80/	SEP80/	(ADD)	E
421479	FINALRPTRECSCHSPROPREUSEMEAS	SEP80/	OCT80/	(ADD)	E
421479	TEST+EVALSTUDIESANAL+ECOEVALDATA	OCT79/	DEC79/		E
421479	HAZARDANAL	NOV79/	FEB80/		E
421479	FINALRPT	MAR80/	APR80/		E
421479	TEST+EVAL	APR79/MAY79	JUL79/		E
421479	FINALRPT	AUG79/	NOV79/		E
421479	INSTALL+ASSY	MAY79/	JUL79/		E
421479	TEST+EVAL	AUG79/	NOV79/		E
421479	FINALRPT	DEC79/	MAR80/		E
421479	PILOTPLANTEVAL	JAN80/	MAR80/	(ADD)	E
421479	DEVSGNCRIT	APR80/	AUG80/	(ADD)	E
421479	FINALRPT	JUN80/	SEP80/	(ADD)	E
421479	ENGRREVIEW	SEP79/SEP79	NOV79/NOV79	(ADD)	E
421479	INVESTIGATESTDYS	NOV79/NOV79	JUN80/	(ADD)	E
421479	PILOTJOBPREP	JUN80/	AUG80/	(ADD)	E
421479	DATAANAL/FINALRPT	JUL80/	SEP80/	(ADD)	E
421479	DSGN+PROCACONSTLABEQUIP	AUG79/AUG79	JAN80/	(ADD)	E
421479	BENCHSACLESTDY	FEB80/	JUL80/	(ADD)	E
421479	FINALRPT	AUG80/	SEP80/	(ADD)	E

421479	ENGRDSGNSTDY(VAAP)	AUG79/AUG79	JAN80/	(ADD)	E
421479	FINALRPT(VAAP)	FEB80/	MAR80/	(ADD)	E
421479	ENGRPREP(BAAP)	AUG79/AUG79	SEP79/AUG79	(ADD)	E
421479	LEASINGEQUIP(BAAP)	SEP79/SEP79	DEC79/	(ADD)	E
421479	TSTOPEQUIPAMATL(BAAP)	DEC79/	SEP80/	(ADD)	E
421479	FINALRPT(BAAP)	OCT80/	NOV80/	(ADD)	E
421478	CNTRAWARD(PHASE4)	DEC78/DEC78	MAR79/MAR79	(ADD)	E
421478	DEVOFANALTST	APR79/APR79	MAY79/JUN79	(ADD)	E
421478	INSTALLAASSYOFFQUIP	JUN79/JUN79	JUN79/JUN79	(ADD)	E
421478	TESTAEVAL	JUL79/JUL79	OCT79/OCT79	(ADD)	E
421478	FINALRPT	OCT79/OCT79	DEC79/	(ADD)	E
421573	COMPLAEVALDATA	AUG72/AUG72	DEC72/DEC72		E
421573	PROGSYSEVALDATA	DEC72/DEC72	JUN73/JUN73		E
421573	PREDSGNCRIT	JAN74/MAY74	JUN74/JUN75		E
421574	PROTOCNTLSYS	JUN74/JUN74	APR76/AUG76		E
421574	PROTOCNTLSYSACC	JUN76/JUN77	JUN76/NOV79		E
421574	TDPCOMPL	JUN76/JAN79	JUL76/JUN80		E
421573,74	PROJPHYSCOMPL	JUN80/JUN80	JUN80/JUN80		E
421573,74	PROJFISCALCOMPL	JUN80/JUN80	JUN80/JUN80		E
421573,74	PROJCLOSEOUT	JUN80/JUN80	JUN80/JUN80		E
422373	PILOTPLANTSCOPOFWORK	OCT72/NOV72	NOV72/NOV72		E
422373	PILOTPLANTCONTRAWARD	NOV74/FEB73	FEB73/FEB73		E
422373	PILOTDSGN	FEB73/FEB73	MAR73/MAR73		E
422373	PILOTFAB	MAR73/MAR73	JUN73/JUN73		E
422373	PILOTINSTALL	JUL73/JUL73	SEP73/SEP73		E
422373	PILOTACCPTD	FEB74/FEB74	JUL74/DEC74		E
422373	FINALRPT	SEP74/APR75	DEC74/AUG75		E
422374	PROTOPLANTSCOPOFWORK	NOV74/NOV74	JAN75/JAN75		E
422374	PROTOPLANTCONTRAWARD	FEB75/FEB75	MAY75/FEB76		E
422374	PROTODSGN	JUL75/FEB76	OCT75/APR76		E
422374	PROTOFAB	SEP75/MAR76	JAN76/AUG76		E
422374	PROTOINSTALL	APR76/AUG76	MAY76/SEP76		E
422374	PROTOACCPTD	MAY76/JAN79	JUL76/FEB79		E
422374	FINALRPT	MAY76/NOV78	SEP76/DEC78		E
422374,77	EQUIPMOD	OCT76/DEC76	DEC78/JAN79	(ADD)	E
422374,77	PROTOEVAL	AUG77/AUG77	FEB79/FEB79	(ADD)	E
422377	PROGAUTHORIZATION	OCT76/DEC76	DEC76/FEB77	(ADD)	E
422377	MFG/PROCPROPCOLLOID	DEC76/DEC76	JUN77/DEC77		E
422377	CONDUCTEXTRUSTUDIES	JAN77/FEB79	JUN77/MAR80		E
422377	FABPROPCHGS	JAN79/	FEB79/	(DEL)	E
422377	LOAD+TEST	APR80/	MAY80/	(DEL)	E
422377	ECOANAL	FEB79/	MAR80/	(DEL)	E
422377	HAZARDANAL	JAN77/NOV75	OCT77/JUN77		E
422377	DWG+RAMDOC	MAR80/MAY80	AUG80/		E
422377	FINALRPT	AUG80/	SEP80/		E
422377	FINALTECHRPT	SEP77/MAY80	SEP80/		E
422377	HAZARDANALSUPPL	MAY80/MAY80	SEP80/	(ADD)	E
422579	PROJFUNDING	JAN79/JAN79	MAR79/JUL79		E
422579	CRITICALCOMPTSTAEVAL	JUL79/JUL79	JUL80/		E
422579	PRELIMHAZARDANAL	JUL79/JUL79	JUL80/		E
422579	ADAPTATIONSTUDIES	JUL80/	AUG80/		E
422579	PROJPHYSICALCOMPLETION	JUL80/	AUG80/		E
422579	PROJFISCALCOMPLETION	AUG80/	SEP80/		E
422579	PROJCLOSEOUT	SEP80/	OCT80/		E
422680	PROJFUNDING	APR80/APR80	AUG80/		E
422680	CHECKOUTFIELDEQUIPMONTORS	SEP80/	JUN81/		E
422680	ASSESSONLINEMONITORPAR	JUN81/	AUG81/		E
422680	INTERIMRPT	AUG81/	SEP81/		E
422680	PROJPHYSCOMPL	OCT81/	OCT81/		E
422680	PROJFISCALCOMPL	OCT81/	OCT81/		E
422680	PROJCLOSEOUT	NOV81/	NOV81/		E
422872	PROGRAMAUTHORIZATION	AUG71/AUG71			E
422872	AWARDCONTRACT		JAN72/SEP72		E
422872,73	DSGNOFPROTOTYPE	JAN72/SEP72	JUL72/SEP73		E
422874	COMPLETEFABASSYOFPROTOSYST	JUN72/SEP73	JUL75/DEC75		E
422874	SHIPMENTTOPA	APR75/APR75	AUG75/JAN76		E

422874	PABLDGPREP+MOD	FEB75/FEB75JUL75/SEP75	E
422876	SYSTINSTALLATION	MAY75/MAY75SEP75/FEB76	E
422876,77,78	DEBUGOPERATIONATPA	JUN75/JUN75JUN76/JUN78	E
422877	FINALIZESCOPEOFWORKWRAPPERLINER	FEB77/FEB77APR77/FEB77(DEL)	E
422877	AWARDWRAPPERLINERCONTRACT	MAY77/MAY77JUL77/ (DEL)	E
422877	WRAPPERLINERFAB	AUG77/ DEC77/ (DEL)	E
422877	FINALIZESCOPEOFWORKIOLBSCALE	FEB77/FEB77MAY77/ (DEL)	E
422877	AWARDSCALECONTRACT	JUN77/ SEP77/ (DEL)	E
422877	SCALESTSTFAB	OCT77/ MAY78/ (DEL)	E
422878	DEMONSTRATEEQUIP	JUL78/JUL78JUN78/JUL78(ADD)	E
422878	SHIPEQUIP	JUL78/JUL78AUG78/OCT78(ADD)	E
423180	PROCPILOTPLANTFAC	NOV80/ JAN81/	E
423180	INSTALLPILOTPLANTSYS	JAN81/ FEB81/	E
423180	PILOTPLANTEVAL	FEB81/ JUL81/	E
423180	ECOAENERGYEVAL	JUL81/ AUG81/	E
423180	PREPDATADSGNCRIT	JUL81/ SEP81/	E
423180	DOCAFINALRPT	AUG81/ NOV81/	E
423180	ESTPROCH2OSPECS	APR80/APR80OCT80/	E
423180	QUALQUANTPOLLABATEH2O	OCT80/DEC80/	E
423180	EVALPRACTECOAENERGY	DEC80/ MAR80/	E
423180	DETMINREQTREAT	MAR81/ MAY81/	E
423180	FINALRPT	MAY81/ JUN81/	E
423180	OVERALLPROJ301FINALRPT	JUN81/ JUL81/	E
423680	RECEIPTOFFUNDS	OCT79/JAN80	E
423680	PREPSCOPEOFWORK	OCT79/OCT79DEC79/JAN80	E
423680	AWARDCONTR	DEC79/JAN80SEP80/	E
423680	DSGNPROTO	SEP80/ FEB81/	E
423680	TESTPROTO	MAR81/ APR81/	E
4236	DELTOLOADPLANT	MAY81/ JUN81/	E
423680	DELTOAFINALTECHRPT	SEP81/	E
423680	FINAL301RTP	SEP81/ SEP81/ (ADD)	E
423773	PROCENGRSERV	OCT72/AUG72JAN73/MAY73	E
423773	FLOWDIA+SITESEL	JAN73/MAY73MAR73/JUL73	E
423773	PILOTPLANTDSGN	FEB73/JUL73MAY73/AUG74	E
423774,76	COMPTRSIMUL	MAY73/MAY73MAR76/MAR76	E
423774	DSGNREV	FEB75/FEB75JUN75/JUL76	E
423774	VENDORCNTRS	JUL75/JUL75OCT75/NOV75	E
423774	EQUIPPROC	NOV75/NOV75DEC75/MAR77	E
423774	EQUIPDEL	MAY76/MAY76MAR77/JUL77	E
423774,76	HAZARDSANAL	JAN74/JAN74SEP80/	E
423776	EQUIPINSTALL	JUN76/JUN77FEB77/JAN78	E
423776	MECHTESTOFEQUIP	APR77/NOV78MAY77/JAN79	E
423776	WHITECOMPD+OXIDSTUDY	MAR77/MAR77AUG77/OCT77(ADD)	E
423777	MECHTESTOFEQUIP	NOV78/NOV78DEC78/JAN79	E
423778	PILOTPLANTSTARTUP(PROVEOUT)	MAY79/ JUL79/ (DEL)	E
423778	FINALRPT+HAZARDSANAL	MAR79/MAR79SEP80/ (ADD)	E
423778	HAZARDSANAL	JAN74/JAN74JAN79/ (DEL)	E
423778	PROJPHYSICALCOMPL	JUN80/JUN80JUN80/JUN80	E
423778	PROJFISCALCOMPL	JUN80/JUN80JUN80/JUN80	E
423778	PROJCLOSEOUT	JUN80/JUN80JUN80/JUN80	E
424974	DSGN	DEC73/DEC73MAR74/MAR74	E
424974	EQUIPPROC+INSTALL	MAR74/APR74JUN74/JUN75	E
424974	EQUIPEVAL	JUL74/JUL74MAR75/OCT75	E
424974	FINALRPT(FY74EFFORT)	APR75/MAR77SEP75/MAY77	E
424974	PILOTPLANTSTDY	MAY75/ OCT76/ (DEL)	E
424974	BIRDPANNEVISFILTERSPEC	MAR76/MAR76OCT76/OCT76(ADD)	E
424975	PILOTPLANTSTUDIES	MAR75/ OCT76/ (DEL)	E
424975	FINALRPT(FY75EFFORT)	SEP76/MAR77OCT76/JUN77	E
424977	BIRDPANNEVISFILTERPROC+INSTALL	DEC76/DEC76SEP77/JAN79	E
424977	EVALOFFILTER	OCT77/ DEC77/ (DEL)	E
424978	HAZARDSANAL	AUG78/AUG78APR79/APR79(ADD)	E
424978	EQUIPTEST	JUL80/ AUG80/	E
424978	PILOTPLANTOPER	JUL79/ DEC79/ (DEL)	E
424978	ECOEVAL	AUG79/ DEC79/ (DEL)	E
424978	BIRDPANNEVISFILTERINSTAL	FEB79/FEB79JUN80/ (ADD)	E
424978	FINALRPT	NOV80/ APR81/	E

424978	FINAL301RPT	OCT80/	DEC80/	(ADD)	E
425274	EXPERSTDYCONTPROCFORMFGOFRDX+HMX	SEP73/SEP73DEC74/OCT77			E
425274	TDP	DEC74/	JAN75/	(DEL)	E
425274,75	PRODIMPLRDX/HMXPROCIMPV	JUL74/JUL74DEC75/OCT74			E
425274,75	EQUIPPROC+INSTALL(ARRADCOMPILOTPLANT)	OCT74/OCT74DEC75/MAY79			E
425275	EXPERSTDYOFPROCFORMFGRDX/HMX	SEP73/SEP73DEC78/		(DEL)	E
425275	USEOFCRUDEACETICANHYDRIDE(LABSTDY)	DEC74/DEC74DEC75/SEP76			E
425275	FINALRPT	NOV77/NOV77MAY79/JUN79			E
425277	PRODPROVEOUTCRUDEACGTICANHYDRIDE	MAR77/MAR77JUN77/JUN77			E
425277	COMPC-4STUDY	JAN77/JAN77JUN77/DEC77			E
425277	COMP*A*STDY	DEC76/DEC76JUN77/DEC77			E
425277	ENGRRPTPRODPROVEOUTCRUDEACETICANHYD	MAY77/JUL77JUN77/JAN78			E
425277	COMPC-4STUDY	JUN77/DEC77JUL78/APR79			E
425277	*A*COMPSTUDY	JUN77/DEC77JUL78/JUN78			E
425277	RDX/HMXYIELDIMPVT	JUN77/OCT77APR78/MAY79			E
425277	PILOTPLANTREACTVAROPT	JUN79/	NOV79/	(DEL)	E
425277	FINALRPT(FY77EFFORT)	FEB78/APR80MAR78/JUN80			E
425278	PRODSIMMERPROC	MAR79/MAR79MAR78/MAY80			E
425278	PRODSIMMERPROC	MAR79/MAR79NOV79/		(DEL)	E
425278	MODHEXAMINEFEEDINCRHMXYIELD	APR80/	AUG80/	(DEL)	E
425278	ADJVARFOROPTYIELD	AUG80/	DEC80/	(DEL)	E
425278	PRODPROVEOUTRDX/HMXPROCIMPVT	JAN78/	JAN79/	(DEL)	E
425278	PILOTPLANTPREPOFSTDHMXBATCH	OCT79/NOV79DEC79/DEC79		(ADD)	E
425278	FINALRPT	APR80/APR80JUL80/			E
425278	PILOTPLANTPROCVARSTDYFORHMX	DEC79/DEC79JUN80/		(ADD)	E
426374	SYSTSTUDY	AUG73/NOV73MAR74/DEC74			E
426374	PILOTPLANTLINELAYOUT	AUG73/NOV73APR74/APR74			E
426374,75	PILOTPLANTDESIGN	NOV73/NOV73APR76/APR76		(ADD)	E
426374	CONVEYORSYST			(DEL)	E
426374,75	PROJWORKSTAS			(DEL)	E
426374,75	EQUIPDSGN	MAR74/MAR74FEB76/MAR76		(ADD)	E
426374,78	INSTRUMENTATION+CONTROL	JUN74/MAY74DEC74/MAY78			E
426375,77	PILOTPLANTCONSTRUCTION	MAR75/FEB77NOV75/JUL78			E
426375,77	EQUIPFAB	FEB75/FEB77JUN77/AUG77		(ADD)	E
426375,77	EQUIPPROCUREMENT	JAN75/JAN75JAN78/JAN78		(ADD)	E
426375,77	EQUIPTEST	APR75/APR75OCT77/OCT77		(ADD)	E
426376,77	PROCEQUIPINSTALL	SEP77/OCT77MAY78/JUN78		(ADD)	E
426376	PILOTPLANTOPER	MAY78/JUN78JAN80/APR80			E
426376	FINALREPORT	APR78/APR78SEP80/			E
426379	FINAL301RPT	APR80/	SEP80/		E
426680	DETDSGNASSLINESYST	JUN80/	NOV80/		N
426680	FABCRITASSINSPATESTSTA	AUG80/	DEC80/		N
426680	DEMOCRITASSINSPATESTSTA	DEC80/	MAR81/		N
426680	PROCEQUIP	MAR81/	SEP81/		N
426680	FABBALASSINSPATESTSTA	JUL81/	DEC81/		N
426680	DEMOASSLINE	DEC81/	FEB82/		N
426680	INTASSLINEINTOFUZEASSLINE	FEB82/	APR82/		N
426680	FINALTECHRTP	JUN82/	JUN82/		N
426680	FINAL301RPT	JUL82/	JUL82/		N
426775	LITSURV	JAN75/FEB75MAR75/JUN75			E
426775	BENCHSCALESTDY	JAN75/JUL75JAN76/AUG75			E
4267 75	PROCSTDY	JUN75/SEP75JAN76/DEC75			E
4267 75	FINALRPT	JAN76/JUN77APR76/JUN77			E
4267 77	DSGNCRIT	OCT77/OCT77DEC77/		(DEL)	E
4267 77	SITEPLAN	DEC77/	JAN78/	(DEL)	E
4267 77	PROCEVAL	OCT77/OCT77MAR79/MAR79		(ADD)	E
426777,78	PRELIM HAZARD ANAL	JAN79/FEB79APR80/			E
426777,78	FINAL HAZARD ANAL	MAY80/	SEP80/	(ADD)	E
4267 77,78	CNTRNEG	MAR79/APR79AUG79/AUG79		(ADD)	E
426777	PRELIM PILOT PLT DSGN	AUG79/SEP79FEB80/			E
42677	FINAL PILOT PLT DSGN	MAY80/	JUL80/	(ADD)	E
4267 77,78	EQUIPPROC+INSTALL	JUN80/	MAR81/		E
4267 77,78	INERTMECHCHECKOUTSYST	MAR81/	MAY81/		E
4267 77	FINALRPT	APR81/	JUN81/		E
4267 78	LIVECHECKOUT	JUN81/	AUG81/	(ADD)	E
4267 78	ENDITEMLDG/TEST	JUL81/	NOV81/	(DEL)	E

4267 78	FINALRPT	SEP81/	DEC81/	(ADD)	E
428076	FISCOBLIG	SEP75/SEP75	SEP75/SEP75		N
428076	SCOPEOFWORK	SEP75/SEP75	OCT75/SEP75		N
428076	CONTAWARD	OCT75/JAN76	JAN76/MAR76		N
428076	COMPLOFSTUDYPHASE	JAN76/MAR76	JUL76/SEP76		N
428076	COMPLOFTDP	MAY76/JUN76	JUL76/AUG76		N
428076	FINALRPT(DSGNSTDY)	JUN76/SEP76	AUG76/SEP76		N
428076	SCOPEOFWORK(AMEND)	NOV76/DEC76	DEC76/JAN77		N
428076	CONTRACT(AMENDED)	JAN77/JAN77	MAR77/AUG77		N
428077	SCOPEOFWORK	OCT77/DEC76	NOV76/JAN77		N
428077	CONTRAWARD	NOV76/JAN77	FEB77/AUG77		N
428077	EQUIPFAB	MAR77/APR77	DEC78/FEB79		N
428077	EQUIPDEBUG+MOD	DEC77/NOV77	JUN79/JUN79		N
428077	DOCUMENTATION	JAN78/JAN78	AUG79/DEC79		N
428077	FINALRPT	SEP79/NOV79	DEC79/DEC79	(ADD)	N
428176THRU79	INVENTORYSELPLANTS	JUL75/JUL75	JAN80/		E
428176THRU79	EVALDATAFRINITIALPLANTS	DEC75/	OCT76/	(DEL)	E
428176THRU79	EVALDATAFRSELPLANTS	APR76/APR76	APR80/	(ADD)	E
428176THRU79	DEFOFTECHREQMTS	JUL76/JUL76	MAR79/SEP79	(ADD)	E
428176,77	APPLIRTHERMOGRAPHYFORPROCINVENTORY	JUL75/JUL76	OCT77/OCT77		E
428176	SELCNTR+ISSUECONT	MAY76/MAY76	SEP76/SEP76		E
428176	IDENTWASTEHEATRECAPPLS	OCT76/OCT76	AUG77/JUL77		E
428176	IDENTADDWASTEHEATRECAPPLS	JAN78/OCT77	FEB78/NOV77		E
428176	FISCALOBLIG	OCT75/OCT75	OCT75/OCT75		E
428176	ACTTEAMFORMED	OCT75/OCT75	OCT75/OCT75		E
428176	SAAPSURSCOPEOFWORK	OCT75/OCT75	OCT75/OCT75		E
428176	SAAPENERGYINVENTCONTPLACED	JAN76/JAN76	APR76/APR76		E
428176	SAAPENERGYINVENTORY	APR76/JUL76	FEB77/FEB77		E
428176	FISCOBLIG	OCT75/OCT75	OCT75/OCT75		E
428176	PREPSCOPEOFWORK	JUL75/JUL75	JUL75/JUL75		E
428176	PLACESTDYCONT	AUG75/AUG75	NOV75/JUN76		E
428176	CONDFORGESTDY	JAN76/JUL76	JUL76/FEB77		E
428176	PREPPILOTPRODSCOPEOFWORK	JUL76/JUL76	SEP76/SEP77		E
428177,78,79	INVENTORYRMGPLANTS	OCT76/	JUN77/	(DEL)	E
428177,78,79	EVALDATAFRREMPLANTS	DEC76/	OCT77/	(DEL)	E
428177,78,79	DEFOFTECHREQ+COMPLOFFINALRPTS	OCT77/	MAR77/	(DEL)	E
428177	SELCONTR+ISSUECONT	JAN77/FEB77	APR77/JUL77		E
428177	ESTABPERFDATA	APR77/JUL77	JUL78/FEB78		E
428177	PERFHAZARDSANALYSIS	JUN77/JUL77	JAN78/DEC77		E
428177	SAAPRPT	FEB77/FEB77	APR77/APR77		E
428177	LCAAPSCOPEOFWORK	OCT76/OCT76	NOV76/NOV76		E
428177	LCAAPCONTPLACED	DEC76/DEC76	APR77/JUN77		E
428177,78	LCAAPENERGYINVENTORY	APR77/JUL77	FEB78/NOV77		E
428177	PLACEPILOTPRODCONTR	JAN77/MAY77	JUL77/NOV77		E
428177	MAKEPILOTPRODQUANT	FEB79/FEB79	MAR79/MAR79		E
428177	EVALRESPILOTPROD	APR79/APR79	APR79/APR79		E
428177	PREPFINALRPT	APR79/APR79	DEC79/		E
428178,79	FINALRPTS	DEC77/MAR78	JUL80/	(ADD)	E
428178,79,80	ENGRDSGNCONST+TESTPILOTFAC	JUL78/JUL78	MAY81/	(ADD)	E
428178	FINALRPT	JUL78/JUL78	AUG78/AUG78	(ADD)	E
428178	ENGRDSGNPILOTFACFORADDWASTEHEATAPPLS	MAR78/	JUN78/		E
428178,79	ENGRDSGNCONST+TESTPILOTFAC	JUL78/JUL78	MAR80/		E
428178	SELCONTR+ISSUECONT	JAN78/JAN78	JUL78/JUN78		E
428178	DETAVAILBIOMASS+NSTL/MSAAPFUELREQMTS	JUL78/JUN78	AUG78/AUG78		E
428178	SUR+SELCOMMERAVAILPROCWOODWASTEUTIL	AUG78/AUG78	OCT78/NOV78		E
428178	PREPECO+ENVIRSTATEONSELUNIT	NOV78/DEC78	FEB79/AUG79		E
428178	FINALRPT	FEB79/AUG79	MAR79/		E
428178	SELCONT+ISSUECONTFORPHASEII	APR78/APR78	JUL78/JUL78	(ADD)	E
428178	DSGNPILOTPLANT	JUN80/	JAN81/		E
428178	PUR+INSTALLPILOTPLANT	JAN81/	JUN81/		E
428178	TEST+EVALPILOTPLANT	JUN81/	JUL81/		E
428178	FINALRPT	AUG81/	SEP81/		E
428178	LCAAPRPT	MAR78/DEC77	MAY78/APR78		E
428178	ADD#LEFFORTSDEF	APR76/APR76	FEB79/FEB79		E
428178	FINALRPT	FEB79/FEB79	MAY79/MAY79		E
428178	FISCOBLIG	OCT77/FEB78	OCT77/FEB78		E

428178	RECSCOPEOFWORK	JUL77/SEP77AUG78/FEB78	E
428178	RECCONTPLACED	SEP77/APR78JUL78/JUL78	E
428178	PLANTDSGNSTDY	AUG78/AUG78DEC78/DEC78	E
428178	OPTRECSYST	JAN79/JAN79JUN79/JUL79	E
428179	STATEOFARTREV	OCT79/SEP79DEC78/OCT79	E
428179	SELOFPROCTOBEEXAM	JAN79/ FEB79/ (DEL)	E
428179	SELOFINSULTYPE+APPL	FEB79/NOV79JAN80/	E
428179	TESTOFSELAPPL	JUL79/ AUG79/ (DEL)	E
428179	EVALOFINSULBOILTUB	FEB80/ JUN80/ (ADD)	E
428179	FINALRPT+RECOM	JUL80/ SEP80/	E
428179	SURVEYOASUSAGEATRAAP	OCT78/AUG79 NOV79/NOV79	E
428179	ENGRSTDYOFCOALGASPROC	SEP79/ MAR80/	E
428179	EVALCOALGASFORUSEINRAAPPROC	NOV79/ MAY80/	E
428179	EVALOFALTPROC	MAR80/ MAY80/	E
428179	SELOFOPTIMUMSYST	APR80/ JUN80/	E
428179	HAZARDSANAL	NOV79/ APR80/	E
428179	DOC+FINALRPT	JUN80/ AUG80/	E
428179	CONST+TESTPILOTFACFORADDWASTERECAPPLS	JUL78/ JUN79/	E
428180	FINALRPT	APR81/ JUN81/	E
428179	FINALRPT	APR80/ JUN80/	E
428179	INTERFACERECSYSTW/VARPLANTDSGNS	APR79/ AUG79/ (DEL)	E
428179	PROVGOCO#SW/DATATOPREPP-15#S	MAR80/ MAY80/	E
428179	PREPFINALRPT	MAR80/ MAY80/	E
428180	ENGRDSGNPILOTFACFORADDWASTERECAPPLS	APR80/ JUN80/ (DEL)	E
428180	CONST+TESTPILOTFACFORADDWASTERECAPPLS	JUL80/ JAN81/ (DEL)	E
428180	FINALRPT(ADDWASTERECAPPLS)	FEB81/ MAR81/ (DEL)	E
428179	DSGNOFRECOVSYSTSOW	MAR79/MAR79MAY79/MAY79 (ADD)	E
428179	AWARDOFCONTRACT	MAY79/MAY79OCT79/ (ADD)	E
428179	DSGNOFRECOVSYST	OCT79/SEP79 MAR80/ (ADD)	E
428576	RECEIVEFUNDS	SEP75/SEP75SEP75/SEP75	E
428576	TESTPLANDEV	SEP75/SEP75JUL76/NOV76	E
428576	TEST+EVAL	NOV75/JAN76DEC76/JAN77	E
428576	GEOMETRYEFFECTS	DEC75/MAY76NOV76/NOV77	E
428576	REPTPREP+DISTRIBUTION	MAR76/MAR76FEB77/JUN78	E
428577	RECEIVEFUNDS	AUG76/AUG76AUG76/AUG76	E
428577	TESTEVAL	SEP76/SEP76JAN77/JAN77	E
428577	PREPOFTECHRPTS	FEB77/FEB77SEP77/SEP77	E
428577	FINALREPORT	AUG78/AUG78AUG78/AUG78	E
428577	RECEIVEFUNDS	OCT76/FEB77OCT76/FEB77	E
428577	SCOPEOFWORK	OCT76/MAY77NOV76/MAY77	E
428577	CONTRACTAWARD	OCT76/MAY77NOV76/AUG77	E
428577	TESTPLANDEVELOPMENT	OCT76/MAR77SEP77/SEP77	E
428577	TEST+EVAL	DEC76/JUN77NOV777MAR78	E
428577	GEOMETRYEFFECTS	DEC76/AUG77NOV77/MAY78	E
428577	REPORTPREP+DISTRIBUTION	FEB77/AUG77DEC79/NOV79	E
428578	RECEIVEFUNDS	OCT77/DEC77OCT77/JAN78	E
428578	SCOPEOFWORK+CONTRACTAWARD	OCT77/JAN78DEC77/MAY78	E
428578	TESTPLANDEV	OCT77/JAN78DEC78/JAN79	E
428578	TEST+EVAL	DEC77/APR78NOV78/JAN80	E
428578	GEOMETRYEFFECTS	DEC77/DEC77NOV78/NOV79	E
428578	RPTPREP+DIST	FEB78/FEB78FEB79/MAY80	E
428579	RECEIVEFUNDS	OCT78/OCT78NOV78/DEC78 (ADD)	E
428579	SCOPEOFWORK+CONTRALTAWARD	DEC79/DEC79MAR80/ (DEL)	E
428579	TESTPLANDEVELOP	NOV78/JAN79AUG79/AUG79 (ADD)	E
428579	TEST+EVAL	FEB79/FEB79NOV79/NOV79 (ADD)	E
428579	GEOMETRYEFFECTS	FEB79/FEB79NOV79/ (DEL)	E
428579	RPTPREP+DIST	JUN79/JUN79DEC80/ (ADD)	E
428579	FINAL301RPT	MAY81/	E
428580	RECFUNDS	OCT79/NOV79DEC79/NOV79 (ADD)	E
428580	TESTPLANDEV	NOV79/NOV79 AUG80/ (ADD)	E
428580	TESTEVAL	FEB80/ NOV80/ (ADD)	E
428580	GEOMETRYEFFECTS	FEB80/FEB80SEP80/ (ADD)	E
428580	RPTPREPADISTR	JUN80/ MAY81/ (ADD)	E
428580	FINALRPT301	MAY82/	E
428877	SAFESEPARATIONTESTS	JAN77/MAR77OCT78/OCT78	E
428877	PRIMARYFRAGIMPACTTESTS	MAR77/APR77OCT78/OCT78	E

428877	SECONDARYFRAGIMPACTTESTS	MAR77/APR77OCT78/OCT78	E
428877	PREPOFTECHRPTS	JUN77/JUN77OCT78/OCT78	E
428878	SAFESEPARATIONTESTS	DEC77/JAN78DEC79/DEC79	E
428878	PRIMARYFRAGIMPACTTESTS	DEC77/JAN78OCT79/OCT79	E
428878	SECONDARYFRAGIMPACTTESTS	DEC77/JAN78OCT79/OCT79	E
428878	PREPOFTECHRPTS	JUN78/JUN78JUN80/JUN80	E
428879	SAFESEPARATIONTESTS	OCT78/JAN79OCT80/	E
428879	PRIMARYFRAGIMPACTTESTS	OCT78/JAN79OCT80/	E
428879	SECONDARYFRAGIMPACTTESTS	OCT78/JAN79OCT80/	E
428879	PREPOFTECHRPTS	JUN79/MAY79OCT80/	E
428880	SAFESEPARATIONTESTS	DEC79/DEC79 DEC80/	E
428880	PRIMARYFRAGIMPACTTESTS	JAN80/JAN80DEC80/	E
428880	SECONDARYFRAGIMPACTTESTS	JAN80/JAN80 DEC80/	E
428880	PREPOFTECHRPTS	JUN80/JUN80SEP81/	E
428976	RECVDFUNDS(RAAPI)	SEP75/SEP75SEP75/SEP75	E
428976	COMPHAZARDANALDATA	NOV75/NOV75AUG76/AUG76	E
428976	PRCVTESTVEHICLES(RAAPII)	DEC76/DEC76FEB77/MAR77	E
428976	HALFSCALEMODELTESTS	FEB77/MAR77MAR77/APR77	E
428976	ONETHDSCALEMODELTESTS	MAR77/MAR77APR77/MAR77	E
428976	ONEFOURTHSCALEMODELTESTS	APR77/MAR77MAY77/MAR77	E
428976	DATAREDUCT+ANAL	APR77/APR77MAY77/MAY77	E
428976	FINALRPT	JUN77/JUN77FEB78/FEB78	E
428976T	DSGNMATHMODEL	JAN78/JAN78APR78/APR78	E
428976T	SUBSCALETEST	MAR78/MAR78JUN78/JUN78	E
428976	CONTAWARD(IITRIII)	FEB76/FEB76MAY76/MAY76	E
428976	COMPLOFHAZARDSTESTDATA+ANAL	JUN76/JUN76NOV76/NOV76	E
428976	DEVOFINPROCHAZARDSCLASSPROC	NOV76/NOV76JAN77/JAN77	E
428976	EVALSUBSCALETESTPROC	JAN77/JAN77AUG77/AUG77	E
428976	RECFULLSCALETESTPROC	AUG77/AUG77SEP77/SEP77	E
428977	CONTAWARD	JUL77/JUL77SEP77/NOV77	E
428977	COMP+ANALADDACCIDENTDATA	NOV77/NOV77FEB78/FEB78	E
428977	CONDSENS+EFFECTSTEST	JUN78/JUN78OCT78/OCT78	E
428977	FINALHAZARDSCLASSPROCS	SEP78/SEP78OCT78/OCT78	E
428977	INTERIMRPT	OCT78/OCT78NOV78/NOV78	E
428978	DATAANAL(MODEL)	JUL78/NOV78AUG78/JAN79	E
428978	FINALRPT	SEP78/FEB79MAR79/MAY79	E
428978	CNTRAWARD(SUPPL)	MAR78/MAR78JUN78/JUL78	E
428978	COMPLTESTMETHVALIDS	NOV78/NOV78APR79/APR79	E
428978	REV+ASSESSPROCSFORINCORPINT8700=2	APR79/APR79JUN79/JUN79	E
428978	DRAFTPROCSFORSAFETYAPPVL	JUN79/JUN79SEP79/SEP79	E
428978	COMPL+ANALPYROHAZARDTESTDATA(IV)	MAR78/MAR78SEP78/SEP78	E
428978	CONDTESTTOEVALHAZARDDUSTFORMATION	SEP78/SEP78NOV78/NOV78	E
428978	PREPPYROHAZARDSHDBK	NOV78/NOV78DEC78/DEC79	E
428978	FINALRPTHAZARDCLASSPROC	JUN79/JUN79DEC79/JUN80	E
428978	FINALRPT		
429176	ANALYTICALSTUDIES(TASK1)	OCT75/OCT75NOV76/NOV76	E
429176	TESTPLANDEV	OCT75/OCT75NOV76/NOV76	E
429176	TEST	JAN76/JAN76JUL77/JUL77	E
429176	TESTEVAL	JAN76/JAN76JUL77/JUL77	E
429176	RPTPREP	FEB76/FEB76NOV77/NOV77	E
429176	ANALYTICALSTUDIES(TASK2)	OCT75/OCT75MAR76/MAY76	E
429176	TESTPLANDEV	OCT75/OCT75MAY76/MAY76	E
429176	TEST	JAN76/JAN76OCT78/OCT78	E
429176	TESTEVAL	JAN76/JAN76NOV78/NOV78	E
429176	RPTPREP	FEB76/FEB76NOV78/NOV78	E
429177	TESTPLANDEV	JUN77/JUN77AUG77/AUG77	E
429177	TESTING(REV6)	MAY79/MAY79JUL79/JUL79	E
429177	TESTEVAL(REV6)	JUN79/JUN79SEP79/SEP79	E
429177	REPORTPREP(REV6)	AUG79/AUG79DEC77/JAN80	E
429179	ANALYTICALSTUDIES	JUN79/JUN79DEC79/DEC79	E
429179	TESTPLANDEV	SEP79/SEP79DEC79/DEC79	E
429179	TEST	JUN80/ SEP80/	E
429179	TESTEVAL	JUN80/ DEC80/	E
429179	REPORTPREP	JAN80/JAN80MAR81/	E
429179	FINAL30IRPT	SEP81/	E
429180	RECFUNDS	JAN80/JAN80JAN80/JAN80	E

429180	ANALSTUDYS	JAN80/JAN80JUN80/	E
429180	DEVUSGNCRIT	JUN80/ MAR81/	E
429180	RPTPREPADIST	SEP80/ SEP81/	E
429180	FINAL301RPT	SEP82/	E
430979	RELPROGAUTHORI	MAY79/MAY79JUL79/JUL79	E
430979	ENGRREVAGENPROCSTDY	JUL79/JUL79DEC79/	E
430979	HAZARDANALI	JUL79/JUL79 JUN80/	E
430979	POLUTABATMENT	JUL79/JUL79JUN80/	E
430979	DSGNSTDYI	SEP79/SEP79JUN80/	E
430979	RELPROGAUTHORIT	MAY79/MAY79MAY79/MAY79	E
430979	REVRADPROCPARIT	MAY79/JUN79SEP79/NOV79	E
430979	ESTABPRELIMPRODPROCII	JAN80/ MAY80/	E
430979	PROTOEQUIPDSGNTI	APR80/ NOV80/	E
431075	PILOTPLANTSCOPEOFWORK	FEB75/FEB75MAR75/MAR75	E
431075	FEASTESTIONSOPROD1	APR75/APR75JAN77/DEC77	E
431075	PILOTPLANTDSGN	MAR75/APR75JUL75/AUG76	E
431075,76,77	EQUIPPROC+INSTALL	JUL75/OCT75JAN76/FEB78	E
431075	FINALRPT	SEP76/NOV77SEP76/JUN78 (ADD)	E
431076	PILOTPLANTTEST	(DEL)	E
431076	TDP	(DEL)	E
431076	FINALRPT	APR77/JUN78APR77/JUN78	E
431076,77	HAZARDSANAL	JAN77/MAR77JUN77/JAN78 (ADD)	E
431077	DEBUGPILOTPLANT	(DEL)	E
431077	EVAL+OPTOFPROC	(DEL)	E
431077	PROVEOUTCONTENDURRUN	(DEL)	E
431077	FINALRPT	APR78/JUN78MAY78/JUN78 (ADD)	E
431078	DEBUGPILOTPLANT	NOV78/NOV78JAN79/FEB79	E
431078	EVAL+OPTOFPROC	FEB79/FEB79SEP79/ (DEL)	E
431078	PROVEOUTCONTENDURRUN	(DEL)	E
431078	STARTAINITIALOPEROFPROC	FEB79/FEB79AUG79/AUG79 (ADD)	E
431078	FINALRPT	JUN79/APR80AUG79/MAY80	E
431079	EVAL+OPTOFPROC	SEP79/AUG79NOV79/NOV79 (ADD)	E
431079	PROVEOUTCONTENDURRUNS	NOV79/OCT79 JAN80/NOV79 (ADDE	
431079	PRODINCORP	DEC79/FEB80JAN80/MAY80 (ADD)E	
431079	PHY+CHEMTESTSOFPROD	AUG79/JAN80FEB80/ (ADD)	E
431079	FINALRPT-PROC	JAN80/JAN80AUG80/ (ADD)	E
431079	QUALTESTS	JUL80/ DEC80/ (DEL)	E
431079	ENDITEMTESTS	AUG80/ SEP81/ (DEL)	E
431079	FINALRPT-PROJ	JUN81/ DEC81/ (ADD)	E
431080	PROTESTAEVAL	FEB80/FEB80SEP81/	E
431080	DOCTESTRESULTS	JUL81/ NOV81/	E
431080	FINALFY80RPT301	AUG81/ DEC81/	E
431080	OVERALLPROJFINAL301RPT	AUG81/ DEC81/	E
431176	FISCALOBLIGATION	OCT75/OCT75OCT75/NOV75	E
431176	SCOPEOFWORK	MAY75/MAY75OCT75/OCT75	E
431176	AWARDCONTRACT(PHASE1+2)	NOV75/NOV75MAY76/JUN76	E
431176	CONCEPTFORMULATION	JUN76/JUL76SEP76/OCT76	E
431176	DSGN+BUILTFEASMODELS	JUN76/AUG76AUG76/JAN77	E
431176	DEPOMODELS	JUL76/OCT76SEP76/JAN77	E
431176	PROTODSGN	JUL76/SEP76JAN77/FEB78	E
431176	MACHPROTOBUILD+TEST	FEB77/FEB77OCT79/OCT79	E
431177	FISCALOBLIGATION	JAN77/JAN77JAN77/JAN77	E
431177	SCOPEOFWORK	SEP76/SEP76SEP76/SEP76	E
431177	AWARDOFCONTRACT	JAN77/JAN77MAR77/AUG77	E
431177	BUILDEQUIP	MAY77/AUG77SEP80/	E
431177	SHIPTOLOADPLANT	JAN79/JAN79OCT80/	E
431177	SETUP+FINALACCEPT	FEB79/FEB79DEC80/	E
431177	FINALTDP	NOV78/NOV78DEC80/	E
431177	FINALTECHRTP	JUN80/ JUN81/ (ADD)	E
431177	FINAL301RTP	JAN81/ JAN81/ (ADD)	E
431279	PRELIMSTUDY	DEC78/DEC78JAN79/JAN79	E
431279	PREPSCOPEOFWORK	DEC78/DEC78MAR79/APR79	E
431279	CONTRACTAWARD	MAY79/MAY79JUN79/AUG79	E
431279	HAZARDSANALYSIS	NOV79/DEC79SEP80/	E
431279	TEST+EVAL	MAY80/APR80FEB81/	E
431279	PRODDSGN	FEB81/ APR81/	E

431279	FINALRPT	APR81/ JUN81/		E
431280	PREPSCOPEOFWORK	SEP79/SEP79MAY80/MAY80		E
431280	CONTRACTAWARD	JUN80/ JUN80/		E
431280	TESTAEVAL	JUL81/ MAR81/		E
431280	PRODDESGN	APR80/ MAY81/		E
431280	FINALRPT	APR81/ JUN81/		E
431280	FINALTECHRPT	JUN81/ JUL81/		E
432278,79	TAILORDFTECHBASE	AUG78/SEP78SEP79/SEP79		A
432279	SCONTRACTAWARDS	JUL79/JUL79SEP79/SEP79	(ADD)	A
432278	2NDREACTIVATIONJAAP	OCT78/OCT78NOV78/NOV78	(ADD)	A
432278	3RDREACTIVATIONJAAP	APR79/APR79MAY79/MAY79	(ADD)	A
432278	1STPHASESTANDBYSIMPLJAAP	AUG79/AUG79DEC79/	(ADD)	A
432279	SHUTDOWNEPCSATVAAP	AUG79/AUG79SEP79/SEP79	(ADD)	A
432278	4THREACTIVATIONJAAP	OCT79/OCT79NOV79/NOV79	(ADD)	A
432279	DOCORIENTVAAPLAYAWAY	OCT79/OCT79OCT80/	(ADD)	A
432279	DEVBSCUNIFORMFAILURERPTPROC	NOV79/NOV79NOV81/	(ADD)	A
432278	2NDPHSESIMPLPROCJAAP	DEC79/DEC79DEC80/	(ADD)	A
432279	IDENTINITIALDATABASESFAAP	JAN80/ JAN81/	(ADD)	A
432279	CYCLEPROCIAAAP	JAN80/ JAN81/	(ADD)	A
432279	IDENTINITIALDATABASEVAAP	JAN80/MAR80DEC80/	(ADD)	A
432279,80	IDENTPROCMULTDOCSTORAGE	SEP79/SEP79FEB81/	(ADD)	A
432278,79	COMP*SYSTEVAL	AUG78/SEP78SEP80/		A
432278,79	ONSITEMEASDATABASE	AUG78/SEP78JUN81/		A
432278,79,80	ONSITECYCLING	AUG78/SEP78JUN81/		A
432278,79,80	ANALOPSUSPECTOPFAILEDCOMPS	AUG78/SEP78JUN81/		A
432279	INTERIMRPTI,FY78EFFORT	JUN79/JUN79JUN80/		A
432279,80	DATA*TRENDANAL	JUN79/ JUN81/		A
432279,80	SPAREPTSPROVISIONING	SEP79/ JAN81/		A
432279,80	DEFOFPROCEDGUIDELINES	JUN79/ JUN81/		A
432279,80	DOC*FINALRPT	JUN79/JUN79FEB82/		A
432280	INTERIMRPTII,FY79EFFORT	JAN80/ SEP81/		A
432278	FINALRTP(FY78-201)	MAR80/ JUN80/		A
432279	FINALRTP(FY79-201)	MAR81/ JUN81/		A
432280	FINALRTP(FY80-201)	JAN82/ APR82/		A
432878	PROJAUTHORIZED	OCT77/JUL78OCT77/JUL78		M
432878	PRCCOFPROTOCONTAINERS	MAY79/MAY79NOV79/NOV79		M
432878	TESTPROTOCONTRS	DEC79/DEC79JUN80/		M
432878	PIDSGN(PID)PHASE	SEP78/SEP78JUL80/		M
432878	PIPROTUREVIEW(PIPR)	JUL80/ JUL80/	(DEL)	M
432878	SELFINALDSGN	JUN80/ JUL80/	(ADD)	M
432878	FINALRPTCOMPL	JUL80/ AUG80/	(ADD)	M
433279	RECEIPTOFFUNDS	FEB79/FEB79FEB79/FEB79		M
433279	OBLIGATIONOFFUNDS	FEB79/FEB79FEB79/FEB79		M
433279	INVESTIGATEALTERNATIVES	SEP79/OCT79DEC79/JAN80		M
433279	SAMPLEFAB	JAN80/JAN80JUN80/		M
433279	SAMPLETEST	JUL80/ AUG80/		M
433279	EVALUATION	AUG80/ SEP80/		M
433279	FINALRPT	SEP80/ OCT80/		M
433579	MASTERPLNREVIEW	SEP79/OCT79SEP79/OCT79		M
433579	ENDRGPROCSTDYASEL	JAN80/NOV79FEB80/DEC79		M
433579	FABPROCTOOLING	FEB80/JAN80MAR80/MAR80		M
433579	MFRSAMPLEHARDWARE	MAR80/FEB80OCT80/		M
433579	STATICDYNAMICTEST	OCT80/ JAN81/		M
433579	TESTEVALAPROCVFR	SEP80/ JAN81/		M
433579	TOOLINGMOD	JAN81/ JAN81/		M
433579	MFRCOMPONENTSFORFINALTEST	FEB81/ FEB81/		M
433579	CONDUCTSTATACANISTERFIRINGTEST	MAR81/ MAR81/		M
433579	CONDUCTFINEVAL	APR81/ APR81/		M
433579	DEVPROCSPECS	JAN81/ MAY81/		M
433579	MFRCOMPFORGYROVERIFTEST	FEB81/ MAR81/		M
433579	TESTGYRO	MAR81/ MAR81/		M
433579	EVALTESTRESULTS	MAR81/ APR81/		M
433579	FINALDATAPKG	APR81/ MAY81/		M
433579	COMPLETEFINALRPT	MAY81/ MAY81/		M
433776	TECHEVALOFORIGMATLS	SEP76/AUG76OCT76/JAN77		M
433776	CONTAWARDPROCCANDIDATEMATLS	SEP76/MAR77DEC76/MAY77		M

433776	INHOUSESTUDYOFCANDIDATEMATLS•PROC	OCT76/JAN77	JAN77/MAY77	M
433776	SELOFMATLS	JAN77/	FEB77/ (DEL)	M
433776	FABOFTESTHDWR	FEB77/	JUN77/ (DEL)	M
433776	TEST•EVAL(TECOM•ARRADCOM)	APR77/	SEP77/ (DEL)	M
433776	INCORPINTOTDP	OCT77/	NOV77/ (DEL)	M
433776	INHOUSESEARCHFORCANDMTLS•PROC	JAN77/JAN77	MAY77/MAY77	M
433776	INHOUSEEVALOFALT	OCT77/OCT77	JAN78/SEP78 (ADD)	M
433776	CONTAWARD-EVALATC3PHASEI	AUG79/AUG79	APR80/APR80 (ADD)	M
433776	EVALOFCONTRESULTSATC3PHASEI	APR80/APR80	MAY80/JUN80 (ADD)	M
433776	GATOR/GEMMS/RAAMUVSTUDYPHASEI	DEC79/DEC79	JUN80/ (ADD)	M
433776	ADAMUVSTUDYPHASEI	JAN80/	JUL80/ (DEL)	M
433776	GATORUVPHASEII	JAN80/	JAN81/ (DEL)	M
433776	GEMMSUVPHASEII	JAN80/	APR81/ (DEL)	M
433776	RAAMUVPHASEII	JAN80/	APR81/ (DEL)	M
433776	ADAMATC3TDP	MAR80/	MAY80/ (DEL)	M
433776	GATORUVTDP	MAY81/	AUG81/ (DEL)	M
433776	GEMMUVTDP	MAY81/	AUG81/ (DEL)	M
433776	RAAMUVTDP	MAY81/	AUG81/ (DEL)	M
433776	ADAMUVRPT	SEP80/	DEC80/ (DEL)	M
433776	GATORINSITUBONDING	AUG79/AUG79	NOV79/NOV79 (ADD)	M
433776	ADAMATC-3TDP	MAR80/	MAY80/ (ADD)	M
433776	GATORTDP	MAY80/	JUN80/ (ADD)	M
433776	PROJECTCOMPL	DEC80/	JAN81/ (DEL)	M
433776	FINALRPT	FEB81/	FEB81/ (ADD)	M
433776	FINAL SCI RPT	JUN80/	JUL80/ (ADD)	M
433776	FINAL TECHRPT	JUN80/	JUL80/ (ADD)	M
433876	CONTRACTAWARD(90PPMTAPESTIFFASSY)	JUN78/JUN78	JUL78/JUL78	M
433876	PROTODSGNCOMPLETE	AUG78/JUL78	OCT78/JUL78	M
433876	PROTOCOMPLETE	OCT78/AUG78	JUL80/	M
433876	INSTALLCOMPLETE	AUG80/	SEP80/	M
433876	TDP/DOFM/FINALRPTCOMPLETE	MAY79/	SEP79/ (DEL)	M
433876	WORKCOMPLETE	JUN78/JUN78	MAY80/ (DEL)	M
433876	PROTOACCEPTATGOCO	OCT80/	NOV80/ (ADD)	M
433876	FISCALOBLIGATION(90PPMTAPESTIFFASSY)	FEB76/MAY76	FEB76/MAY76	M
433876	CONCEPTSTUDYFORSOW	APR76/AUG76	APR76/AUG76	M
433876	CONCEPTSTUDYFORADVERFORBIDS	APR76/SEP76	APR76/OCT76	M
433876	CONCEPTSTUDYINITIATEDCONTRACTAWARD	JUN76/SEP77	AUG76/SEP77	M
433876	FEASDSGN/PROCCOMPL	AUG76/NOV77	AUG76/NOV77	M
433876	FEASEQUIP/PROCCOMPL	AUG76/NOV77	JAN77/FEB78	M
433876	FEASTESTCOMPL	APR78/FEB78	JUN78/	M
433876	PROTODSGNCOMPL	MAY79/	NOV79/	M
433876	PROTOCOMPL	AUG79/	MAR80/	M
433876	INSTALLCOMPL	MAR80/	MAY80/	M
433876	TDP/DOFM/FINALRPTCOMPL	MAR80/	MAY80/	M
433876	TDP/DOFM/FINALRPTRELEASED	MAY80/	JUN80/	M
433876	WORKCOMPL	FEB76/	JUN80/	M
433876	FISCALOBLIGATION(AUTOGRENADEMACH)	FEB76/MAY76	FEB76/MAY76 (DEL)	M
433876	CONCEPTSTUDYFORSOW	APR76/AUG76	APR76/AUG76 (DEL)	M
433876	CONCEPTSTUDYFORADVERFORBIDS	APR76/SEP76	APR76/OCT76 (DEL)	M
433876	CONCEPTSTUDYINITIATEDCONTRACTAWARD	JUN76/SEP77	AUG76/SEP77 (DEL)	M
433876	FEASDSGN/PROCCOMPL	AUG76/NOV77	AUG76/NOV77 (DEL)	M
433876	FEASEQUIP/PROCCOMPL	AUG76/NOV77	JAN77/FEB78 (DEL)	M
433876	FEASTESTCOMPL	JAN77/FEB78	APR78/ (DEL)	M
433876	PROTODSGNCOMPL	APR77/MAY78	JUN77/ (DEL)	M
433876	PROTOCOMPL	JUN77/	MAR78/ (DEL)	M
433876	INSTALLCOMPL	MAR78/	MAR78/ (DEL)	M
433876	TDP/DOFM/FINALRPTCOMPL	MAR78/	NOV78/ (DEL)	M
433876	TDP/DOFM/FINALRPTRELEASED	NOV78/	JAN79/ (DEL)	M
433876	WORKCOMPL	JAN79/SEP77	MAR79/ (DEL)	M
433876	FINALRPT		DEC80/ (ADD)	M
434177	CONTAWARD	JAN77/APR77	JAN77/APR77	E
434177	MARKETSURVOFPROC•EQUIP	MAR77/MAR77	MAY77/JAN78	E
434177	INTERIMLTRRPT	MAY77/MAY77	MAY77/MAY77 (ADD)	E
434177	BENCHSCALESTDYS	JUN77/JUN77	OCT77/MAR79	E
434177	ECOSTDYOFPROC•EQUIP	AUG77/AUG77	NOV77/APR78	E
434177	HAZARDSANAL	JUL77/JUL77	DEC77/MAR79	E

434177	PRELIMSELOFEQUIP	OCT77/OCT77JAN78/FEB78	E
434177	INTERIMLTRRPT	DEC77/DEC77DEC77/FEB78	E
434177	FINALRPT	MAR79/MAR79 MAR79/MAR79	E
434178	PROCOFEQUIP	SEP80/AUG79AUG80/	E
434178	HAZARDSANAL	MAY79/APR79FEB81/	E
434178	SELOFEQUIP	SEP79/SEP79 JAN80/MAR80	E
434178	FINALSTATUSRPT	DEC80/ DEC80/	E
434178	PRODASSURANCE	OCT79/OCT79FEB81/	E
434179	INSTALLOFPROCEQUIP	SEP79/MAR80OCT80/	E
434179	CNTLSYSTDEV	DEC79/FEB80FEB81/	E
434179	EQUIPCHECKOUT	SEP80/ DEC80/	E
434179	FINALSTATUSRPT	JUN81/ JUN81/	E
434180	EVALOFPROCEQUIP	JAN81/ JUN81/	E
434180	FINALSTATUSRPT	DEC81/ DEC81/	E
434181	FINALSTATUSRPT	JUN82/ JUN82/	E
434181	FINALTECHRPT	OCT81/ MAR82/	E
434377	FUNDSTRANSTOGOCO	MAR77/MAR77JUL77/OCT77	E
434377	EVALOFPROCCNTLPARAMETERS	OCT77/OCT77SEP79/SEP79	E
434378	FINALRPT	APR79/MAY79OCT79/MAR80	E
4343 77	LIT+CNTLRECEXAM	OCT77/OCT77AUG78/SEP78	E
434378	FINALSTATUSRPT	APR77/APR77APR77/APR80	E
434378	FINALTECHRPT	JAN80/APR80JUN80/	E
436277	PROCINVESTIGATION	JUN77/JUN77AUG77/AUG77	E
436277	EQUIPPROCUREMENT	JUN77/JUN77SEP77/JAN78	E
436277	CONTLCOOLPROCDEV	DEC77/FEB78JUL80/	E
436277	BASELINEDSGNCRITERIA	JUN77/DEC77FEB79/FEB79	E
436277	FINALRPT	JUL79/JUL79 DEC80/	E
436277	FINAL3U1RPT	DEC80/ JAN81/ (ADD)	E
441077	SINTERTOSHAPEKENNAMETAL	NOV76/MAY77APR77/JUL77	Q
441077	SINTERTOSHAPETELEDYNE	NOV76/APR77APR77/MAY77	Q
441077	EVALTWOSTEPSWAGEKENNAMETAL	NOV76/APR77JAN77/NOV77	Q
441077	EVALONESTEPSWAGEKENNAMETAL	MAY77/MAY77SEP77/NOV77	Q
441077	EVALVARIEDDIESWAGETELEDYNE	FEB77/JUL77JAN78/FEB78	Q
441077	FINALEVALSTEPSWAGE	DEC77/DEC77AUG79/AUG79	Q
441077	FINALEVALVARIEDSWAGE	JAN78/FEB78SEP79/SEP79	Q
441077	FINALRPT	SEP79/NOV79OCT79/DEC79 (ADD)	Q
443177	AWARDCONTRACT	JAN77/JAN77JUN77/NOV77	E
443177	CONCEPT/DSGNEQUIP	SEP77/NOV77AUG78/MAR79	E
443177	BUILDEQUIP	OCT78/OCT78JUN78/	E
443178	AWARDCONTRACTPHASE3+4	NOV77/JUL78JAN78/SEP78	E
443178	TESTEQUIP(CONTD)	JUL78/MAY79AUG79/	E
443178	SHIP+INSTALLEQUIPATMAAP	SEP78/MAY79OCT78/	E
443178	INERT+LIVETESTSATMAAP	NOV78/ DEC78/	E
443178	TDP-COMPL	APR78/OCT78DEC78/	E
443178	SUBMITFINALRPT	JAN79/JAN80FEB79/JAN80	E
443178	FINALIZETDP	JAN79/ FEB79/	E
444477	PROJAPPROVAL	JUL76/AUG76JUL76/AUG76	M
444477	FISCALOBLIGATION	JUL76/AUG76JUL76/AUG76	M
444477	SCOPEOFWORK	MAY76/MAY76MAY76/MAY76	M
444477	ADFORBIDS	OCT76/OCT76DEC76/DEC76	M
444477	CONTRACTAWARD	FEB77/APR77FEB77/APR77	M
444477	CONCEPTSTUDY	APR77/MAY77SEP77/SEP77	M
444477	CONCEPTREVIEW	SEP77/SEP77OCT77/OCT77	M
444477	FINALRPT	/MAY80	M
444478	PROGAUTH	JAN78/JAN78JAN78/JAN78	M
444478	FISCOBLIGATION	JAN78/JAN78JAN78/JAN78	M
444478	SELECTBESTAPPROACH	AUG78/AUG78SEP78/OCT78	M
444478	DEVPROCPKG	NOV78/MAR77DEC78/MAY79	M
444478	CONTRACTAWARD	JAN78/JUN79JUN80/	M
444478	ESTABPILOTLINE	MAR78/ AUG78/ (DEL)	M
444478	MFGBODIES	OCT78/ JUN79/ (DEL)	M
444479	PROGAUTH	JUL79/SEP78JUL79/ (DEL)	M
444479	FISCOBLIGATION	SEP78/SEP78NOV78/DEC78	M
444479	LAPPROJS	FEB82/ MAR82/	M
444479	PROJBALLISTICTESTS	APR82/ JUL82/	M
444479	EVALRESULTS	JUL82/ SEP82/	M

444479	PERFORMLOCALTESTS	JUL79/	SEP79/	(DEL)	M
444479	AMENDTOP	APR80/	MAY80/	(DEL)	M
444479	SURVEILLANCE	MAY80/	SEP80/	(DEL)	M
444479	FINALRPT	SEP81/	OCT81/		M
444478	TDPTOPROC	MAY79/MAY79	MAY79/JUN79		M
444478	PREPOFCONTRDWG	JUL80/	NOV80/		M
444478	APPRVLOFDWGSBYARRADCOM	NOV80/	DEC80/		M
444478	FABOF2[illegible]BDY	JAN81/	MAY81/		M
444478	TEST/EVAL2[illegible]BDY	JUN81/	SEP81/		M
444478	FABOF1[illegible]BDY	OCT81/	DEC81/		M
444478	ACCEPTOFBDYBYARRADCOM	DEC81/	JAN82/		M
444478	FINALRTP		FEB82/		M
444479	LAPATLSAAPCOMPLETE	MAR81/			M
444479	HALLISTICCOMPLETE	JUN81/			M
444479	FINALRTP-TECH	SEP82/	OCT82/		M
444479	FINALRTP-301	OCT82/	OCT82/		M
444778	LITSEARCH	MAR78/MAR78	APR78/APR78		E
444778	EVAL+SELOFALTS	MAY78/MAY78	FEB79/APR79		E
444778	DEV+ADJUSTOFMTHDS+CNTLS	JUL78/JUL78	APR79/SEP79		E
444778	RPT	APR79/SEP79	SEP80/		E
444778	DEV OFICMETHOD	JAN80/JAN80	AUG80/	(ADD)	E
444778	FINALTECHRPT				
444978	TESTLOTIFG(2TESTLOTS)	OCT78/NOV78	OCT78/NOV78		E
444978	EXTRUDE2TESTLOTS	APR79/APR79	MAY79/APR79		E
444978	EVAL2TESTLOTS	MAY79/APR79	JUN79/APR79		E
444978	TEST(END ITEMS)	JUN79/APR79	AUG79/APR79		E
444978	FINALRPT(2TESTLOTS)	AUG79/OCT79	OCT79/NOV79		E
444978	PILOTPLANTENGRDSGN	JAN78/	OCT79/		E
444978	HAZARDSANAL	APR79/	AUG79/	(DEL)	E
444978	EQUIPPROC	APR79/	JUN79/	(DEL)	E
444978	SITEPREP+EQUIPTINSTALL	APR79/	JUL79/	(DEL)	E
444978	OPERTRAINING	APR79/	JUL79/	(DEL)	E
444978	EQUIPTEST	AUG79/	OCT79/	(DEL)	E
444978	PROCEVAL	NOV79/	APR80/	(DEL)	E
444978	ECOEVAL	FEB80/	MAY80/	(DEL)	E
444978	FINALRPT	FEB80/FEB80	JUL80/		E
444978	MFGRADUTESTLOTS	JUN79/NOV79	JUL79/NOV79	(ADD)	E
444978	EXTRUDEADDTESTLOTS	JUL79/DEC79	AUG79/DEC79	(ADD)	E
444978	EVALADDTESTLOTS	AUG79/DEC79	OCT79/DEC79	(ADD)	E
444978	FINALRPT(ADDTESTLOTS)	DEC79/DEC79	JUL80/	(ADD)	E
445777	FUNDSRECVDARRCOM		/AUG76	(ADD)	E
445777	FUNDSRECVDIAAP		JUL76/AUG76		E
445777	PDAWARDS	AUG76/OCT76	FEB77/FEB77		E
445777	MATERIALRECVD	NOV76/NOV76	JUL77/SEP77	(ADD)	E
445777	FABRICATION	SEP76/NOV76	MAY77/MAY77		E
445777	MACHASSY	JAN77/MAR77	JUN77/AUG78		E
445777	DEBUG	MAY77/MAY77	JUL77/OCT78		E
445777	TEST	AUG77/NOV78	AUG77/NOV78		E
445777	FINALRPT	SEP77/JAN79	OCT77/AUG79		E
445777	PROCPKG	SEP77/	OCT77/	(DEL)	E
446079	DEVANAL+CONTLCRITERIA	JAN79/JAN79	SEP79/SEP79		E
446079	PROC+DELIVERYOFINSTRUMENTATION	OCT79/	MAY80/	(DEL)	E
446079	INSTALLOFINSTRUMENTATION	JUN80/	JUL80/	(DEL)	E
446079	HAZARDSANAL	JUN80/	SEP80/		E
446079	EVALINSTRUMENTATION	JUL80/	NOV80/	(DEL)	E
446079	FINALRPT	JUN80/	SEP80/		E
446079	COMPDATAONCONCEPTSYS	JAN79/JAN79	SEP79/SEP79	(ADD)	E
446079	EVALDATAONSELCONCEPTSYSTS	SEP79/SEP79	JAN80/APR80	(ADD)	E
446079	DEVANAL+CONTPROCASYST	JAN80/APR80	JUN80/	(ADD)	E
446079	PREPPROCSCOPEFORANALEQUIP	JUN80/	SEP80/	(ADD)	E
446079	FINAL301RPT	JUN80/	SEP80/		E
446277	ENGEVALRPT	AUG77/AUG77	MAY78/MAY78		E
446277	LAB+BENCHSCALETSTDYS	OCT77/SEP77	MAY78/MAY78		E
446277	HAZARDSANALYSTS	MAR78/APR78	MAY78/JUL78		E
446278	ENGRSTDYS	SEP78/SEP78	JUL80/		E
446278	HAZARDANALII	SEP78/SEP78	DEC79/DEC79		E

446278	EQUIPPROCFORFADBAYMOD	OCT78/OCT78MAY79/DEC79		E
446278	BLDGMOD	NOV78/NOV78JUN79/MAR80		E
446278	PROCNGSCRUBBERTANKS+PUMPS	FEB79/FEB79AUG80/		E
446278	SUBMITABSORBERDSGN+DWGS	MAY79/MAY79JUN80/		E
446278	DATAACQUISEQUIP	OCT78/OCT78FEB79/DEC79		E
446278	EVALOFMODFADBAY	APR80/APR80JUL80/		E
446279	HAZARDANAL	JUL79/OCT79SEP80/	(ADD)	E
446279	COMPLSOLVENTABSORBDSGN	AUG79/MAR80JUN80/		E
446279	PROCOFSOLVENTABSORBDSGN	MAR80/ SEP80/	(ADD)	E
446279	INITPROCOFSOLVENTABSORBER	AUG79/AUG79JUL80/	(ADD)	E
446279	SITEPREPINSTALLOFNGSCRUBBERTANKS+NGMO	JAN80/JAN80SEP80/	(ADD)	E
446279	EVALNGSCRUBBER+NGMONITOR	SEP80/ NOV80/	(ADD)	E
446279	DATAAQUIS+PRELIMINSTRUDSGNFORFADCOM	DEC79/DEC79NOV80/	(ADD)	E
446279	HEATPIPESTUDY	DEC79/DEC79APR80/APR80		E
446280	HAZARDSANALYSISIV(4)	AUG80/ OCT81/	(ADD)	E
446280	PROCOFSOLVENTABSORB	JUN80/ DEC80/	(ADD)	E
446280	INSTALLSOLVENTABSORB	JAN81/ APR81/	(ADD)	E
446280	EVALFADBAYW/NGSCRUBBER	APR81/ JUL81/	(ADD)	E
446280	FACILITYDESGNCRITERIA	FEB81/ OCT80/	(ADD)	E
446280	DOCFINALRPT	JUL81/ APR82/	(ADD)	E
446280	DATAACQAPRELIMINSTDSGNCONCFADII	MAY81/ SEP81/	(ADD)	E
446280	FINALTECHRPT	JUL81/ APR82/		E
446280	FINAL30IRPT	JUN82/ JUN82/		E
446678	STUDYEXISTMETHODSOFTNTLDG	FEB78/FEB78APR78/APR78		E
446678	STUDYINSTRUMENTATION	FEB78/FEB78MAY78/MAY78		E
446678	MODAUTOMELTSYST	DEC79/ JAN80/		E
446678	PROCINTOCTOL+CYCLOTOL	APR78/APR78FEB78/FEB80		E
446678	INSTALLINSTRUMENTATION	JUL78/NOV78AUG78/FEB79		E
446678	PILOTLINETEST	AUG78/MAY80FEB78/MAY80		E
446678	TECHRPT(INTERIM)	FEB80/ MAR80/		E
446679	DSGNSPECSMIXINGSYST	JAN79/JAN79MAR79/MAR79		E
446679	PROCUREMIXINGSYST	MAR79/FEB79DEC80/		E
446679	HAZARDSANALYSIS	NOV79/NOV79JUN80/		E
446679	INSTALLMIXINGSYST	JAN81/ APR81/		E
446679	PROTOTEST	MAY81/ AUG81/		E
446679	FINALTECHRPT	AUG81/ NOV81/		E
446678	FINAL30IRPT	SEP80/		E
446679	FINAL30IRPT	JUN81/		E
446978	PROGRAMAUTHORIZATION	NOV77/JAN78NOV77/JAN78		E
446978	AWARDPHASE1CONTRACTFORM483	FEB78/FEB78JUL78/JUL78		E
446978	CONCEPT+FEASSTUDIES	JUL78/JUL78OCT78/	(DEL)	E
446978	DSGNPROTOFORM483	OCT78/ APR79/	(DEL)	E
446979	REVSCOPESOFWORKFORDUALCAPABILITY	JAN79/JAN79FEB79/FEB79	(ADD)	E
446978	DSGNABUILDINSPNEVICE	OCT78/OCT78SEP79/SEP79		E
446978	PROGRAMAUTHORIZATION	DEC78/MAY79DEC78/MAY79		E
446979	AWARDCONTRACT	MAY79/MAY79SEP79/SEP79	(ADD)	E
446979	AWARDPHASE2CONTRACTFORM483+M509	DEC78/ APR79/	(DEL)	E
446979	CONCEPT+FEASSTUDIESFORM509	MAY79/ JUL79/	(DEL)	E
446979	BUILDPROTOEQUIPFORM483	APR79/ OCT79/	(DEL)	E
446979	DSGNPROTOFORM509	JUL79/ JAN80/	(DEL)	E
446979	BUILDPROTOFORM509	JAN80/ JUN80/	(DEL)	E
446979	INSTALL+ACCEPTTESTEQUIPFORM483+M509	JUL80/ SEP80/	(DEL)	E
446979	COMPLTUP/DOFM+FINALRPT	JUL80/ OCT80/	(DEL)	E
446979	DSGN+BUILDCONCEPTMODELS	SEP79/SEP79JUL80/	(ADD)	E
446979	DEBUG+EVALCONCEPTMODELS	DEC79/OCT79AUG80/	(ADD)	E
446979	DSGNABUILDSYSPROTO	FEB80/SEP79MAR81/	(ADD)	E
446980	RECVDFUNDS	NOV79/NOV79NOV79/NOV79	(ADD)	E
446980	BUILDSYSTPROTO(DUAL)	NOV79/ MAY80/	(DEL)	E
446980	DEBUGPROTOW/INERT	SEP80/ MAY81/	(ADD)	E
446980	SHIP+INSTALLA+GOCO	JAN81/ JUN81/	(ADD)	E
446980	DEBUG+SHAKEDOWNW/HE	FEB81/ JUL81/	(ADD)	E
446980	ACCEPTA+GOCOW/HE	MAR81/ AUG81/	(ADD)	E
446980	TDPFORREPLICATES	JUN81/ SEP81/	(ADD)	E
446980	FINALRPT	APR81/ SEP81/	(ADD)	E
447278	RECPTOFFUNDS	OCT77/DEC77		E
447278	CONTRACTAWARD	JAN78/JAN78JUL78/AUG78	(ADD)	E

447278	FEASSTUDYOFALTERUNDERCONSIDERATION	OCT77/AUG78MAY78/JAN79	E
447278	DETEROPBESTAPPROACHFORBAGFAB	JUN78/JAN79JUL78/JAN79	E
447278	DEVSELECTCONCEPT	APR79/MAY79JUL79/JUL79 (ADD)	E
447278	PREPARESCOPEOFWORK	FEB79/FEB79DEC79/ (DEL)	E
447278	JURYRIGTEST	MAR79/APR79JUL79/JUL79 (ADD)	E
447278	FINALTECHRPT		
447278	FINAL301RPT	JUN80/JUN80	E
447479	ENGRSTUYSAMARKETSURVEY	MAY79/SEP79 JUL80/	E
447479	LAB/BENCHSCALESTDY	JAN80/JAN80JUL80/	E
447479	HAZARDANL	JAN80/JAN80JUL80/	E
447479	FINALRPT	JUL80/ AUG80/	E
448177	ENGRANALOFPYROLYSISSYST	SEP77/SEP77AUG78/AUG78	E
448179	SELECTCNTR+ISSUECONTRACT	DEC78/ APR79/	E
448179	DSGNOPILOTPLANT	MAY79/ OCT79/	E
448179,80	PURCHASEEQUIP	NOV79/ MAR80/	E
448180	INSTALLPILOTPLANT	APR80/ AUG80/	E
448180	EVALPILOTPLANT	SEP80/ JAN81/	E
448180	FINALRPT	FEB81/ MAR81/	E
449878	CONDUCTSTUDYPROGRAM	MAR78/MAR78MAY78/MAY78	M
449878	FEASSTUDY	SEP78/SEP78DEC78/FEB79	M
449878,79	DSGNEQUIP	SEP78/SEP78JAN81/	M
449878	FAB+INSTALLEQUIP	MAR79/ SEP80/ (DEL)	M
449879,80	FABEQUIP	MAR80/MAR80APR81/ (ADD)	M
449879+80	INSTALLEQUIP	JUL80/ MAY81/ (ADD)	M
449880	DEBUGEQUIP	JUL80/ JUN81/	M
449880	FINALRPT	DEC80/ DEC80/	M
449878	FINALRPT3?1	SEP80/ SEP80/ (ADD)	M
449879	FINAL301RPT	SEP81/ SEP81/ (ADD)	M
449880	FINAL301RPT	DEC81/ DEC81/	M
450878	ENGRDATACOMPL	DEC78/OCT78JAN78/JAN79	E
450878	EVALCOATTECHS	JAN78/JAN79MAY78/MAY79	E
450878	HAZARDANAL	MAY79/MAY79SEP79/MAY80 (ADD)	E
450878,79	PILOTPLANTDSGNCRIT+DSGN	JAN79/JAN79SEP80/	E
450878	FINALRPTFY78	NOV79/ DEC80/	E
450879	ENCLDRYER+D+DISCHARGE(A7)	FEB79/FEB79APR79/MAR79	E
450879	COVERPHOTOCELLPORTS(A7)	FEB79/FEB79FEB79/FEB79	E
450879	INSTALLMAKEUPAIRSYST(A7)	FEB79/FEB79FEB79/FEB79	E
450879	INSTALLAIRESLUBRYSYST(A7)	FEB79/FEB79MAY79/MAY79	E
450879	INSTALL+ASH+SCRUBWATERSYSTS(A7)	MAR79/FEB79JUN79/MAY79	E
450879	DEVCNTLSYST(A7)	JUN79/FEB79AUG79/MAY79	E
450879	EVALMOD(A7)	JUN79/MAY79AUG79/MAY79	E
450879	FINALRPT(A7)	JUN79/JUN79SEP79/AUG79	E
450879	INSTALLAYSSMONTTURBODRYER	NOV80/ MAR81/ (ADD)	E
450879	FINALRPTFY79	MAR81/ MAY81/	E
450880	HAZARDSANALINERT	MAY80/MAR80MAR81/	E
450880	EIMCOFILTERENGRDSGN	SEP80/ JAN81/	E
450880	EIMCOFILTERINSTALL	FEB81/ JUN81/	E
450880	COATINGEVALA3+A4	SEP80/ DEC80/	E
450880	EIMCOEQUIPTEST	JUL81/ AUG81/	E
450880	EIMCOFILTEREVAL	SEP81/ JAN82/	E
450880	FINALRPTFY80	DEC81/ APR82/	E
621174	MAILPROC	JUL73/SEP73SEP73/OCT73	Q
621174	PREFORMDSGN	JUL73/SEP73DEC73/DEC73	Q
621174	PROCENGR	OCT73/OCT73MAR74/MAR74	Q
621174	FABPROTOPREFORMS	JAN74/JAN74JUN74/JUN74	Q
621174	PRODFM+9A2BODIES	APR74/APR74JUN74/SEP74	Q
621174	BALLISTICTEST+EVAL	JUL74/OCT74DEC74/NOV75	Q
621175	OPTOFMATL	NOV74/NOV74FEB75/AUG75	Q
621175	OPTOFPREFORMDSGN	NOV74/NOV74FEB75/AUG75	Q
621175	FABOFP/+TOOLS	JUN75/JUN75AUG75/AUG75 (ADD)	Q
621175	MODOFFORM+OOLS	JUN75/JUN75OCT75/NOV75 (ADD)	Q
621175	FABOFP/+PREFORMS	SEP75/OCT75OCT75/NOV75 (ADD)	Q
621175	FABXM72 BODIES	OCT75/DEC75MAR76/MAR76 (ADD)	Q
621175	TECHRPT(COLDPROC)	JAN76/FEB76MAY80/ (ADD)	Q
621175	FABPREFORMS	NOV76/APR77JUN77/MAY77 (ADD)	Q
621175	FABMCCHODIES	MAR77/MAY77JUL77/JUN77 (ADD)	Q

621175	PITTEST	JUN77/NOV77OCT77/NOV78(ADD)	Q
621175	PANELTEST	JUL77/OCT77OCT77/MAR78(ADD)	Q
621175	TECHRPT(HCCCPROC)	FEB78/MAY78JUN80/ (ADD)	Q
647276	FUNDSRECVD	NOV75/OCT75NOV75/OCT75	M
647276	FEASSTDYSCOPEOFWORK	FEB76/FEB76APR76/APR76	M
647276	CNTRAWARD	APR76/MAY77JUN76/SEP77	M
647276	FEASDSGN	JUN76/ AUG76/ (DEL)	M
647276	FEASDSGN/PROCSTDY	OCT77/OCT77FEB79/JAN79(ADD)	M
647276	FEASTESTS	MAR78/MAR78JUN80/	M
647276	APPVLOFSELDSGN/PROC	MAY80/MAY80JUN80/	M
647276	APBIDSPROTO	JAN77/ FEB77/ (DEL)	M
647276	CONTAWARDPROTO	FEB77/ MAR77/ (DEL)	M
647276	PRCTODSGN	MAR77/ MAY77/ (DEL)	M
647276	PROTOFAB	APR77/ JUL77/ (DEL)	M
647276	PROTOTEST	AUG77/ NOV77/ (DEL)	M
647276	PROTOACCEPT	OCT77/ NOV77/ (DEL)	M
647276	TDP	MAY80/MAY80JUL80/	M
647276	FINALRPT	AUG80/ SEP80/	M
655373	FINALRPT	/SEP76	M
655374	FINALRPT	/SEP76	M
655377	FINALRPT	/JUN78	M
655379	AUTHFUNDS	MAY79/MAY79JUN79/JUN79	M
655379	PREPCOORDTSTPLAN	JUN79/MAY79JUN79/JUN79	M
655379	CONTRACTSCOPPROFWORK	JUL79/JUL79JUL79/JUL79	M
655379	AWARDCONTRACT	AUG79/AUG79SEP79/NOV79	M
655379	FRABTSTSTD	OCT79/JAN80OCT79/MAR80	M
655379	PREPOPRINSTACALPROC	OCT79/AUG79OCT79/MAR80	M
655379	REALTACALRACOUSTICINSPSYS	OCT79/MAR80OCT79/MAR80	M
655379	PREFORMPRODLINETST	NOV79/APR80NOV79/APR80	M
655379	EVLOAPPROVEAISTSTMETHDATA	JAN80/JAN80JAN80/APR80	M
655379	PREPAISOPERAMAINTMANUAL	JAN80/ JAN80/	M
655379	PREPPURCHASEDFSCRFORAIS	JAN80/ JAN80/	M
655379	APPVDTESTSTDS	JAN80/ JAN80/	M
655379	EVALTESTRESULTS	MAR80/APR80JUN80/	M
655379	FINALAISOPERAMAINTMANUAL	JUL80/ JUL80/	M
655379	PREPREQDESFORAIS	JUL80/ JUL80/	M
655379	FINALTECHRPT	AUG80/ AUG80/	M
655474	FINALRPT	/ /JUN76	N
655475	FUNDING	JUL74/OCT74DEC74/JAN75	N
655475	SCOPE	OCT74/DEC74JAN75/FEB75	N
655475	PROCACTION	FEB75/FEB75FEB75/OCT75	N
655475	CONTREXECUTE	MAY75/OCT75MAY75/JUL79	N
655475	EQUAPINSTALL*HDWRPREP	SEP75/NOV75NOV75/DEC75	N
655475	TEST*EVAL	NOV75/DEC75FEB76/MAY77	N
655475	FINALRPT	AUG76/AUG77JUN80/DEC79	N
662578	AWARDCONTRACT	/JUN78AUG78/SEP78	M
662578	PHASEIINSTRMTOFINERTIAWELDER	SEP78/OCT78DEC78/	M
662578	MEASUPERTWELDPARA	DEC78/ JUN79/	M
662578	PHASEIIACQUISOFSYSTCNTLHDWR	JUN79/ SEP79/	M
662578	DEVSOFTWAREFORADAPTHACHCNTL	SEP79/ FEB80/	M
662578	FINALRPT	MAR80/ APR80/	M
662876	FUNDING	OCT75/OCT75OCT75/OCT75	N
662876	PREPSCOPE/ADFORBIDS	JUN75/JUN75OCT75/OCT75	N
662876	CONTAWARD	/ JAN76/MAR76	N
662876	DSGN	FEB76/APR76MAY76/AUG76	N
662876	FAB	MAY76/AUG76OCT76/SEP79	N
662876	ACCEPTTEST	OCT76/ NOV76/	N
662876	TDP	AUG77/AUG77JUN80/	N
662876	FINALRPT	MAY79/MAY79JUN80/	N
662876	DEMOMS77CONTMOD	DEC78/DEC78JAN79/MAR79	N
662876	DEMO(PEAS)TEST	MAR79/APR79MAR79/FEB80	N
662876	EVALREDESIGNRPT	JUN79/ JAN80/	N
662876	INCRCONTFUNDS*MOD	JUL79/ SEP79/ (DEL)	N
664076	CONTPROC	NOV75/NOV75MAR76/APR76	Q
664076	PRODOF60%LINERS	MAR76/AUG76AUG76/FEB77	Q
664076	PRELIMTESTONLINERS	APR76/SEP76NOV76/FEB77	Q

664076	X-RAYTESTSOFSAMPLELINERS	APR76/SEP76NOV76/FEB77	Q
664076	STATICBALLISTIC+FLASHX-RAYTESTS	APR76/SEP76SEP76/FEB77	Q
664076	COMPOFRESULTS	SEP76/JAN77NOV76/SEP77	Q
664076	INTERIMTECHRPT	JAN78/JUN78MAR78/ (DEL)	Q
664077	ANALOFTEXTUREMAPSPRODINFY76	OCT76/MAR77DEC76/OCT77	Q
664077	QUANTITEXTUREINDICESCHAR	JAN77/JUN77MAR77/OCT77	Q
664077	PRODOFEXPERCHAMBERLAINLINERS	FEB77/FEB77MAY77/MAY77 (ADD)	Q
664077	X-RAYTESTOFABOVELINERS	NOV76/NOV76JUN77/JUL77 (ADD	Q
664077	COMPTEXTURESTATICBALLISTIC+XRAYRES	APR77/JUL77JUN77/JUN78	Q
664077	PREPPROCPKGFORPRECLINERS	OCT77/OCT77JAN78/DEC77 (ADD)	Q
664077	AWARDCONT	JUN77/DEC77AUG77/FEB78 (ADD)	Q
664077	PRODOFPRECISIONLINERS	AUG77/MAR78OCT79/MAY80 (ADD)	Q
664077	X-RAY+BALLISTICTESTOFPRECLINERS	NOV78/DEC78JUL80/ (ADD)	Q
664077	IDENT+SELOFMFGPROC	APR77/SEP77AUG80/	Q
664077	COMPOFTOP	JAN79/OCT79SEP80/	Q
664077	PREPOFFINALTECHRPT	JAN79/MAY80OCT80/	Q
663476	RECEIPTOFFUNDS(TASKA)	DEC75/DEC75DEC75/DEC75	M
663476	PLACECONTRACTFORFORMSTUDIES	OCT75/OCT75JAN76/ (DEL)	M
663476	CONDUCTFORMSTUDIES	FEB76/ JUL76/ (DEL)	M
663476	REDIRECTEFFORT	FEB76/FEB76MAR76/MAR76 (ADD)	M
663476	CONDUCTRECYCLINGSTUDY	APR76/APR76JUN77/JUN77 (ADD)	M
663476	BALLISTICTESTS	JUL79/JUL79OCT79/SEP79 (ADD)	M
663476	COMPLETERECYCLINGSTUDY	SEP77/SEP77OCT77/NOV78 (ADD)	M
663476	FINALREPORT	SEP79/SEP79SEP80/ (ADD)	M
663476	RECEIPTOFFUNDS(TASKB)	NOV75/NOV75NOV75/NOV75	M
663476	TRANSFUNDSTOBRI	NOV75/NOV75DEC75/DEC75	M
663476	CHEM+SWAGEVAL	DEC75/DEC75FEB76/APR76	M
663476	SINTERINGEVAL	DEC75/JAN76MAR76/MAY76	M
663476	HEATTREATEVAL	JAN76/FEB76APR76/JUN76	M
663476	HOTISOSTATICPRESSEVAL	JAN76/FEB76MAY76/JUN76	M
663476	XM735EVALLOTNO1	FEB76/APR76MAY76/JUN76	M
663476	XM735EVALLOTNO2	MAR76/JUN76AUG76/SEP76	M
663476	DESCRIPTOFMFG	FEB76/APR76DEC76/MAY77	M
663476	FINALRPT	AUG77/SEP77SEP80/	M
663477	SELECT+OPTIMIZEPROC	JUL76/ AUG76/ (DEL)	M
663477	FABSOURCESOFEACHALLOY	SEP76/ NOV76/ (DEL)	M
663477	INSPCT+TESTCORES	NOV76/ DEC76/ (DEL)	M
663477	RECEIVEFUNDS(TASKC)	SEP76/JAN77SEP76/JAN77	M
663477	PLACECONTRACTS	SEP76/SEP76JUL77/JUL77	M
663477	ACTIVATEROLLINGFACILITY	MAY76/MAY76JUL77/AUG77	M
663477	PRODUCERODS	AUG77/AUG77AUG77/AUG77	M
663477	PRODUCESTABALLOY	AUG77/AUG77JAN78/MAR78	M
663477	PLACECONTRACTFORFORMSTUDY(TASKD)	AUG77/AUG77JAN78/JUN78	M
663477	DEVPROC	JAN78/JUN78OCT78/OCT78	M
663477	FABPENETRATORS	FEB79/FEB79JUN79/JUN79	M
663477	PREPFINALRPTFORMSTUDY	AUG79/AUG79MAY80/MAY80 (ADD)	M
663477	BALLISTICTEST	JUN79/ JUN79/ (DEL)	M
663478	CONDUCTPROCSTUDIES	MAY78/MAY78MAY79/MAY79	M
663478	CONFIRMATORYBALLISTICSTUDY	FEB79/FEB79MAY79/APR79	M
663478	FINALRPT	JUN79/JUN79AUG80/	M
663478	FINALRTP-301	OCT78/JUN79AUG80/	M
663479	CASTINGOTS	OCT78/ NOV78/ (DEL)	M
663479	FABPRODQUANTITY	JAN79/ MAY79/ (DEL)	M
663479	PLACECONTRACTFORCHIPRECYCLE	FEB79/FEB79JUN80/ (ADD)	M
663479	CONDUCTCHIPRECYCLEEFFORT	JUN80/ JUN81/ (ADD)	M
663479	EVALPRODHEATTREATPROC	JAN80/JAN80JUL80/ (ADD)	M
663479	FABPENETRATORS	NOV80/ DEC80/ (ADD)	M
663479	BALLISTICTEST	FEB81/ FEB81/ (ADD)	M
663479	FINALRPT	MAR81/ APR81/	M
663479	FINALRTP(301)	JUN81/ JUN81/	M
664076	PREPCONTWORKSCOPE	OCT75/OCT75NOV75/NOV75	Q
673880	FINAL3U1RPT	AUG81/ AUG81/	M
664276	RECPTOFFUNDS	OCT75/OCT75OCT75/OCT75	M
664276	AWARDOFCONTRACT	OCT75/OCT75JAN76/MAR76	M
664276	PERFORMSTUDIES	JAN76/APR76MAY76/AUG76	M
664276	WELDBANDSONPROJECTILES	APR76/OCT76JAN77/OCT77	M

664276	ESTABNUTPROCEDURE	APR76/APR76DEC76/SEP76	M
664276	BALLISTICTESTS	MAY76/MAY77DEC76/FEB78	M
664276	FINALRPT	DEC77/DEC77MAY79/JUN79	M
667877	PREPENGRSCOPEOFWORK	SEP76/SEP76SEP76/SEP76	M
667877	AWARDCONT	FEB77/FEB77JUN77/SEP77	M
667877	CONDSTUY155MMM107PROJ	JUL78/JUN78MAR79/MAY79	M
667877	CONDSTUY155MMM483PROJ	OCT77/OCT77JUL80/	M
667877	FINALRPT	APR78/MAY78MAR80/	M
667877	FINALRTP-301	APR78/MAY78SEP80/	M
667877	FINALTECHRTP	DEC80/ (ADD)	M
668178	FISCALOBLIGATION(ROTARYFORGE)	OCT77/JAN78OCT77/JAN78	M
668178	DSGNAFABTOOLING	JAN79/FEB79APR79/APR79	M
668178	PROCUREPREFORMS	APR78/APR78AUG78/AUG78	M
668178	CONDUCTFORGINGTRIALS	MAY79/MAY79JUN78/JUN79	M
668178	INSPHITARYFORGINGS	JUL78/AUG79JUL78/JAN80	M
668178	PREPECONOMICANAL	JUL78/JAN80AUG78/FEB80	M
668178	WRITEFINALRPT	MAR80/ APR80/	M
668178	CONDUCTSURVEY	OCT77/JAN78DEC77/JAN78	M
668178	SELCOMPFORINBEST	JAN78/JAN78JAN78/JAN78	M
668178	AWARDCONTRACTFORINVEST	APR78/APR78SEP78/SEP78	M
668178	CONDUCTINVEST	SEP78/OCT78OCT78/FEB80	M
668178	PREPECONOMICANAL	NOV78/FEB80DEC78/APR80	M
668178	WRITEFINALRPT	APR80/ MAY80/	M
668178	WRITEFINALRPT(301)	NOV79/MAR80JAN80/JUN80	M
668178	FINALTECHRPT	NOV79/JUN80AUG80/ (ADD)	M
668178	WRITEFINALRPT(301)SC	NOV79/MAR80DEC79/APR80	M
668178	FINALTECHRTP	NOV79/MAR80DEC79/MAY80 (ADD)	M
668278	SELLINETOBESIMULATED	OCT78/DEC78NOV78/DEC78	M
668278	ANALREQUIREMENTS	NOV78/DEC78DEC78/DEC78	M
668278	DEVSIMULATION	JAN79/JAN79MAR79/ (DEL)	M
668278	DEBUG+TESTCOMPUTERIZEDSIMUL	NOV79/NOV79JAN80/ (DEL)	M
668278	CALIBOFCOMPUTERSIMUL	JAN80/ MAR80/ (DEL)	M
668278	DSGNLINE+DATACOLLECT	JUN79/JUN79AUG79/NOV79	M
668278	SELECTSECONDLINETOBESIMUL	MAR80/ MAY80/	M
668278	ANALREQUIREMENTS	MAY80/ JUL80/	M
668278	DEVSIMUL	JAN80/ MAR80/	M
668278	DEBUG+TESTSIMUL	AUG80/ NOV80/	M
668278	CALIBSIMUL	NOV80/ DEC80/	M
668278	DSGNLINE+DATACOLLECT	JUL80/ AUG80/	M
668278	RPT	DEC80/ FEB81/	M
668377	SCALEMODELPROCENGR(XM791)	MAR77/MAR77MAY77/MAY77	Q
668377	PROTOPENETRATOR(XM791)	MAY77/MAY77JUN77/JUN77	Q
668377	CHAROFMATLS(XM791)	JUN77/JUN77AUG77/FEB79	Q
668377	BALLISTICEVAL(XM791)	JUN77/JUN77AUG77/AUG77	Q
668377	ANAL+INTERIMRPT(XM791)	SEP78/DEC78JUN79/AUG79	Q
668377	MIPRTODOE	MAY78/JUL78JUL78/AUG78	Q
668377	PROCENGR+PROD	AUG78/OCT78FEB79/FEB79	Q
668377	BALLISTICTEST+EVAL	DEC78/JAN79JUL79/JUL79	Q
668377	ANALDATAINTERIMRPT	JUL79/AUG79OCT79/DEC79	Q
668377	FINALRPT	DEC79/DEC79AUG80/ (ADD)	Q
668378	CONTPILOTPROD	NOV78/NOV78OCT79/NOV79	Q
668378	PENETCHARACTER	NOV78/DEC78NOV79/DEC79	Q
668378	SMALLSCALEBALLISTICTEST	FEB79/FEB79JAN80/FEB80	Q
668378	BALLISTICTEST+EVAL	AUG79/AUG79JAN80/MAR80	Q
668378	PROJCOMPL	DEC79/DEC79MAR80/	Q
668378	DOFMFINALRPT	DEC79/DEC79AUG80/	Q
668378	DATAANAL	DEC79/DEC79JUL80/	Q
668378	FINALRTP-301	SEP80/	Q
671A76	ESTABSCOPEOFCONT(NOSEOPER)	APR76/APR76APR76/APR76	M
671A76	PLACEOFCONT(BILLETSEP)	APR76/MAY76MAY76/JUN76	M
671A76	ANALOFTEMPFLOW+VEL	JUN76/AUG76JAN77/MAR77	M
671A76	STRESSANALOFSHELL	SEP76/OCT76FEB77/APR78	M
671A76	FAILUREANALOFSHELL	OCT76/NOV76FEB77/APR78	M
671A76	FINALCOMPPROGFORNOSE	MAR77/JAN78MAR77/APR78	M
671A76	PREPUFINALRPT(NOSING)	MAR77/APR78APR77/MAY78	M
671A77	PLACEOFCONT(BILLETOFSEP)	OCT76/FEB77NOV76/APR77	M

671677	HEATPRINTOSHEAR	OCT76/APR77MAR77/	(DEL)	M
671677	METALFLOW•FRACTURE	DEC76/ MAY77/	(DEL)	M
671677	OPTCOMPROGFORFILLETSEP	MAY77/ SEP77/	(DEL)	M
671677	PREPOPRPTFORFILLETSEP	OCT77/ OCT77/	(DEL)	M
671677	TOPICREVIEWFILLETSEPTECHS	OCT77/APR77OCT77/JAN78	(ADD)	M
671677	VECTROFWORKEFFORT	/AUG77 /MAY78	(ADD)	M
671677	REFINEDFMATHMODFORDWG	JUN78/JUN78JUN78/AUG78	(ADD)	M
671677	CONFTESTOFMATHMODFORDWG	AUG78/SEP78MAR79/APR79	(ADD)	M
671677	PREPOFFINALRPTFORDWGCONFTEST	MAR79/APR79APR79/MAY79	(ADD)	M
671679	ESTABSCOPEOFWORK(NOSEPIERCECABBOPERS)	/SEP78 /SEP78	(ADD)	M
671679	PLACEOFCONT	FEB79/FEB79JUN79/MAY79	(ADD	M
671679	CONFTESTOFMATHMODFORNOSING	JUL79/JUN79JUL80/	(ADD)	M
671679	DEVOFMATHMODFORPIERCECABB•BLOCK	JUL79/JUL79AUG80/	(ADD)	M
671679	CONFTESTOFMATHMODFORPIERCECABB•BLOCK	JAN80/MAYA0SEP80/	(ADD)	M
671679	ANALDATA	SEP80/ OCT80/	(ADD)	M
671679	PREPOFFINALRPT	OCT80/ NOV80/	(ADD)	M
672578	PRTINSTRUINERTGAWELD	SEP78/OCT78DEC78/MAY79		Q
672578	MEASUPPLMTWELDPARA	DEC78/APR79JUN79/APR80		Q
672578	ACQUISYSTCRTLHOWR	JUN79/AUG79SEP79/FEB80		Q
672578	DEVSFTWREFORADDMTMACHCNTL	SEP79/FEB80FEH80/MAR80		Q
672578	FINALRPT	MAR80/MAYA0 AUG80/		Q
672578	PREPPROCPKG	JAN78/JAN78MAY78/AUG78		Q
672578	AWARDCONTRACT	JUN78/JUN78AUG78/SEP78		Q
673676	SELONGV•DEVMONITTCNSPROJ	SEP76/SEP76OCT76/OCT76		M
673676	SELRELGOCOMFGRS	OCT76/OCT76NOV76/NOV76		M
673676	INVESTATSELGOCOFAC	NOV76/NOV76DEC76/DEC76		M
673678	DETCRITITEMS•THEIRIMPACT	APR78/APR78MAY78/MAY78		M
673678	DEVBASICCOMPUTERPROG	MAY78/MAY78SEP78/SEP78		M
673678	DEV•TESTNUMCNTLTOOL•SPAREPTSPROG	AUG78/AUG78NOV78/NOV78		M
673679	PREPDOCCOVERCIMPROCEDURES	DEC78/FEB79JUN79/JUN79	(ADD)	M
673679	PREPBSCOMPDOC	MAY79/APR79SEP80/	(ADD)	M
673679	PREPRPT	JUL79/JUL79SEP80/	(ADD)	M
673680	DATABASESTRUCT	OCT80/ JAN81/		M
673680	INPUT/OUTPUTFORMATS	NOV80/ FEB81/		M
673680	DEFMATRICES	JAN81/ MAR81/		M
673680	USENDATABASESYS	OCT80/ JUL81/		M
673680	DOC	JUN81/ SEP81/		M
673680	DEMOAFINALRPT	AUG81/ OCT81/		M
673879	RCPTOFFUNDS	OCT78/OCT78OCT78/OCT78		M
673879	PLACECONTRACTPLASMAARC	DEC78/DEC78APR79/MAY79		M
673879	PLACECONTRACTMACHEVAL	MAR79/MAY79JUL79/NOV79		M
673879	CONDMACHSTUDIES	JUL79/DEC79SEP80/		M
673879	PREPSPEC	JAN80/ JUN80/		M
673879	FINALRPT	JUN80/ SEP80/		M
673880	PLACECONT	MAYA0/MAYA0NOV80/		M
673880	CONDUCTMACHSTUDYS	DEC80/ MAR81/		M
673880	FINALTECHRPT	MARA1/ JUL81/		M
675976	RCPTOFFUNDS	MAY76/MAY76MAY76/MAY76		M
675976	RCPTOFADDFUNDS	JUL77/NOV77JUL77/NOV77	(ADD)	M
675976	PLACECONTR/NORMISINDUST	MAY76/JAN78JUN76/FEB78		M
675976	MFGTOOL	JUN76/AUG78AUG76/AUG78		M
675976	TOOLTRYOUT	JUL76/OCT78AUG76/NOV78		M
675976	FORGE•INSPCTPTS	AUG76/NOV78AUG76/NOV78		M
675976	FINISHFORM•MACHPTS	SEP76/ DEC76/	(DEL)	M
675976	FINALINSPCTPTS	JAN77/ JAN77/	(DEL)	M
675976	PREPFINALRPT	JAN77/DEC79MAY78/DEC79		M

SAMPLE OF HOW MILESTONE DATA IS EXTRACTED FROM THE MILESTONE DATA BASE PROGRAM FOR NOV 79

1240=400078	AWARDCONTRACT(PHASE3)		NOV79/	(DEL)
1440=400080	FINALREPORT	AUG79/	NOV79/	(DEL)
2340=401275	PREPPRELIMDSGNCRITERIA	JAN79/JAN79	NOV79/	(ADD)
2360=401275	HAZARDSANALYSIS	FEB76/FEB76	NOV79/	
3480=405179	EVALOFINSTRUMENTATION	SEP79/	NOV79/	
4020=405474	SHIPMACHTOARRADCOM	NOV79/	NOV79/	(ADD)
6360=411473THRU76	DSGNPROCINSTALLREVEQUIP	DEC77/DEC77	NOV79/	(ADD)
9200=411475	RPT	OCT78/OCT78	NOV79/	(ADD)
10560=411476	EVALOFSULFIDEMONITOR	MAR76/MAR76	NOV79/	(ADD)
10580=411476	EVALOFTOTCARBONMONITOR	MAR76/MAR76	NOV79/	(ADD)
13380=416379	EXECUTIONOFTESTPLN	JUN79/JUN79	NOV79/	
13400=416379	FIRINGTEST(PROVGRD)	OCT79/	NOV79/	
14480=421177	INSTALLPROTOCNTLSYSTFOREVAL	DEC78/DEC78	NOV79/	
15060=421478	FINALRPTRECSCHOFPROPREUSEMEAS	OCT79/	NOV79/	
15580=421479	FINALRPT	AUG79/	NOV79/	
15620=421479	TEST+EVAL	AUG79/	NOV79/	
15720=421479	ENGRREVIEW	SEP79/SEP79	NOV79/	(ADD)
16180=421574	PROTOCNTLSYSTACCPTD	JUN77/JUN77	NOV79/	
18080=425277	PILOTPLANTREACTVAROPT	JUN79/	NOV79/	(DEL)
18140=425278	PRODSIMMERPROC	MAR79/MAR79	NOV79/	(DEL)
18220=425278	PILOTPLANTPREPOFSTDHMXBATCH	OCT79/	NOV79/	(ADD)
20380=428179	SURVEYGASUSAGEATRAAP	AUG79/	NOV79/	
21260=428579	TEST+EVAL	FEB79/FEB79	NOV79/	(ADD)

21280=428579	GEOMETRICEFFECTS	FEB79/FEB79NOV79/	(ADD)
23040=431078	FINALRPT	SEP79/ NOV79/	
23060=431079	EVAL+OPTOFPROC	SEP79/ NOV79/	(ADD)
23080=431079	PROVEOUTCONTENDURRUNS	OCT79/ NOV79/	(ADD)
23460=431177	SHIPTOLOADPLANT	JAN79/JAN79NOV79/	
23760=432279	INTERIMRPTI,FY78EFFORT	JUN79/JUN79NOV79/	
24820=433776	GATORINSITUBONDING	AUG79/AUG79NOV79/	(ADD)
25200=433676	PROTODSGNCOMPL	MAY79/ NOV79/	
28200=446678	MODAUTOMELTSYST	OCT79/ NOV79/	
28260=446678	PILOTLINETEST	OCT79/ NOV79/	
28780=446980	RECVDFUNDS	NOV79/ NOV79/	(ADD)
29500=450878	HAZARDANAL	MAY79/MAY79NOV79/	(ADD)
30600=655379	PREFORMPRODLINETST	NOV79/ NOV79/	
33100=668178	INSPRITARYFORGINGS	JUL79/AUG79NOV79/	
33220=668178	CONDUCTINVEST	SEP78/OCT78NOV79/	
33380=668278	DSGNLINE+DATACOLLECT	JUN79/JUN79NOV79/	
33740=668378	PENETCHARACTER	NOV78/DEC78NOV79/	
34220=671679	CONFTESTOFMATHMODFORNOSING	JUL79/ NOV79/	(ADD)
34340=672578	MEASOFPERTWELDPARA	APR79/APR79NOV79/	
34880=675976	PREPFINALRPT	DEC78/DEC78NOV79/	

SAMPLE OF HOW MILESTONE DATA IS EXTRACTED FROM THE MILESTONE DATA BASE PROGRAM FOR NOV 79

2920=404178	TESTPROTOSTASATMAAP	NOV79/	JAN80/	(ADD)
3500=405179	DOC+FINALRPT	NOV79/	DEC79/	
4020=405474	SHIPMACHTOARRADCOM	NOV79/	NOV79/	(ADD)
12040=412479	TOOL+FIXTURESPECS	NOV79/		
13420=416379	PRODPROCDSGNS	NOV79/	DEC79/	
15280=421479	PROCPILOTPLANTFAC(RAAP)	NOV79/	JAN80/	(ADD)
15520=421479	HAZARDANAL	NOV79/	FEB80/	
15740=421479	INVESTIGATESTDYS	NOV79/	JUN80/	(ADD)
15940=421479	TSTOFEQUIP&MATL(BAAP)	NOV79/	SEP80/	(ADD)
16600=422377	FABPROPCHGS	NOV79/	DEC79/	
18260=425278	PILOTPLANTPROCVARSTDYFORHMX	NOV79/	MAR80/	(ADD)
20300=428179	SELOFINSULTYPE+APPL	NOV79/	JAN80/	
20420=428179	EVALCOALGASFORUSEINRAAPPROC	NOV79/	MAY80/	
20460=428179	HAZARDSANAL	NOV79/	APR80/	
23100=431079	PRODINCORP	NOV79/	JAN80/	(ADD)
23120=431079	PHY+CHEMTESTSOFPROD	NOV79/	FEB80/	(ADD)
23580=431279	HAZARDSANALYSIS	NOV79/	JUL80/	
24120=433579	FABPROCTOOLING	NOV79/		
27400=444978	PROCEVAL	NOV79/	APR80/	(DEL)

28280=446678	TECHRPT(INTERIM)	NOV79/	DEC79/	
28340=446679	HAZARDSANALYSIS	NOV79/	JUN80/	
28780=446980	RECVDFUNDS	NOV79/	NOV79/	(ADD)
28800=446980	BUILDSYSTPROTO(DUAL)	NOV79/	MAY80/	(DEL)
29100=447479	LAB/BENCHSCALESTDY	NOV79/	JUL80/	
29120=447479	HAZARDANL	NOV79/	JUL80/	
29220=448179,80	PURCHASEEQUIP	NOV79/	MAR80/	
30600=655379	PREFORMPRODLINETST	NOV79/	NOV79/	
33140=668178	WRITEFINALRPT	NOV79/	JAN80/	
33340=668278	DEBUG+TESTCOMPUTERIZEDSIMUL	NOV79/	JAN80/	
35000=678178	WRITEFINALRPT	NOV79/	JAN80/	
35120=678178	WRITEFINALRPT	NOV79/	DEC79/	

SAMPLE OF HOW MILESTONE DATA IS EXTRACTED FROM THE MILESTONE DATA BASE PROGRAM FOR DEC 79

2380=401275	GUNFIRINGS	DEC79/	DEC79/	
3380=405075	DELIVERYINSTALL+PROVEPROTOEQUIPATLP	DEC79/	JUN80/	
3400=405075	FINALIZETECHDATAPKG	DEC79/	JUN80/	
4120=405979	INSTALLATION	DEC79/	JAN80/	
4420=406479	SAFETYTESTSYSTEM	DEC79/	AUG80/	
9360=411475	HAZARDSANAL+ONLINEEVAL	DEC79/	MAR80/	(ADD)
10100=411476	EVALOFREVPROC	DEC79/	FEB80/	(ADD)
10220=411476	FINALRPT	DEC79/	APR80/	(ADD)
12060=412479	PROGRAMMING	DEC79/		
13440=416379	FINALRPTARRADCOM	DEC79/	JAN80/	
13600=4194	PROC/FABOFTSTEQUIP	DEC79/AUG79	JUL80/	
15420=421479	QUALQUANTPOLLABATEDWATERS	DEC79/	MAR80/	(ADD)
15640=421479	FINALRPT	DEC79/	MAR80/	
16640=422377	ECOANAL	DEC79/	JAN80/	
16780=422579	ADAPTATIONSTUDIES	DEC79/	AUG80/	
18100=425277	FINALRPT(FY77EFFORT)	DEC79/	JAN80/	
22460=429179	TEST	DEC79/	APR79/	
22480=429179	TESTEVAL	DEC79/	JUN80/	
24000=433279	SAMPLEFAB	DEC79/	JAN79/	
24140=433579	MFRSAMPLEHARDWARE	DEC79/		
26940=444478	PREPOFCONTRDWG	DEC79/		
27800=446079	HAZARDSANAL	DEC79/	NOV80/	
28740=446979	DEBUG+EVALCONCEPTMODELS	DEC79/	JAN80/	(ADD)
32060=603479	CONDUCTCHIPRECYCLEEFFORT	DEC79/	OCT80/	(ADD)
33240=658178	PREPECONOMICANAL	DEC79/	JAN80/	
33800=668378	PROJCOMPL	DEC79/	MAR80/	
33820=668378	DOFMFINALRPT	DEC79/	APR80/	

SAMPLE OF HOW MILESTONE DATA IS EXTRACTED FROM THE MILESTONE DATA BASE PROGRAM FOR DEC 79

1080=400077	MONITORMULTITOOLLOADERPROG	JUL77/	JUL77	DEC79/		(ADD)
1280=400078	ASSEMTEST+MODIFY	SEP79/		DEC79/		(DEL)
2380=401275	GUNFIRINGS	DEC79/		DEC79/		
3500=405179	DOC+FINALRPT	NOV79/		DEC79/		
4100=405979	EQUIPMOD	SEP79/		DEC79/		
8820=411475,76	PILOTPLANTINSTALL+EVAL	OCT77/	NOV77	DEC79/		(ADD)
11780=411477	IMPLPROG	SEP77/	AUG78	DEC79/		
13420=416379	PRODPROCDSGNS	NOV79/		DEC79/		
14500=421177	COMPL+EVALDATAFRONLINEPROCCNTLOPER	SEP79/		DEC79/		
15400=421479	ETABPROCWATERSPECSQUAL+QUANT(KAAP)	AUG79/	AUG79	DEC79/		(ADD)
15500=421479	TEST+EVALSTUDIESANAL+ECOEVALDATA	OCT79/		DEC79/		
16060=421478	FINALRPT	OCT79/		DEC79/		(ADD)
16200=421574	TDPCMPL	JAN79/	JAN79	DEC79/		
16600=422377	FABPROPCHGS	NOV79/		DEC79/		
17460=423778	FINALRPT+HAZARDSANAL	MAR79/	MAR79	DEC79/		(ADD)
17740=424978	PILOTPLANTOPER	JUL79/		DEC79/		(DEL)
17760=424978	ECOEVAL	AUG79/		DEC79/		(DEL)
18700=4267 77,78	HAZARDSANAL	JAN79/	FEB79	DEC79/		
19140=428077	FINALRPT	SEP79/		DEC79/		(ADD)
19780=428177	PREPFINALRPT	APR79/	APR79	DEC79/		
21060=428577	REPORTPREP+DISTRIBUTION	FEB77/	AUG77	DEC79/		
22420=429179	ANALYTICALSTUDIES	JUN79/	JUN79	DEC79/		

22440=429179	TESTPLANDEV	SEP79/ DEC79/	
22540=430979	ENGRREV&GENPROCSTDY	JUL79/JUL79DEC79/	
23980=433279	INVESTIGATEALTERNATIVES	SEP79/ DEC79/	
26060=436277	FINALRPT	JUL79/JUL79 DEC79/	
26760=444479	LAPPROJS	OCT79/ DEC79/	
27160=444778	RPT	SEP79/ DEC79/	
27260=444978	FINALRPT(2TESTLOTS)	OCT79/ DEC79/	
27440=444978	FINALRPT	OCT79/ DEC79/	
27520=444978	FINALRPT(ADDTESTLOTS)	OCT79/ DEC79/	(ADD)
27920=446278	ENGRSTDYS	SEP78/SEP78DEC79/	
27940=446278	HAZARDANALII	SEP78/SEP78DEC79/	
28000=446278	PROCNGSCRUBBERTANKS+PUMPS	FEB79/FEB79DEC79/	
28020=446278	SUBMITABSORBERDSGN+DWGS	MAY79/MAY79DEC79/	
28280=446678	TECHRPT(INTERIM)	NOV79/ DEC79/	
28720=446979	DSGN+BUILDCONCEPTMODELS	SEP79/ DEC79/	(ADD)
29040=447278	PREPARESCOPEOFWORK	FEB79/FEB79DEC79/	
29520=450878,79	PILOTPLANTDSGNCRIT+DSGN	JAN79/JAN79DEC79/	
29540=450878	FINALRPTFY78	OCT79/ DEC79/	
30080=621175	TECHRPT(HCCCPROC)	FEB78/MAY78DEC79/	(ADD)
31160=657174	FINALRPT	OCT78/NOV78DEC79/	(ADD)
31440=662876	TDP	AUG77/AUG77DEC79/	
31460=662876	FINALRPT	MAY79/MAY79DEC79/	
31860=664077	X-RAY+BALLISTICTESTOFPRECLINERS	NOV78/DEC78DEC79/	(ADD)
32640=663479	PLACECONTRACTFORCHIPRECYCLE	FEB79/FEB79DEC79/	(ADD)
34360=672578	ACQUISYSTCNTLHDWR	JUN79/AUG79DEC79/	
35120=678178	WRITEFINALRPT	NOV79/ DEC79/	

**********FY 79MMT PROGRAM**********

PROJ	TOTAL AWTH	IN HOUSE		CONTRACT			GOCO			OGA		
		COMM	OBLIG	COMM	OBLIG	DATE	COMM	OBLIG	DATE	COMM	OBLIG	DATE
4000	1614000	1249000	1249000	0	0		365000	365000		0	0	
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS LAP								
4024	1132000	111000	111000	1021000	1021000		0	0	0	0	0	
% OBLIG =	100.0	DIVISION IS MSD		TECH AREA IS MPTS								
4046	307000	237000	237000	0	0	0	70000	70000		0	0	
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS LAP								
4051	157000	157000	157000	0	0	0	0	0	0	0	0	
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS PROP+EXPL								
4059	250000	25000	25000	0	0	0	225000	225000		0	0	
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS PROP+EXPL								
4062	507000	191000	191000	305000	0	9/30/80	11000	11000	0	0	0	
% OBLIG =	39.8	DIVISION IS ESP		TECH AREA IS LAP								
4064	1262000	1026000	1026000	195000	195000		41000	41000		0	0	
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS LAP								
4084	121000	96000	96000	0	0	0	25000	25000	0	0	0	
% OBLIG =	100.0	DIVISION IS MSD		TECH AREA IS POLLUTION								
4124	930000	132000	132000	798000	798000		0	0	0	0	0	
% OBLIG =	100.0	DIVISION IS MSD		TECH AREA IS MPTS								
4137	205000	114000	114000	85000	85000		6000	6000	0	0	0	
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS LAP								
4163	661000	399000	399000	0	0	0	262000	262000		0	0	
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS LAP								
4189	533000	58000	58000	375000	375000		0	0	0	0	0	
% OBLIG =	36.7	DIVISION IS MSD		TECH AREA IS MPTS								
4194	327000	311000	311000	0	0	0	16000	16000	0	0	0	0
% OBLIG =	100.0	DIVISION IS MSD		TECH AREA IS PROP+EXPL								
4214	1269000	716000	716000	20000	20000		533000	533000		0	0	
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS POLLUTION								

4225	350000	120000	120000	0	0 0	230000	230000		0	0
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS	POLLUTION					
4263	329000	304000	304000	25000	25000	0	00 0		0	00
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS	LAP					
4281	1345000	572000	572000	0	0	773000	773000		0	0
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS	ENERGY					
4285	420000	285000	285000	0	0 0	0	0 0		135000	135000
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS	SAFETY					
4288	643000	633000	633000	0	0 0	10000	10000		0	0
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS	SAFETY					
4291	235000	155000	155000	80000	80000	0	0 0		0	0
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS	SAFETY					
4309	848000	384000	384000	0	0 0	464000	464000		0	0
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS	PROP+EXPL					
4310	483000	189000	189000	0	0 0	294000	294000		0	0
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS	PROP+EXPL					
4312	261000	80000	80000	0	0 0	181000	181000		0	0
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS	LAP					
4322	609000	410000	410000	0	0 0	199000	199000		0	0
% OBLIG =	100.0	DIVISION IS ASD		TECH AREA IS	MPIS					
4332	83000	5000	5000	78000	78000	0	0 0		0	0
% OBLIG =	100.0	DIVISION IS MSD		TECH AREA IS	MPIS					
4335	411000	111000	111000	300000	300000	0	0 0		0	0
% OBLIG =	100.0	DIVISION IS MSD		TECH AREA IS	MPIS					
4341	742000	136000	136000	0	0 0	606000	606000		0	0
% OBLIG =	100 0	DIVISION IS ESP		TECH AREA IS	PROP+EXPL					
4444	355100	295000	295000	37000	0 4/30/80	23100	23100		0	0
% OBLIG =	89.6	DIVISION IS MSD		TECH AREA IS	MPIS					
4460	236000	122000	122000	0	0 0	114000	114000		0	0
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS	PROP+EXPL					
4462	528000	132000	132000	0	0 0	396000	396000		0	0
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS	PROP+EXPL					

4466	461000	371000	371000	90000	90000		0	0 0		0	0
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS PROP+EXPL							
4469	1150000	279000	279000	871000	871000		0	0 0		0	0
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS LAP							
4474	175000	75000	75000	0	0 0		100000	100000		0	00
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS ENERGY							
4498	1147000	88000	88000	4000	4000		1055000	1055000		0	0
% OBLIG =	100.0	DIVISION IS MSD		TECH AREA IS LAP							
4508	357000	68000	68000	0	0 0		289000	289000		0	0
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS PROP+EXPL							
6553	95000	67000	67000	28000	28000		0	0 0		0	0
% OBLIG =	100.0	DIVISION IS MSD		TECH AREA IS MPTS							
6634	542000	242000	242000	300000	0 5/30/80		0	0 0		0	0
% OBLIG =	44.6	DIVISION IS MSD		TECH AREA IS MPTS							
6682	170000	170000	170000	0	0 0		0	0 0		0	0
% OBLIG =	100.0	DIVISION IS MSD		TECH AREA IS MPTS							
6683	146000	146000	146000	0	0		0	0		0	0
% OBLIG =	100.0	DIVISION IS MSD		TECH AREA IS MPTS							
6716	306000	36000	36000	270000	270000 0		0	0 0		0	0
% OBLIG =	100.0	DIVISION IS MSD		TECH AREA IS MPTS							
6736	256000	81000	81000	175000	175000		0	0 0		0	0
% OBLIG =	100.0	DIVISION IS MSD		TECH AREA IS MPTS							
6738	181000	132000	132000	49000	49000 0		0	0 0		0	0
% OBLIG =	100.0	DIVISION IS MSD		TECH AREA IS MPTS							
TOTALS	22139100	10510000	10510000	5106000	4166500		6288100	6288100	235000	235000	

DIVISIONS

ASD			NFD			ESP			MSD			
COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	
410000	410000	100.0	0	0	-I	8019000	8019000	100.0	2081000	2081000	100.0	IN HOUSE
199000	199000	100.0	0	0	-I	4970000	4970000	100.0	1119100	1119100	100.0	GOCO
0	0	-I	0	0	-I	1671000	1366000	81.7	3035000	2760500	80.4	CONTRACTS

0	0	-1	0	0	-1	135000	135000	100.0	100000	100000	100.0	OGA
609000	609000	100.0	0	0	-1	14795000	14490000	97.9	6735100	6060600	90.0	TOTAL

TECH AREAS

IN HOUSE			CONTRACTS			GOCO			OGA			
COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	
3967000	3967000	100.0	1485000	1180000	79.5	1991000	1991000	100.0	0	0	-1	LAP
1996000	1996000	100.0	3431000	2756500	80.3	222100	222100	100.0	100000	100000	100.0	MPTS
932000	20000	2.1	20000	20000	100.0	788000	788000	100.0	0	0	-1	POLLUTION
1073000	1073000	100.0	80000	80000	100.0	10000	10000	100.0	135000	135000	100.0	SAFETY
1895000	1895000	100.0	90000	90000	100.0	2404000	2404000	100.0	0	0	-1	PROP+EXP
0	0	-1	0	0	-1	0	0	-1	0	0	-1	FUZE
647000	647000	100.0	0	0	-1	873000	873000	100.0	0	0	-1	ENERGY

TOTAL % OBLIG.= 95.6 TOTAL $ OBLIG. 21159600

TOTAL % OBLIG

CONTRACT= 80.8

GOCO =100.0

OGA = 100.0

TOTAL $ TO BE OBLIGATED BY:

MONTH	CONTRACT	GOCO	OGA	TOTAL
JAN	0	0	0	0
FEB	0	0	0	0
MAR	0	0	0	0
APR	37000	0	0	37000
MAY	300000	0	0	300000
JUNE	0	0	0	0
JULY	0	0	0	0
AUG	0	0	0	0
SEPT	305000	0	0	305000
OCT	0	0	0	0
NOV	0	0	0	0
DEC	0	0	0	0

***** A POINT SPECIFIED IN A CALL TO PLOT LIES OUTSIDE THE PLOTTING AREA. PEN MOVEMENT TERMINATED AT BOUNDARY

TOTAL $ TO BE CARRIED OVER TO FY 80:

MONTH	CONTRACT	GOCO	OGA	TOTAL
JAN	0	0	0	0
FEB	0	0	0	0
MAR	0	0	0	0
APR	0	0	0	0
MAY	0	0	0	0
JUNE	0	0	0	0
JULY	0	0	0	0
AUG	0	0	0	0
SEPT	0	0	0	0
OCT	0	0	0	0
NOV	0	0	0	0
DEC	0	0	0	0

PROJ	TOTAL AUTH	IN HOUSE COMM	IN HOUSE OBLIG	CONTRACT COMM	CONTRACT OBLIG	CONTRACT DATE	GOCO COMM	GOCO OBLIG	GOCO DATE	OGA COMM	OGA OBLIG	OGA DATE
4000	250000	230000	230000	0	0	0	20000	20000		0	0	0
% OBLIG = 100.0	DIVISION IS ESP			TECH AREA IS LAP								
4033	153000	153000	153000	0	0		0	0		0	0	
% OBLIG = 100.0	DIVISION IS ESP			TECH AREA IS PROP+EXPL								
4037	236000	30000	30000	0	0	0	206000	206000		0	0	
% OBLIG = 100.0	DIVISION IS ESP			TECH AREA IS PROP+EXPL								
4061	260000	63000	63000	0	0	8	197000	197000		0	0	0
% OBLIG = 100.0	DIVISION IS ESP			TECH AREA IS PROP+EXPL								
4062	884000	9000	9000	875000	0	9/30/80	0	0	0	0	0	0
% OBLIG = 1.0	DIVISION IS ESP			TECH AREA IS LAP								
4084	111000	111000	111000	0	0	0	0	0	0	0	0	0
% OBLIG = 100.0	DIVISION IS MSD			TECH AREA IS PROP+EXPL								
4137	67000	67000	67000	0	0		0	0	0	0	0	0
% OBLIG = 100.0	DIVISION IS ESP			TECH AREA IS LAP								
4189	1248000	404000	404000	0	0	0	644000	0	9/30/80	200000	0	9/30/80
% OBLIG = 32.4	DIVISION IS MSD			TECH AREA IS MPTS								
4200	29000	29000	29000	0	0		0	0		0	0	
% OBLIG = 100.0	DIVISION IS ESP			TECH AREA IS PROP+EXPL								
4210	450000	112000	112000	0	0		338000	338000		0	0	
% OBLIG = 100.0	DIVISION IS ESP			TECH AREA IS PROP+EXPL								
4225	155000	84000	84000	0	0	0	71000	71000		0	0	
% OBLIG = 100.0	DIVISION IS ESP			TECH AREA IS POLLUTION								
4226	100000	50000	50000	0	0	0	50000	0	8/30/80	0	0	0
% OBLIG = 50.0	DIVISION IS ESP			TECH AREA IS POLLUTION								
4231	250000	88000	88000	0	0	0	162000	162000		0	00	0
% OBLIG = 100.0	DIVISION IS ESP			TECH AREA IS POLLUTION								
4236	612000	130000	130000	459000	0	9/30/80	23000	23000		0	0	0 0 0
% OBLIG = 21.6	DIVISION IS ESP			TECH AREA IS LAP								

4266	345000	345000	345000	0	08	0	00		0	00 0
% OBLIG =	100.0	DIVISION IS NFD		TECH AREA IS FUZE						
4281	1234000	315000	315000	0	0 0	919000	660000	7/30/80	0	0 0
% OBLIG =	79.0	DIVISION IS ESP		TECH AREA IS ENERGY						
4285	408000	408000	408000	0	0 0	0	0 0		0	0
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS SAFETY						
4288	767000	767000	767000	0	0	0	0 0		0	0 0
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS SAFETY						
4291	100000	100000	100000	0	0	0	0		0	0
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS SAFETY						
4309	3726000	347000	347000	2396000	0 9/30/80	983000	0	7/30/80	0	0
% OBLIG =	9.3	DIVISION IS ESP		TECH AREA IS PROP+EXPL						
4310	278000	278000	278000	0	0	0	0		0	0
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS PROP+EXPL						
4312	279000	153000	153000	0	0 0	126000	126000		0	0
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS LAP						
4322	502000	257000	257000	8000	0 1/30/80	237000	175000	8/30/80	0	0
% OBLIG =	86.1	DIVISION IS ASD		TECH AREA IS MPTS						
4341	583000	170000	170000	0	0 0	413000	0	7/30/80	0	0
% OBLIG =	29.2	DIVISION IS ESP		TECH AREA IS PROP+EXPL						
4462	850000	341000	341000	0	0	509000	509000		0	0
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS PROP+EXPL						
4469	350000	225000	225000	0	0	125000	125000		0	0
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS LAP						
4498	392000	110000	110000	182000	0 9/30/80	100000	100000		0	0
% OBLIG =	53.6	DIVISION IS MSD		TECH AREA IS LAP						
4508	506000	172000	172000	0	0 0	334000	334000		0	0
% OBLIG =	100.0	DIVISION IS ESP		TECH AREA IS PROP+EXPL						
6736	340000	155000	155000	160000	009/30/80	0	0		25000	0 7/31/80
% OBLIG =	45.6	DIVISION IS MSD		TECH AREA IS MPTS						
6738	297000	117000	117000	180000	0 9/31/80	0	0		0	0
% OBLIG =	39.4	DIVISION IS MSD		TECH AREA IS MPTS						

TOTALS	15762000	5820000	5820000	4260000	0	5457000	3025300	225000	0			

DIVISIONS

ASD			NFD			ESP			MSD			
COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	
257000	257000	100.0	345000	345000	100.0	4321000	4321000	100.0	897000	897000	100.0	IN HOUSE
237000	175000	73.8	0	0	-I	4476000	2750300	61.4	744000	100000	13.4	GOCO
8000	0	0.0	0	0	-I	3730000	0	0.0	522000	0	0.0	CONTRACTS
0	0	-I	0	0	-I	0	0	-I	225000	0	0.0	OGA
502000	432000	86.1	345000	345000	100.0	12527000	7071300	56.4	2388000	997000	41.8	TOTAL

TECH AREAS

IN HOUSE			CONTRACTS			GOCO			OGA			
COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	COMM	OBLIG	%OBLIG	
924000	924000	100.0	1516000	0	0.0	394000	373300	94.7	0	0	-I	LAP
933000	933000	100.0	348000	0	0.0	881000	175000	19.9	225000	0	0.0	MPTS
222000	0	0.0	0	0	-I	283000	233000	82.3	0	0	-I	POLLUTION
1275000	1275000	100.0	0	0	-I	0	0	-I	0	0	-I	SAFETY
1806000	1806000	100.0	2396000	0	0.0	2980000	1584000	53.2	0	0	-I	PROP+EXP
345000	345000	100.0	0	0	-I	0	0	-I	0	0	-I	FUZE
315000	315000	100.0	0	0	-I	919000	660000	71.8	0	0	-I	ENERGY

TOTAL % OBLIG.= 56.1 TOTAL $ OBLIG. 8845300

TOTAL % OBLIG

CONTRACT= 0.0

GOCO = 55.4

OGA = 0.0

TOTAL $ TO BE OBLIGATED BY:

MONTH	CONTRACT	GOCO	OGA	TOTAL
JAN	0	0	0	0
FEB	0	0	0	0
MAR	0	0	0	0
APR	0	0	0	0
MAY	0	0	0	0
JUNE	0	0	0	0
JULY	8000	1655000	25000	1688000
AUG	0	112000	0	112000
SEPT	4252000	644000	200000	5096000
OCT	0	0	0	0
NOV	0	0	0	0
DEC	0	0	0	0

***** A POINT SPECIFIED IN A CALL TO PLOT LIES OUTSIDE THE PLOTTING AREA. PEN MOVEMENT TERMINATED AT BOUNDARY

TOTAL $ TO BE CARRIED OVER TO FY 81:

MONTH	CONTRACT	GOCO	OGA	TOTAL
JAN	0	0	0	0
FEB	0	0	0	0
MAR	0	0	0	0
APR	0	0	0	0
MAY	0	0	0	0
JUNE	0	0	0	0
JULY	0	0	0	0
AUG	0	0	0	0
SEPT	0	0	0	0
OCT	0	0	0	0
NOV	0	0	0	0
DEC	0	0	0	0

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