

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

47775 ①

SELECTED PROCEEDINGS

ADPA CONFERENCE

INDUSTRIAL BASE PLANNING ISSUES

"INDUSTRIAL PREPAREDNESS INITIATIVES IN THE NEW BUDGET SCENARIO"

AD-A151 518



Washington, D.C.

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PRESENTATION ON
DOD INDUSTRIAL RESPONSIVENESS SIMULATION
ADPA CONFERENCE

BY
MR. SOL LOVE

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BACKGROUND

- **INITIATED BY USD(P), DR. IKLE**
 - **DIRECTED BY SOL LOVE, CHAIRMAN INDUSTRIAL TASK FORCE**
- **DESIGNED TO ADDRESS PAST SHORTCOMINGS OF COMMAND POST EXERCISES AND STUDIES CONSTRAINED BY NARROW PARAMETERS**
 - **DIRECTLY INVOLVE INDUSTRY IN ASSESSING RESPONSIVENESS**
 - **MINIMIZE GOVERNMENT ROLE AND ASSUMPTIONS**
- **ALSO DESIGNED TO ADDRESS CURRENT OSD THRUST, I.E., SURGE**
 - **SURGE -- RAPID EXPANSION OF PRODUCTION OF CRITICAL END ITEMS IN A NATIONAL SECURITY EMERGENCY SHORT OF MOBILIZATION**

PURPOSE

**DEVELOP SET OF RECOMMENDATIONS FOR
POTENTIAL ACTIONS BY GOVERNMENT
AND INDUSTRY TO PROVIDE A CAPABILITY
TO RAPIDLY INCREASE PRODUCTION OF
CRITICAL END ITEMS IN A NATIONAL
SECURITY EMERGENCY SHORT OF
MOBILIZATION.**

BASIC CONCEPT

- **DEFENSE CONTRACTORS SIMULATED MAXIMUM PRODUCTION ACCELERATION OF SELECTED ITEMS**
 - **NATIONAL SECURITY EMERGENCY WHICH WOULD TRANSITION TO MOBILIZATION LATER**
 - **GOVERNMENT ESTABLISHED A STEERING GROUP AND A RESPONSE CELL**
- **INDUSTRY GIVEN THE PROBLEM AND ASKED TO SOLVE IT**
- **ALL PEACETIME BUSINESS-AS-USUAL RULES, REGULATIONS AND PRACTICES EXAMINED AND CHANGES PROPOSED**
- **GOVERNMENTAL GUIDANCE AND ASSUMPTIONS MINIMIZED**
- **INDUSTRY PROVIDED CONCLUSIONS AND RECOMMENDATIONS TO STEERING GROUP**
- **ULTIMATE RECIPIENT TO BE THE DEPSECDEF AND THE MOBILIZATION AND DEPLOYMENT STEERING GROUP CHAIRED BY DR. IKLE**
- **PROGRAM OF FUTURE CORRECTIVE ACTIONS WILL DERIVE FROM THE INDUSTRY RECOMMENDATIONS, I.E., AND ACTION PLAN**

PRODUCT REQUIREMENT

- CONTRACTOR TO DETERMINE TOTAL NUMBER OF SELECTED ITEMS THAT CAN BE DELIVERED IN 18 MONTHS IN THREE SITUATIONS:
 - CONDITION A — ALL EXISTING PEACETIME PROCEDURES, REGULATIONS AND LAWS WILL BE OBSERVED AND COMPLIED WITH USING EXISTING IMPLEMENTATION
 - CONDITION B1 — WITH JUSTIFICATION, ANY IDENTIFIED PEACETIME PROCEDURES, ETC. MAY BE WAIVED OR MODIFIED AND IMPLEMENTATION MAY BE INCREASED
 - CONDITION B2 — SAME AS B1 BUT WITH PRIOR GET-READY PERIOD, E.G., PRIOR STOCKAGE OF LONG LEAD MATERIAL AND EQUIPMENT

INDUSTRY'S TASK

- IDENTIFY IMPLEMENTATION ACTIONS REQUIRED TO ACCELERATE PRODUCTION
- DEVELOP AND PROPOSE WORK AROUNDS
- PROPOSE MODIFICATIONS/WAIVER TO ANY AND ALL RULES, REGULATIONS, REPORTING REQUIREMENTS AND DESIGN AND ACCEPTANCE TEST SPECIFICATIONS
- NO PEACETIME RULES, ETC., TO INCLUDE STATE AND LOCAL LAWS, WERE TO BE SACROSANCT
- ALL PROPOSALS WERE TO BE JUSTIFIED IN TERMS OF TIME BENEFIT
 - INDIVIDUAL IMPACT OF EACH PROPOSAL MUST BE PROVIDED
 - DEFINITIVE COST DATA NOT REQUIRED

SELECTED PROGRAMS

PROGRAMS 14

CONTRACTORS (11)

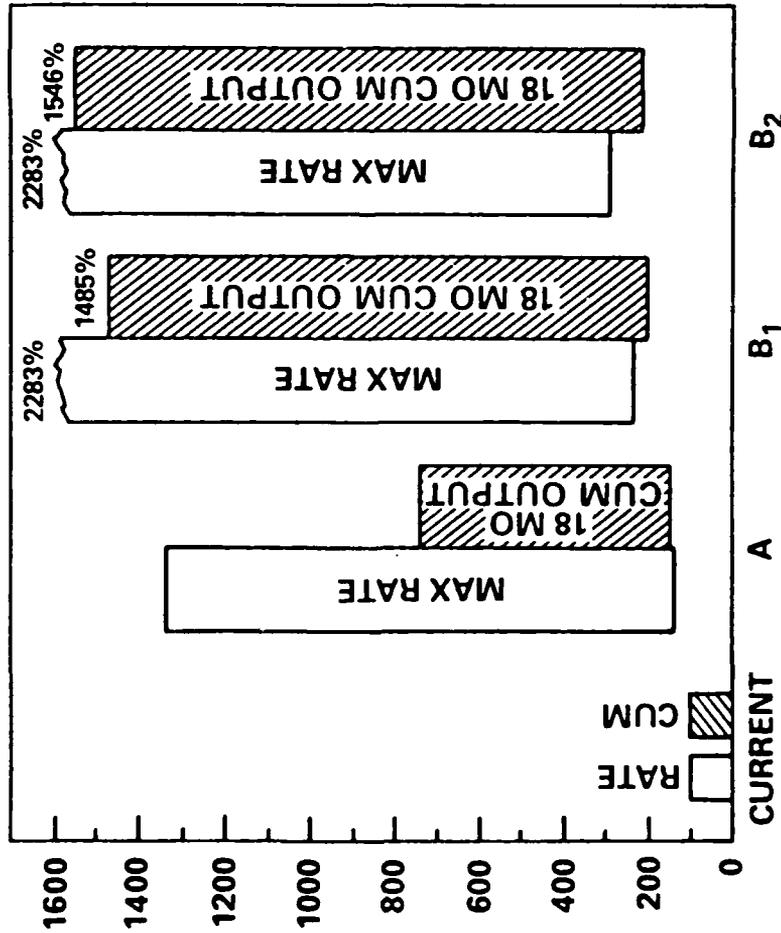
ALQ-99 ECM	AIL
M113 APC	FMC
BRADLEY FIGHTING VEHICLE	FMC
AIM-9M SIDEWINDER	FORD AND RAYTHEON
AIM-7M SPARROW	G. D. AND RAYTHEON
AGM-65D IR MAVERICK	HAC
AIM-54C PHOENIX	HAC
BGM-71D TOW II	HAC
CHEMICAL PROTECTION SUITS	WINFIELD
SONOBUOYS (VARIOUS)	MAGNAVOX AND SPARTON
MIM-23B HAWK	RAYTHEON
AH-1S HELICOPTER	BELL
F-100 ENGINE	PRATT AND WHITNEY
TF-30 ENGINE	PRATT AND WHITNEY

SUMMARY RESULTS

1871-4

POTENTIAL FOR EXPANDED OUTPUT

(SUMMARY OF 13 PROGRAMS)



COST TO EXPAND	COST TO EXPAND		VALUE	Δ
	IMP.	INV		
CURR.	-	-	4975	
A	8	-	8289	3314
B1	324	247	12511	7536
B2	375	467	17493	12518
		TOTAL		
		8		
		571		
		842		

CURRENT = CURRENT RATE AND CURRENTLY PLANNED 18 MO. OUTPUT
A = MAX. OUTPUT WITH EXISTING IMPLEMENTATION AND REGULATIONS
B1 = MAX. OUTPUT WITH INCREASED IMPLEMENTATION AND SELECTED WAIVERS AND DEVIATIONS
B2 = SAME AS B1 BUT WITH GET-READY PERIOD

POTENTIAL FOR EXPANDED PROGRAM BY PROGRAM

PROGRAM	18 MO. CUM. OUTPUT AS % OF				CUR.	VALUE OF DELIVERIES OVER 18 MO. (MIL \$)		
	CURRENT PRODUCTION					A	B1	B2
	A	B1	B2	B2		A	B1	B2
SPARROW	131%	173%	179%	179%	306	402	511	546
SIDEWINDER	128%	180%	241%	241%	231	297	417	567
PHOENIX C	139%	200%	211%	211%	341	475	681	721
TOW II	199%	214%	348%	348%	224	446	479	779
IR MAVERICK	628%	894%	985%	985%	144	899	1284	1415
HAWK	195%	202%	311%	311%	85	166	173	266
SONOBUOYS	478%	1485%	1546%	1546%	160	729	2172	2273
BRADLEY FIGHTING VEHICLE	121%	195%	221%	221%	1361	1642	2653	3004
M 113 APC	131%	296%	356%	356%	289	377	854	1028
TF-100 ENGINE	146%	163%	348%	348%	1435	2094	2340	5002
TF-30 ENGINE	154%	200%	390%	390%	290	447	580	1130
AH-1S	325%	375%	815%	815%	86	279	322	699
ALO-99	160%	200%	280%	280%	23	36	45	63
TOTAL			4975	4975	8289	12511	17493	17493
			% INCREASE		167%	252%	352%	352%

SELECTED CONSTRAINTS

- FOUR KINDS OF CONSTRAINTS PROJECTED — LEGAL, PHYSICAL, PROCEDURAL, FINANCIAL
- TOTAL OF 43 GENERIC CONSTRAINTS IDENTIFIED, SEVERAL HAVE MULTIPLE SOLUTIONS
 - LEGAL 10
 - FINANCIAL 4
 - PHYSICAL 16
 - PROCEDURAL 13
- LEGAL
 - PRODUCT LIABILITY
 - LOCAL LIMITATIONS, E.G., RESTRICTED LAND USAGE
 - VOLATILE EMISSIONS RESTRICTIONS

SELECTED CONSTRAINTS

(Cont)

- **PHYSICAL**
 - **MATERIAL LEADTIME**
 - **TOOLING AND TEST EQUIPMENT CAPACITY, PRIME AND SUBS**
 - **VENDOR RESPONSIVENESS**
 - **OFFSHORE VULNERABILITY — RAW MATERIALS, PROCESSING AND ASSEMBLY, CO-PRODUCTION**
- **PROCEDURAL**
 - **DELAYS IN ACQUIRING ADDITIONAL CAPACITY**
 - **PRODUCTION PROCESS DELAYS**
 - **TESTING REQUIREMENTS**
 - **DAR REQUIREMENTS**
 - **QUALITY CONTROL REQUIREMENTS**

SELECTED CONSTRAINTS

(Cont)

- **FINANCIAL**
 - **UP FRONT FUNDING FOR FACILITY AND PRODUCTION EXPANSION**
 - **LACK OF INCENTIVES FOR PRIVATE FINANCING OF EXCESS OR BALANCED CAPACITY**
 - **PROGRAM STABILITY**

INDUSTRY CONCLUSIONS*

- PRODUCTION CAPACITY FOR SIGNIFICANTLY EXPANDED OUTPUT CAN BE MADE AVAILABLE AT THE PRIME LEVEL AT REASONABLE COST SUBJECT TO THESE LIENS:
 - FINDINGS MAY BE TRANSITORY AS A FUNCTION OF ECONOMIC DEVELOPMENTS.
 - A NUMBER OF 2ND AND 3RD TIER SUPPLIERS COULD BECOME CHOKe POINTS.
 - CONTINUED COMFORTABLE RELIANCE UPON OFFSHORE CAPABILITY FOR LOW-COST-LABOR PROCESSING, SOME UNIQUE PRODUCTS AND CO-PRODUCTION COULD LEAD TO MAJOR DISRUPTIONS.
 - COMMERCIAL PRODUCTION THAT DEVELOPS AND SUPPORTS CAPABILITY FOR EXPANDED MILITARY OUTPUT CANNOT BE POSITIVELY ASSURED.
 - CRITICAL MATERIALS, IF NOT STOCKPILED AND SUPPLIED AS REQUIRED, COULD BECOME PRODUCTION STOPPERS.

*INDUSTRY STATES THAT THESE FINDINGS ARE THE PRODUCT OF A VARIETY OF RESPONSES TO A GROUP OF DIVERSE PROGRAMS. THEY BELIEVE THEM TO BE GOOD GENERIC INDICATORS BUT NOT TRULY DEFINITIVE.

INDUSTRY CONCLUSIONS

(Cont)

- **THE MAJOR OUTPUT DRIVER IS THE BASIC AVAILABILITY OF PRODUCTION CAPACITY AT THE PRIME AND SUBTIER LEVEL. WAIVERS AND DEVIATIONS CONTRIBUTE TO ACCELERATED PRODUCTION AND, IN SPECIFIC INSTANCES, PERPETUATE MAJOR BOTTLENECKS IF NOT GRANTED.**
- **PREPARATORY CASH FUNDING, "ASSUMED" FOR SIMULATION, IS A REAL NEED TO BUILD SUB- CONTRACTOR CAPABILITY AND TO SUPPORT INCREASED DEMANDS FOR SUBCONTRACTOR AND PRIME WORKING CAPITAL.**

FUNDAMENTAL ISSUES

1871-4

FUNDAMENTAL ISSUES

- SURGE CAPABILITY
- SURGE CAPABILITY IS A FUNCTION OF INVENTORY, UNDERUTILIZED AND /OR IDLE CAPACITY
 - AT PRIME CONTRACTORS
 - AT MAJOR SUB-ASSEMBLY SUB-CONTRACTORS
 - SUPPORTED BY ROBUST, RESPONSIVE SUB-TIER BASE
- PRIVATE INDUSTRY WON'T MAINTAIN IDLE CAPACITY AND INVENTORIES ABSENT ECONOMIC INCENTIVES (FMC POSSIBLE EXCEPTION)
- SURGE CAPABILITY REQUIRES DIRECT GOVERNMENT INVOLVEMENT THRU
 - MAX RATE DETERMINATION
 - FUNDING FOR EXCESS CAPACITIES, INVENTORY, ET AL

SURGE GOALS/REQUIREMENT

- **INSTITUTIONAL GOAL OF PRODUCTION SURGE MUST BE ESTABLISHED**
 - **SURGE/MOBILIZATION NOT NOW A UNIVERSAL GOAL**
 - **SURGE/MOBILIZATION REQUIREMENTS ARE NOT COMMONLY AVAILABLE**
- **PRODUCTION CAPACITY GOALS MUST BE ESTABLISHED FOR EACH SURGE ITEM SELECTED**
 - **DURING DEVELOPMENTAL PHASE**
 - **MUST ADDRESS BOTH END ITEMS AND LOGISTICAL SUPPORT**
- **PROGRAM MANAGER AND PRIME CONTRACTOR MUST BE RESPONSIBLE FOR SURGE/MOBILIZATION**
 - **MUST BE A CONSISTENT CONSIDERATION OVER LIFE CYCLE**
 - **FUNDING MECHANISMS MUST BE AVAILABLE, DIRECT OR INDIRECT, TAILORED TO SPECIFIC PROGRAM**

- **PROMPT ACCESS TO CAPACITY**
- **MECHANISMS, LEGAL AND PROCEDURAL, TO ASSURE PROMPT ACCESS TO AVAILABLE CAPACITY MUST BE . . .**
 - **IN PLACE**
 - **UNDERSTOOD**
 - **IMMEDIATELY AVAILABLE IN CIRCUMSTANCES SHORT OF WAR, I.E., WARNING**
- **EXAMPLE — REQUIRED FLEXIBILITY IN DAR MAY NOT BE AVAILABLE WITHOUT LEGISLATIVE RELIEF**
- **DECLARATION OF NATIONAL EMERGENCY WILL NOT NECESSARILY SOLVE**
- **WAIVERS AND DEVIATIONS CAN ENHANCE ACCESS TO CAPACITY**

- **FUNDING**

- **SURGE WILL REQUIRE IMMEDIATE COMMITMENT OF MONEY BY GOVERNMENT**

- **UNIVERSAL REQUIREMENT OF IRS PARTICIPANTS**

- **MECHANISMS TO PROMPTLY OBTAIN ADDITIONAL FUNDING AUTHORITY FROM CONGRESS MUST BE IN PLACE**

- **PRODUCTIVITY**
- **STRONG PRESSURES EXIST TO IMPROVE PRODUCTIVITY THRU CAPITAL INVESTMENT**
- **REQUIRED CAPITAL EQUIPMENT TO ACHIEVE PRODUCTIVITY IS EXPENSIVE**
- **COST OPTIMIZATION TENDS TO CAUSE MULTI-SHIFT OPERATION OF EXPENSIVE EQUIPMENT, THEREBY INHERENTLY CREATING SURGE BOTTLENECKS**
- **FMC MAY OFFER POTENTIAL TO SUPPORT BOTH SURGE AND PRODUCTIVITY**
- **COST SAVING GOALS MUST BE BALANCED WITH SURGE GOALS**

- FOREIGN SOURCE DEPENDENCY
- SURGE/MOBILIZATION CAPABILITY CANNOT BE
FOUNDED UPON FOREIGN PRODUCTION CAPACITY
(HISTORICAL EXCEPTION — CANADA)
 - NO CONTROL
 - NO COERCIVE MECHANISMS AVAILABLE
 - NO ASSURANCE THAT U.S. OBJECTIVES WILL COINCIDE WITH
THOSE OF OUR ALLIES, E.G., 1973 ARAB/ISRAEL WAR
- TRENDS ARE TOWARDS MORE, NOT LESS,
DEPENDENCE
 - NATURAL EFFECT OF ECONOMIC INTERDEPENDENCE
- RAW MATERIAL PROTECTION IN PLACE —
STRATEGIC AND CRITICAL MATERIAL STOCKPILE
 - EFFECTIVE REMEDIES FOR MANUFACTURED GOODS MUST BE
FOUND

POLICY IMPLICATIONS

IF AN ABILITY TO SURGE IS REQUIRED, THE FOLLOWING POLICIES MUST BE EMPHASIZED, COMMONLY UNDERSTOOD AND UNIVERSALLY APPLIED:

- PRODUCTION SURGE MUST BE AN INSTITUTIONAL GOAL**
- PRODUCTION GOALS MUST BE ESTABLISHED FOR SURGE ITEMS SELECTED**
- CLEAR-CUT RESPONSIBILITY FOR ACHIEVING SURGE MUST BE ASSIGNED TO THE PROGRAM MANAGER AND THE CONTRACTOR**
- DIRECT GOVERNMENT INVOLVEMENT IS REQUIRED, TO ESTABLISH GOALS AND PROVIDE FUNDING**
- LEGAL AND PROCEDURAL MECHANISMS MUST BE IN PLACE TO ASSURE PROMPT ACCESS TO CAPACITY**
- FUNDING MECHANISMS MUST BE IN PLACE TO PROMPTLY OBTAIN CONGRESSIONAL AUTHORITY**
- SURGE/MOBILIZATION PRODUCTION CAPABILITY CANNOT BE FOUNDED UPON FOREIGN PRODUCTION CAPACITY**
- SURGE CAPABILITY MUST HAVE CO-EQUAL STATUS WITH PRODUCTIVITY ENHANCEMENT**

IRS FOLLOW-ON ACTIONS

- FOLLOW-ON ACTIONS TO BE INITIATED BY TASKING LETTER TO OUSDRE AND OSD OFFICES RESPONSIBLE FOR SPECIFIC CONSTRAINTS. LETTER WOULD:
 - CONFIRM ESSENTIAL VALIDITY OF FUNDAMENTAL ISSUES AND THE DERIVATIVE POLICY IMPLICATIONS
 - TASK OUSDRE TO ADDRESS POLICY IMPLICATIONS DERIVING FROM FUNDAMENTAL ISSUES AND PURSUE CORRECTIVE ACTIONS
 - TASK COGNIZANT OSD ELEMENTS TO EXAMINE EACH SPECIFIC ISSUE DERIVING FROM INDIVIDUAL CONSTRAINTS IDENTIFIED IN REPORTS AND DEVELOP APPROPRIATE POLICIES AND/OR CORRECTIVE ACTIONS
 - TASK OUSDRE TO MONITOR OVERALL DEVELOPMENT OF INDIVIDUAL POLICIES/ CORRECTIVE ACTIONS. COORDINATED TIMELINES ARE TO BE ESTABLISHED BY OUSDRE AND THE OSD PROPONENT FOR EACH ISSUE
 - TASK THE MDSG TO OVERSEE ALL FOLLOW-ON ACTIVITY RELATED TO THE IRS
- DISPATCH TASKING LETTER, EARLY FEBRUARY
- WORK FOLLOW-ON ACTION IAW TASKING LETTER

Remarks by Norman G. Cornish, private consultant to industry and government, before the Industrial Base Planning Meeting of the American Defense Preparedness Association, Washington, D.C., March 15, 1984.

At a time when crisis is the word of the day in the Middle East, Central America, and elsewhere in the world, Congress and the Administration seem to be playing a game of "Russian roulette" with the vitally-important Defense Production Act.

Key elements of the law, which is the cornerstone of America's defense industrial preparedness, officially expire at the end of this month and no firm agreement on extension of the Act has yet been reached. Without such an extension, the nation's efforts to strengthen national defense and our industrial base could be dealt a costly blow.

The Defense Production Act has been on the books for 34 years since the early days of the Korean War and has served the country well in meeting crisis situations since then.

Prominently at stake in the coming days are two Titles of the Act with the first mandating priority industrial production of key weapons systems and their components and the allocation of scarce materials to make them.

Another major part of the Act -- Title III -- makes it possible for industry -- through various credit and purchase agreement incentives -- to produce absolutely vital items and resources at American factories and mines instead of depending solely or largely upon unreliable and sometimes unfriendly foreign sources for their supply.

There is a great danger in the present situation. If U.S. industry perceives the Defense Production Act will not actually be extended, it is altogether possible defense production will take a backseat to more profitable manufacturing such as video games and the like. Priorities on defense items would be unenforceable.

The defense effort also would be dependent on still more foreign sources for vital parts and components that otherwise would be made in the United States. We will simply be forced to sit on the dock at some seaport, or wait on the tarmac at some airport, for the "nuts and bolts" to arrive -- if they ever do. Lurking in the oceans are 367 Soviet submarines, according to the U.S. Navy, and there is no assurance that sealanes will not be seriously threatened.

Speaking of "nuts and bolts," it is not exactly a comforting thought that today 8 out of every 10 nuts used in the United States are now imported and the same applies to 7 out of every 10

standard bolts. A dramatic illustration of the importance of this fact is that each Army tank requires 7,000 of these and other fasteners.

Another example is ball bearings. More than 50 percent of all ball bearings used in the United States are now imported. Quiet ball bearings, which are used in our nuclear submarines, are now 100 percent imported from Japan. Ball bearings are also important in aircraft engines and military vehicles. We are now talking about importing ball bearings from a Communist country -- Rumania -- to use in our armored personnel carriers. I can't help but wonder whether they will be made at the same factory sites we bombed during World War II.

Well then, what is the problem? Many members of the House, except for a small vocal minority, want to strengthen and modernize the Defense Production Act. Some members of Congress seem bent on weakening the act and robbing it of its flexibility and fast responsiveness by insisting upon a two-step detailed and time-consuming review of each project assisted, no matter how modest in cost. The House and Senate Appropriations Committees already do this, but some members of the Senate and House Banking Committees, who have jurisdiction over the Defense Production Act, want a crack at the same job.

A fundamental principle of good legislation is not to administer such programs through Congress. That is the job of the Executive Branch. Too often, Congress tries to administer

the law instead of determining objectives, setting legislative policy guidelines, and then following up how these are carried out.

Where does the Administration stand? It is betwixt and between. It wants to strengthen the Act but, in the process, not offend the small band of fiscal conservative who are quite willing to erect procedural roadblocks and try to write highly restrictive language into the law. It also has come up with a new and novel interpretation of the Act which guarantees multi-committee consideration and jurisdictional conflict.

It is ironic that if those legislators supporting the sanctity of the budget, credit availability for fast food outlets, and the so-called "free market" do prevail, the cost to the taxpayers might well be staggering.

In the judgment of the General Accounting Office, delays in production and deliveries will inevitably result. And this will raise price tags even in these days of lower inflation rates. Military readiness suffers at possible costs that cannot even be measured in terms of money. With American fighting men under real or potential fire in many global trouble spots, this is hardly the time to fool around.

Then too, as the country attempts to sustain economic recovery, the loss of business by American industry to foreign imports imposes an expensive toll in terms of unemployment and lower corporate profits. In turn, Federal, State and local tax

revenues of all kinds drop, and increases in cost for such things as unemployment benefits and welfare force the government to do more borrowing -- the original sin the critics are trying to cure.

What should be done? For the moment a simple two-year extension of the Defense Production Act is in order just to keep the nation's defense industrial preparedness in sound shape.

Meanwhile, the Administration should come up with a practical plan, using the time-tested and proven assistance provisions of the Act, to modernize our aging and deteriorating Defense Industrial Base and send it to Congress.

This plan should certainly include bringing the so-called defense-related "smokestack industries" into the exciting new technological world of flexible manufacturing systems, computer-assisted design and manufacture, robotics, and process control equipment. Obviously, action must also be taken to train and retrain the necessary "human capital" to carry out any such national effort.

So while Congress continues to study the admitted need for an "industrial policy" to meet the competitive challenge of Japan and other foreign industrial nations, a major aspect of already-accepted U.S. "industrial policy" in the form of the Defense Production Act, supported by every President and Congress for more than three decades, conceivably could go down the tubes.

Ladies and gentlemen -- now for the sermonette -- the Defense Production Act is not a self-perpetuating law. In these times, it needs your support. You cannot expect members of Congress to show continued interest in the Act and its potentialities to remedy defense industrial problems unless you tell them. Otherwise, they will think no one is interested whether the Act lives or dies.

I strongly urge every prime contractor, subcontractor and vendor represented here today to write or visit your Representatives and Senators urging them to vote for extending the Defense Production Act, and to support any Amendments designed to help modernize and meet the needs of our Defense Industrial Base. Weakening amendments must be opposed and defeated. Only two weeks remain before the Act expires so time is of the essence. I hope you will respond to this truly bipartisan challenge to our national security.

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FACILITIES REACTIVATION
ADVANCED PLANNING

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DAY & ZIMMERMANN, INC.

FACILITIES REACTIVATION ADVANCED PLANNING

The Department of Defense is placing an increased emphasis on the industrial preparedness of our Nation. The mass military arms buildup of our potential enemies and the threat of conflicts in various parts of the world necessitates improved planning for mobilization of our industrial base. Just as it is with any successful business venture, well defined mobilization plans and objectives must be established, followed by organizing, directing and controlling the established plans and objectives.

The purpose of this briefing is to re-affirm the need for a disciplined approach towards reactivation planning and to present a technique that has been developed by the Army's Armament, Munitions and Chemical Command (AMCCOM) and the Kansas Division of Day & Zimmermann, Inc. This joint effort between Government and private contractor has spanned approximately five (5) years. We hope that this briefing will prove beneficial to both Government and privately owned plants in establishing improved mobilization planning in the event of a National emergency.

The next war or major conflict

- Where will it be?
- What are the types and strengths of the forces that we may face?
- What does our inventory of munitions consist of? Where are they located?
- What about our aircraft, tanks, ships and other vehicles - are they ample and can we logistically support them?
- How long can we sustain an all out conflict?
- Is the industrial base capable and ready?

We are reminded that our industrial base has been called upon four (4) times during the 20th century to provide war materials to preserve our Nations' freedom or the freedom of other nations. In both world wars there was sufficient time to mobilize our factories to support American and allied forces. A sufficient stockpile of World War II materials existed to support early stages of the Korean conflict. The limited industrial base was sufficient to support the Viet Nam experience. Following each of these National emergencies, portions of the military industrial base was either placed into a standby status or surplus. Private industry returned to producing consumer goods.

The American Free Enterprise System is still healthy and functioning. Our National technology is still dynamic - small business firms are formed, mergers are taking place, companies are expanding and our Gross National Product index is increasing.

Our military needs are also dynamic and not static. New weapons systems are being developed. The Navy's vessels are being modernized. The aircraft to support all three military services are more sophisticated and have more fire power. The modes of transporting personnel and materials on land are being updated. These dynamic changes result in higher survival and increased mission effectiveness.

Previous mobilization responses have required as long as three years. But what about our current industrial base?

- Is it capable and ready?
- Have we established or planned the capabilities required to support production of the new weapons systems, ships, aircraft, vehicles, etc?
- Can we produce today's military munitions and equipment or are we still geared to World War II machinery.

The mass military arms buildup of the communist controlled or influenced countries of the world does pose a threat to the defense of our Nation. Current Department of Defense planning is generally based on full mobilization within nine months. When compared to previous experiences of up to three years this is a very ambitious task and cannot be attained without detailed and comprehensive planning.

When and how we mobilize may determine the outcome of the next all out conflict. Time may determine if we remain a free people.

The questions posed thus far concerning readiness have been aimed at the National level. What are some of the mobilization related questions that face management at a factory or plant level?

- What is to be produced and the required quantities?
- Is the production line designed for the assigned mission?
- What is the current status - active or laidaway?
- What is the condition of the buildings and equipment?
- Are there equipment deficiencies by either absence or obsolescence?
- What are procurement lead times for equipment, materials, etc?

- ° Are spare parts available?
- ° What will be the management, craft and technical personnel requirements?
- ° Are knowledgeable personnel available to reactivate and operate equipment?
- ° Are there adequate utilities?
- ° What materials will be required from commercial sources?
- ° If a production line is active, what is needed to meet full mobilization?

We can see that the questions posed as to mobilization actions may be varied and almost unlimited. The change from the status quo to full mobilization must be made in an orderly and timely manner through disciplined planning. This must be accomplished from the Department of Defense level to the smallest Government production plant and must extend to the commercial sector of the industrial base.

A disciplined approach to mobilization planning has been developed by Day & Zimmermann, Inc. and the Army's Armament, Munitions and Chemical Command at Rock Island, Illinois. This command which is referred to as AMCCOM is the Government's central procurement agency for standard items of armament, munitions and chemicals that are used by all three military services. The detailed instruction for

mobilization planning to meet AMCCOM's needs are published in AMCCOM Pamphlet 500-1, Reactivation Networks, dated 27 October 1983.

To better understand the need for detailed planning we need to look at a brief overview of AMCCOM's industrial complex which is only one of many segments of the Department of Defense. The following is a brief summary of types of Government owned ammunition and chemical facilities that are either contractor or Government operated.

° Ammunition Plants	27
° Arsenals	4
° R & D Centers	2

This does not include the commercial sources of materials when the facilities and equipment are contractor owned or where the facilities are contractor owned and the equipment is Government owned. This simple overview points to the need for preparedness through planning.

There must be a practical, uniform and flexible system which can be applied throughout the military and commercial industrial complex to determine where resources must be applied to enable our Nation to respond to emergencies.

In order for a comprehensive mobilization planning system to be established, an overall mission must be established. Based on Department of Defense requirements, AMCCOM determines:

- Products for each plant
- Production build-up and sustain rate for each product
- Who buys product and packing materials - Government or plant
- Component part and finished product storage quantities
- Commercial suppliers for Government purchased parts and materials

Based on the mobilization planning guidance furnished by AMCCOM, the plant reviews each product and determines:

- Facility and equipment requirements to meet maximum schedule
- Storage requirements for components and finished product
- Production support requirements - utilities, testing, maintenance, etc.
- Potential suppliers for product and packaging components
- Personnel requirements and availability of critical disciplines
- Transportation requirements

The results of this analysis must lead to identification of:

- Required facilities rehabilitation and/or construction
- Equipment voids and procurement lead times for new equipment and special tooling
- Required equipment rehabilitation and/or modification
- Safety and health related requirements

Now that we have established the basic ingredients for a disciplined approach to reactivation planning let's take a closer look at the Reactivation Networking technique for mobilization planning. The technique used is the Venture Evaluation Review Technique which is referred to as VERT. The technique was originally developed by AMCCOM in the early 1970's and then simplified by the joint efforts of Day & Zimmermann and AMCCOM to its present application as detailed in AMCCOM Pamphlet 500-1, Reactivation Networks. VERT does allow the network developer to include variables of:

- Time
- Cost
- Performance

Realism in each of these critical areas cannot be overemphasized. The accumulative effect of understating detailed problems, making ballpark assumptions and not

understanding interrelationships between tasks to be accomplished can lead to disaster - a planning document of no value.

Using the basic information developed from the analyses discussed thus far, the network developer is now ready to begin forming the reactivation networks. Very simply stated, the developer:

- Establishes a listing of reactivation tasks to be performed.
- For each task determines:
 - required manhours by craft
 - estimated elapsed time - optimistic, pessimistic and probable
 - material requirements to support activation and operation
- Assigns a control number to each task
- Establishes interrelationships between tasks - can they be performed independently or must they be performed before, during or after a related task.

Again, realism in defining the tasks and associated costs cannot be overemphasized. Every building, utility and piece of equipment must be reviewed, evaluated and included in the network. Equal attention must be given to all tasks from the most obvious to the seemingly small tasks. An item representing a small cost but a long lead time could delay

complete reactivation and production. The old cliché "for the want of a nail, a war was lost" applies in good reactivation network planning.

It is not intended to make each of you in the audience a network planner, but to gain an appreciation for the disciplined technique.

Figure 1 represents the work required to reactivate a billet breaker which is used on the imaginary M-12 Widget Manufacturing Line at a Fictitious Army Ammunition Plant. The network consists of 8 arcs and 5 nodes. The arcs describe the tasks while the nodes (rectangles) represent milestones or decision points. Note that each arc and node is identified by a unique 8-digit code. This is critical when using VERT. The direction of network flow is from left to right. Each node has 2 logic designations (such as AND/ALL) which determine what is required of the arcs entering and leaving the node. For example, AND indicates that all arcs entering a node must be completed before the arcs leaving that node can be started. The ALL indicates that all arcs leaving the node start simultaneously. Arcs ACWBAA06 and ACWBAA07 represent an EITHER/OR situation. Only one of the two arcs will be activated during each computer iteration. In this example, once the billet breaker has been tested, there is an 85% probability that it will operate without further repair. However, there is a 15% probability that

repairs will be needed. A series of numbers below each arc may represent the crew size that will be required and the estimated minimum, maximum and most likely time periods. Multiplying the crew size with the time required results in a performance measurement.

Figure 1 is actually a sub-network of Figure 2. It, in turn, is a sub-network of the M-12 Widget Line master network Figure 3. The VERT technique uses data histograms to transfer information from the lower level of networks to the higher level networks. Figure 4 & 5 represent high level networks.

Once a complete set of reactivation networks have been prepared and the computer at AMCCOM has performed the VERT program, planners can identify the problem areas which slow down the reactivation process. A methodology for reactivation network analysis is included in AMCCOM pamphlet 500-1. This methodology is based on the experience of analyzing the Kansas AAP network data. The principal goal was to identify the critical path through the network which caused the apparent reactivation time required to exceed the time allotted. This then permits calculation of the actual cost anticipated to shorten lead times.

The ultimate result at Kansas AAP was a listing of the actions required during peacetime, and during the

PREPARE BILLET BREAKER #1 NETWORK - OCWBAA00
 REFERENCE ACWBAA001

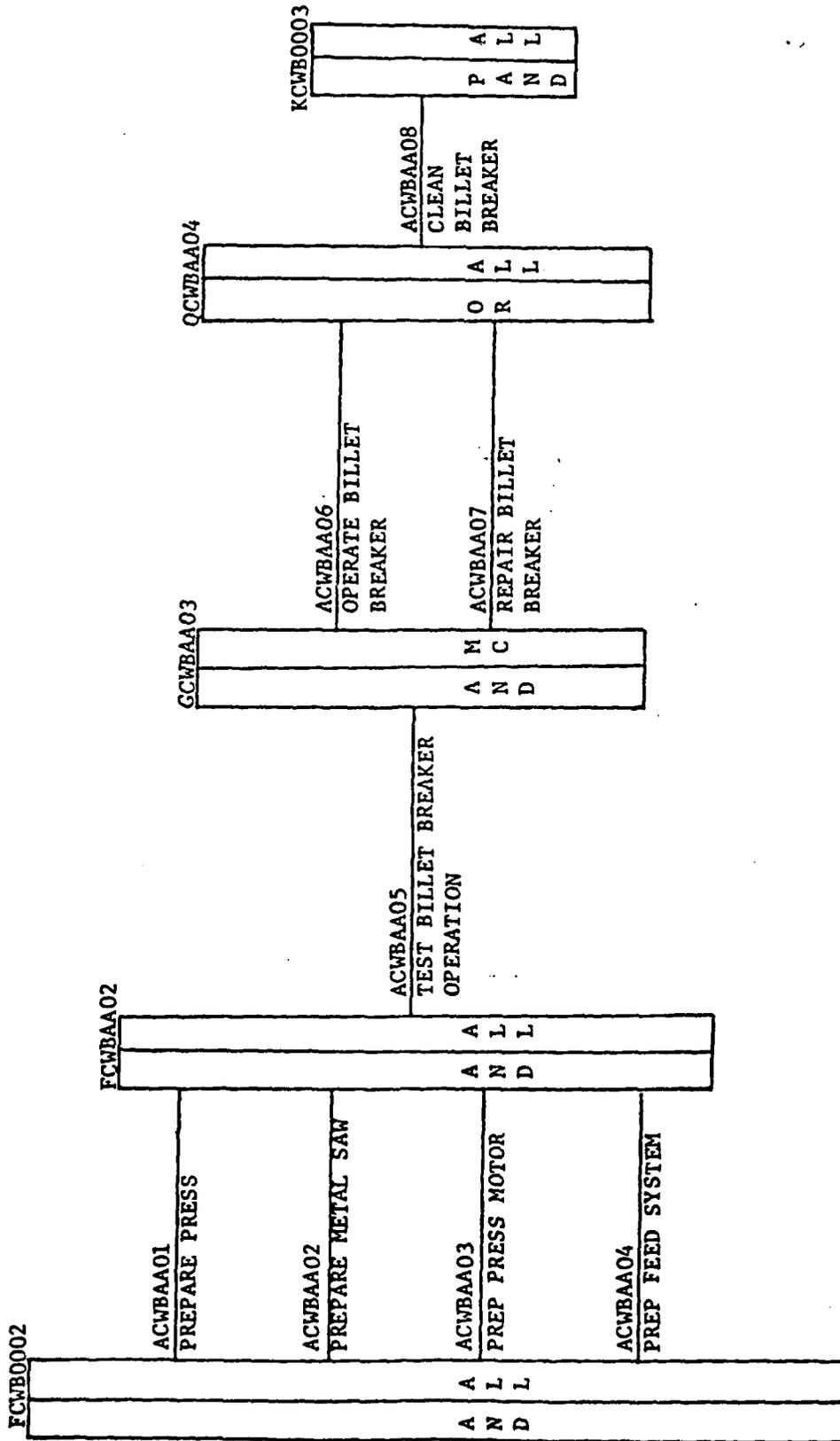
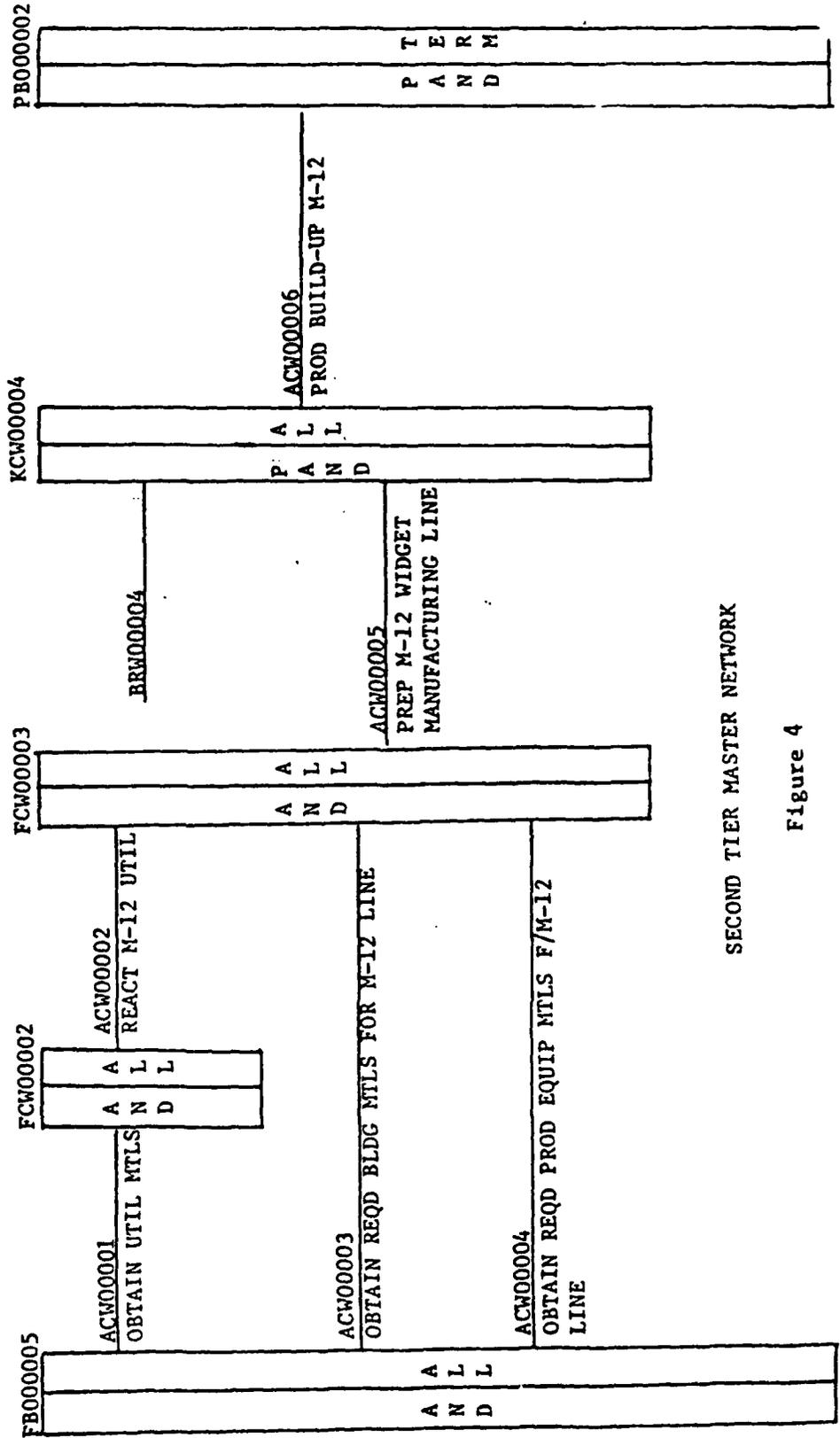


Figure 1

REACTIVATE M-12 PRODUCTION FACILITIES OCHW00000
 REFERENCE AB000015

REFERENCE

ACW00005 - OCHW00000
 ACW00006 - OFW000000



SECOND TIER MASTER NETWORK

Figure 4

reactivation period and the related expense and effective time reduction.

For example, if an additional production machine is needed within a three month period, but delivery will require twelve months, the benefit/cost analysis will show the impact on production of expending funds during peacetime so that the item will be on hand when it is needed.

So far, AMCCOM has focused its VERT networking projects on reactivating ammunition plants for mobilization support. These projects are in varying stages of completion at Holston, Indiana, Kansas, Lone Star, Milan, Riverbank, Sunflower and Twin Cities Army Ammunition Plants. Additional plants are being scheduled for projects during FY84.

There are, however, many other applications for VERT networking within the defense industry.

The data generated from the network development is then fed into the VERT computer program at AMCCOM. The information produced from the computer is in the form of a histogram of the probable reactivation time. If the planned reactivation time is not in harmony with the required time, the critical path can be analyzed for problems areas and work identified that must be accomplished prior to mobilization.

This information can then be used in budgeting and obtaining resources to eliminate the bottlenecks.

AMCCOM has the capability to interface the network plans between item component manufacturing plants to further identify the resources that are needed to insure an orderly and timely reactivation for mobilization. It is believed this disciplined approach to mobilization planning can be extended to all levels of the Department of Defense.

Now that we have a birdseye view of Reactivation Network Planning, let's quickly review it's benefits. They are briefly:

- Uniform planning from plant level to Department of Defense level
- Decisioning for allocation of scarce resources
- Orderly reactivation of industrial base
- Early identification of potential problem areas
- Identify and stockpile critical materials, equipment, etc.
- Identify and retain critical skills

Why should we be looking for an improved industrial readiness posture? Let's again generally summarize the reasons.

- World unrest
- World mobility

- Arms build-up of potential enemies
- Limited munitions stockpile of allied nations
- Changing DOD objectives and mission

Mobilization requirements are dynamic - not static

Ammunition technology is dynamic - not static

Commercial sector is dynamic - not static

- Need for early identification of resource needs

Now that we have covered the basics for a disciplined approach to reactivation planning, we would like to offer just a few of the benefits that have been realized by the Kansas Plant and AMCCOM. Briefly stated, the benefits realized by the Plant include:

- Forced an indepth review of the technical data bank for each product on the Plant's mobilization plans. Included updating item technical data packages as well as production related data
- An updated potential supplier listing
- Strengthened the Plant's Industrial Preparedness Plans
- Improved deferred deficiency listings
- Improved estimates of costs and lead times for special tooling, equipment and construction
- Contributed to AMCCOM rescheduling mission requirements for a Lead Azide Facility which will reduce costs and time if reactivated

- Identified potential personnel resource needs
- Source data for preparing cost estimates to activate facilities for short term use on special work effort

The goal of AMCCOM is to eventually integrate their total production base into Reactivation Network Planning. This will result in improved readiness by better use of resources, potential problem early identification and solution and a step-by-step procedure for reactivation.

Single Manager for Conventional Ammunition

US ARMY MUNITIONS PRODUCTION BASE MODERNIZATION AGENCY

"ORGANIZATION FOR MODERNIZATION"

DEFENSE INDUSTRIAL BASE MODERNIZATION CONFERENCE

15-16 MARCH 1984

Presented By:
COLONEL HENRY J. THAYER
Commander



15 MARCH 1984

"ORGANIZATION FOR MODERNIZATION"

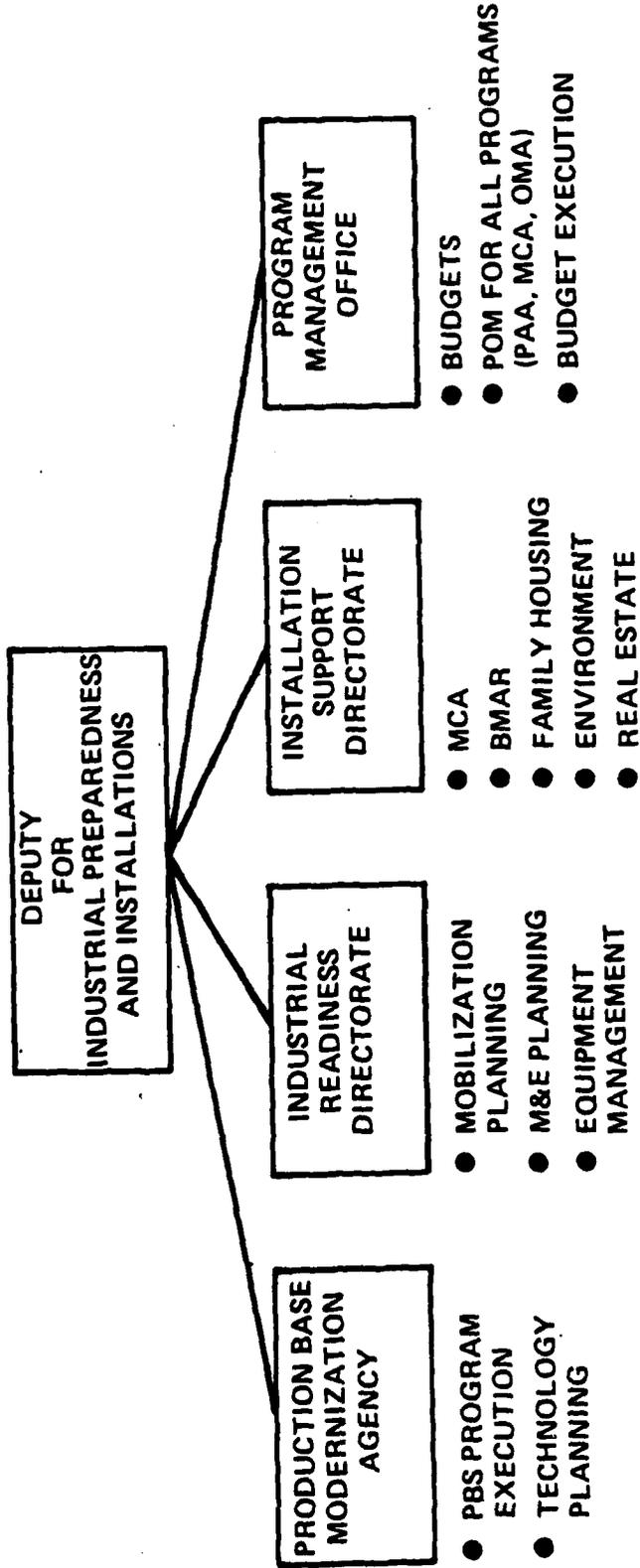
IT IS A PLEASURE TO SPEAK TO THIS GROUP. I WILL TALK ABOUT A MAJOR REORGANIZATION THAT IS TAKING PLACE AND HOW IT WILL AFFECT SUPPORT FOR MODERNIZATION AND EXPANSION. AFTER A DISCUSSION OF THE REORGANIZATION, I WILL DISCUSS THE TRIALS AND TRIBULATIONS OF THE FY84 AND FY85 PROGRAMS.

PRE-AMCCOM ORGANIZATION

THIS CHART DEPICTS THE PRE-AMCCOM ORGANIZATION. THE US ARMY MUNITIONS PRODUCTION BASE MODERNIZATION AGENCY REPORTED TO THE COMMANDER, US ARMY ARMAMENT READINESS COMMAND; THE INDUSTRIAL READINESS DIRECTORATE WAS AN ORGANIZATIONAL ELEMENT OF THE US ARMY ARMAMENT READINESS COMMAND AND REPORTED TO THE DEPUTY FOR PROCUREMENT AND PRODUCTION; AND THE INSTALLATIONS AND SERVICES DIRECTORATE WAS ALSO AN ORGANIZATIONAL ELEMENT OF THE US ARMY ARMAMENT READINESS COMMAND REPORTING TO THE DEPUTY FOR RESOURCES AND MANAGEMENT.

AMCCOM CONCEPT FOR IP&I

COMMAND GROUP



AMCCOM CONCEPT FOR IP&I

THIS CHART SHOWS THE REPORTING CHAIN FOR THE DEPUTY FOR INDUSTRIAL PREPAREDNESS AND INSTALLATIONS AND THE ORGANIZATIONAL ELEMENTS REPORTING TO THE DEPUTY WITH MISSIONS AND FUNCTIONS. IN THE FOLLOWING CHARTS I WILL TALK ABOUT THE MAJOR MISSIONS AND FUNCTIONS OF EACH ELEMENT.

DEPUTY
FOR
INDUSTRIAL PREPAREDNESS
AND INSTALLATIONS
C3 (1) M1
R

PRODUCTION BASE
MODERNIZATION
AGENCY
D 142 (63) M8
R 30 (4) M1

INDUSTRIAL
READINESS
DIRECTORATE
C 154 (22) M10
R

INSTALLATION
SUPPORT
DIRECTORATE
C 48 (7) M5
R

PROGRAM
MANAGEMENT
OFFICE
D C29 (9) M4
R C27 (3) M2

DEPUTY FOR INDUSTRIAL PREPAREDNESS AND INSTALLATIONS

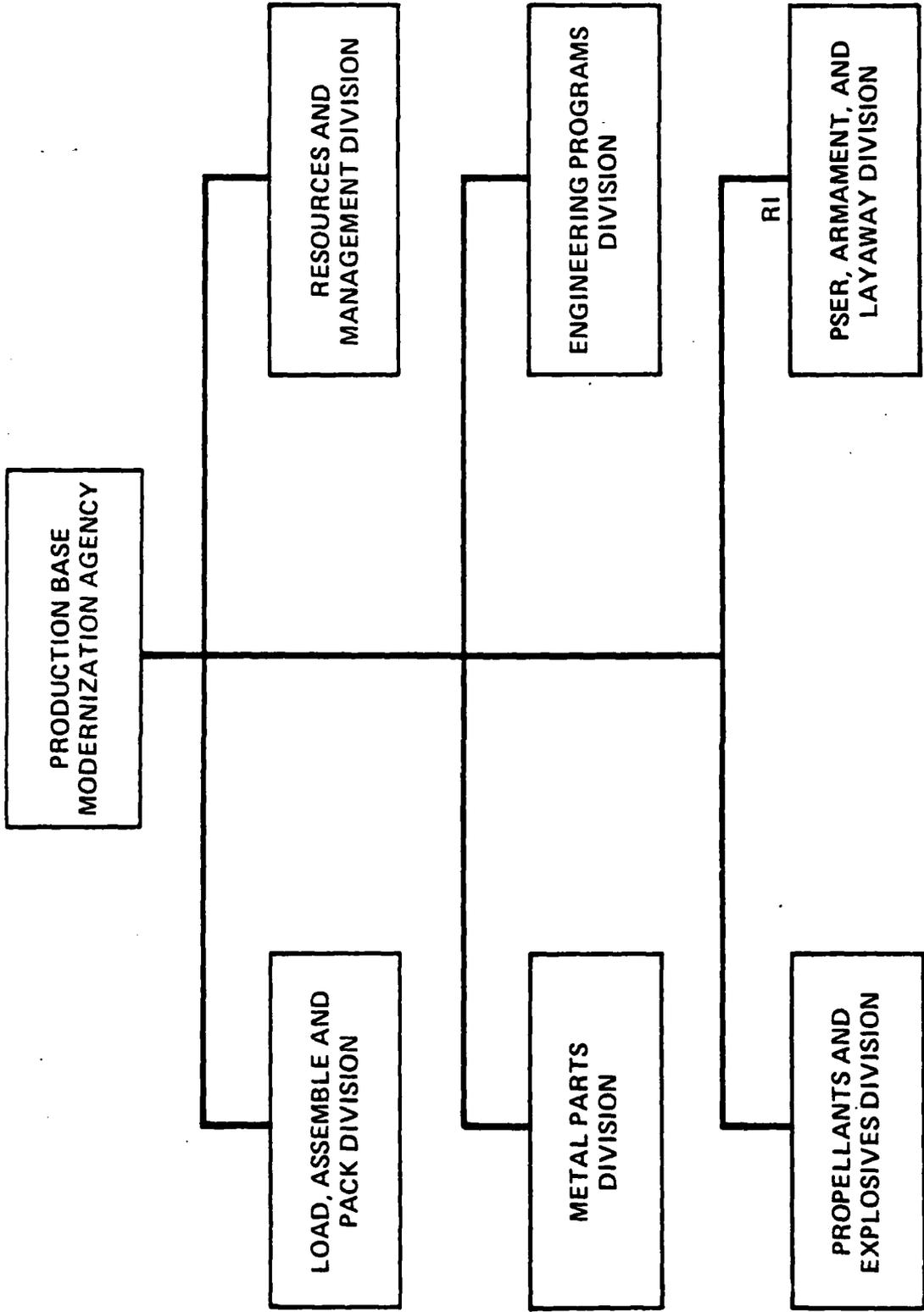
THE DEPUTY FOR INDUSTRIAL PREPAREDNESS AND INSTALLATIONS IS LOCATED AT THE US ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND (AMCCOM), ROCK ISLAND, ILLINOIS. THIS ORGANIZATION CONSISTS OF 4 MAJOR ELEMENTS: THE PRODUCTION BASE MODERNIZATION AGENCY, WITH THE BULK OF PERSONNEL LOCATED AT DOVER, NJ, THE REMAINDER AT ROCK ISLAND, IL; THE INDUSTRIAL READINESS AND INSTALLATION SUPPORT DIRECTORATES AT ROCK ISLAND, IL; AND THE PROGRAM MANAGEMENT OFFICE, WITH PERSONNEL LOCATED AT DOVER, NJ, AND ROCK ISLAND, IL.

THE DEPUTY ACTS FOR THE COMMANDING GENERAL, AMCCOM HQ, AND THE DEPUTY COMMANDING GENERAL FOR PROCUREMENT AND READINESS, AMCCOM HQ, IN EXERCISING MANAGERIAL AUTHORITY OVER INDUSTRIAL BASE PLANNING, PRODUCTION BASE SUPPORT, INCLUDING MODERNIZATION AND EXPANSION, AND INSTALLATION SUPPORT PROGRAMS.

MISSIONS AND FUNCTIONS OF THESE MAJOR ELEMENTS WILL BE SHOWN AND DISCUSSED IN THE FOLLOWING CHARTS.

("R" DENOTES LOCATION AT ROCK ISLAND, IL. "D" AT DOVER, NJ. "C" CIVILIANS.

"M" MILITARY. FIGURES IN PARENTHESIS INDICATE NUMBER OF HIGH GRADES)



PRODUCTION BASE MODERNIZATION AGENCY

THE CHIEF, PRODUCTION BASE MODERNIZATION AGENCY IS LOCATED AT DOVER, NJ, AND THE AGENCY CONSISTS OF 6 DIVISIONS, 5 LOCATED AT DOVER, NJ, AND 1 DIVISION AT THE ROCK ISLAND SITE. THE AGENCY IS RESPONSIBLE FOR ENGINEERING INITIAL PRODUCTION FACILITIES; MODERNIZATION AND EXPANSION OF PRODUCTION FACILITIES; MANUFACTURING METHODS AND TECHNOLOGY ENGINEERING; AND RELATED ENGINEERING SUPPORT AT DOD PLANTS AND ARSENALS; AND FOR THE GOVERNMENT-OWNED PRODUCTION EQUIPMENT LOCATED AT CONTRACTOR-OWNED FACILITIES. FUNCTIONS OF THESE DIVISIONS ARE DELINEATED BELOW:

A. LOAD, ASSEMBLE & PACK DIVISION CONSISTS OF THE ARTILLERY, MORTAR & BOMB BRANCH; THE TANK, CHEMICAL & NONBALLISTIC MUNITIONS BRANCH; AND THE SELECTED AMMUNITION & SMALL CALIBER BRANCH. THE DIVISION MANAGES AND EXECUTES LOAD, ASSEMBLE AND PACK MODERNIZATION AND EXPANSION AND MANUFACTURING METHODS AND TECHNOLOGY PROGRAMS; PROJECTS RELATED TO PRODUCTION OF ALL ARMY, NAVY AND AIR FORCE MUNITION ITEMS.

B. METAL PARTS DIVISION CONSISTS OF THE ARTILLERY AMMUNITION BRANCH; ELECTRO-MECHANICAL SYSTEMS BRANCH; KE TANK AMMUNITION BRANCH; AND THE HEAT AND MISC AMMO BRANCH. THE DIVISION MANAGES THE TECHNICAL AND FINANCIAL ASPECTS OF THE METAL PARTS MODERNIZATION AND EXPANSION AND MANUFACTURING METHODS AND TECHNOLOGY PROGRAMS AND PROJECTS RELATED TO IMPROVED CONVENTIONAL MUNITIONS, CONVENTIONAL ARTILLERY, INCLUDING MORTAR AND NAVY SHIPBOARD MUNITIONS, TANK ROUNDS, CONVENTIONAL BOMBS, GRENADES, MINES AND CANNON CALIBER.

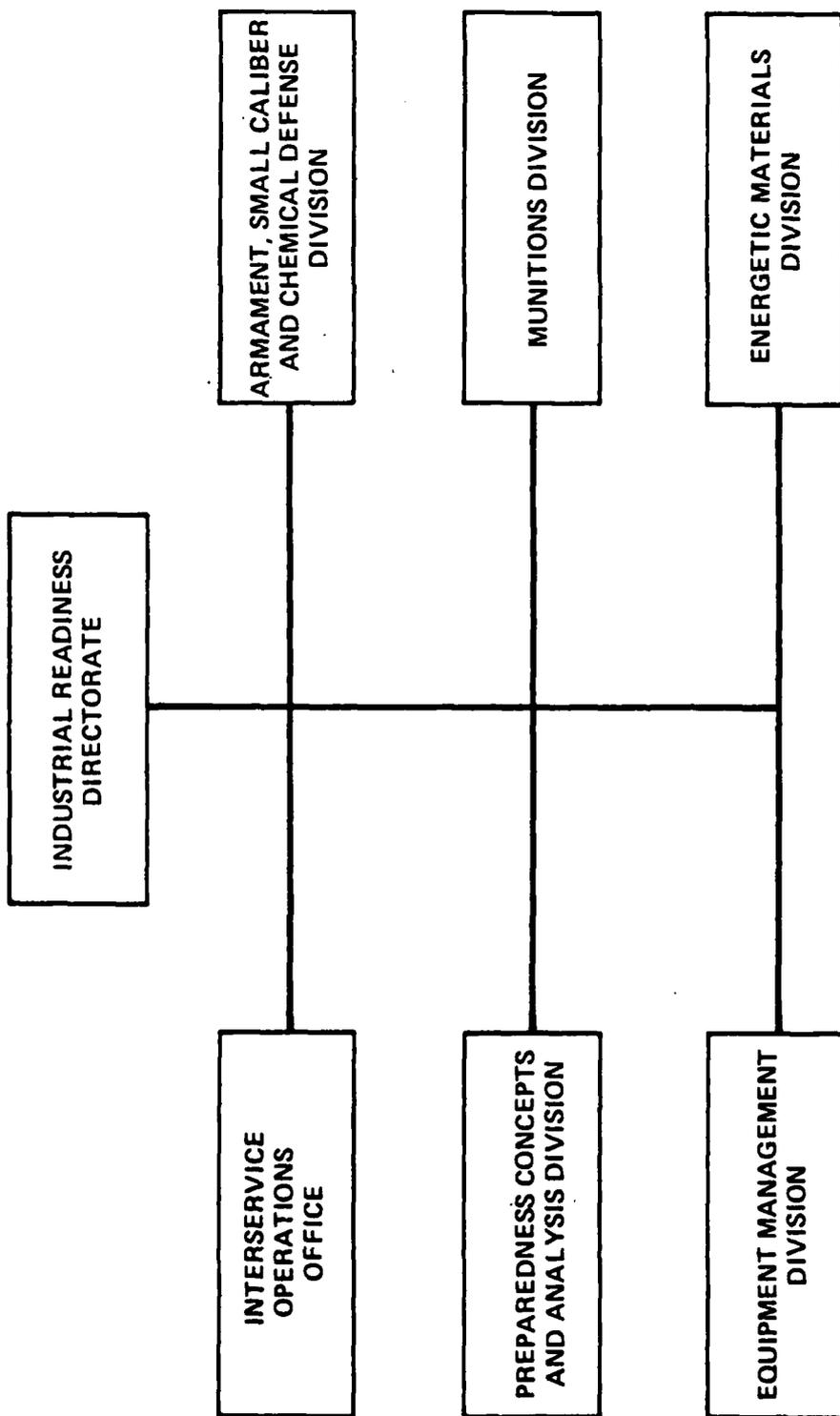
PRODUCTION BASE MODERNIZATION AGENCY (CONT)

C. PROPELLANTS & EXPLOSIVES DIVISION CONSISTS OF THE EXPLOSIVES BRANCH; THE PROPELLANTS BRANCH; THE EXPANSION PROGRAM BRANCH; AND THE SELECTED MUNITIONS & ENGINEERING SUPPORT BRANCH. THE DIVISION MANAGES AND EXECUTES PROPELLANTS AND EXPLOSIVES, MODERNIZATION AND EXPANSION, AND MANUFACTURING METHODS AND TECHNOLOGY PROGRAMS/PROJECTS RELATED TO PRODUCTION OF PROPELLANTS, EXPLOSIVES, CHEMICALS, CHEMICAL MUNITIONS AND PYROTECHNICS.

D. RESOURCES & MANAGEMENT DIVISION CONSISTS OF THE MANAGEMENT & SYSTEMS BRANCH AND THE SERVICES & ADMINISTRATIVE BRANCH. THE DIVISION PERFORMS MANAGEMENT ANALYSES AND ADMINISTRATIVE SERVICES FUNCTIONS.

E. ENGINEERING PROGRAMS DIVISION CONSISTS OF THE JOINT SERVICES ENGINEERING OFFICE; THE CONFIGURATION MANAGEMENT & COST ENGINEERING BRANCH; THE PRODUCT ASSURANCE BRANCH; AND THE INDUSTRY & TECHNOLOGY BRANCH. THE DIVISION ESTABLISHES POLICY AND MANAGES ENGINEERING AND TECHNICAL PROGRAMS SUCH AS JOINT SERVICES ENGINEERING, INDUSTRY AND TECHNOLOGY AND ENGINEERING/TECHNICAL OPERATIONS.

F. PS&ER, ARMAMENT AND LAYAWAY (PAL) DIVISION CONSISTS OF THE PRODUCTION SUPPORT & EQUIPMENT REPLACEMENT (PS&ER) BRANCH; ARMAMENT & CHEMICAL DEFENSE BRANCH; AND LAYAWAY BRANCH. THE DIVISION MANAGES PLANNING AND EXECUTION OF ANNUAL SUPPORT PROJECTS, LAYAWAY OF INDUSTRIAL FACILITIES (LIF) PROGRAM FOR ALL AMCCOM COMMODITIES. MANAGES THE EXECUTION PHASE OF PROVISION OF INDUSTRIAL FACILITIES PROGRAM (PIF) FOR ARMAMENT AND CHEMICAL DEFENSE COMMODITIES. MANAGES PLANNING AND EXECUTION OF MANUFACTURING TECHNOLOGY PROGRAM FOR ARMAMENT AND CHEMICAL DEFENSE COMMODITIES; SUPPORTS AMCCOM PRODUCTIVITY ENHANCEMENT CAPITAL INVESTMENT PROGRAM (PECIP) AND ENERGY CONSERVATION AND MANAGEMENT (ECAM) PROGRAM. MANAGES ALL REARM ACTIVITIES.



INDUSTRIAL READINESS DIRECTORATE

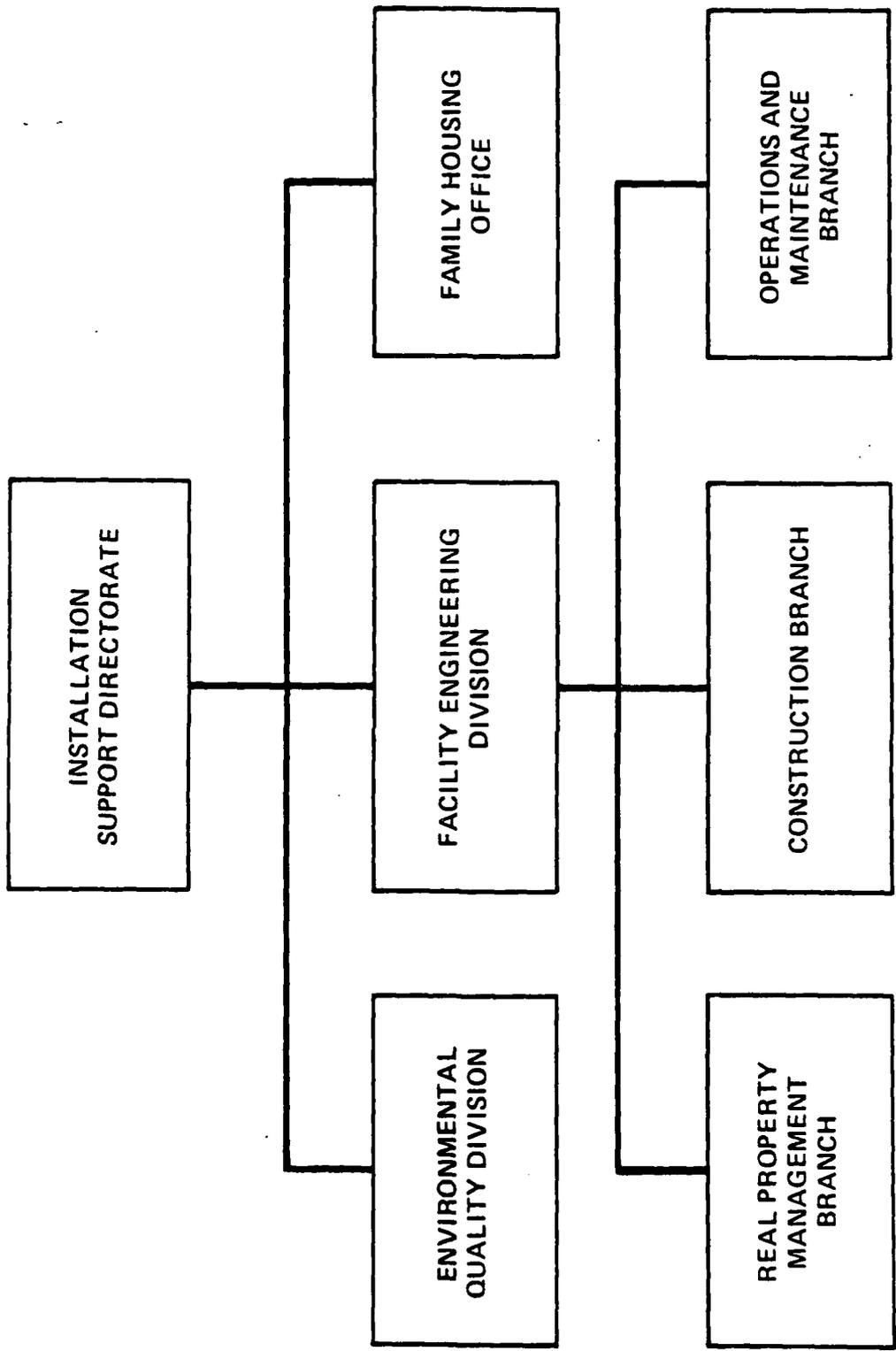
THE CHIEF, INDUSTRIAL READINESS DIRECTORATE IS LOCATED AT ROCK ISLAND, IL, AND CONSISTS OF 6 ORGANIZATIONAL ELEMENTS. THE DIRECTORATE IS RESPONSIBLE FOR MANAGING THE INDUSTRIAL PREPAREDNESS PLANNING PROGRAM AND THE PLANNING PHASE OF THE PRODUCTION BASE SUPPORT PROGRAM. PROVIDES PROPERTY ADMINISTRATION AND EQUIPMENT MANAGEMENT SERVICES. SPECIFIC FUNCTIONS ARE DELINEATED BELOW:

- A. INTERSERVICE OPERATIONS OFFICE ASSURE; INTERSERVICE COORDINATION OF THE INDUSTRIAL PREPAREDNESS PROGRAM; ANALYZES PROBLEMS AND EXPEDITES CORRECTIVE ACTIONS.
- B. PREPAREDNESS CONCEPTS AND ANALYSIS DIVISION CONSISTS OF THE BASE CONCEPTS BRANCH; THE PREPAREDNESS REQUIREMENTS BRANCH; AND THE PREPAREDNESS MANAGEMENT SYSTEMS BRANCH. THE DIVISION MANAGES LONG RANGE PLANNING; CONSOLIDATION AND ANALYSIS OF REQUIREMENTS; ADP/ADPE SYSTEMS; DEVELOPS PRIORITIZATION OF INDUSTRIAL PREPAREDNESS MEASURES AND INDUSTRIAL PREPAREDNESS PLANNING LIST; DIRECTS AND CONTROLS MOBILIZATION EXERCISES AND EMERGENCIES.
- C. EQUIPMENT MANAGEMENT DIVISION CONSISTS OF THE COMMAND REVIEW OF INDUSTRIAL BASE (CRIB) BRANCH; INSTALLATION EQUIPMENT BRANCH; PRODUCTION EQUIPMENT BRANCH; AND THE PROPERTY ACCOUNTABILITY BRANCH. THE DIVISION MANAGES AMCCOM PLANT EQUIPMENT; DIRECTS SUBORDINATE ELEMENTS CONCERNING EQUIPMENT MANAGEMENT, INSTALLATION SUPPLY ACCOUNTING, COMMAND SUPPLY DISCIPLINE; EQUIPMENT AND PROPERTY ACCOUNTABILITY OF GOVERNMENT PROPERTY AND AUDIOVISUAL MANAGEMENT; MANAGES COMMAND REVIEW OF INDUSTRIAL BASE PROGRAM.
- D. ARMAMENT, SMALL CALIBER AND CHEMICAL DEFENSE DIVISION CONSISTS OF THE ARMAMENT PREPAREDNESS BRANCH AND THE ARMAMENT TECHNICAL BRANCH. THE DIVISION MANAGES THE INDUSTRIAL PREPAREDNESS PLANNING FOR ALL WEAPON, FIRE CONTROL, SMALL CALIBER MUNITIONS AND CHEMICAL DEFENSE COMMODITIES; MANAGES INDUSTRIAL PREPAREDNESS OPERATIONS ACCOUNT FOR ASSIGNED PLANT EQUIPMENT PACKAGES.

INDUSTRIAL READINESS DIRECTORATE (CONT)

E. MUNITIONS DIVISION CONSISTS OF THE MUNITIONS PREPAREDNESS BRANCH AND THE MUNITION TECHNICAL BRANCH AND MANAGES THE INDUSTRIAL PREPAREDNESS PLANNING PHASE FOR ALL MUNITIONS COMMODITIES EXCEPT SMALL CALIBER; MANAGES INDUSTRIAL PREPAREDNESS OPERATIONS ACCOUNT FOR ASSIGNED PLANT EQUIPMENT PACKAGES.

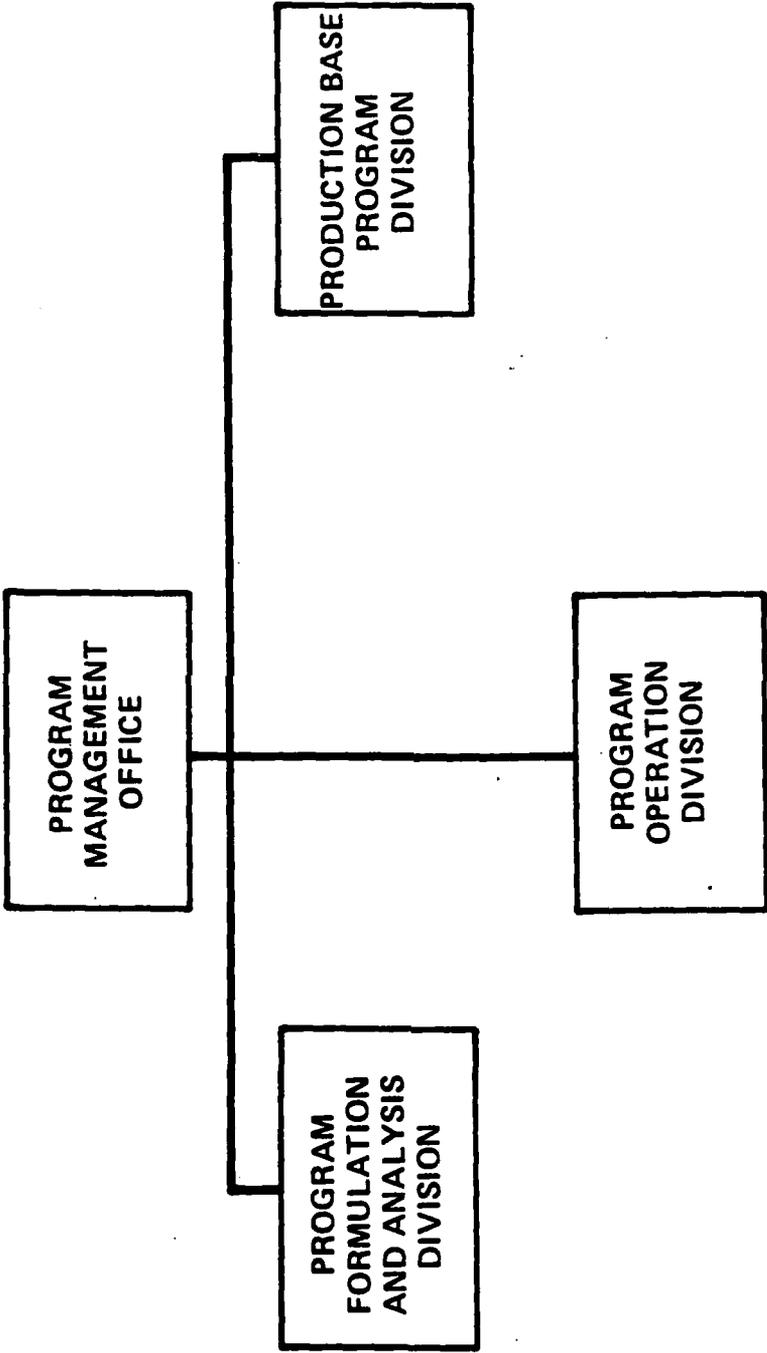
F. ENERGETIC MATERIALS DIVISION CONSISTS OF THE ENERGETIC MATERIALS PREPAREDNESS BRANCH AND THE ENERGETIC MATERIALS TECHNICAL BRANCH. THE DIVISION MANAGES THE INDUSTRIAL PREPAREDNESS PLANNING FOR ACID, NITROCELLULOSE, NITROGLYCERIN, NITROGUANIDINE, PROPELLANT, PROPELLANT CHARGES, BLACK POWDER, EXPLOSIVES, PYROTECHNICS, OFFENSE CHEMICALS; MANAGES INDUSTRIAL PREPAREDNESS OPERATIONS ACCOUNT FOR PLANT EQUIPMENT PACKAGES.



INSTALLATION SUPPORT DIRECTORATE

THE CHIEF, INSTALLATION SUPPORT DIRECTORATE IS LOCATED AT ROCK ISLAND, IL, AND CONSISTS OF 2 DIVISIONS AND AN OFFICE, ALL LOCATED AT ROCK ISLAND. THIS DIRECTORATE IS RESPONSIBLE FOR MANAGEMENT AND UTILIZATION OF PHYSICAL PLANTS OF AMCCOM HQ AND ALL SUPPORT SERVICES INCIDENT TO OPERATION AND PROPER ADMINISTRATION OF INSTALLATIONS AND ACTIVITIES. DEVELOPS AND EXECUTES FACILITIES CONSTRUCTION PROGRAM; COORDINATES ENVIRONMENTAL POLLUTION ABATEMENT PROGRAM. MONITORS MAINTENANCE, REPAIR AND ALTERATION TYPE PROJECTS, PLANS AND SPECIFICATIONS DEVELOPED BY AMCCOM INSTALLATIONS. DIRECTS AND COORDINATES FAMILY HOUSING, ENERGY CONSERVATION, RESOURCE RECOVERY AND RECYCLING PROGRAMS. FUNCTIONS OF THE DIVISIONS ARE DELINEATED BELOW:

- A. THE ENVIRONMENTAL QUALITY DIVISION IS RESPONSIBLE FOR PREVENTION, CONTROL AND ABATEMENT OF ENVIRONMENTAL POLLUTION RELATING TO INSTALLATIONS, FACILITIES AND MATERIEL. SUPERVISES SOLID WASTE AND TOXIC HAZARDOUS WASTE PROGRAMS.
- B. THE FACILITY ENGINEERING DIVISION CONSISTS OF THE REAL PROPERTY MANAGEMENT BRANCH; THE CONSTRUCTION BRANCH; AND THE OPERATIONS AND MAINTENANCE BRANCH. THE DIVISION IS RESPONSIBLE FOR THE MANAGEMENT OF REAL PROPERTY MAINTENANCE; INSTALLATION MASTER PLANNING; CONSTRUCTION PROGRAMMING AND EXECUTION; REAL ESTATE; FACILITIES ENGINEERING AND CONSERVATION OF ENERGY AND NATURAL RESOURCES.
- C. THE FAMILY HOUSING OFFICE MANAGES FAMILY HOUSING, BACHELOR HOUSING (EXCEPT TROOP BARRACKS), GUEST HOUSING AND HOUSING REFERRAL SERVICES AT SUBORDINATE INSTALLATIONS.



PROGRAM MANAGEMENT OFFICE

THE CHIEF OF THE PROGRAM MANAGEMENT OFFICE IS LOCATED AT ROCK ISLAND, IL, AND CONSISTS OF 3 DIVISIONS. THE OFFICE DEVELOPS, COORDINATES AND SUBMITS PROGRAMS TO SUPPORT THE INDUSTRIAL PREPAREDNESS AND INSTALLATION MISSION; DEVELOPS AND OPERATES THE IPI PRIORITIZATION SYSTEM; ISSUES FUNDS, PROVIDES FINANCIAL MANAGEMENT, DEVELOPS FORECASTS, REVISES PROGRAMS AND REPORTS STATUS OF PROGRAMS. FUNCTIONS OF DIVISIONS ARE DELINEATED BELOW:

- A. THE PROGRAM FORMULATION & ANALYSIS DIVISION IS LOCATED AT ROCK ISLAND, IL, AND MANAGES THE NEAR-TERM BUDGET, PRE-BUDGET, AND 5-YEAR DEFENSE PLAN FOR THE PRODUCTION BASE SUPPORT PROGRAM.
- B. THE PROGRAM OPERATIONS DIVISION IS LOCATED AT ROCK ISLAND, IL, AND CONSISTS OF THE PRODUCTION BASE SUPPORT BRANCH AND THE INDUSTRIAL PREPAREDNESS OPERATIONS BRANCH. IT DEVELOPS, COORDINATES THE PROGRAM FOR INDUSTRIAL PREPAREDNESS OPERATIONS, MILITARY CONSTRUCTION (ARMY), FAMILY HOUSING, BASE LEVEL COMMERCIAL EQUIPMENT, REAL PROPERTY MAINTENANCE, BASE OPERATIONS, AGRICULTURE, FISH AND WILDLIFE, FORESTRY AND AUDIOVISUAL EQUIPMENT.
- C. THE PRODUCTION BASE PROGRAM DIVISION IS LOCATED AT DOVER, NJ, AND DIRECTS, COORDINATES AND CONTROLS PROGRAM AND FINANCIAL MANAGEMENT OPERATIONS AND ACTS AS FINANCIAL POLICY ADVISOR CONCERNING DELEGATION OF AUTHORITY, SOURCES AND USES OF FUNDS, REPROGRAMMING ACTIVITIES AND LIMITATIONS.

GAINS WITH REORGANIZATION

- ONE ORGANIZATION RESPONSIBLE FOR ALL FACILITY NEEDS (UP & DOWN)
- SINGLE AMCCOM VOICE FOR INDUSTRIAL PREPAREDNESS
- CONSOLIDATION OF MISSIONS
- ENHANCES COORDINATION IN PLANNING & EXECUTION
- SINGLE PROGRAM & BUDGET ORGANIZATION
- ENHANCES TECHNOLOGY TRANSFER
- UNIFIED PRIORITIZATION SYSTEM
- ORGANIZED ACTIVE INDUSTRIAL BASE CONFIGURATION MGT.

GAINS WITH REORGANIZATION

THIS CHART LISTS THE MAJOR GAINS ENVISIONED AS A RESULT OF THIS NEW ORGANIZATION.

FY84 MHT PROGRAM

(\$ MILLIONS)

PROJ NO.	PROJECT TITLE	RDT&E	PAA
4563	PROCESS IMPROVEMENT F/TANK DU PENETRATORS	.650	\$1.700
1802	AUTOMATED VISUAL MICROELECTRONICS INSPECTION	.496	
1803	IMPROVED LEAD DIOXIDE ELECTROPLATING TECHNOLOGY	.346	
1914	EAK EXPLOSIVE	.495	
4078	UPGRADE SAFETY READINESS AND PRODUCTION OF EXISTING MELT-POUR LINES	.621	
4200	TNT CRYSTALLIZER FOR LARGE CALIBER MUNITIONS	.570	
4273	AUTO PRODUCTION OF STICK PROPELLANT	1.028	
4291	ENERGY CONSERVATION AT AAP	.180	
4358	AUTO LINE PROCESS INSPECTION OF NEW ELECTRO EXPLOSIVE DEVICES	.250	
4406	IMPROVING THE YIELD OF HMX DURING RDX NITROLYSIS	.217	
4473	AUTOMATED LEAK DETECTIN OF WHITE PHOSPHORUS	.410	
4489	ADVANCED POLLUTION ABATEMENT FOR DARCOM FACILITIES	.917	
4510	AUTOMATIC ASSEMBLY OF ADDITIVE LINER TO TANK CARTRIDGE	.295	
4511	DISPOSAL OF FINAL SLUDGE FROM ACID RECOVERY OPERATIONS	.164	
4520	COLD PRESSING SHAPED CHARGE PROJECTILES	.589	
4523	RAPID MOISTURE ANALYSIS OF EXPLOSIVES MIXES	.200	
4524	AUTOMATED MELT-POUR EQUIPMENT FOR SMALL AP MINES	.385	
4529	MANUFACTURE OF PRECISION CONES FOR HEAT PROJECTILE	.675	
4534	SAWS BULLET CONVERSION OF SCAMP EQUIPMENT	1.858	
4539	AUTOMATIC CARTRIDGE CASE HARDNESS MEASUREMENT AND CONTROL	.182	
4540	CALCIUM CARBONATE COATING OF 7.62MM BALL PROPELLANT	.322	
4541	HIGH SPEED INSPECTION OF SAA PRIMED CASES	.374	
4544	THIRD GENERATION DYNAGUN (GAMMA) TO SIMULATE TANK GUNS	.416	
4547	PROCESS TECHNOLOGY FOR IR SCREENING DEVICES	.301	
4548	PYRO SAFETY ENHANCEMENT	.347	
4550	AUTOMATED ASSEMBLY OF M22 FLASH SIMULATOR	.465	
4556	ON-LINE MONITOR F/WATER POL GENERATED BY MFG OF EXPLOSIVES	.458	
4570	IMPROVE MANUFACTURING PROC/TEST PRODUCTION F/ARTILLERY ELEC TIME FUZE	.387	
4574	IMPROVED PROCESS FOR RDX/HMX MANUFACTURE	.150	
4573	MOD AND IMPR OF OMSO PILOT PLANT FOR RDX/HMX	.435	
4579	WHITE WATER WASTE TREATMENT	.500	
4597	MANUFACTURING PROCESSES F/CARINON CALIBER DU PENETRATOR (20mm/25mm/30mm)	.374	
1606	COMBINED EFFECTS MUN AUTO ASSEMBLY MACHINE F/BOMB LOAD UNIT	1.418	

FY84 MM&T PROGRAM

THIS CHART AND THE ONE THAT FOLLOWS SHOW THE FY84 MM&T PROGRAM.

FY84 MMT PROGRAM (CONT)

(\$ MILLIONS)

<u>PROJ NO.</u>	<u>PROJECT TITLE</u>	<u>RDT&E</u>	<u>PAA</u>
4626	AUTOMATED ASSEMBLY OF MILLIMETER WAVE TRANSDUCERS	\$.180	\$
4657	BINARY DETECTION	.290	
4665	COMPUTER SIMULATION FOR DU QUENCH FACILITY	.400	
4667	CONT REC & PURIF OF MECH DU SCRAP	.255	
4668	ELECTROSTATIC PRECIP (SMOG HOG) IMPROV	.150	
TOTALS		\$17.750	\$1.700

SOURCE: PBM-PB

AS OF 17 FEB 84

FY85 MMT PROGRAM

(\$ MILLIONS)

PROJ NO.	PROJECT TITLE	RT&E
4563	PROCESS IMPROVEMENT F/TANK DU PENETRATORS	\$ 1.322
4612	NITRAMINE (LOVA) PROPELLANT WASTEWATERS ABATEMENT	.250
4656	NITRAMINE PROPEL PROCESSING	.398
4578	MOD + IMPROV OF DMSO PILOT PLANT F/RDX/HMX	.425
1914	EDDN/EAK PROCESS ENGINEERING	.250
4406	IMPROVING YIELD OF HMX DURING RDX NITROLYSIS	1.146
4273	AUTO PRODUCT OF STICK PROPELL	.712
4624	AUTOMATED MANUFACTURE OF MMW DEVICES	2.753
4626	AUTO ASSY OF MMW TRANSDUCERS	2.605
4627	AUTOMAT TEST OF MMW TRANSDUCER	2.043
4628	AUTO MANUFACT OF IR DETECTORS AND REFLECTORS	2.262
4630	AUTO METHOD F/BORESIGHTING IR	1.581
4632	LEADED CHIP CARRIERS	.773
4633	AUTOMATED SENSOR SYSTEM	.724
4629	AUTOMATED ASSEMBLY AND TEST OF IR TRANSDUCER	1.946
4625	VOLUME MANUFAC OF IF AMPLIFIER INTEGRATED CIRCUITS	.806
4634	AUTO ASSY OF ELECTRONIC MODULE AND TOP SENSOR ASSEMBLY	1.018
4631	AUTOMATED SIGNAL PROCESS TEST STATION	.844
4281	CONSERVATION OF ENERGY AT AAPS	.090
4358	AUTO LINE-PROCESS INSP OF NEW EED ALPINE	.515
4520	PRESS LOAD OF HMX COMPOSITIONS FOR TANK ROUNDS	.468
4550	AUTOMATED ASSEMBLY OF M22 FLASH SIMULATOR	.840
1805	IMPROVED PRODUCTION VIBRATION TESTS-M732(PIP) FUZE MATERIAL	.450
4473	AUTO LEAK DETO OF WP MUNITIONS	.230
4570	IMPR MFS PRO TEST PROD F/ARTY ELECT TIME FUZE	.978
4524	AUTOMATED MELT-POUR EQUIPMENT FOR SMALL AP MINES	.332
4510	AUTO ASSY OF ADDITIVE LINER TO TANK CARTRIDGE	.189
4659	AUTO INSPECT FOR ROTATING BAND CHEMISTRY	.432
4660	AUTO BLENDING OF STICK PROP	.723
4539	AUTOMATED CARTRIDGE CASE HARD MEASURE CONTROL	.403
4641	LONG ROD PENET MFG PROCESSES (25MM/30MM)	.800
4531	PROTOTYPE PRODUCT OF MULTIBASE STICK PROPELLANT OF CAMBL	.898
4534	SAWS BULLET CON OF SCAMP EQUIP	.557
4636	PROCESS FOR PRESS LOADING SFF SUBMUNITIONS	.560
1712	FILL AND PRESS TECHNOLOGY F/M8 RP GRENADE	.340
4584	LOADING EQUIPMENT FOR CAL .50 AMMUNITION	.650

FY85 MM&T PROGRAM

THIS CHART AND THE ONE THAT FOLLOWS SHOWS THE FY85 MM&T PROGRAM.

FY85 MMT PROGRAM (CONT)

(\$ MILLIONS)

<u>PROJ NO.</u>	<u>PROJECT TITLE</u>	<u>RDT&E</u>
4595	AUTOMATED ASSY OF M21 FLASH SIMULATOR	\$.550
4544	THIRD GENERA FYNAGUN-GAMMA-TO SIMULATE TANK GUNS	.318
4613	METHOD FOR PROCESS ANALYSIS OF RDX/HMX SLURRY	.319
4574	IMPROVED PROCESS FOR RDX/HMX	.342
4449	PROC IMP F/COMP C4 AND PBX EXPLOSIVES	.175
4200	TNT CRYSTALLIZER FOR LARGE CAL MUNITIONS	.235
		<u>\$33.252</u>

SOURCE: PBM-PB

AS OF 8 FEB 84

FY84 MODERNIZATION AND EXPANSION PROJECTS

(CHANGES TO 84 PROGRAM)

<u>PROJ</u>	<u>DESCRIPTION OF PROJECTS</u>	<u>PLANI</u>	<u>CUI</u>	<u>TOTAL (\$M)</u>	<u>CUI BY</u>
3046	ENGINEERING DESIGN	OMNIB	.100	29.879	PBD 107*
0063	BINARY - BIGEYE BOMB FAC	PINEB	30.614	-0-	CONGRESS
0051	MINE - COMB EFF MUN/BLU 97B MPTS	COMME	.494	13.506	DEFLATION
2041	MINE - FASCAM GATOR (MOPMS IPF) LAP	LONES	.419	11.445	DEFLATION
0084	PROP - 155 STICK (M203)	RADF0	.112	3.071	DEFLATION
3194	MORTAR - 60/81 INCR CONT	COMME	1.639	-0-	CONGRESS
2207	105/120 KE MPTS TRN XM797/832	COMME	.503	13.760	DEFLATION
2855	25MM GAU 12/U AMMO	COMME	.428	11.702	DEFLATION
3906	ACID - NITRIC MOD	HOLST	.064	1.736	DEFLATION
0079	QL MFG FAC	X-FAC	34.494	-0-	CONGRESS
0103	DC MFG FAC	X-FAC	25.195	-0-	CONGRESS
2632	NITROGUANIDINE	SUNFL	.306	8.367	DEFLATION
3215	8 INCH M509 THREADED BASE	COMME	8.870	-0-	CONGRESS
	SUBTOTAL		103.238	93.466	
	CLASSIFIED PROJECT	X-FAC	.200	7.100	DEFLATION
	TOTAL		103.438	100.566	

*\$10 MILLION FENCED FOR BINARY

SOURCE: PBM-PB

AS OF 4 JAN 84

FY84 MODERNIZATION & EXPANSION PROJECTS

THIS CHART SHOWS CHANGES TO THE FY84 MODERNIZATION & EXPANSION PROGRAM. THIS IS THE ORIGINAL PROGRAM AS SUBMITTED TO THE DEPARTMENT OF THE ARMY. CUTS TO THE PROGRAM AMOUNTED TO \$103.4 MILLION OUT OF A \$204 MILLION PROGRAM--THE PROGRAM WAS CUT IN HALF.

FY84 MODERNIZATION AND EXPANSION PROJECTS

<u>PROJ</u>	<u>DESCRIPTION OF PROJECTS</u>	<u>PLANT</u>	<u>TYPE</u>	<u>TOTAL (\$M)</u>	<u>CE (\$M)</u>
3046	ENGINEERING DESIGN	OMNIB	OMN	24.766	4.500
0051	MINE - COMB EFF MUN/BLU 97B MPTS	COMME	IPF	13.871	
2041	MINE - FASCAM GATOR (MOPMS IPF) LAP	LONES	EXP	11.445	1.290
0084	PROP - 155 STICK (M203)	RADFO	EXP	3.071	2.014
2207	105MM KE MPTS TRN XM797	COMME	EXP	11.362	
3906	ACID - NITRIC MOD	HOLST	MOD	1.736	
2632	NITROGUANIDINE	SUNFL	EXP	6.236	
5900	ENGINEERING DESIGN	OMNIB	MOD	5.113	
2439	PRODUCTIVITY IMPROVEMENTS RDX	HOLST	MOD	3.000	
2447	REACTIVATE/MOD/CONVERT RDX TO HMX	HOLST	MOD	8.000	
0117	MUSALL PILOT PLANT	HOLST	IPF	21.000	
	SUBTOTAL			109.600	7.804
	CLASSIFIED PROJECT	X-FAC	EXP	7.100	
	TOTAL			116.700	

SOURCE: PBM-PB

AS OF 3 FEB 84

FY84 MODERNIZATION & EXPANSION PROJECTS

THIS CHART SHOWS THE CURRENT FY84 MODERNIZATION & EXPANSION PROGRAM.

FY84 PROGRAM STATUS

(\$M)

	PRE OSD	OSD CUTS	DA REBUTTAL	FINAL PROGRAM
PSER	30.5	1.1	(-)	29.4
LAYAWAY	17.3	0.3	(-)	17.0
MT	24.4	21.8*	21.8	2.6*
CONF	7.3	0.2	(-)	7.1
OMNIBUS	31.1	11.3	10.1	29.9**
M&E	188.9	79.3	79.3	109.6
RDX/HMX	(-)	(-)	(-)	(32.0)
TOTAL		114.0		

*17.8 RDTE

**10.1 RESERVE FOR BINARY

SOURCE: PBM-P

AS OF 4 JAN 84

FY84 PROGRAM STATUS

THIS CHART SHOWS THE FY84 PROGRAM STATUS. THE TOTAL PROGRAM BEFORE IT WAS SUBMITTED TO THE OFFICE OF THE SECRETARY OF DEFENSE (PRE--OSD); THE SECRETARY OF DEFENSE CUTS; WHAT THE DEPARTMENT OF THE ARMY DID TO REBUTT THE CHANGES; AND THE FINAL PROGRAM.

PRODUCTION BASE PROGRAM (FY84 M&E LOSSES)

(\$ MILLIONS)

PROJECT	PLANT	TITLE	\$ VALUE	REASON
5840063	PINE B	IPF - PROD FAC F/BLU	30.614	CONGRESSIONAL ACTION PBD #630
5840079	X - FAC	IPF - BINARY QL PROD FACILITY	34.494	CONGRESSIONAL ACTION PBD #630
5840103	X - FAC	IPF - BINARY DC FACILITY	25.195	CONGRESSIONAL ACTION PBD #630
5842855	COMM	EXP - 25MM BUSH MASTER - GAU 12/U AMMO	(11.702)	CANCELLED FOR HIGHER PRIORITY RDX/HMX PROJECTS/REPROGRAMMED
5843194	COMM	EXP - 60/81MM PROP CHG	1.639	CONGRESSIONAL ACTION PBD #630
TOTAL			91.942	

SOURCE: PBM - PB

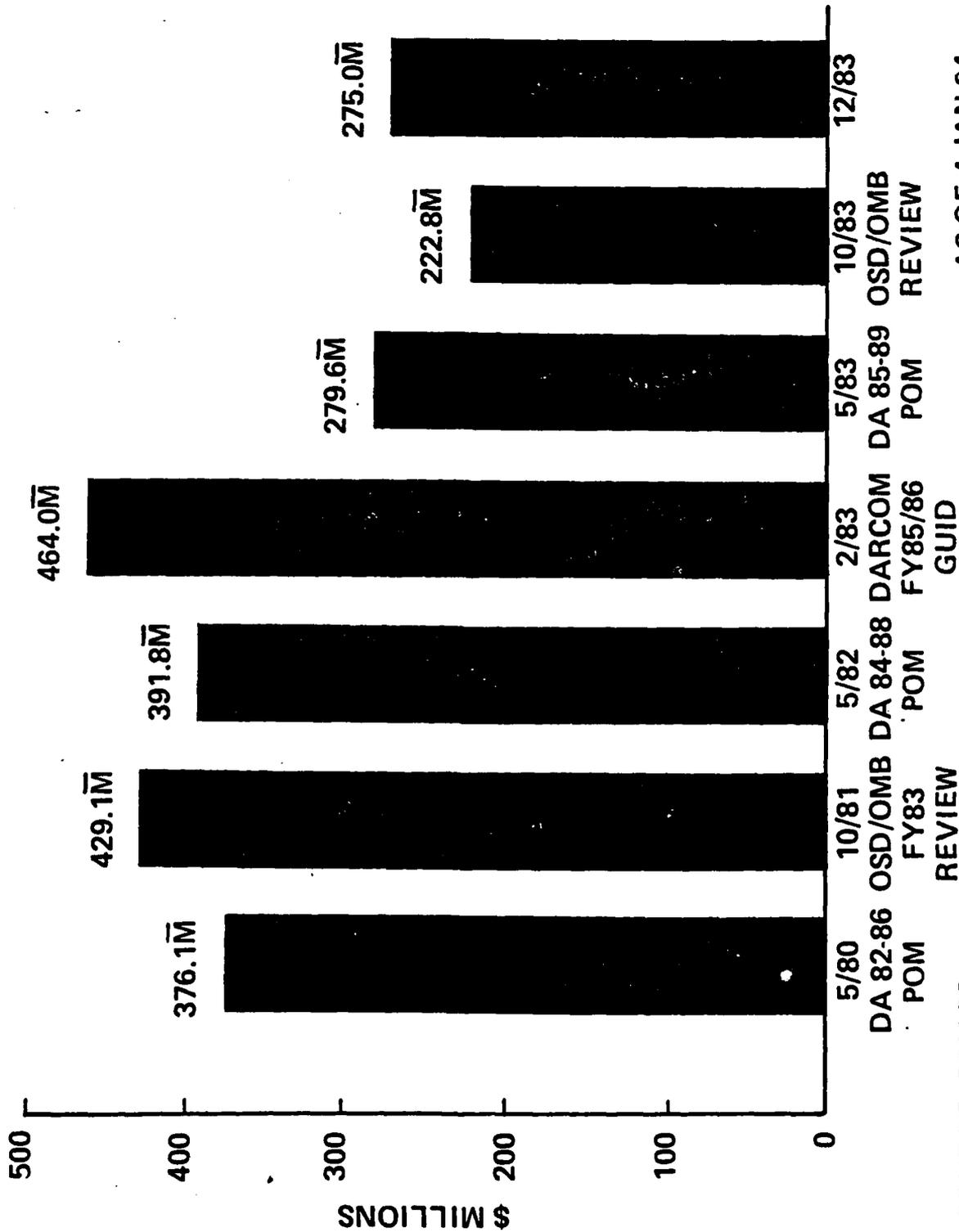
AS OF 31 DEC 83

PRODUCTION BASE PROGRAM

(FY84 M&E LOSSES)

THIS CHART SHOWS THE FY84 LOSSES IN THE MODERNIZATION & EXPANSION PROGRAM.

FY85 TOA VARIATIONS



SOURCE: PBM-PB

AS OF 4 JAN 84

FY85 TOA VARIATIONS

THIS CHART SHOWS THE FY85 LONG-RANGE VARIATIONS IN TOTAL OBLIGATIONAL AUTHORITY
FROM 1980 TO 1983.

FY85 MODERNIZATION AND EXPANSION PROJECTS
 (CHANGES TO 85 PROGRAM)

PROJ	PLANI	LIILE	ORIGINAL	CURRENT	CHANGE	REASON
3046Q	OMNIB	ENGINEERING DESIGN	30.00	24.07	- 5.93	PBD 107
C003		ADDITIONAL PROGRAM	65.50	64.40	- 1.10	DEFLATION
2229A	RADF0	120 TANK PROP STICK BLEND	.53	.50	- .03	DEFLATION
0070	IHEAD	PROP-NITRAMINE GUN PROP FAC	2.29	3.00	+ .71	FINAL DESIGN EST
0085	COMME	105 HEAT XM815 MPTS	18.00	-0-	- 18.00	HIGH RISK PROGRAM
5160	JEFFE	JEFFERSON PROVING GROUND TEST CAP	-0-	1.81	+ 1.81	DIRECTED BY HIGHER HQ
0099	MILAN	105MM HEAT XM815 LAP	2.10	-0-	- 2.10	HIGH RISK PROGRAM
3230	CRANE	16 IN PROJ MPTS/LAP	3.00	2.54	- .46	DEFLATION
0064	PINEB	MORTAR - 81 RP XM819 IMP SMK LAP	2.14	3.08	+ .94	FINAL DESIGN EST
3195	COMME	MORTAR - 81 INCR CONT	5.11	4.90	- .21	DEFLATION
0086	LAKEC	5.56 SAWS TRACER (M196/856E1)	5.10	2.36	- 2.74	EXCEEDED REQUIREMENTS
2410	LONES	155/8 M549/650 DELAY PDN FAC	.60	.59	- .01	DEFLATION
3199	COMME	MINE - FASCAM MPTS	9.49	1.90	- 7.59	TRANSFER TO RDX/HMX
0050A	X-FAC	MINE - TAC MUN DISP MPTS	18.00	17.22	- .78	DEFLATION
2386	KANSA	BOMB - COMB EFF MUN (CEM)	10.44	10.00	- .44	DEFLATION
2199	HOLST	MOD COAL HANDLING IMPROV	-0-	9.00	+ 9.00	DIRECTED BY HIGHER HQ

SOURCE: PBM-PB

AS OF 4 JAN 84

FY85 MODERNIZATION AND EXPANSION PROJECTS

(CHANGES TO FY85 PROGRAM)

THIS CHART AND THE TWO THAT FOLLOW SHOW THE FY85 MODERNIZATION AND EXPANSION PROGRAM AS SUBMITTED TO THE DEPARTMENT OF THE ARMY AND THE CUTS THAT WERE MADE TO THE PROGRAM.

FY85 MODERNIZATION AND EXPANSION PROJECTS (CONT'D)
 (CHANGES TO 85 PROGRAM)

PROJ	PLANI	TITLE	ORIGINAL	CURRENT	CHANGE	REASON
2439B	HOLST	PRODUCTIVITY IMPROV	-0-	3.00	+ 3.00	DIRECTED BY HIGHER HQ
2054	HOLST	MOD C4 FAC, LN8	-0-	12.00	+ 12.00	DIRECTED BY HIGHER HQ
2447B	HOLST	MODIFY AND REACTIVATE RDX/HMX LN	-0-	20.00	+ 20.00	DIRECTED BY HIGHER HQ
2391	IOWAA	MINE - FASCAM - GATOR LAP	5.03	3.93	- 1.10	FINAL DESIGN EST
2232	LAKEC	5.56 (SAWS/CONV) PDN MOD EQUIP	2.90	1.35	- 1.55	EXCEEDED REQUIREMENTS
3233	BULOV	FUZE - PDN EQUIP (XM763/XM764)	1.95	1.87	- .08	DEFLATION
2159	INDIA	BLDG - 155/8 PROP CHG QUALIFY	2.64	2.23	- .41	FINAL DESIGN EST
2240	MULTI	PYRO - VAPOR SENSOR	.54	.53	- .01	DEFLATION
2230	RIVER	GREN - M42/46 MPTS FILL VOID	3.74	-0-	- 3.74	EXCEEDS REQUIREMENTS
3216	MULTI	GREN - M42/46 MPTS EQUIP UPGRADE	5.67	-0-	- 5.67	EXCEEDS REQUIREMENTS
3187	COMME	FUZE - HYDRO PINION EXTR	.94	-0-	- .94	OSD PROBLEM W/SOURCE
2287	WELLS	PEP AT WELLS MARINE	2.79	-0-	- 2.79	EXCEEDS REQUIREMENTS
3551	MULTI	FUZE - M223 HI-SPEED ASSY LINE	16.55	2.04	- 14.51	EXCEEDS REQUIREMENTS
2301	IOWAA	DET - M55 LOADER REPLACEMENT	1.25	-0-	- 1.25	MOVED TO FY87
2507B	LOUIS	BLDG - SPT CHEMICAL LAB	1.50	1.64	+ .14	FINAL DESIGN EST
2371	INDIA	155/8 PROP CHG CAN CRADLES	.97	.93	- .04	DEFLATION

SOURCE: PBM-PB

AS OF 4 JAN 84

FY85 MODERNIZATION AND EXPANSION PROJECTS (CONT'D)
 (CHANGES TO 85 PROGRAM)

PROJ	PLANI	ITILE	ORIGINAL	CURRENT	CHANGE	REASON
2359	SCRAN	UTIL - WATER DISTRIBUTION SYSTEM	1.60	2.08	+ .48	FINAL DESIGN EST
2389	KANSA	155 - M483 EXPLUSION CHG SYSTEM	.24	.23	- .01	DEFLATION
2430	X-FAC	MUSALL FAC DSGN	-0-	11.00	+ 11.00	DIRECTED BY HIGHER HQ
0063A	PINEB	BIGEYE LAP EQUIP	-0-	11.80	+ 11.80	DIRECTED BY HIGHER HQ
0079A	COMME	QL FACILITY	-0-	13.50	+ 13.50	DIRECTED BY HIGHER HQ
0071A	COMME	BIGEYE MPTS	<u>-0-</u>	<u>16.70</u>	+ <u>16.70</u>	DIRECTED BY HIGHER HQ
		TOTAL	220.61	250.20	+ 29.59	

SOURCE: PBM-PB

AS OF 4 JAN 84

FY85 PROGRAM CUTS

<u>PROJ</u>	<u>TITLE</u>	<u>REDUCTION</u>	<u>REASON</u>
0085	105MM HEAT XM815 MPTS	100%	HIGH RISK PROGRAM
0099	105MM HEAT XM815 LAP	100%	HIGH RISK PROGRAM
0086	5.56 SAWS TRACER (M196/856E1)	50%	EXCEEDED PLANNED REQUIREMENTS
2232	5.56 (SAWS/CONV) PDN MOD EQUIP	50%	EXCEEDED PLANNED REQUIREMENTS
2230	GREN - M42/46 MPTS FILL VOID	100%	CURRENT CAPACITY EXCEEDS RQMTS
3216	GREN - M42/46 MPTS EQUIP UPGRADE	100%	CURRENT CAPACITY EXCEEDS RQMTS
3187	FUZE - HYDRO PINION EXTR	100%	OSD CONFUSED ON SOURCE
2287	PEP AT WELLS MARINE	100%	CURRENT CAPACITY EXCEEDS RQMTS
3651	FUZE - M223 HI-SPEED ASSY LINE	\$11M	6 PRODUCERS PLANNED; ONLY 2 RQD
3046	ENGINEERING DESIGN	\$4M	PROJS DESIGNED IN ADVANCE OF NEED
	ENGINEERING SUPPORT	\$1.6M	ESTIMATE AT 2% SHOULD BE 1.2%
	BIGEYE - MPTS	\$10.1M	MOVED TO FY86 TO MAINTAIN BIGEYE
0070	PROP - NITRAMINE GUN PROP FAC	\$4M	ACQUISITION STRATEGY
			REFURBISHING EQUIP IS OMA

SOURCE: PBM-PB

AS OF 4 JAN 84

FY85 PROGRAM CUTS

THIS CHART SHOWS REASONS FOR PROGRAM CUTS IN THE FY85 PROGRAM.

RDX/HMX PROGRAM

PROJ	ITEM	\$M
2199	HOLSTON COAL HANDLING	9.23
2054	HOLSTON COMP C4	16.42
2439A	HOLSTON PRODUCTIVITY	3.33
2447B	HOLSTON CONVERT RDX	20.00
2430A	X-FACILITY MUSALL	11.00
	TOTAL	59.98

SOURCE: PBM-PB

AS OF 4 JAN 84

RDX/HMX PROGRAM

THIS CHART SHOWS THE FY85 RDX/HMX PROGRAM.

AD-A151 518

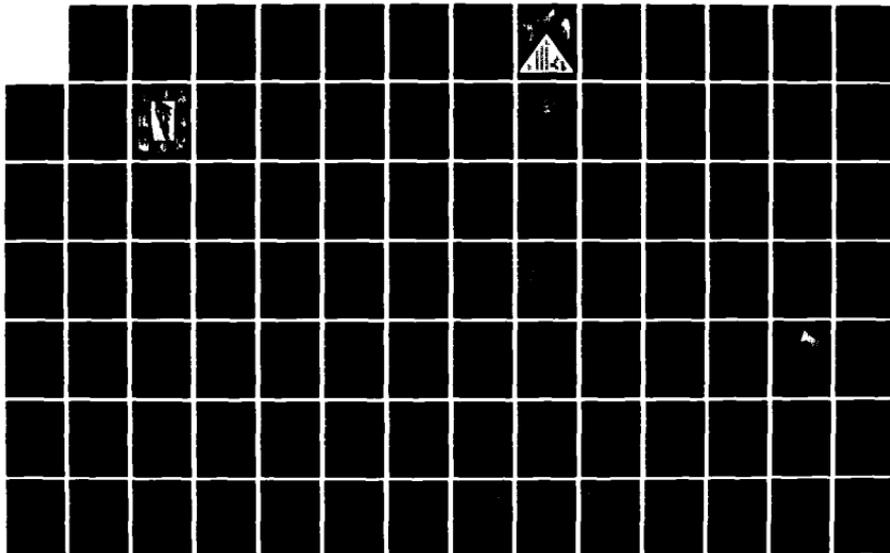
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PREPAREDNESS ASSOCIATION) CON. (U) AMERICAN DEFENSE
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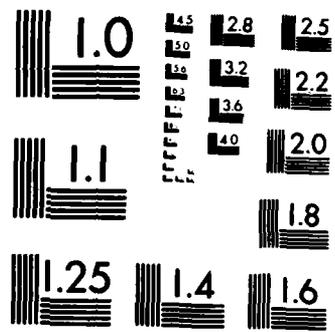
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

BINARY MUNITIONS PROGRAM

FY85

PROJ	ITEM	\$M
OMNIBUS	DC FACILITY DESIGN	3.5
0063A	BIGEYE BOMB LLLAP EQUIPMENT	11.8
0079A	BIGEYE BOMB QL LL EQUIPMENT	13.5
0074	BIGEYE BOMB MPTS FACILITY	16.7
	TOTAL	45.5
MCA	BIGEYE BOMB FILL BUILDING	10.8
	GRAND TOTAL	56.3

SOURCE: PBM-E

AS OF 4 JAN 84

BINARY MUNITIONS PROGRAM

THIS CHART SHOWS THE FY85 BINARY MUNITIONS PROGRAM.

FY85 PROBLEM AREAS

- VERY LOW TOA
- NO DA/OSD SUPPORT FOR MOB/MOD
- ARBITRARY/CAPRICIOUS CUTS
- NO RATIONALE FOR MOB CUTS
- REDUCTIONS IN PRIOR YEAR PROGRAM THREE MONTHS INTO FISCAL YEAR
- BINARY CUT IN FY85 OUTSIDE AMCCOM KNOWLEDGE (ITEM PLUSED UP IN FY84 DOUBLE DIPPED)
- "BOOKKEEPING" OSD ERRORS
 - FY84--\$0.5 MILLION
 - PLUS UPs IN EITHER OUT YEARS OR OTHER TYPE FUNDS IS ERRONEOUS
- LACK OF DA/OSD SUPPORT FOR 120MM TANK AND ENHANCED 105MM
- HIGHER HQ LAST MINUTE "ADD-ONS"

SOURCE: PBM-PB

AS OF 4 JAN 84

FY85 PROBLEM AREAS

THIS CHART SHOWS PROBLEM AREAS FOR FY85.

INITIATIVES

- PRODUCTION BASE STUDY
- CONGRESS DIRECTED
- 1 FEB 83
- SGATF
- CORE ITEMS
- FENCED
- PRIORITIZATION
- REORGANIZATION

SOURCE: PBM-PB

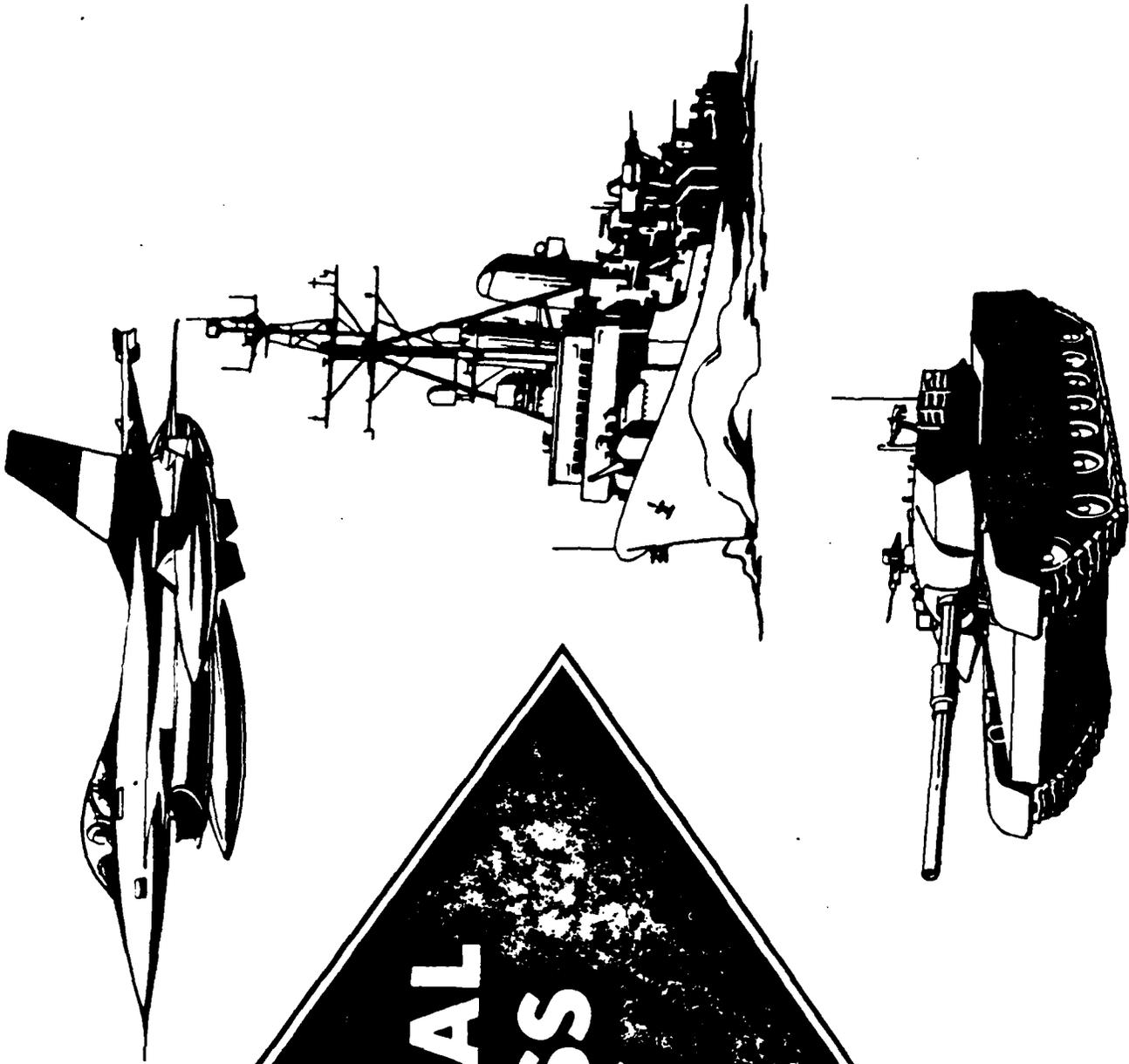
AS OF 4 JAN 84

INITIATIVES

THIS CHART SHOWS INITIATIVES DEVELOPED BY THE DEPARTMENT OF THE ARMY AND
THE US ARMY ARMAMENT, MUNITIONS AND CHEMICAL COMMAND.

(SGATF: STUDY GROUP, AMMUNITION TASK FORCE)

IMPROVE INDUSTRIAL READINESS



IMPROVE INDUSTRIAL PREPAREDNESS

AND, FINALLY, THE PRIMARY PURPOSE OF OUR PROGRAM IS TO IMPROVE THE INDUSTRIAL PREPAREDNESS OF THE MUNITIONS PRODUCTION BASE, THANK YOU FOR GIVING ME THE OPPORTUNITY TO BRIEF YOU TODAY.

MODERNIZATION
AND THE
INDUSTRIAL BASE

Presented By:

Mr. Andrew McMahon
General Dynamics

MODERNIZATION AND THE INDUSTRIAL BASE

TODAY, WE HAVE HEARD SOME EXCITING STORIES OF WHAT MODERNIZATION IS DOING FOR THE INDUSTRIAL BASE. I SAY EXCITING BECAUSE, ONLY A FEW YEARS BACK, IT WAS POPULAR TO READ OF THE DECLINING INDUSTRIAL BASE. NOW I FEEL STRONGLY THAT, THROUGH OUR COMBINED EFFORTS AND BY TAKING ADVANTAGE OF THE NEW EMERGING TECHNOLOGIES, WE WILL OVERCOME THAT STIGMA. HOWEVER, IN ADDRESSING THE SUBJECT OF INDUSTRIAL BASE PLANNING AND LOOKING AT IT FROM THE VIEWPOINT OF WHAT MODERNIZATION IS ACCOMPLISHING TOWARD IMPROVING OUR POSITION, THERE ARE THREE BASIC ELEMENTS WHICH MUST BE ADDRESSED. THESE ELEMENTS ARE MATERIALS, FACILITIES, AND PEOPLE. EACH ELEMENT PLAYS A KEY ROLE BUT IS ALSO DEPENDENT UPON THE OTHER TWO.

WHEN WE LOOK AT THE ABSOLUTE LEAD TIME REQUIRED TO BUILD FIGHTER AIRCRAFT SUCH AS THE F-16, WE SEE 32 MONTHS FROM THE INITIAL MATERIAL ACQUISITION TO DELIVERY OF THE AIRCRAFT - WITH 26 MONTHS ATTRIBUTED TO ACQUISITION OF MATERIALS AND EQUIPMENT AND 12 MONTHS NEEDED FOR IN-HOUSE PRIME CONTRACTOR MANUFACTURING ACTIONS. AT GENERAL DYNAMICS, INITIAL EFFORTS TO REDUCE LEAD TIME WERE DIRECTED TOWARD REDUCING IN-HOUSE LABOR AND SPAN TIMES. TODAY, WE HAVE EXPANDED THIS EFFORT TO INCLUDE SYSTEMS SUPPLIERS. THERE ARE TWO REASONS FOR THIS ACTION: (1) THE SYSTEMS HAVE THE GREATEST TIME SPAN IN THE PRODUCTION CYCLE AND (2) THEIR COST REPRESENTS 60% OF THE COST OF THE AIRCRAFT. TO BE EFFECTIVE, MODERNIZATION MUST ADDRESS BOTH LEAD TIME AND COST. WE ALL KNOW THAT WE CANNOT MODERNIZE "MATERIALS" BUT WE CAN MODERNIZE THE PRODUCTION OF THOSE MATERIALS AND THE SUBCOMPONENTS THAT HAVE SUCH A FAR-REACHING EFFECT ON END-ITEM PRODUCTION CAPABILITY.

DURING THE LAST EIGHT YEARS, WITH THE USAF PROVIDING TECHNOLOGY SEED MONEY AND GENERAL DYNAMICS ACQUIRING FACILITIES, THE CAPACITY TO PRODUCE HAS IMPROVED DRAMATICALLY AT THE FORT WORTH PLANT. THIS IMPROVEMENT HAS INCREASED THE CAPACITIES IN CERTAIN AREAS BY A MARGIN OF 4 TO 1 (SERIES OF VUGRAPHS). WE ARE ALSO EXPERIENCING SOME DRAMATIC GAINS BY OUR SUPPLIERS SINCE THE PROGRAM HAS BEEN EXTENDED TO THEM.

WITH THE INTRODUCTION OF THESE NEW FACILITIES, WE HAVE BEGUN TO CHANGE OUR WAY OF DOING BUSINESS. AS AN EXAMPLE, WE ARE NOW PLANNING A SYSTEM WHERE WE MAY GO DIRECTLY FROM THE ENGINEERING DATA BASE TO THE TOOL DESIGN DATA BASE AND STRAIGHT TO THE PRODUCTION TOOL, ELIMINATING THE NEED FOR TOOLING TOOLS. THIS PROCESS WILL REDUCE NEW PROGRAM DEVELOPMENTS BY 3½ MONTHS. THE ADVANCED MACHINING SYSTEM (AMS) IS OPERATING UNDER THIS CONCEPT, WHICH ALLOWS US TO GO FROM THE ENGINEERING DATA BASE DIRECTLY TO THE MACHINE TOOL.

THE MODERNIZATION PROGRAM ALSO IMPACTS ANOTHER KEY ELEMENT IN THE INDUSTRIAL BASE - PEOPLE. IT IS CHANGING THE ROLE OF THE WORKER. IN 1957, OUR FORT WORTH PLANT HAD 27,600 WORKERS; 72% OF THESE WERE BUILDING THE AIRPLANE (HANDS ON), WHILE 28% WERE OFFICE AND PROFESSIONAL EMPLOYEES. TODAY, THERE ARE 17,000 EMPLOYEES, AND ONLY 33% ARE HANDS-ON WITH 67% BEING OFFICE AND PROFESSIONAL EMPLOYEES. THIS TREND COULD BE FRIGHTENING IF WE THOUGHT THAT THE FACTORY SAVINGS WERE SPONSORING AN EVER-INCREASING OFFICE FORCE. NOT SO, WE HAVE A GROWING GROUP OF TECHNICIANS WHO ARE BUILDING THE AIRCRAFT WITH SOFTWARE AND NEW TECHNOLOGIES INSTEAD OF LIKE "ROSE THE RIVETER." I THINK THE REAL PROOF OF THE IMPACT OF THIS TECHNOLOGY ON OUR INDUSTRIAL BASE IS THAT, DURING THE 1957 TIME PERIOD,

27,000 PEOPLE WERE PRODUCING AN AVERAGE OF 2.7 POUNDS OF AIRFRAME PER EMPLOYEE. TODAY, OUR CURRENT GROUP OF 17,000 EMPLOYEES IS PRODUCING 10.8 POUNDS PER EMPLOYEE. WITH THE NEW TECHNOLOGIES NOW BEING ADDRESSED, WE CAN EXPECT THAT FIGURE TO BE 15.5 POUNDS BY 1990.

MODERNIZATION IS ALSO IMPACTING OTHER AREAS. USING THE SAME TIME BASE, I RESEARCHED THE TASK OF OUR ENGINEERING DEPARTMENTS. THE "MAGIC CHIP" IS ACTIVE THERE ALSO. IN 1957, 87% OF THE ENGINEERS WERE DIRECTLY INVOLVED IN DESIGN AND DEVELOPMENT OF THE AIRFRAME AND BASIC SYSTEMS. ONLY 13% WERE INVOLVED IN AVIONICS AND ELECTRONICS. TODAY, THAT NUMBER HAS RISEN SO THAT 47% ARE INVOLVED IN AVIONICS AND ELECTRONICS WITH 53% CONCERNED WITH TRUCK. ANOTHER INTERESTING FACET IS THAT, AS TECHNOLOGY GAINS SURFACE, A GREATER PERCENTAGE OF THE TOTAL PLANT POPULATION CONSISTS OF ENGINEERS - UP FROM 13% TO 23% TODAY. ANOTHER REVELATION IS THAT THIS CHANGE FROM AIRCRAFT BUILDER TO SYSTEMS INTEGRATOR REQUIRES NEW TYPE FACILITIES AND LABS. IT DOESN'T DO AWAY WITH THE OLD - JUST ADDS A NEW DIMENSION.

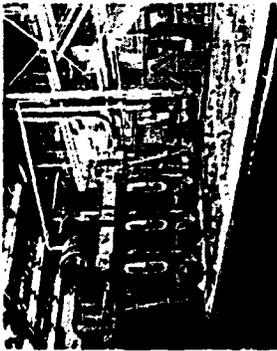
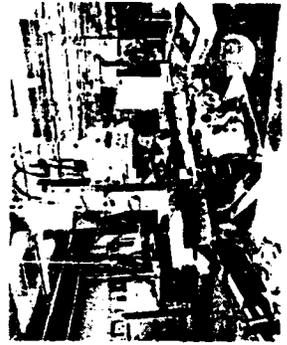
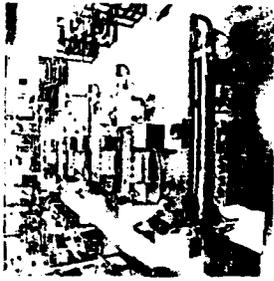
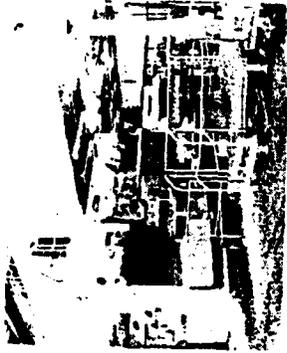
THE INITIAL MODERNIZATION PROGRAM WAS AIMED AT THE MANUFACTURING DISCIPLINES. HOWEVER, DURING THE PAST 2 TO 3 YEARS, GENERAL DYNAMICS HAS HAD AN AGGRESSIVE WHITE COLLAR PRODUCTIVITY PROGRAM. SOME OF THE PROGRAMS THAT ARE BEING ADDRESSED INCLUDE INVENTORY MANAGEMENT THROUGH MANUFACTURING RESOURCE PLANNING (MRP), MULTIPLE ACCESS STORAGE SYSTEM (MASS), AND COMPUTER AIDED RETRIEVAL AND DISTRIBUTION SYSTEM (CARDS). OUR GOAL IS TO DELIVER ENGINEERING DATA TO THE FACTORY, MAKING IT AVAILABLE ON DEMAND AS REQUIRED TO CRTs OR IN HARD COPY. USING THESE TOOLS PROVIDES AN ON-LINE MANAGEMENT INFORMATION SYSTEM NETWORK THAT WILL HAVE A FAR-

REACHING EFFECT ON BOTH THE WHITE COLLAR WORKER AND THE BLUE COLLAR WORKER.

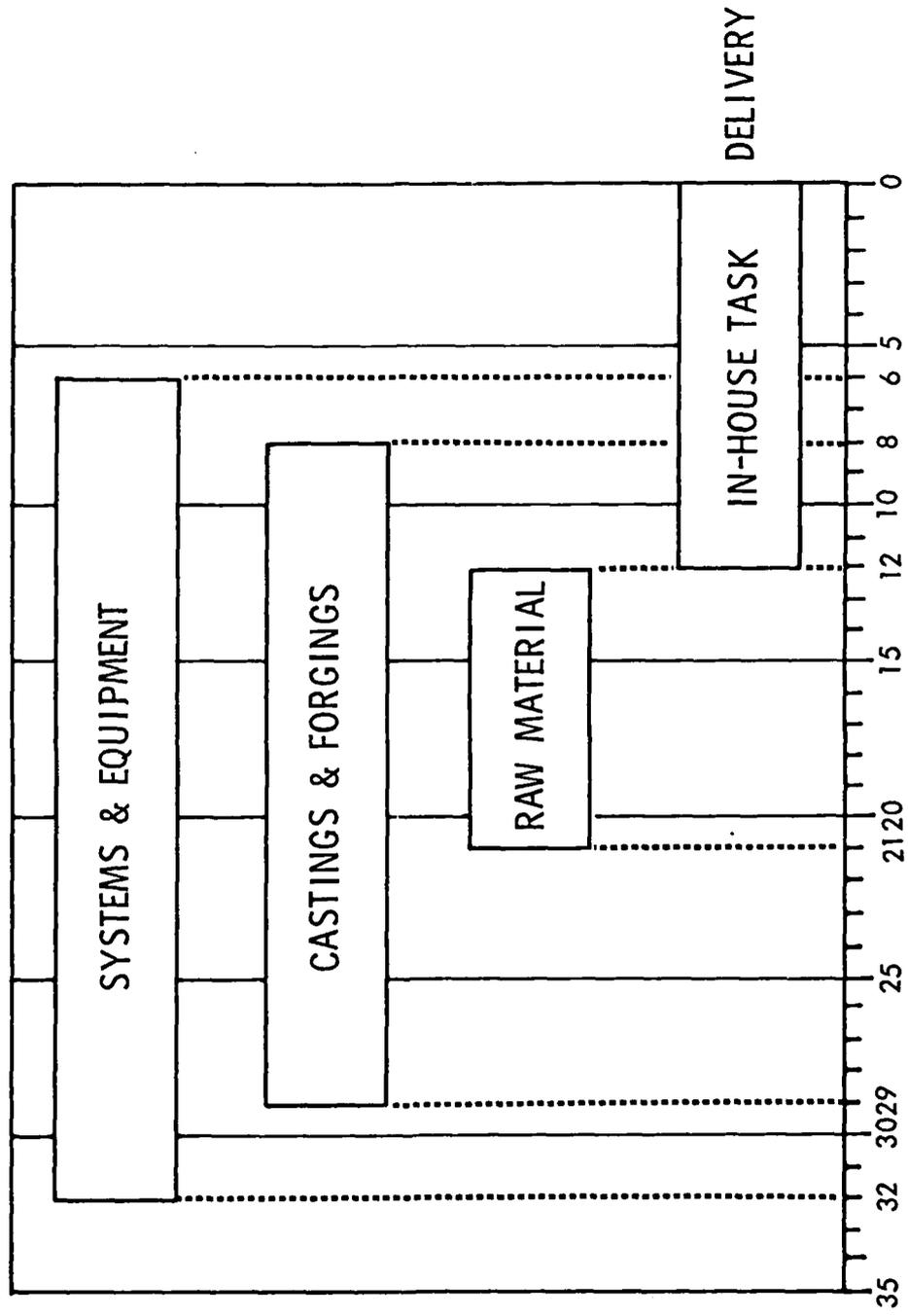
So, WHEN WE ADDRESS MODERNIZATION AND THE INDUSTRIAL BASE, ONE MUST CONCLUDE THAT MODERNIZATION HAS PROVIDED THE MEANS TO REDUCE LEAD TIMES, REDUCE COSTS, AND IMPROVE QUALITY AND INCREASE CAPACITY.

**MODERNIZATION
AND THE
INDUSTRIAL BASE**

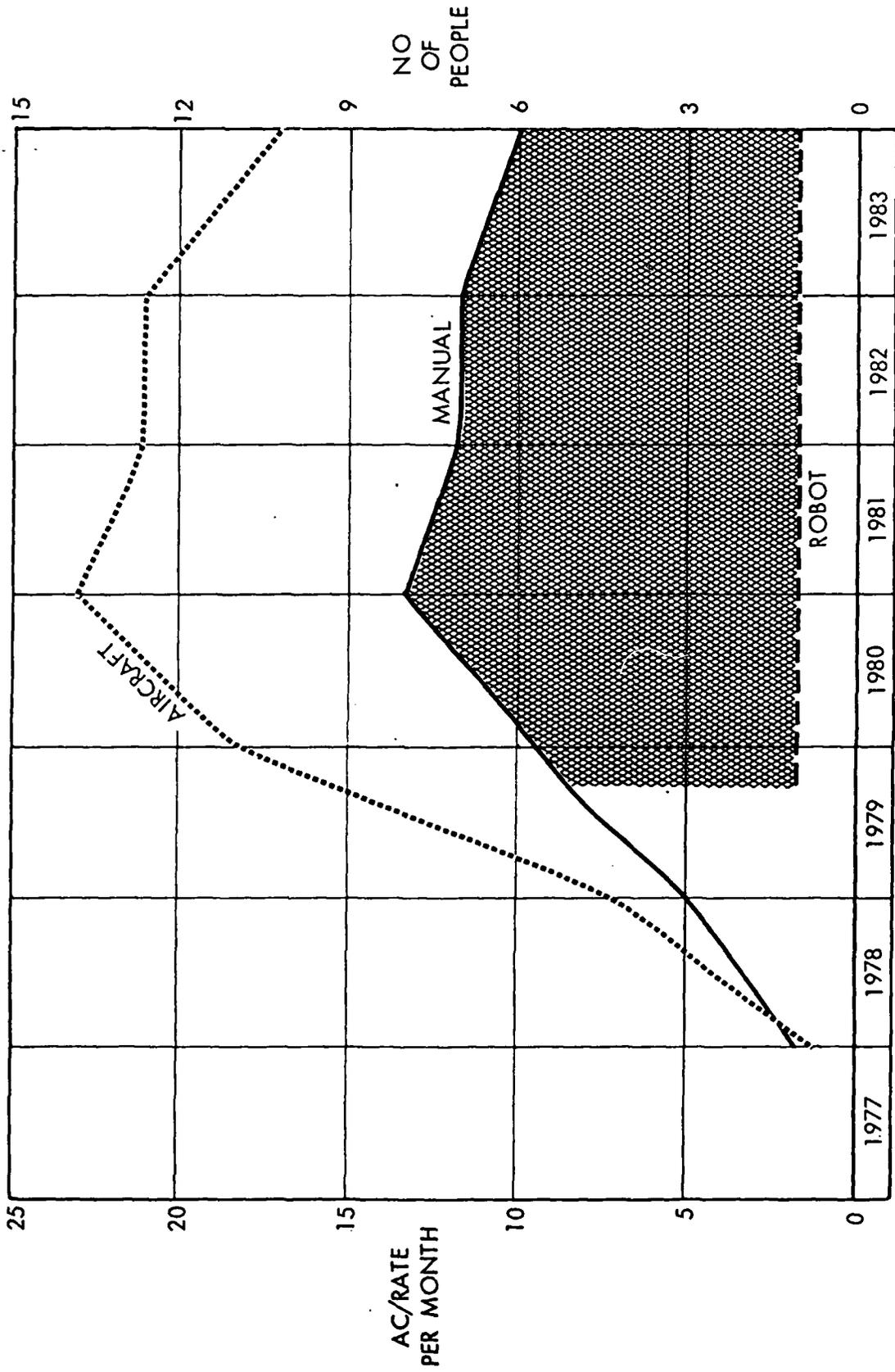
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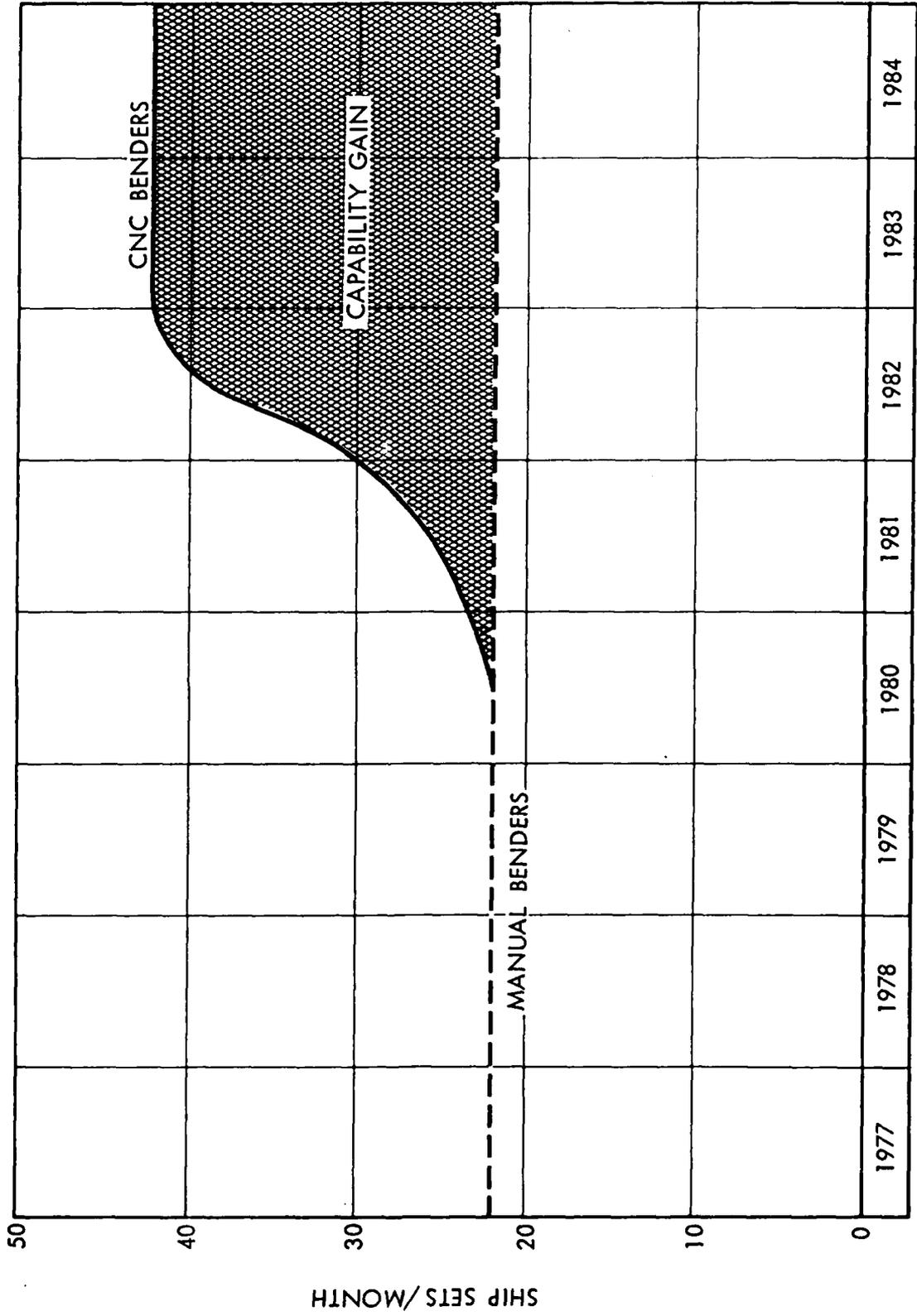
F-16 Production Lead Time



Vertical Fin Skin Robot Productivity Data

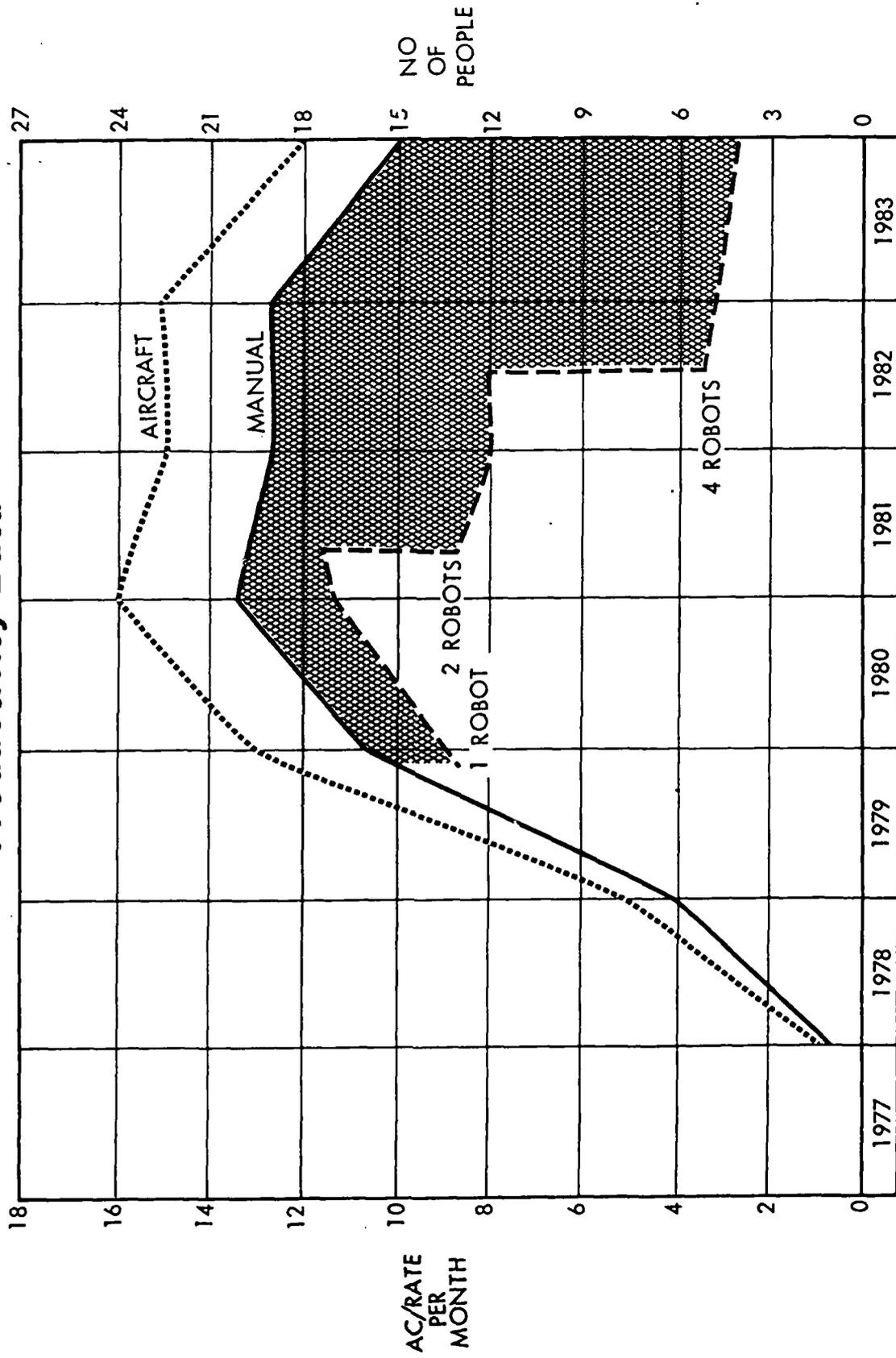


Tube Forming - Production Capability Gain

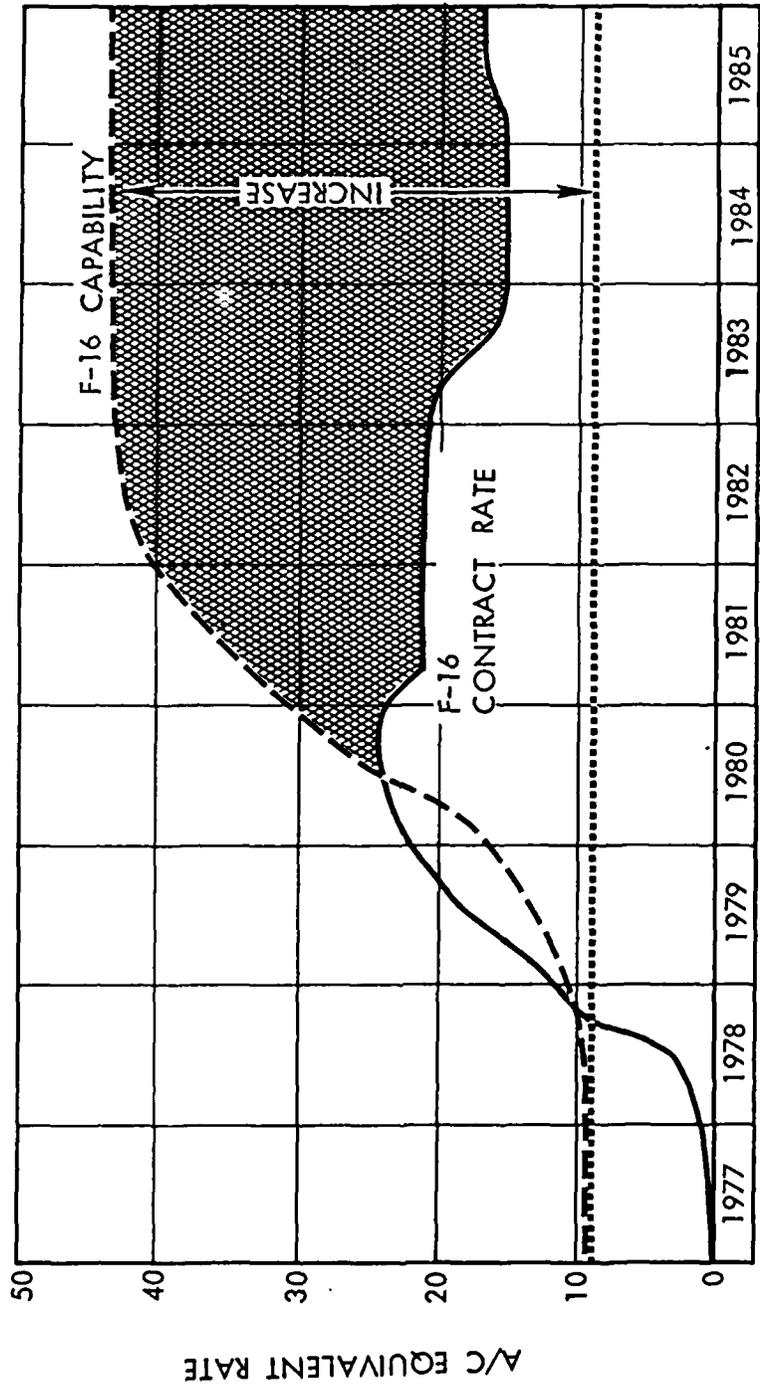


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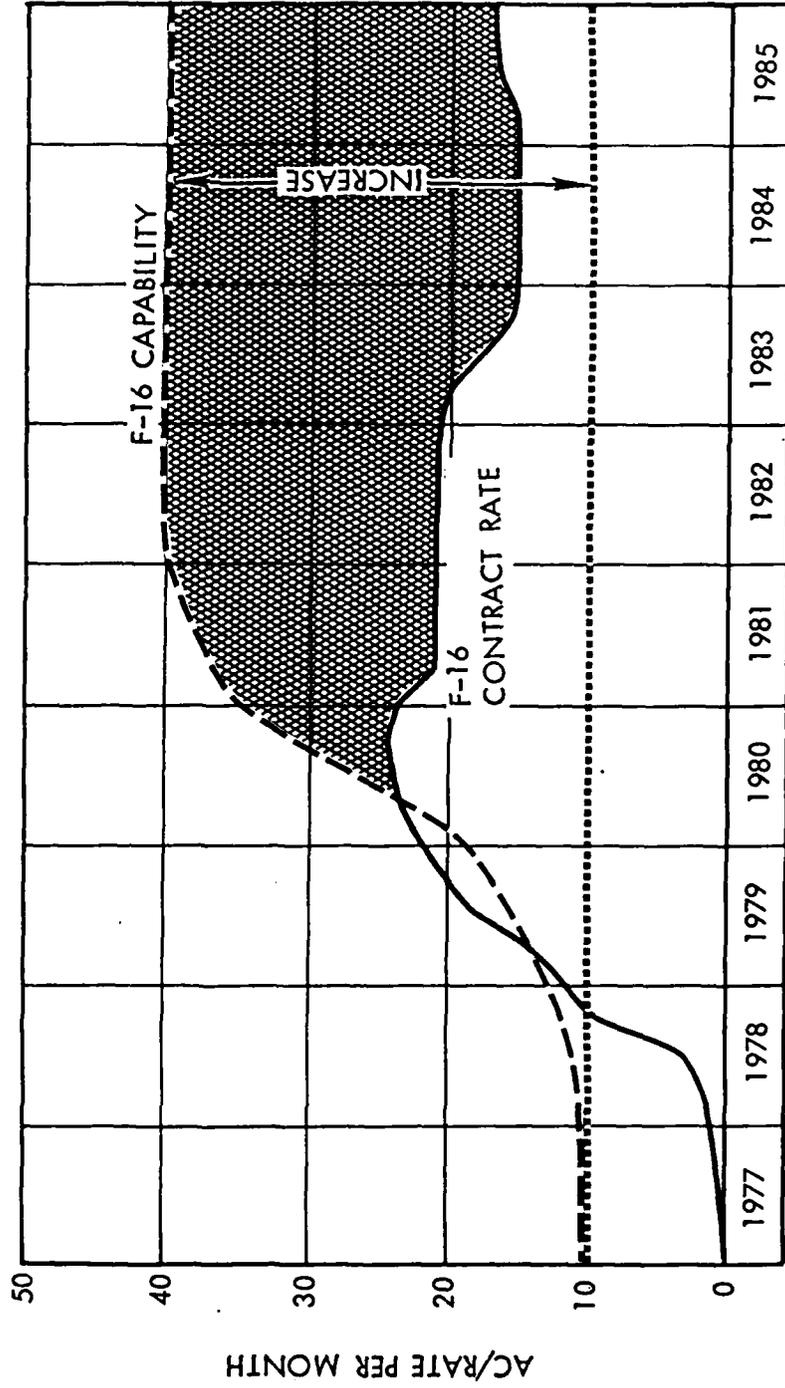
I/R Panel Robots Productivity Data



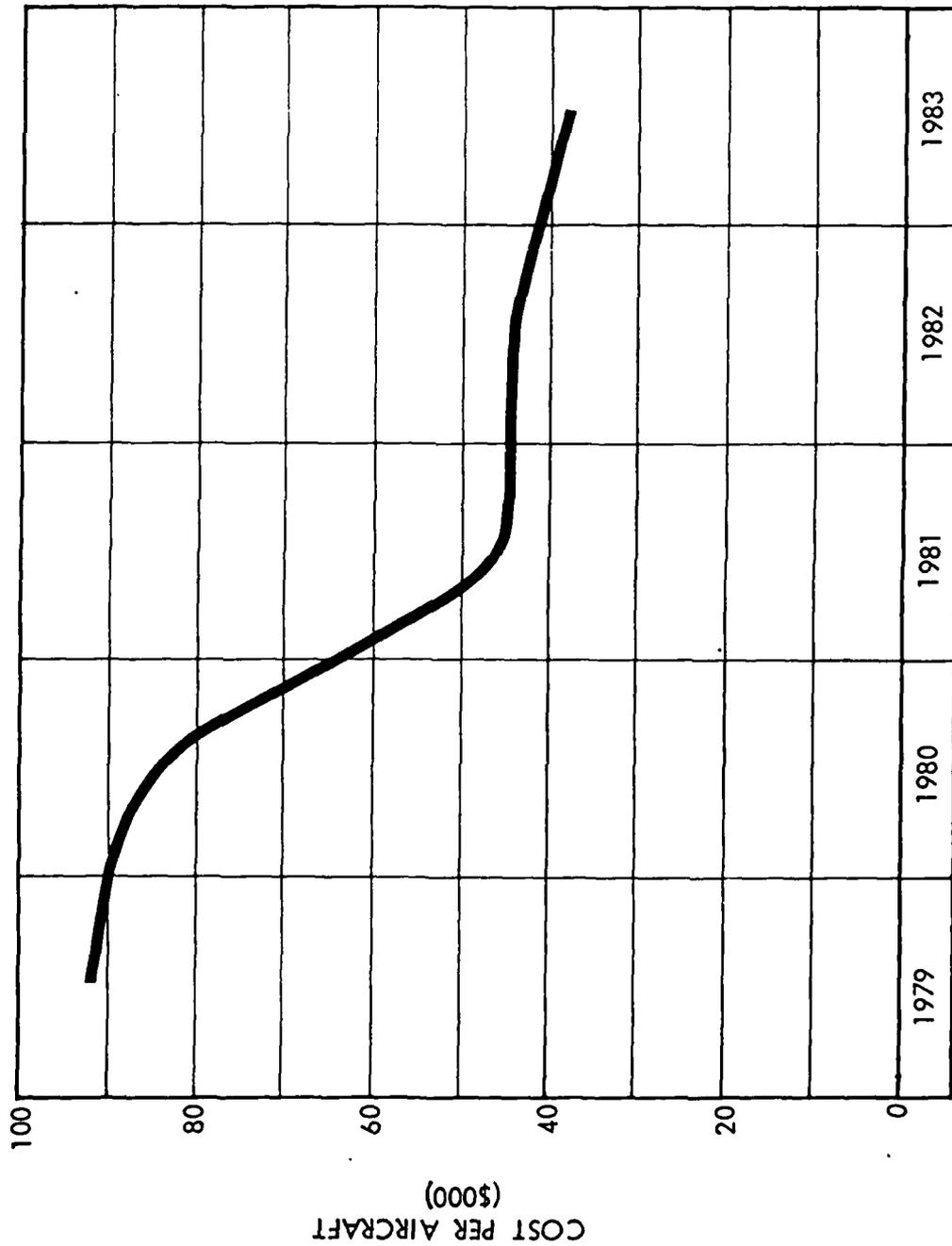
Sheet Metal Capability Analysis



N C Machine Shop Capability Analysis

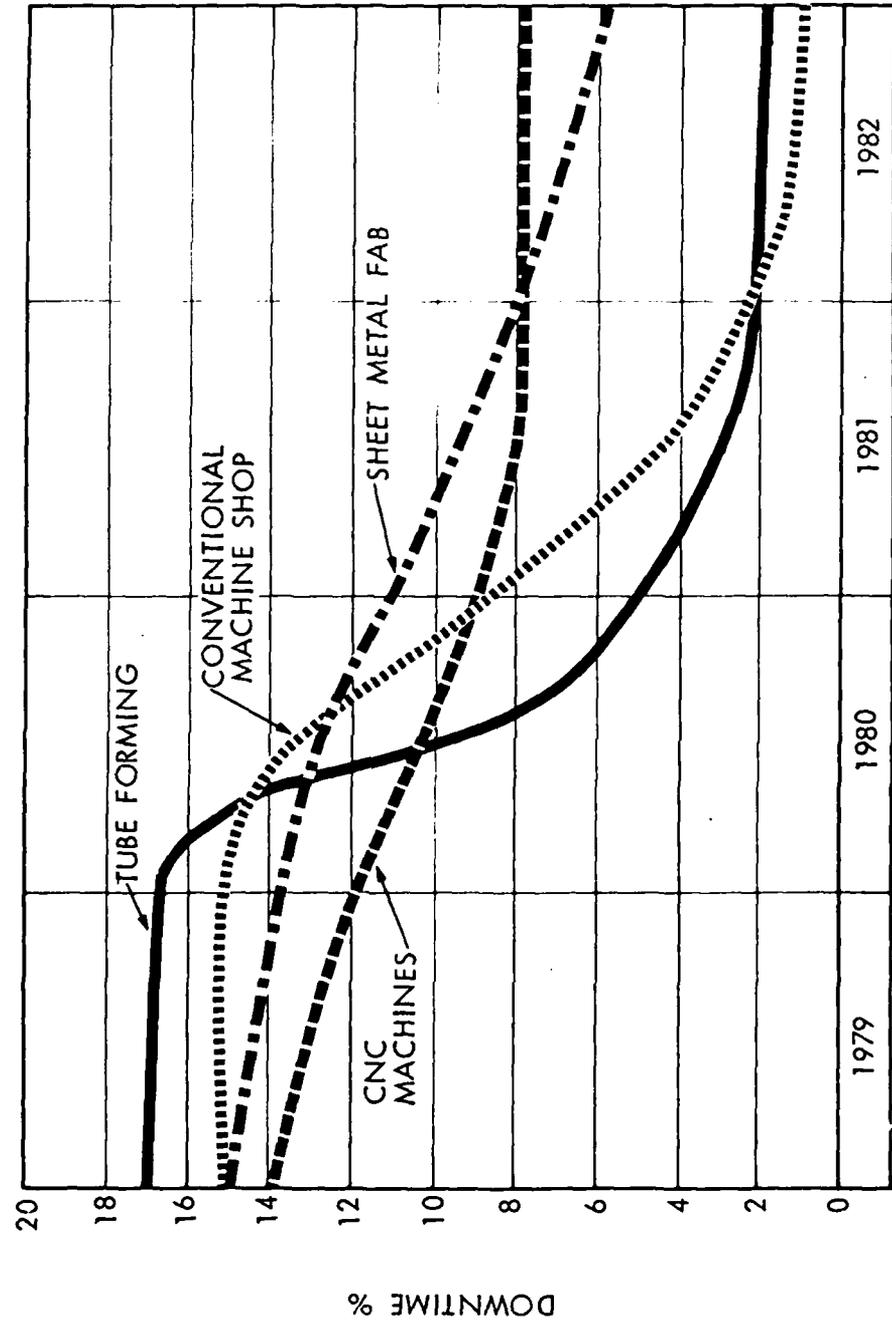


Scrap - Rework - Repair



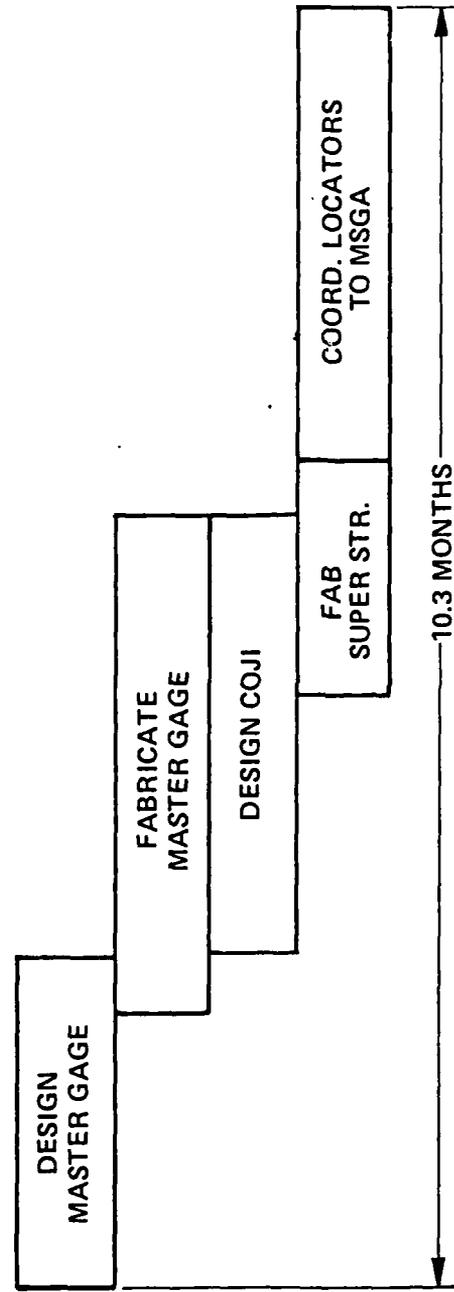
As technology is implemented - Quality improves - And capacity is made available for production - Therefore increases capability.

Capability Gains Thru Maintenance Improvements

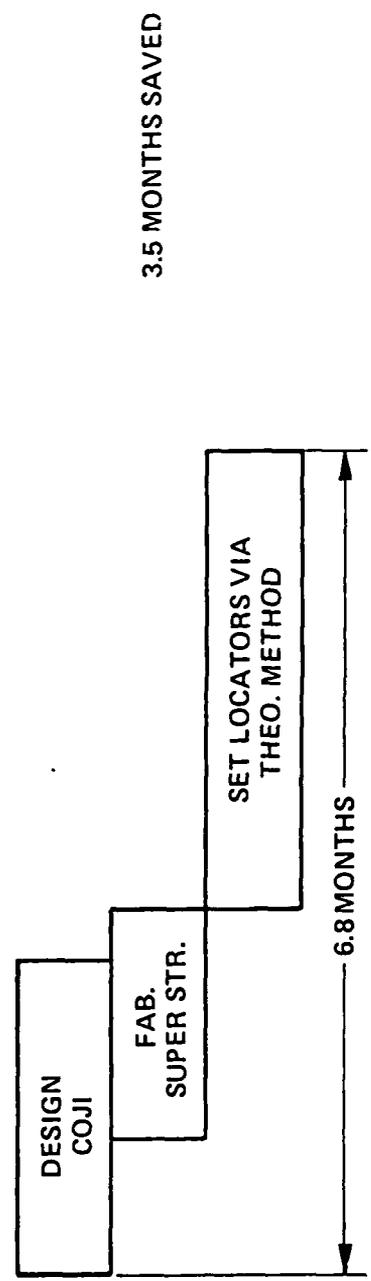


SCHEDULE IMPROVEMENT WILL BE POSSIBLE WHEN NEW TOOL TECHNOLOGY IS IMPLEMENTED

• PRESENT METHOD



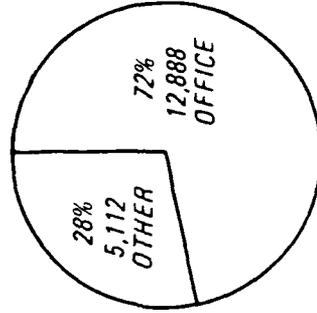
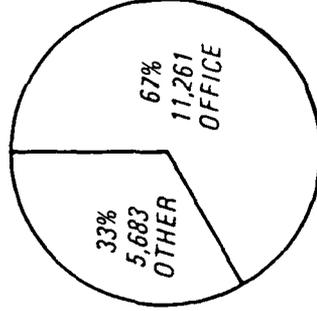
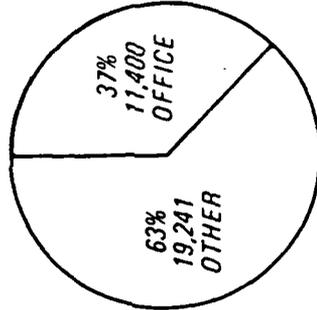
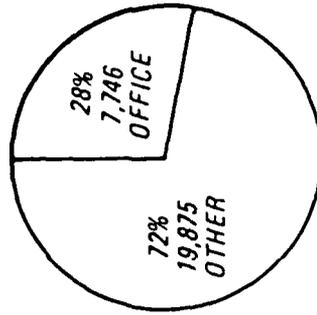
• NEW TECHNOLOGY



Changing Employee Roles

1957	1969	TODAY	1990
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DIVISION EMPLOYMENT	27,621	30,641	16,944	18,000
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PRIMARY PROGRAM	B-36 MODS B-58	F-111	F-16	F-16 DERIVATIVES
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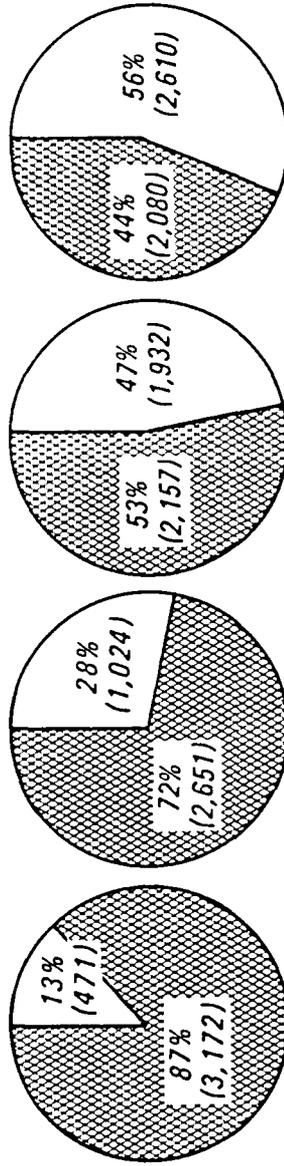
PRODUCTIVITY POUNDS OF AIRFRAME PRODUCED PER EMPLOYEE	2.7	7.6	10.8	15.5
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Engineering Tasks

	1957	1969	TODAY	1990
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DIVISION EMPLOYMENT 27,621 30,641 16,944 18,000

ENGINEERING EMPLOYEES % OF TOTAL 3,643 (13%) 3,675 (11%) 4,089 (23%) 4,690 (27%)



A/C DEV., DESIGN, & TEST

AVIONICS & ELECTRONICS

LABORATORY SPACE 232,972 SQ FT 435,789 SQ FT 545,416 SQ FT 647,916 SQ FT



A/C DEV., DESIGN, & TEST

AVIONICS & ELECTRONICS

PRINCIPAL PROGRAM B-58 F-111 F-16 F-16 DERIVATIVES

INDUSTRIAL PREPAREDNESS
A MOBILIZATION BASE PRODUCER'S PERSPECTIVE

Presented by:

Donald Bailey
Flinchbaugh Division
General Defense Corporation

3/10/84

(SLIDE 1) GOOD AFTERNOON LADIES AND GENTLEMEN

INDUSTRIAL PREPAREDNESS
A MOBILIZATION BASE PRODUCER'S PERSPECTIVE

(SLIDE 2) TODAY I WOULD LIKE TO REVIEW FOR YOU HOW INDUSTRIAL PREPAREDNESS HAS WORKED FOR THE FLINCHBAUGH DIVISION OF GENERAL DEFENSE CORPORATION, I.E., OUR PERSPECTIVE ON INDUSTRIAL PREPAREDNESS. TEN YEARS AGO THE COMMANDING GENERAL OF FT. KNOX CAME THRU OUR PLANT IN RED LION, PENNSYLVANIA, AND LATER WAS QUOTED AS HAVING SAID AT AN AMMUNITION CONFERENCE (SLIDE 3) - "OUR WORLD IS IN A PRETTY SORRY STATE WHEN OUR DEFENSE RELIES UPON A QUAIN T LITTLE COMPANY IN THE HILLS OF PENNSYLVANIA WHERE WOMEN IN TENNIS SHOES MAKE OUR TANK AMMUNITION." HE WAS TALKING ABOUT INDUSTRIAL PREPAREDNESS. AS I SAID, THAT WAS 10 YEARS AGO. IF HE VISITED OUR FACILITIES TODAY, I FEEL CONFIDENT HE WOULD BE IMPRESSED AND FEEL A LOT BETTER ABOUT WHAT HE SAW. (SLIDE 4) - THIS OUTLINE BRIEFLY SUMMARIZES MY TALK. KEEP IN MIND, IT IS FROM OUR PERSPECTIVE. WHAT IS A MOBASE PRODUCER? WHAT IS A FLINCHBAUGH? HOW DID WE GET MOBASED? HOW CAN MOBASE BE IMPROVED?

(SLIDE 5) - WE SUPPORT THIS PREMISE. "WE BELIEVE IT MAKES SENSE FOR THE UNITED STATES GOVERNMENT TO HAVE AVAILABLE MODERN, EFFICIENT FACTORIES IMPORTANT TO THE DEFENSE OF THE US AND HER ALLIES."

(SLIDE 6) - WHAT IS A MOBASE PRODUCER? A MOBASE PRODUCER IS A FIRM THAT HAS AGREED TO PROVIDE ITS FACILITIES, AND THOSE FURNISHED IT BY THE GOVERNMENT IN SUPPORT OF A NATIONAL EMERGENCY. "MOBASE" IS A WORD USED TO MEAN INDUSTRIAL PREPAREDNESS PLANNING, COMMONLY CALLED MOBILIZATION BASE, OR SHORTENED TO MOBASE.

WHAT IS OUR CONTRACTUAL REQUIREMENT UNDER MOBASE? NONE--WE AND THE GOVERNMENT SIGN A GENTLEMEN'S AGREEMENT, A DD FORM 1519, WHEREBY WE STIPULATE WHAT PORTION OF THE NATIONAL EMERGENCY REQUIREMENT WE ARE PREPARED TO MEET. THE GOVERNMENT GIVES NO CONSIDERATION FOR THE CONTRACTOR'S COMMITMENT.

ALTHOUGH WE DON'T HAVE A CONTRACTUAL REQUIREMENT TO MAINTAIN CAPACITY, WE DO HAVE A LEGAL REQUIREMENT TO MAINTAIN THE GOVERNMENT EQUIPMENT. OUR FACILITIES CONTRACT CONTAINS A GOVERNMENT PROPERTY CLAUSE WHICH REQUIRES US TO NEGOTIATE AN EQUIPMENT MAINTENANCE AGREEMENT. THE GOVERNMENT INSPECTS THE PROPERTY AT LEAST ONCE A YEAR AND WE HAVE FOUND THEM TO BE VERY SYSTEMATIC AND THOROUGH. THEY ARE FUSSY AND RIGHTFULLY SO.

(SLIDE 7) WITH UP-TO-DATE, WELL-MAINTAINED EQUIPMENT, MOBILIZATION BASE PRODUCERS CAN KEEP THE COST OF MANUFACTURING DEFENSE PRODUCTS DOWN THROUGH IMPROVED EQUIPMENT EFFICIENCIES, LESS MACHINE DOWNTIME, LOWER ENERGY COSTS AND LOWER MANPOWER REQUIREMENTS.

MODERN PRECISION EQUIPMENT ENABLES MOBILIZATION BASE PRODUCERS TO CONSISTENTLY ACHIEVE THE CLOSE TOLERANCES REQUIRED FOR PRODUCTS SUCH AS AMMUNITION.

WITH APPROPRIATE EQUIPMENT, MOBILIZATION BASE PRODUCERS CAN RAPIDLY INCREASE THEIR PRODUCTION LEVELS TO MEET THE COUNTRY'S NEEDS DURING NATIONAL EMERGENCIES.

(SLIDE 8) TO BETTER UNDERSTAND OUR PERSPECTIVE, I WOULD LIKE TO BRIEFLY TELL YOU A LITTLE BIT ABOUT OUR COMPANY. WHAT IS A FLINCHBAUGH? SOME OF THE EARLY ANNOUNCEMENTS ON THIS CONFERENCE SAID WE ARE A DIVISION OF GENERAL DYNAMICS. NOT QUITE--THEY MAKE THE M1 TANK AND WE MAKE AMMUNITION FOR IT. OUR SIZE DIFFERENCE PROBABLY VERY CLOSELY PARALLELS THAT RELATIONSHIP BETWEEN THE TANK AND ITS AMMUNITION. (SLIDE 9)

- WE ARE A DIVISION OF GENERAL DEFENSE CORPORATION, A PUBLIC

COMPANY HEADQUARTERED IN HUNT VALLEY, MARYLAND. GDC HAS AN ABA SUBSIDIARY IN PINELLAS PARK, FLORIDA THAT ALSO DOES DEFENSE CONTRACTING.

(SLIDE 10) THE FLINCHBAUGH DIVISION HAS BEEN ENGAGED IN ORDNANCE PRODUCTION SINCE ITS INCEPTION IN 1953. WE HAVE A PRODUCT DEVELOPMENT CENTER WITH 50 EMPLOYEES IN WHARTON, NEW JERSEY, JUST OUTSIDE PICATINNY ARSENAL. OUR PRIMARY MANUFACTURING OPERATIONS AND OFFICES, WITH 750 EMPLOYEES, ARE LOCATED IN SOUTH CENTRAL PENNSYLVANIA, JUST SOUTH OF HARRISBURG AND YORK, AND 50 MILES NORTH OF BALTIMORE, MARYLAND.

OUR 280,000 SQUARE FOOT RED LION OPERATION IS WHERE WE RUN OUR PRODUCTION CONTRACTS FOR THE US ARMY AND OVERSEAS CUSTOMERS. WE SPECIALIZE IN AMMUNITION DESIGN AND MASS PRODUCTION OF KINETIC ENERGY PROJECTILES AND MOTOR BODIES FOR ROCKET-ASSISTED ARTILLERY SHELLS. WE ALSO SELL COMPLETELY LOADED ROUNDS TO FRIENDLY OFFSHORE COUNTRIES UTILIZING GOCO FACILITIES RUN BY D&Z, HERCULES, MARTIN MARIETTA AND ICI.

(SLIDE 11) I HAVE A FEW SLIDES OF OUR OPERATIONS THAT I WILL QUICKLY RUN THROUGH. OUR WHARTON, NEW JERSEY PRODUCT DEVELOPMENT CENTER. (SLIDE 12) THIS IS AN AIR VIEW OF OUR RED LION FACILITIES; (SLIDE 13) A NEW BUILDING WE MOVED INTO TWO YEARS AGO; (SLIDE 14) OUR GROUND BREAKING IN JANUARY OF THIS YEAR FOR ANOTHER BUILDING; WE ARE VERY PROUD OF OUR NEW RED LION HOME OFFICE AND WOULD LIKE TO SHOW THAT TO YOU (SLIDE 15). WHOOPS, HOW DID THAT GET IN THERE? JUST WANTED TO SEE IF YOU WERE STILL AWAKE. GETTING SERIOUS AGAIN. (SLIDE 16) A NEW HEAT TREAT FACILITY INSTALLED LAST YEAR WITH GOVERNMENT FUNDS. MOTOR BODY PARTS EXITING THE QUENCHING AREA OF THE HEAT TREAT SYSTEM (SLIDES 17, 18, 19 & 20). (SLIDE 21) A MOTOR BODY BEING FORGED. NOTE THE ROBOTS FEEDING AND REMOVING PARTS. (SLIDE 22) CLOSE UP OF ROBOT REMOVING MOTOR BODY; (SLIDE 23) FINISHING LINE; (SLIDE 24) - THIS IS A TYPICAL PRODUCTION LINE. WE CURRENTLY HAVE 40 CNC MACHINES AND ARE IN THE PROCESS OF ACQUIRING 40 MORE.

(SLIDE 25) WE HAVE BEEN FUNDED BY AMCCOM AND ITS PREDECESSORS ON SEVERAL FACILITIZATION PROGRAMS. THIS LIST REPRESENTS THE LAST EIGHT YEARS. CURRENTLY WE HAVE 260 PIECES OF GOVERNMENT EQUIPMENT IN OUR FACILITIES WITH A REPLACEMENT VALUE OF \$23 MILLION AND ARE HEADED TO OVER \$50 MILLION. THE BOTTOM TWO PROGRAMS ON THIS LIST WERE AWARDED LAST YEAR AND ARE NOT INCLUDED IN THE 260 PIECES OF GOVERNMENT EQUIPMENT NOW ON HAND.

(SLIDE 26) - WHILE THE GOVERNMENT HAS BEEN FUNDING THESE FACILITIZATION PROGRAMS, GENERAL DEFENSE CORPORATION HAS CONTINUED TO BUY EQUIPMENT WITH COMPANY FUNDS TO MAKE US MORE EFFICIENT. THIS INCLUDES THOSE ROBOTS I SHOWED YOU EARLIER. WE ALSO FUNDED A COMPLETE LINE OF EQUIPMENT TO MAKE M650 MOTOR BODIES. IN THE LAST THREE YEARS WE HAVE FUNDED TWO NEW BUILDINGS AND SOLD OFF A PROFITABLE BUSINESS TO GENERATE FLOOR SPACE. MILLIONS OF DOLLARS OF COMPANY FUNDS WERE COMMITTED FOR FLOOR SPACE AND HUMAN RESOURCES PRIOR TO ANY CONTRACT AWARDS. IT IS A RISK.

HERE ARE SOME OF THE PRODUCTS WE ARE MOBASED ON.

(SLIDE 27) - M737 WHICH IS THE US ARMY'S 105MM TRAINING ROUND FOR TANKS.

(SLIDE 28) - M549 - A 155MM FORGED MOTOR BODY FOR ARTILLERY AMMO.

(SLIDE 29) - M650 - ANOTHER FORGED MOTOR BODY FOR ARTILLERY-
- THIS TIME 203MM.

(SLIDE 30) - M735 - A 105MM FIN STABILIZED KINETIC ENERGY TANK ROUND.

(SLIDE 31) - M774 - A 105MM FIN STABILIZED KINETIC ENERGY TANK ROUND AND IT SUPERSEDED THE M735.

(SLIDE 32) - M833 - ANOTHER 105MM FIN STABILIZED KINETIC ENERGY TANK ROUND. WE HAVE ONLY BEEN IN PRODUCTION ON M833 A FEW MONTHS. IT IS AN IMPROVED ROUND OVER THE M735 AND M774 AND WE HELPED TO DEVELOP IT.

WE WILL SOON BE MOBSED ON THESE 120MM PRODUCTS. (SLIDE 33) THE 829 AND (SLIDE 34) THE CASE BASE.

(SLIDE 35) - HOW DID WE BECOME A MOBASE PRODUCER? IT HAS HAPPENED IN A VARIETY OF WAYS.

(SLIDE 36) IN THE EARLY 70'S, WE WERE REQUESTED BY ROCK ISLAND ARSENAL TO ACCEPT MOBASE AGREEMENTS FOR SEVERAL ITEMS WE HAD PRODUCED IN THE PAST. WE AGREED, AND THAT'S HOW WE GOT STARTED. OVER THE YEARS, THE GOVERNMENT FACILITIZATION PROCESS HAS CHANGED FROM A DECENTRALIZED SYSTEM TO TODAY'S HIGHLY CENTRALIZED AND THOROUGHLY COORDINATED OPERATION. THE GOVERNMENT RECOGNIZED THE NEED TO EXERCISE GREATER CONTROL OVER ITS FACILITIZATION PROGRAMS AND THAT HAS PROVEN TO BE A GOOD DECISION.

(SLIDE 37) - LET'S LOOK AT OUR EVOLUTIONARY EXPERIENCE. AS SUCCESSOR ROUNDS HAVE BEEN DEVELOPED, OUR FACILITIES HAVE KEPT PACE. WE HAVE BEEN AWARDED CONTRACTS TO UPGRADE OUR EQUIPMENT TO MAKE THESE NEW ROUNDS.

M735 WAS THE FIRST FIN STABILIZED KINETIC ENERGY ROUND AND WE WERE FACILITIZED TO MAKE IT EIGHT YEARS AGO. WE WERE AWARDED A COST REIMBURSEMENT CONTRACT WITH MINIMAL GOVERNMENT REVIEW REGARDING EQUIPMENT SELECTION.

ONCE WE HAD THE BASIC M735 KINETIC ENERGY LINE IN PLACE, IT WAS LOGICAL FOR THE US ARMY TO AWARD US A FACILITIZATION CONTRACT FOR THE M774 WHICH REPLACED THE M735. MUCH OF THE EQUIPMENT IS COMMON TO BOTH PRODUCTS AND DURING THE TRANSITION PERIOD, THE GOVERNMENT PURCHASED BOTH PRODUCTS. AGAIN, AS A SELECTED SOURCE, WE WERE GIVEN A COST REIMBURSEMENT CONTRACT AND WERE DIRECTED TO PROCEED. ON THE M774, A FORMAL LINE PROVEOUT PROCESS WAS ADDED PRIOR TO GOVERNMENT ACCEPTANCE OF THE M774 LINE, AND THIS HAS PROVEN TO BE A VERY BENEFICIAL REQUIREMENT.

OUR FACILITIZATION FOR THE CURRENT GENERATION KE ROUND, THE M833, WAS MARKED BY TIGHTER CONTROLS--TO THE POINT OF APPROVAL AT ALL STAGES INCLUDING REVIEWS OF OUR EQUIPMENT SOLICITATIONS PLUS PRIOR APPROVAL OF EVERYTHING PURCHASED.

WE HAVE FOUND THAT WE CAN LIVE WITHIN THE GOVERNMENT'S SYSTEM AND THAT THE SYSTEM DOES WORK VERY WELL. THE TIGHTER CONTROLS SLOW US DOWN A LITTLE, BUT I DON'T FEEL THE SYSTEM IS OVERLY BUREAUCRATIC BY ANY MEANS. DURING THE REVIEW PROCESS, THE GOVERNMENT ENGINEERS ARE AN ASSET, AND WE GET SOME GOOD SUGGESTIONS FROM THEM. THEY HAVE WORKED VERY HARD TO SUPPORT US. HOWEVER, IF ADDITIONAL CONTROLS CONTINUE TO BE ADDED AT THE RATE EXPERIENCED IN THE LAST EIGHT YEARS, WE WILL BE IN REAL TROUBLE EIGHT YEARS FROM NOW. THAT IS A CAUTION, NOT A CRITICISM BECAUSE IT IS NOT A PROBLEM TODAY.

OUR MOST RECENT SELECTED SOURCE FACILITIZATION PROGRAM IS OUR CURRENT \$19.5 MILLION EFFORT TO EQUIP AN INTEGRATED KE PRODUCTION FACILITY CAPABLE OF PRODUCING BOTH 105 AND 120MM AMMUNITION. BOTH THE GOVERNMENT AND THE CONTRACTOR HAVE BENEFITED FROM THE SELECTED SOURCE APPROACH, CAPITALIZING ON THE CONTRACTOR'S EXPERIENCE AND EXISTING EQUIPMENT. THE GOVERNMENT HAS FACILITIZED MORE THAN ONE CONTRACTOR SO THERE IS COMPETITION FOR THE PRODUCTION CONTRACTS.

FOR US, THESE EVOLUTIONARY FACILITIZATIONS HAVE HELPED MAINTAIN CONTINUITY OF OUR SKILLED LABOR BASE AND ALSO HELPED US TO FACILITIZE, WITH STATE DEPARTMENT APPROVAL, FRIENDLY OFFSHORE NATIONS.

(SLIDE 38) - WE RECENTLY FACILITIZED OURSELVES ON THE 8" M650 ROCKET MOTOR BODY--AT NO COST TO THE GOVERNMENT.

WE WERE ABLE TO DO THIS EFFICIENTLY BECAUSE OF OUR EXPERIENCE IN PRODUCING A SIMILAR ROUND, THE M549 MOTOR BODY, WHICH REQUIRES SIMILAR SPECIALIZED TECHNOLOGY. OUR EXPERIENCE AS A SELECTED SOURCE ON OTHER FACILITIZATION EFFORTS WAS ALSO VERY USEFUL.

(SLIDE 39) - THE 120MM CASE BASE FACILITIZATION CONTRACT WAS AWARDED DIFFERENTLY. FLINCHBAUGH AND ANOTHER VENDOR PRODUCED THE PRODUCT THRU ITS DEVELOPMENT STAGE. IT SEEMED AS THOUGH EVERYONE WANTED THE CASE BASE FACILITIZATION CONTRACT. THE GOVERNMENT DECIDED TO GO COMPETITIVE AND MAKE TWO AWARDS BASED ON MANAGEMENT, TECHNICAL, AND COST. OVER 50 COMPANIES REQUESTED THE SOLICITATION PACKAGE. ELEVEN CONTRACTORS BID ON THE PROGRAM AND FORTUNATELY FOR US, WE WERE ONE OF THE TWO WINNERS. WE GOT A CONTRACT FOR \$10.2 MILLION.

(SLIDE 40) - HOW CAN THE MOBASE SYSTEM BE IMPROVED? FIRST LET'S ASK, DOES IT NEED IMPROVED? A GENERAL ACCOUNTING OFFICE REPORT TO THE US ARMY IN FEBRUARY 1983, STATED THAT THE PRODUCTION BASE CANNOT MEET MOBILIZATION REQUIREMENTS FOR APPROXIMATELY 34% OF THE CRITICAL AMMUNITION END ITEMS. IN ADDITION, 27% OF THE TOTAL HAS A MOBASE CAPACITY SHORTFALL OF 75% OR MORE. LET'S THINK ABOUT THAT. THE GAO A YEAR AGO SAID THE PRODUCTION BASE CAN'T MEET MOBASE REQUIREMENTS ON 34% OF CRITICAL AMMO. IN ADDITION, 27% OF THE TOTAL ARE SHORT BY 75%. PITY US IF WE GET IN A WAR AND NEED THOSE ITEMS.

(SLIDE 41) WHAT CAN WE DO TO IMPROVE THE MOBILIZATION BASE? AGAIN, FROM OUR PERSPECTIVE, AND THIS CERTAINLY ISN'T ALL INCLUSIVE.

LET'S START WITH IMIP. INDUSTRIAL MODERNIZATION INCENTIVE PROGRAM. WE WERE VERY EXCITED WHEN WE FIRST HEARD ABOUT THIS PROGRAM. HOWEVER, PRIOR TO COMING HERE THIS WEEK, WE HAVE TALKED TO MANY GOVERNMENT EMPLOYEES ON IMIP AND, FRANKLY, WE ARE ^{somewhat} CONFUSED AND DISCOURAGED. WE ARE VERY INTERESTED IN IMIP, BUT ARE TAKING A "WAIT-AND-SEE" ATTITUDE UNTIL WE GET MORE KNOWLEDGE AND CONFIDENCE IN IT. I AM LOOKING FORWARD TO TOMORROW'S SESSIONS ON IMIP.

(SLIDE 42) NEXT--MULTI-YEAR. ANOTHER PROGRAM WITH POTENTIAL. LONGER CONTRACTS, MORE EFFICIENCIES, LOWER COSTS. IT'S UNFORTUNATE THERE AREN'T MORE MULTI-YEAR PROGRAMS AROUND TO ENCOURAGE PRIVATE INVESTMENT IN THE MOBILIZATION BASE.

(SLIDE 43) PAPERWORK. THIS IS MORE OF A CONCERN FOR FUTURE FACILITIZATION CONTRACTS. THE SYSTEM TODAY WORKS FINE; BUT, I MENTIONED EARLIER IF THE GOVERNMENT KEEPS ADDING MORE PAPERWORK TO THE FACILITIZATION PROCESS, THERE WILL BE A PROBLEM. YOU WON'T BE ABLE TO GET THERE FROM HERE. EXCESSIVE COMMUNICATIONS CAN CAUSE INCORRECT COMMUNICATIONS. WE DON'T WANT THIS PROBLEM. (SLIDE 44) -----PAUSE-----

(SLIDE 45) SELF FACILITIZATION. THERE IS A TIME AND PLACE FOR SELF FACILITIZATION, BUT THE SITUATION MUST BE CLOSELY EVALUATED BECAUSE WHEN THERE IS A LULL IN BUSINESS, WILL THE CONTRACTOR BE WILLING TO MAINTAIN THE MOBASE?

(SLIDE 46) TIMELY SOLICITATIONS. THIS HAS BECOME A VERY SERIOUS PROBLEM WITH US. PRACTICALLY ALL OF MY TALK TODAY CONCENTRATED ON EQUIPMENT AND FACILITIES, BUT AN IMPORTANT

PART OF INDUSTRIAL PREPAREDNESS PLANNING IS MATERIAL AND HUMAN RESOURCE PLANNING. TOO MANY SOLICITATIONS WE GET NOW ARE LATE AND THE PROBLEM IS GETTING WORSE. THE CONTRACTOR HAS A CHOICE. EITHER LAY OFF OUR SKILLED LABOR BASE AND SHUT THE LINE DOWN BETWEEN CONTRACTS, OR BUY MATERIALS IN ADVANCE AND MAKE PARTS ON THE ASSUMPTION YOU WILL WIN THE NEXT CONTRACT. THIS IS DANGEROUS. IF WE SHUT DOWN, THIS COSTS THE CONTRACTOR MONEY, WHO IN TURN MUST PASS THE COSTS ALONG TO THE GOVERNMENT. IT ALSO SHUTS DOWN THE MOBASE IF YOU ARE FORCED TO LAY OFF DUE TO LATE AWARDS.

(SLIDE 47) LEADER/FOLLOWER - WITH THE ACKNOWLEDGED MOBASE SHORTAGE, ICAP, THE INDUSTRIAL COMMITTEE OF AMMUNITION PRODUCERS, HAS MADE A SUGGESTION ON HOW TO IMPROVE THE READINESS OF THE BASE. UNDER THIS PARTICULAR PROPOSAL, THE ACTIVE BASE WOULD BE THE LEADERS AND THE FOLLOWERS WOULD COME FROM THE INACTIVE BASE. AN ACTIVE BASE PRODUCER WOULD BE ASSIGNED TO WORK WITH AN INACTIVE PRODUCER TO ASSURE THAT PRODUCT INFORMATION IS KEPT CURRENT; PROCESS IMPROVEMENTS ARE MADE AVAILABLE; A PLAN DEVELOPED FOR TOOLING SUPPLY; A START-UP PLAN DEVELOPED UTILIZING ACTIVE BASE SKILLED EMPLOYEES FOR PERSONNEL TRAINING, TROUBLE SHOOTING, ETC. ICAP READILY ACKNOWLEDGES THERE ARE PROBLEMS TO BE WORKED OUT WITH THEIR LEADER/FOLLOWER PROPOSAL, BUT IT IS CONCEIVABLE IT COULD HELP TO SOLVE SOME OF THE MOBASE SHORTAGE.

(SLIDE 48) DIPEC. AS YOU PROBABLY KNOW, THE GOVERNMENT HAS A DEFENSE INDUSTRIAL PLANT EQUIPMENT CENTER, DIPEC, WHO CONTROL MOST OF THE PLANT EQUIPMENT ASSIGNED TO DOD CONTRACTORS. WE HAVE ONE PIECE OF DIPEC EQUIPMENT THAT IS 40 YEARS OLD. AMMUNITION DESIGNS ARE GETTING MORE COMPLICATED REQUIRING MORE SOPHISTICATED EQUIPMENT. MUCH OF THE DIPEC EQUIPMENT NEEDS TO BE UPGRADED AS IT WOULD NOT SUPPORT A NATIONAL EMERGENCY. ALSO, TOO MANY TIMES WE FIND EQUIPMENT IN DIPEC DOES NOT MATCH ITS READINESS RATING. SOMETIMES MACHINES HAVE BEEN OVERHAULED AND THIS FACT NEVER GOT INTO THE SYSTEM.

THE DIPEC SYSTEM HAS PROVEN VERY WORTHWHILE, BUT LIKE ANYTHING ELSE, IT CAN BE IMPROVED. ANOTHER EXAMPLE. LAST FALL WE WERE TOLD THERE WERE TWO HUGE PRESSES IN EXCELLENT CONDITION AT SENECA FALLS ARMY DEPOT THAT SOUNDED JUST LIKE WHAT WE WERE LOOKING FOR. TOO GOOD TO BE TRUE. WE SENT OUR EXPERTS TO EVALUATE THE PRESSES. UPON ARRIVAL, THEY FOUND THE PRESS PARTS WERE IN TWO SEPARATE LOCATIONS INCLUDING OUTSIDE STORAGE. WHEN THE PRESSES WERE DISMANTLED, THEY WERE NOT IDENTIFIED. IT TURNED OUT THERE WERE COMPONENTS MIXED TOGETHER FROM AT LEAST FIVE PRESSES AND NOT JUST TWO. MUCH OF THE DISMANTLING WAS BY TORCH. KEEP IN MIND, PRESSES LIKE THESE ARE WORTH OVER \$1 MILLION EACH. THERE IS MORE TO THIS SAD STORY, BUT I WON'T TAKE THE TIME TO GO THRU IT.

(SLIDE 49) - IN SUMMARY, I WOULD LIKE TO EMPHASIZE AGAIN MY TALK TODAY WAS OUR PERSPECTIVE. THE SYSTEM ISN'T PERFECT BY ANY MEANS, BUT FOR THE MOST PART IT DOES WORK AND CAN BE IMPROVED. I WOULD LIKE TO LEAVE YOU WITH THIS MESSAGE.
(SLIDE 50).

BASE MODERNIZATION

A PARTNERSHIP EXPERIENCE

NORMAN E. WEARE

DIRECTOR OF PROGRAM MANAGEMENT

NUCLEAR METALS, INC.

CONCORD, MASSACHUSETTS

PRESENTED TO

AMERICAN DEFENSE PREPAREDNESS ASSOCIATION

MEETING

"INDUSTRIAL PREPAREDNESS INITIATIVES IN THE NEW BUDGET SCENARIO"

RAMADA RENAISSANCE HOTEL

WASHINGTON, DC

MARCH 15, 1984

In the mid 1970's a decision was made by the Department of the Army to field new anti-armor ammunitions utilizing depleted uranium (DU) penetrators. Based upon this decision to improve the effectiveness of kinetic energy and anti-armor ammunitions a new series of 105mm and 120mm armor piercing, fin stabilized, discarding sabot (APFSDS) ammunitions was developed. A challenge was thus presented to provide a strong industrial base to produce the depleted uranium penetrator core. This talk discusses the experience of Nuclear Metals, Inc. (NMI) in base modernization and some reflection upon this experience.

THE CHALLENGE

Establishment of the new mobilization base for depleted uranium penetrators was made more challenging due to:

- Development of industrial sources new to the mobilization base.
- A material new to the government ammunition community.
- Accelerated effort to move from R&D into full scale manufacture. This resulted in the introduction of new test requirements after production started.
- Accelerated effort to introduce new improved designs which occurred simultaneously with establishment of the base.

Thus this establishment of the government industry partnership was rather special.

Prior to the base modernization effort, the depleted uranium industry consisted basically of small business or small divisions of major corporations. The products were primarily commercial items used for radioactive shielding or for counterweight applications. In the mid 1970's this industry began the manufacture and delivery of depleted uranium penetrators for the 30mm GAU-8/A gun system. At the start of the large caliber base modernization program this industry was still small.

The majority of the DoD mobilization base consists of large companies, most of whom are experienced government prime contractors. NMI is a small business which, at the time that the modernization and manufacturing effort began, had no experience in this type of government prime contracting. Even today we are still learning. The entrepreneurship of the small company is at times in conflict with the bureaucratic system of government contracting.

The base modernization was also rather special in that a new series of APFSDS ammunition was being introduced and a new material, depleted uranium was being introduced as well. APFSDS ammunition was not new, but new designs designated M774, M833 and XM829 were being developed, type classified and manufactured. Prior penetrator cores were made of steel, tungsten, and tungsten carbide; materials which are less effective and in the case of tungsten-based materials, significantly less available domestically. While industry had experience, the government had no extensive experience in high volume manufacture of depleted uranium components.

Another rather special feature of this modernization was the need to establish base suppliers who could process material starting with the reduction to metal all the way through to finished machined penetrators within one single organization. Also, process parameters never before used in a production mode for depleted uranium were required.

Compounding this challenge was the requirement to accelerate the delivery of this new ammunition into inventory. Early plans called for the introduction of depleted uranium tank ammunition in FY '84. This acceleration was required in order to replace ineffective ammunition which was then carried in the inventory. Not only was there a need to accelerate the manufacture of the 105mm M774 ammunition, but there was also an accelerated effort to introduce its replacement, the M833.

As you can see there was significant challenge. This challenge was met through a strong commitment and effort by both industry and the government.

NUCLEAR METALS INCORPORATED

I would like to take a few minutes to acquaint you with Nuclear Metals, Inc. (NMI). Genesis of NMI was the Metallurgical Project of the Manhattan District during World War II. The basic charter was the development of processes to fabricate uranium and much of the technology developed by this group is still employed in the processing of uranium alloys.

After the war, attention turned to nuclear power applications and NMI personnel developed much of the basic metallurgical data for uranium and its alloys.

NMI became a privately owned company in 1972. Seeking ways to employ its expertise, NMI was early to recognize and promote the potential of depleted uranium for KE penetrator applications. This led to a strong commitment and a pioneering effort to support the government in the introduction of depleted uranium anti-armor penetrators into the ammunition stock pile. NMI is the industrial leader in the development and manufacture of depleted uranium ordnance items.

While depleted uranium penetrator manufacture is the major portion of our business, NMI is a specialty metal producer in other areas:

- Commercial depleted uranium products for radiation shields and counterweights
- Metal powders: steel and aluminum for photocopy use, superalloy, titanium alloy, and special alloys

- Bi-metallic transition joints such as Ti alloy to stainless steel for nuclear and aerospace requirements.
- Beryllium structural tubing for satellite use
- Special braze alloy (Zr-Be) for nuclear applications
- NM-100 stainless steel for high temperature bearing use

Presently NMI activities occur at two sites:

- Concord, Massachusetts, containing corporate headquarters and primary manufacturing facility
- Barnwell, South Carolina, where Carolina Metals, Inc., a wholly owned subsidiary, produces depleted uranium derby metal.

NMI COMMITMENT TO ORDNANCE PROGRAMS

As mentioned above, NMI has provided a strong commitment to serving the ordnance requirements of the United States. This commitment jelled shortly after the company became privately owned in 1972. Commitment is exemplified by the following.

- 1973-1975 - A GAU-8/A penetrator manufacturing line was established at corporate expense.
- 1978-1983 - 100,000 square feet of manufacturing and support activity space was provided with NMI capital. The space now occupied by the large caliber manufacturing line was built and dedicated a full year before NMI obtained a contract.
- 1979-1983 - A Phalanx penetrator manufacturing line was established at NMI expense.
- 1983 - Carolina Metals, Inc., a wholly owned subsidiary, was dedicated. This facility was established to furnish depleted uranium metal primarily for the ordnance requirements.

- 1979-1984 - A large portion of the equipment required to establish NMI as a mobilization base producer is NMI owned.
- 1984 - NMI announces expansion of Carolina Metals, Inc., to add capabilities to produce UF₄ in anticipation of future government requirements.
- 1972-Present- NMI continues to invest corporate resources in R&D aimed at the development of depleted uranium ordnance products.

DEPLETED URANIUM

Depleted uranium is a by-product of the nuclear fuel enrichment process. Uranium, as it exists in nature, contains 0.7 percent of the isotope 235, the balance being the isotope 238. It is this fissionable isotope 235 which is required to provide the energy to fuel a nuclear power reactor. Power reactors require the isotope 235 to be at a higher concentration than in nature, and thus they require the uranium to be enriched. To do this, uranium ore is processed to produce uranium hexafluoride (UF₆) which is a gas at temperature slightly above room temperature. Differences in the diffusion rate of the 235 and 238 isotopes are used to concentrate the fissionable isotope. The products of the diffusion process are enriched uranium, which is processed into nuclear fuel and depleted uranium, which is basically the "tailings" of the process. For every unit of enriched uranium produced many units of depleted uranium are produced. The domestic inventory of depleted uranium is growing and is inexhaustible at projected user rates.

Depleted uranium is slightly radioactive, so low it offers no serious radioactive hazards to personnel working with or handling it. DU like all heavy metals is a toxic material, so that attention must be paid to limiting exposure to particulate material which may be generated during processing. These procedures are relatively straight forward for companies involved in processing depleted uranium.

The high density of depleted uranium, nearly two and one half times that of steel, makes it attractive as a kinetic energy penetrator material. In addition to its high density, uranium alloys:

- Can be worked by standard metallurgical processes
- Can be fabricated and heat treated to high strength levels with good toughness and ductility

- Can have properties tailored to the applications
- Act in a pyrophoric manner upon penetration of armor, producing startling behind target effects
- Can be fabricated from an abundant domestic supply of material without depleting strategic stockpile

Presently, depleted uranium is in high volume manufacture for a number of kinetic energy penetrator applications.

- GAU-8/A, 30mm ammunition for the A-10 ground support aircraft
- Phalanx, 20mm ammunition for shipboard close in defense systems
- M774 and M833, 105mm tank ammunition
- XM829, 120mm tank ammunition for the M-1E1 tank

THE PRODUCTION PROCESS

A complete process beginning with the reduction to metal through the delivery of finished penetrators is employed in this mobilization base. The basic process is:

Receipt of UF₄ (Green Salt)

Reduction to DU Metal

Melt, Alloy and Cast Billets

Extrude to Rod Stock

Cut to Blanks

Heat Treat

Machine, Ultrasonic Test, Hardness test

Machine to Penetrator

Some highlights of the process which made the modernization effort unique are worth some brief discussion.

Reduction

Most mobilization activities begin with materials supplied from other industrial sources, steel for one. In this case the government supplies the depleted uranium in the form of UF_4 , normally called green salt. This is blended with magnesium granules and reacted in retorts to produce depleted uranium metal, commonly called derby.

Melt, Alloy, and Cast

The DU derby along with solid alloy recycle material and titanium are charged into vacuum melting furnaces, melted and cast into billets for extrusion. The alloy used in the large caliber penetrator manufacture is DU -0.75% titanium. Strict controls are required to produce alloy to stringent chemical and metallurgical specifications.

Extrusion

The billets cast above are hot extruded to a bar diameter consistent with the penetrator to be produced.

Heat Treatment

A two phased heat treatment is employed to achieve the required properties of the DU -0.75% Ti alloy. First the alloy must be heated to a high temperature phase (γ) and quenched. Second, the alloy must be heated at a lower temperature and held for a period of time to develop the final desired properties. This is a typical precipitation hardening process. What makes this particular treatment difficult is the need to produce material having a very low hydrogen content (less than one part per million) and the fact that the 0.75% Ti alloy in larger cross sections have a tendency to form voids along the centerline upon quenching. Thus the equipment had to have the capability of:

- Heating the alloy to temperature of $850^{\circ}C$ under relatively high vacuum (10^{-4} Torr)
- Quench into water (water and high vacuum are not compatible)
- Lower the hot blanks into the water quench at a controlled rate to minimize void formation

This had been done successfully on a laboratory scale on a two at a time. NMI was faced with accomplishing this in a full manufacturing scale. This has been accomplished, but not without problems.

Machining

Prior to penetrator manufacture, machining was accomplished on standard lathes at low speeds and feeds. Production and mobilization base requirements much higher rates of metal removal in order to keep costs down. CNC lathes were chosen for this purpose and integrated into a production line to manufacture the close toleranced penetrators. In addition to introduction of CNC lathes into the DU manufacturing line, a considerable effort was pursued to develop the machining programs, the cutting tool material selection, and tool geometry.

CHALLENGES MET

I began this talk by speaking of the challenge thrown out to industry and the government to develop a mobilization base for depleted uranium penetrators. At time the road was rocky and full of chuckholes, but today I can say the challenge has been met. How did we get there?

FY '75 to FY '78 NMI installed machining and heat treating equipment and provided development penetrators to prove they could be made in a production mode.

FY '78 NMI dedicated a new facility for eventual and manufacture of large caliber penetrators. However, we were unsuccessful in the competition for a contract.

FY '79 NMI received a contract to facilitate to manufacture M774 penetrators.

FY '80 Work on the facility began and in the second quarter of FY '80 manufacture of the M774 began at an accelerated pace. Manufacture was complicated; facilities were not yet in place, normal start up problems were encountered as some processes such as heat treating had never been accomplished at production rate.

FY '81 M774 deliveries build up. Rates exceeding 4,000 per month were realized.

FY '82 M774 manufacturing rates exceed 6,000 per month. A contract was received to modify the facility to produce the M833 penetrator.

FY '83 M774 manufacture nears its end and M833 manufacture begins. Facilities additions began. A second contract was received to further modify facilities to provide a base capacity of 10,000 M833 and 4,000 XM829 penetrators per month.

FY '84 Production levels of 9,000 M833 cores per month were demonstrated. Government requirements are less than this level, and current production rates are at lower levels.

While facilities remain in a state of change, the challenges have been met and will continue to be met by the industry - government partnership. Over 200,000 M774 and M833 penetrators have been manufactured and delivered for inventory.

REFLECTIONS

Both partners have received benefits from this relationship. The government has established a reliable industrial base to manufacture depleted uranium penetrators and over 200,000 M774 and M833 penetrators have been manufactured for inventory. For NMI it has meant significant business which has provided the basis for corporate growth.

From the perspective of a small business the experience of becoming a prime mobilization base contract can be harsh! It is difficult for the government personnel to fully understand the small business and even more difficult for the small business to understand the government. Small businesses have limited resources and find these resources stretched to the limit in an attempt to satisfy the government requirements. There are limitations on how much a small business can do. Somehow a better mutual understanding must develop early in the relationship. Small companies contemplating entry into the arena of government prime mobilization base contracts must first of all have a product or a technology which is rather special and needed, be strongly committed to becoming a contractor, be ready to make some changes in how they operate, and be prepared to "hang in there" and make it happen.

There is room for improvement of the partnership:

- The government must provide sufficient work for the mobilization base to maintain its operation at an efficient level. Low levels of business, particularly following high levels, have a profound effect on small business where the base cannot easily absorb the swings.
- Development work, new designs, and new processes must be directed to the mobilization base. Currently this work is primarily directed to government laboratories. Directing this work to the mobilization base will strengthen the base technically, provide added work for the base and provide a smoother transition from R&D to manufacture. Also the mobilization base will look at development with productivity in mind.
- Further expansion, whether in capacity or in additional process steps on new ammunition is best done within the established mobilization base. This will strengthen the base and any added business will absorb more of the fixed costs to lower the overall cost of items delivered to the government.
- There is a need to have early interaction between the industrial base and the government in order to properly develop mutual plans.

SUMMARY

NMI experience as a partner with the government has been difficult at times, but overall rewarding. It has been a great learning experience and there is still much both NMI and the government must learn in order to strengthen our partnership for the future. If we were asked if we would do it over again, the answer would be resounding yes!

**ESTABLISHMENT OF THE
SGT YORK PRODUCTION CAPABILITY**

**(PLANNING THE TRANSITION
FROM PROTOTYPE TO PRODUCTION)**

PRESENTED BY:

IRVIN O. WOLF, JR.
AAI CORPORATION

**ADPA INDUSTRIAL BASE PLANNING
MARCH 15-16, 1984**



- Film
- AAI's Responsibility
- Background
- Manpower Requirements
- Capital Equipment Requirements
- Facility Requirements
- Risk Areas
- Success Assessment



NEW YORK AIR DEFENSE SYSTEM

DIVAD PROGRAM SUMMARY

Milestones: Phase I

- Design and Fabricate 2 Production Prototype Units
- Award January 1978
- DT/OT — June-Nov 1980
- On Schedule

Phase II

- RFP — May 1980
- Continued Engrg. Development
- Production Options for 276 Systems
- Award May 1981



OVERVIEW — PRODUCTION OPTIONS

- Program Management
 - Eng./Mfg. Liaison
 - ANAD/FACC Liaison
 - Project Management
- Refurbish Prototypes
- Tool Fabrication
- Documentation & Data
- Production

Opt. 1	50 Systems
Opt. 2	96 Systems
Opt. 3	<u>130 Systems</u>
	276 Systems



SCOPE OF PROGRAM PLAN

- Detailed Base Program Plan
- Overview of Production Options
- Detailed Base Program Cost/Schedule Control
- Production Options Cost/Schedule Control Concepts
- DIVAD Phase II Program Organization



PLAN DEVELOPMENT

- Generated Detail Work Breakdown Structure (WBS)
- Manufacturing & Project Estimates
- Assumed: 1 Shift - 8 Hours - 5-Day Work Week
- Assigned Manpower by WBS Element
- Calculated Duration of Each WBS Element
- Developed Network Schedule
- Performed Resource Allocation/Leveling
- Determined Time Phased Costs
- Risk Assessment



BASE PROGRAM WBS

- 6 Level WBS
- Lowest Levels Are Associated With Work Packages or Functional Charges
- Work Packages Include Labor Category Breakdown
- Point No.'s Can Be Cross Referenced Between Functional Area
- Approximately 240 Chargeable Point No.'s Are Required
- Tool No.'s Are Required For Each Tool



COST/SCHEDULE CONTROL REQUIREMENTS

- Prepare Work Packages for Each WBS Element
 - Task Definition
 - Duration/Schedule Dates
 - Interface Requirements/Milestones
- Monitor Performance Schedule
 - Weekly Report — Remaining Duration
 - Target Schedule Reporting — Actuals To Schedule
 - Cost
 - Weekly Reports
 - Baseline Versus Actuals

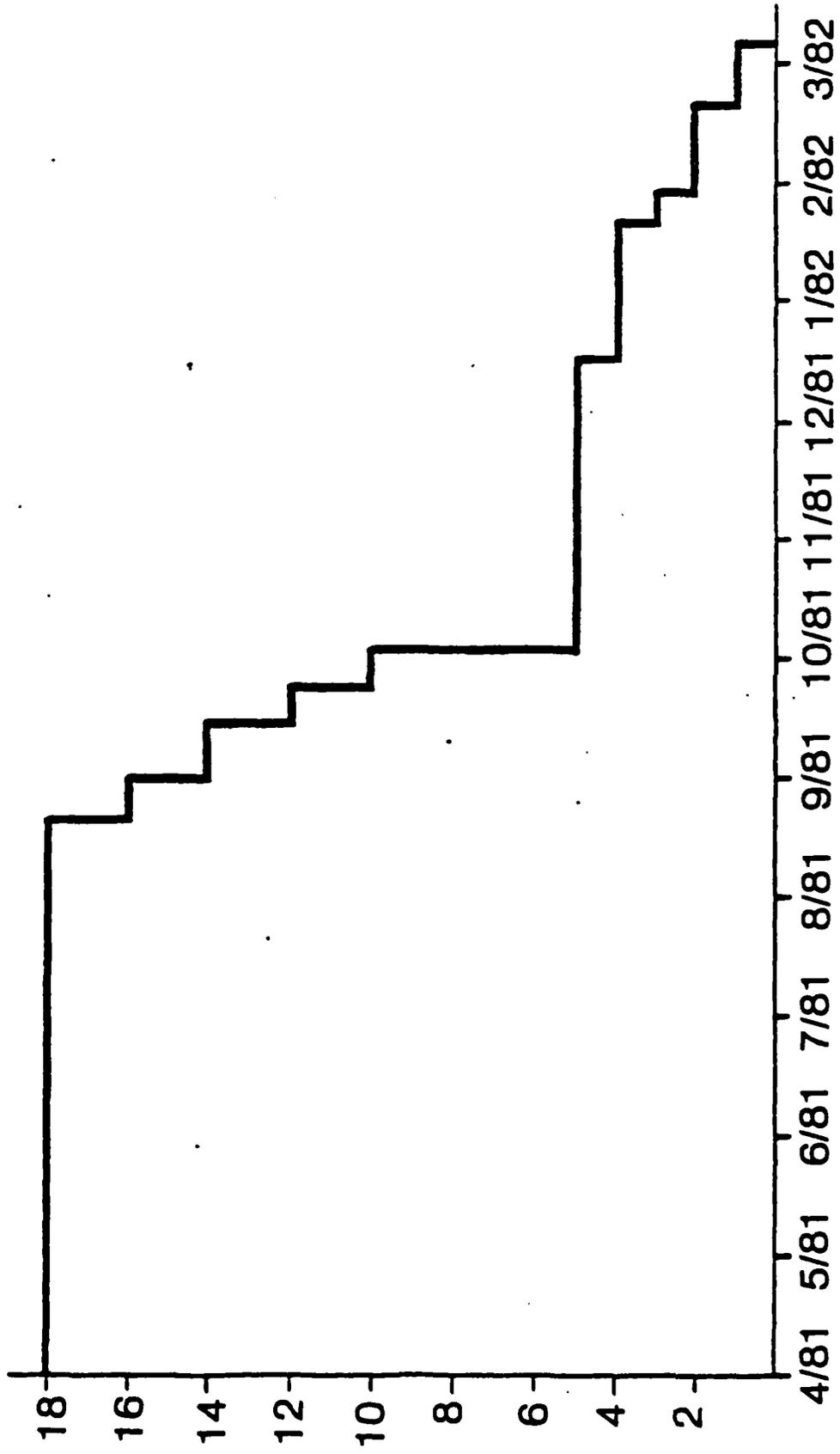


MANPOWER REQUIREMENTS

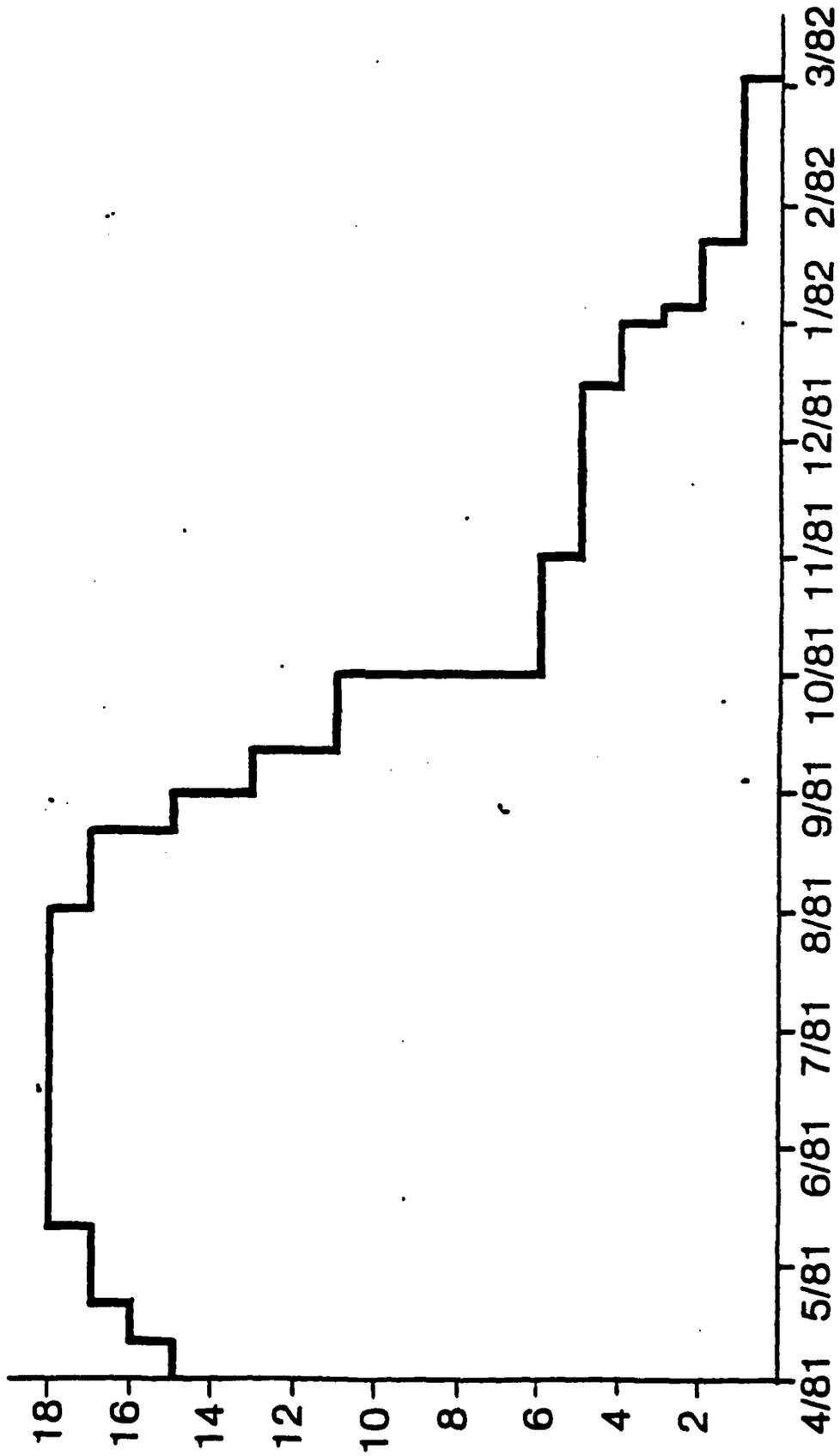
	Base Program	Opt. 1	Opt. 2	Opt. 3
Program Management	20	22	18	18
Engineering	39	14	--	--
Manufacturing	15	163	193	222
Tool Design	21	--	--	--
Tool Fabrication	<u>21</u>	<u>15</u>	<u>3</u>	<u>3</u>
Total	116	214	214	243



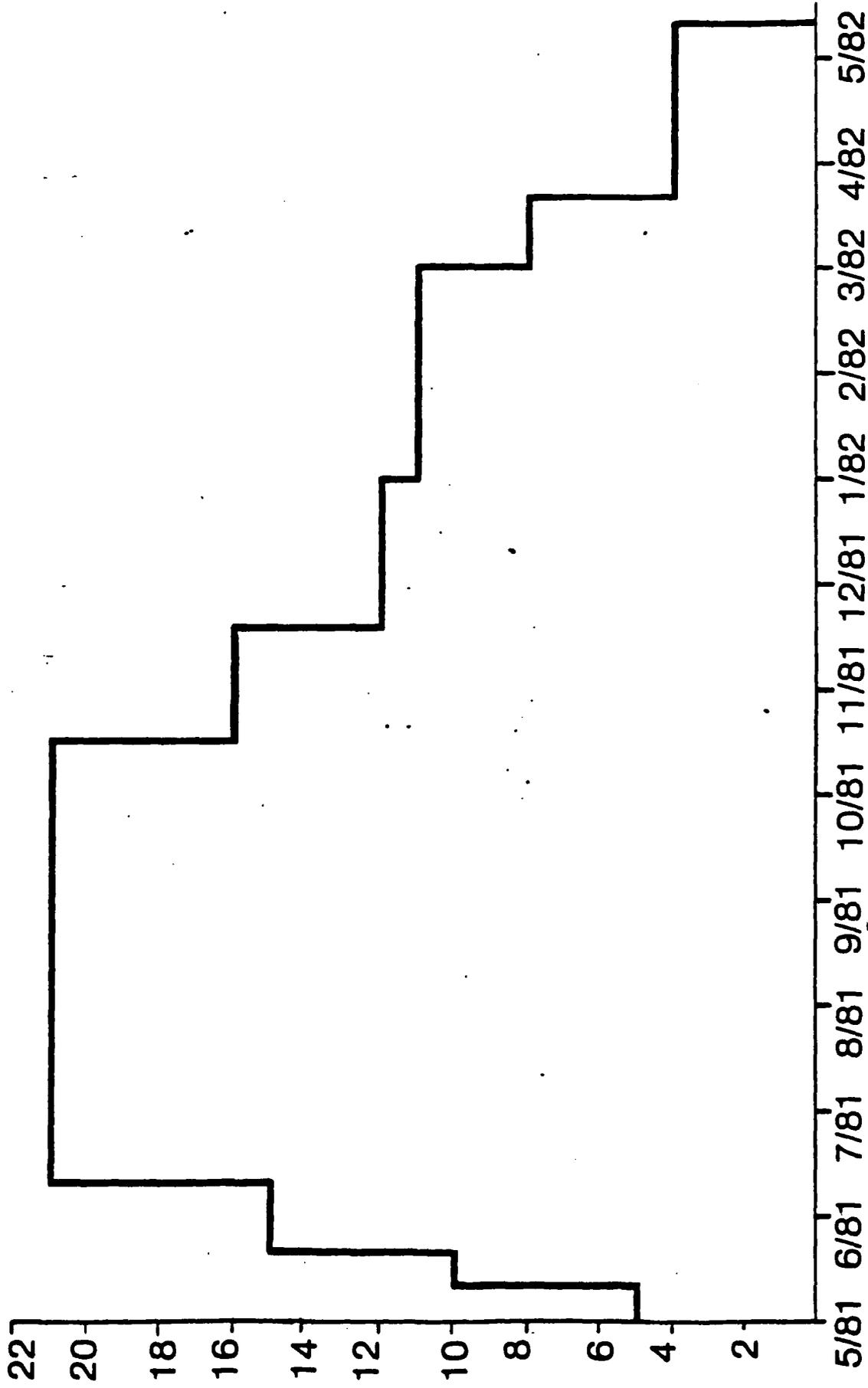
MANPOWER REQUIREMENTS -- DESIGN ENGINEER



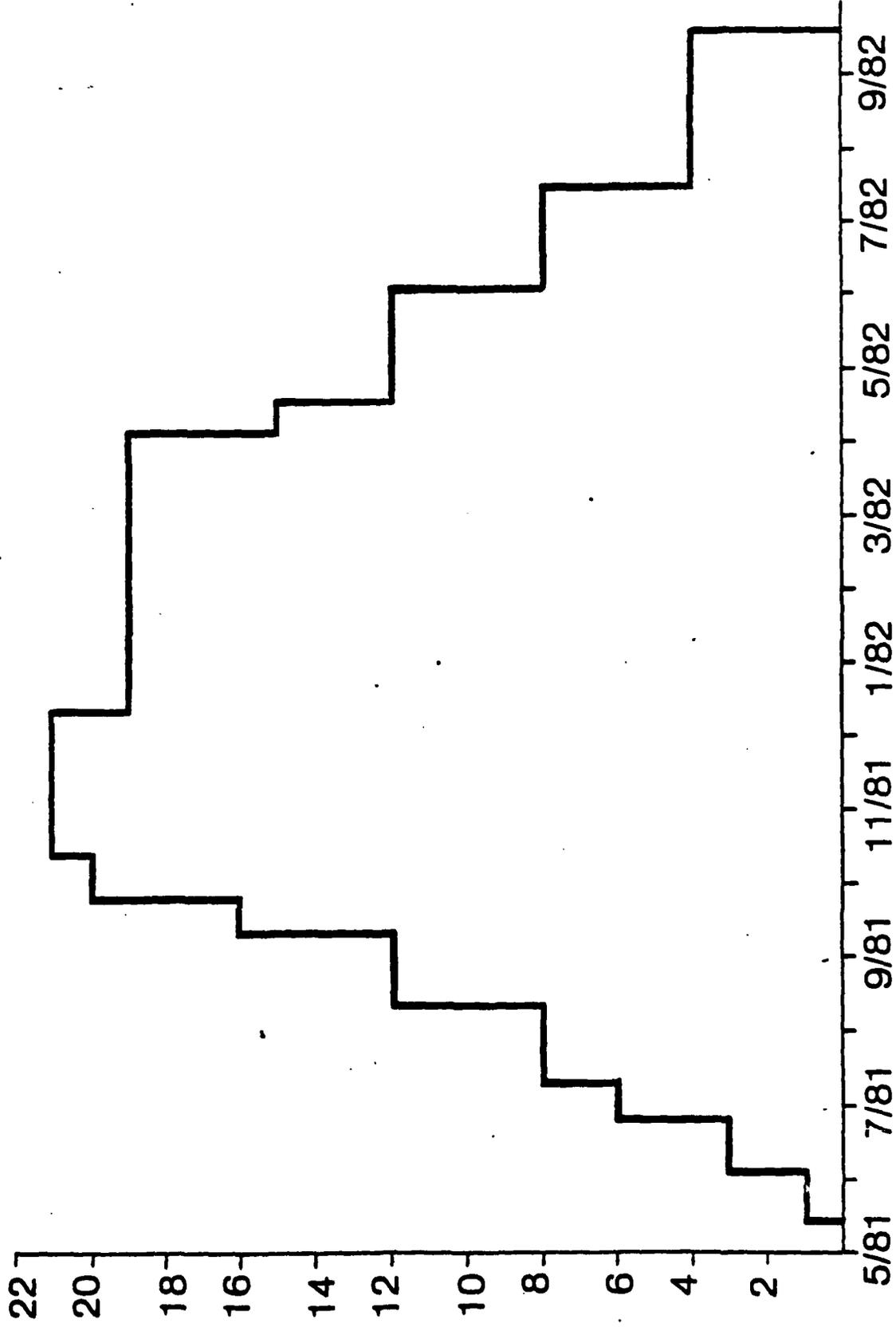
MANPOWER REQUIREMENTS — DRAFTING



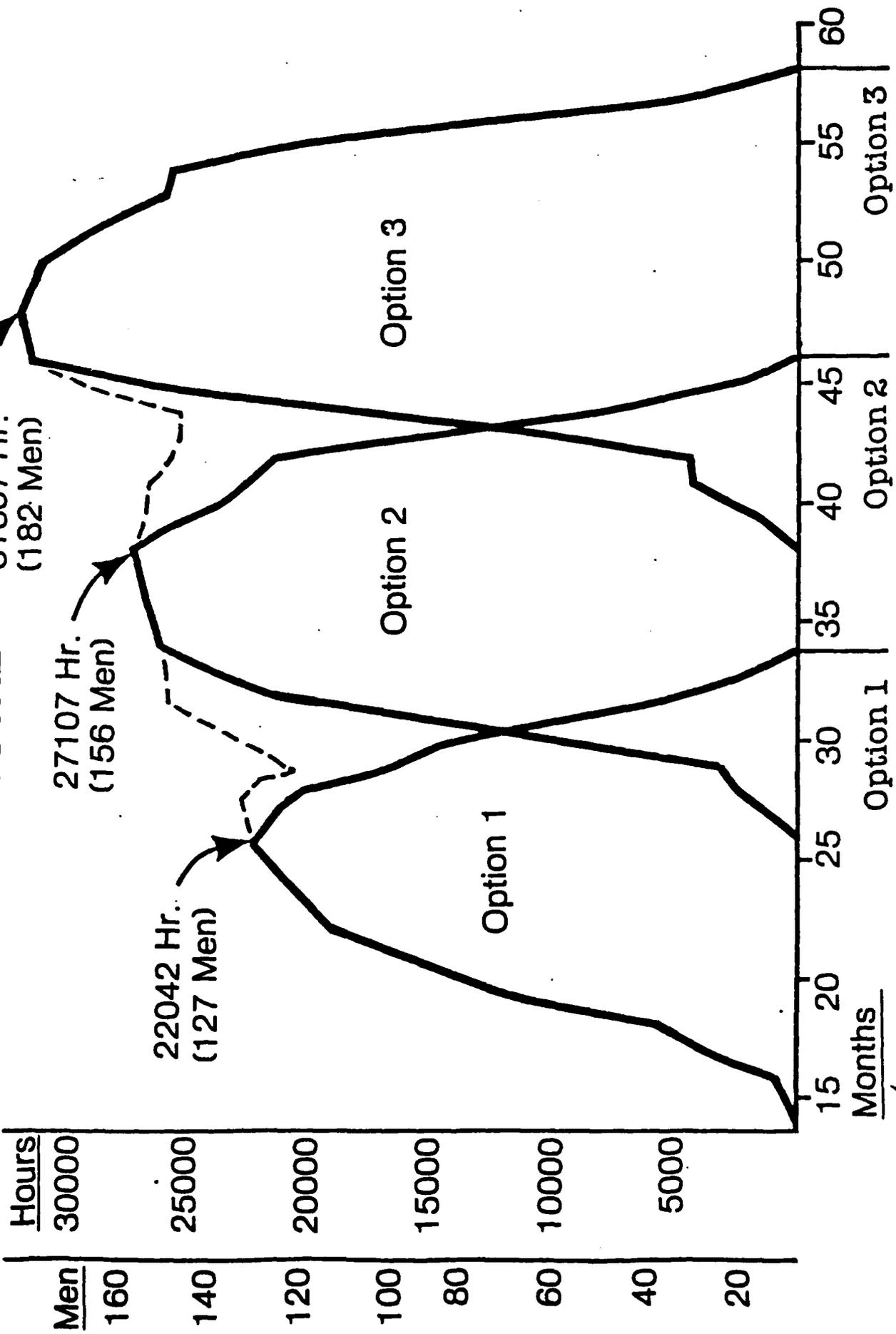
MANPOWER REQUIREMENTS — TOOL DESIGN



MANPOWER REQUIREMENTS -- TOOL MAKER



TOTAL



DIVAD MINIMUM EQUIPMENT LIST

- **Burning**
 - N/C Burning Machine W/Double Water Tables (4)**
 - Bevel Machines (5)**
 - Misc.**
- **Welding**
 - Power Supplies & Welders (21)**
 - Sub Arc Units (5)**
 - Weld Positioners (7)**
 - Misc.**
- **G&L Machining Center**
- **Bendix Cordax**
- **X-Ray Facility**
- **Inspection Equipment**



DIVAD MINIMUM EQUIPMENT LIST (CONT.)

- Shot Blast Room
- Paint Room
- Store Room
 - Fork Lifts (4)
 - Pallet Trucks (4)
 - Racks & Misc.
- Material Handling Systems
 - 425' Crane Rails (3)
 - Cranes (7)
 - Electro Lifting Magnets (2)
 - Transfer Carts (2)
 - Racks & Misc.

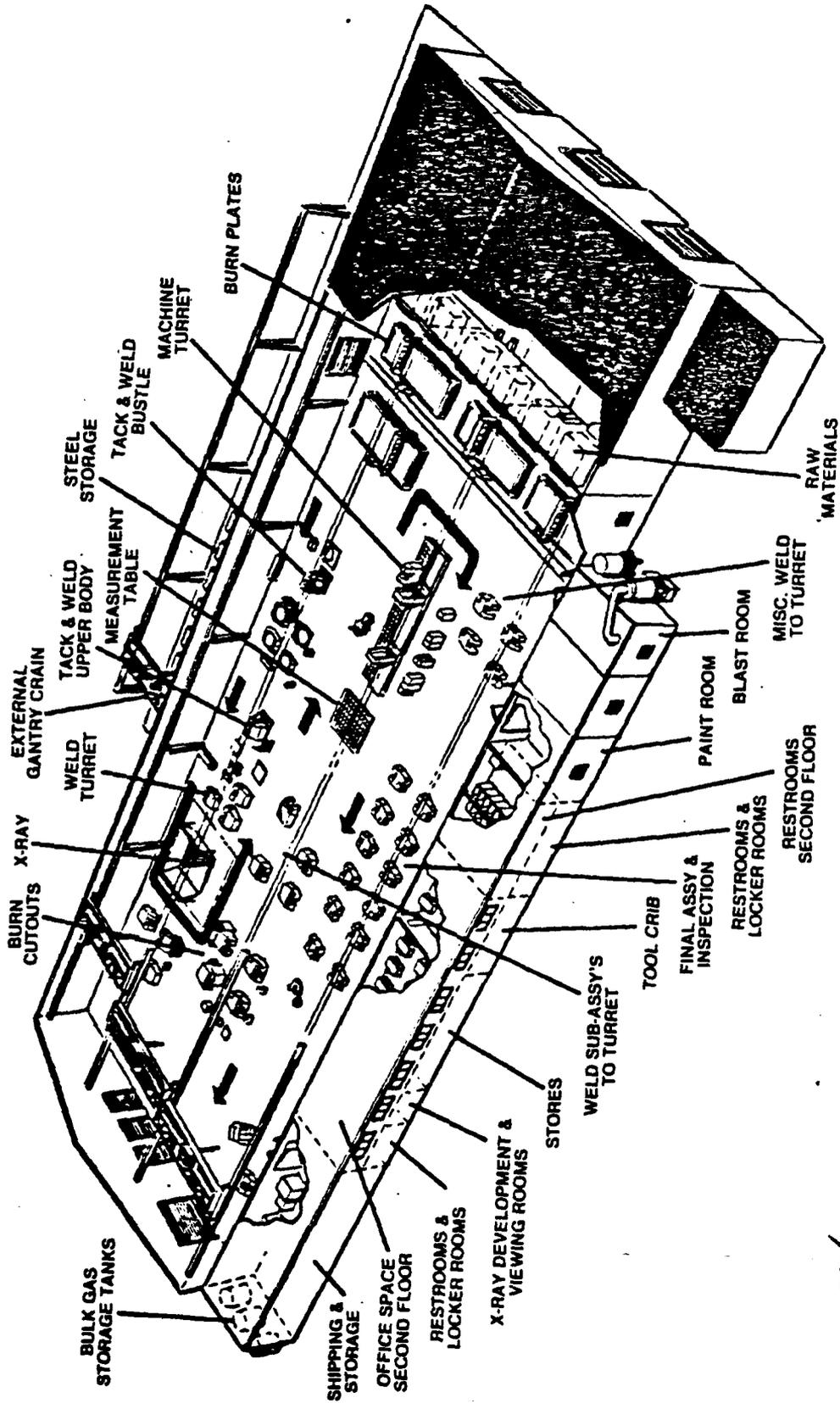


MINIMUM FACILITY REQUIREMENTS

F Bldg. Extension	High Bay	Low Bay	Total
• High Bay Area 425' x 150'	63,750 Sq. Ft.		
• Low Bay Wing 1st Floor 400' x 30' 2nd Floor 250' x 30'	<u>63,750 Sq. Ft.</u>	<u>12,000 Sq. Ft.</u> <u>7,500 Sq. Ft.</u> 19,500 Sq. Ft.	<u>83,250 Sq. Ft.</u>
Usage of Space			
• Fabricate Turret	45,000 Sq. Ft.		
• Fabricate Kits	12,500 Sq. Ft.		
• Shipping & Storage	6,250 Sq. Ft.	2,250 Sq. Ft.	
• Blast & Paint		2,250 Sq. Ft.	
• Tool Crib & Stores		3,750 Sq. Ft.	
• Bathrooms, Concessions, Power, ETC.		4,500 Sq. Ft.	
• Office Space	<u>63,750 Sq. Ft.</u>	<u>6,750 Sq. Ft.</u> 19,500 Sq. Ft.	<u>83,250 Sq. Ft.</u>



PRODUCTION FACILITY



RISK ASSESSMENT

- Manpower Availability
Engineer & Draftsmen
Tool Designers
Tool Makers
- Schedule Requirements
- Facilities
Facilities Planning (Work-Around Plan)
Construction
On-Line Capital Equipment
- Labor Rates
- Travel Expenses



AREAS OF POTENTIAL RISK

- Manufacturing Facility — Availability
- Manufacturing Equipment — Availability
- G & L Machining Center — Downtime
- Manpower — Availability/Labor Rates
- Design Revisions — Freeze



INDUSTRIAL MODERNIZATION INCENTIVES PROGRAM (IMIP) OVERVIEW

PRESENTATION AT THE INDUSTRIAL BASE PLANNING MEETING
SPONSORED BY THE AMERICAN DEFENSE PREPAREDNESS ASSOCIATION

BY

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OFFICE OF THE UNDER SECRETARY OF DEFENSE (RESEARCH & ENGINEERING)

MARCH 16, 1984

RAMADA RENAISSANCE HOTEL

WASHINGTON, D.C.

INTRODUCTION:

IT IS A PLEASURE TO HAVE THE OPPORTUNITY THIS MORNING TO PROVIDE YOU WITH AN OVERVIEW OF THE INDUSTRIAL MODERNIZATION INCENTIVES PROGRAM (IMIP). I'LL DESCRIBE THE PHILOSOPHICAL BASIS OF THE PROGRAM, THE PROGRAM PRINCIPLES, AND THE CURRENT STATUS. I'LL TRY TO BRIEFLY PROVIDE YOU WITH SOME PERSPECTIVES ON HOW THE IMIP RELATES TO OUR OVERALL EFFORTS TO IMPROVE THE DEFENSE ACQUISITION PROCESS. DURING THE PANEL FOLLOWING MY PRESENTATION, YOU'LL GET A CHANCE TO DISCUSS THE IMIP IN GREATER DETAIL. PLEASE HOLD YOUR QUESTIONS UNTIL THEN! BUT IF ALL YOUR QUESTIONS GET ANSWERED, PLEASE LET ME KNOW--WHEN WE'RE AT THAT POINT, WE'LL BE ABLE TO MOVE THE IMIP OUT OF ITS CURRENT TEST PHASE.

NEED:

THE FIRST ASPECT WHICH SHOULD BE DISCUSSED IN CONJUNCTION WITH IMIP IS WHY WE NEED THE PROGRAM. THE SIMPLEST ANSWER IS TO PROMOTE INCREASED PRODUCTIVITY AND REDUCED ACQUISITION COSTS. THE DEPARTMENT OF DEFENSE BUYS SUCH A WIDE VARIETY OF PRODUCTS FROM SO MANY SOURCES UNDER DIFFERENT ACQUISITION CIRCUMSTANCES THAT SWEEPING GENERALIZATIONS ABOUT PRODUCTIVITY AND CAPITAL INVESTMENT LEVELS CANNOT BE MADE. THERE ARE BRIGHT SPOTS AS WELL AS AREAS WHERE MAJOR IMPROVEMENTS ARE NEEDED. PRODUCTIVITY PROBLEMS AND SOLUTIONS IN THE VARIOUS SEGMENTS OF INDUSTRY VARY. HOWEVER, A SIGNIFICANT PORTION OF MANUFACTURING UNDER DEFENSE PROGRAMS IS DONE USING OUTDATED AND INEFFICIENT CAPITAL EQUIPMENT IN A LABOR-INTENSIVE FASHION.

RECENT TECHNOLOGY ADVANCES WHICH POINT TO MAJOR MANUFACTURING IMPROVEMENTS ARE PARTICULARLY SUITED TO DoD NEEDS. BATCH PRODUCTION METHODS ARE USED EXTENSIVELY IN MANUFACTURING FOR THE DoD. QUANTITIES ARE SMALL AND DELIVERIES ARE MADE OVER A PERIOD OF TIME. ENGINEERING CHANGES OCCUR FREQUENTLY.

BECAUSE OF THESE FACTORS, FLEXIBLE MANUFACTURING SYSTEMS OFFER THE GREATEST PROMISE IN THE DoD MANUFACTURING ENVIRONMENT. THESE COMPUTER-CONTROLLED AND INTEGRATED MACHINES, WORK STATIONS, TRANSFER MECHANISMS, AND TOOLING ALLOW PRODUCTION OF A WIDE VARIETY OF PRODUCTS IN SMALL NUMBERS. THE ECONOMIC ORDER QUANTITY APPROACHES ONE, AND LEARNING CURVES ARE NO LONGER RELEVANT. BENEFITS IN THE PROCUREMENT OF SPARE PARTS WILL ENSUE. AND SINCE ABOUT 1/2 OF MY TIME THESE DAYS IS SPENT ON SPARE PARTS PROCUREMENT, THAT TO ME IS A VERY IMPORTANT BENEFIT.

THE QUESTION ARISES AS TO WHY WE HAVEN'T SEEN AN ACROSS-THE-BOARD AGGRESSIVE MODERNIZATION EFFORT IN DEFENSE INDUSTRIES. IN DEFENSE, TWO PROBLEMS HAVE BEEN CITED MOST FREQUENTLY AS INHIBITING MODERNIZATION AND PROGRESS IN THE PRODUCTIVITY AREA.

THESE ARE PROGRAM UNCERTAINTIES AND A PROFIT POLICY WHICH, IN CERTAIN ACQUISITION CIRCUMSTANCES, IS BASED ON COST. IN THE FIRST INSTANCE, RISKS ARE INTRODUCED WHICH HINDER INVESTMENT AMORTIZATION AND INHIBIT LONG-TERM PLANNING. IN THE SECOND CASE, WHEN THE DEPARTMENT OF DEFENSE NEGOTIATES COSTS AND PROFITS, PROFIT IS TYPICALLY PERMITTED BASED ON THE COST. OVER THE LONG-TERM

STREAM OF CONTRACTS, COST REDUCTIONS ACHIEVED BY A CONTRACTOR AND CORRESPONDING PROFIT LEVELS ARE NEGOTIATED AWAY BY THE GOVERNMENT. THEREFORE, A CONTRACTOR MAY ACTUALLY SEE PROFITS REDUCED AS A RESULT OF EFFORTS TO IMPROVE PRODUCTIVITY AND REDUCE COSTS.

RESPONSIBILITIES:

GIVEN THAT IMPROVEMENTS ARE BOTH POSSIBLE AND NEEDED, NOW LET'S TALK A LITTLE ABOUT RESPONSIBILITIES. TO THE INDUSTRY PEOPLE IN THE AUDIENCE, LET ME SAY THAT MODERNIZATION IS FIRST AND FOREMOST YOUR RESPONSIBILITY. DON'T WAIT FOR IMIP TO DO THINGS YOU NEED TO DO TO REMAIN COMPETITIVE IN DEFENSE WORK. ADDITIONALLY, SOME OF YOU MAY LEAVE THIS MEETING WITH THE FEELING THAT IMIP MAY BE EITHER TOO COMPLEX OR TOO LIMITED FOR APPLICATION IN YOUR SITUATION. LET ME JUST SUGGEST TO YOU THAT IMIP IS NOT GOING TO BE THE ANSWER TO EVERY PROBLEM WE FACE. IT IS IN A TEST PHASE AND A NUMBER OF ISSUES AND DETAILS ARE STILL OPEN. BUT IT WILL MAKE AN IMPORTANT CONTRIBUTION WHERE IT APPLIES. LET'S TRY TO MAKE IT WORK--SYNERGISTICALLY WITH THE MANY OTHER INITIATIVES WE HAVE UNDERWAY. IT SHOULD BE VIEWED BOTH AS AN OPPORTUNITY AND A CHALLENGE. DON'T TELL US ANYMORE THAT MODERNIZATION WITH BENEFITS TO BOTH PARTIES DOESN'T MAKE SENSE FOR INDUSTRY--WE ARE WILLING TO DO THINGS DIFFERENTLY UNDER IMIP IF YOU CAN DEMONSTRATE THE NEED. LIKEWISE DON'T BE INHIBITED FROM MOVING OUT AGGRESSIVELY ON YOUR OWN. INDEED, I FEEL IMIP IS MOST APPROPRIATE WHEN A COMPANY CAN DEMONSTRATE THAT IT IS ALREADY MAKING SIGNIFICANT STRIDES TO IMPROVE PRODUCTIVITY. IMIP IS A WAY FOR US IN THE DoD TO DEMONSTRATE THAT WE RECOGNIZE OUR RESPONSIBILITIES TO SPUR IMPROVED PRODUCTIVITY AND

REDUCED ACQUISITION COSTS--AND TO REINFORCE ON-GOING CONTRACTOR ACTIVITIES.

OBJECTIVES:

THE INITIATION OF THE TEST OF THE IMIP AUTHORIZED BY THE DEPUTY SECRETARY OF DEFENSE ON NOVEMBER 2, 1982, IS A RESPONSE TO THE MANY CHALLENGES I DISCUSSED EARLIER.

THE OBJECTIVE OF THE IMIP TEST IS TO DEVELOP AND REFINE CONTRACT INCENTIVES AIMED AT ENCOURAGING INDUSTRY TO MAKE PRODUCTIVITY ENHANCING CAPITAL INVESTMENTS. THE MAJOR INCENTIVES BEING TESTED ARE SHARED SAVINGS REWARDS AND CONTRACTOR INVESTMENT PROTECTION. SHARED SAVINGS REWARDS PROVIDE AN ADDITIONAL FINANCIAL INCENTIVE. CONTRACTOR INVESTMENT PROTECTION INVOLVES THE GOVERNMENT'S ASSUMING PART OF THE INVESTMENT RISK. THE USE OF THIS LATTER INCENTIVE MUST CONSIDER THE PROBABILITIES OF VARIOUS PROGRAM EVENTS, AND CERTAIN CONGRESSIONAL REVIEW REQUIREMENTS APPLY.

THESE TWO INCENTIVES MAY BE USED SEPARATELY OR IN COMBINATION. OTHER INCENTIVES, SUCH AS AWARD FEES, ARE PERMISSIBLE, BUT SO FAR HAVE RECEIVED LESS ATTENTION.

THE IMIP TEST EVOLVED OUT OF SUCCESSES THE AIR FORCE HAS ACHIEVED IN ITS TECHNOLOGY MODERNIZATION (TECHMOD) PROGRAM AND STRONG TRI-SERVICE SUPPORT FOR CONTINUED DEVELOPMENT OF THE CONCEPTS. THE IMIP ENCOMPASSES AND EXPANDS, AND PROVIDES A COMMON FRAMEWORK FOR, SERVICE PROGRAMS SUCH AS TECHMOD. IT IS A PRIMARY VEHICLE

FOR IMPLEMENTATION OF DEFENSE ACQUISITION IMPROVEMENT INITIATIVE
No. 5, "ENCOURAGE CAPITAL INVESTMENT TO ENHANCE PRODUCTIVITY."

DATA AND INFORMATION DEVELOPED DURING THE TEST ON THE EFFECTS OF VARIOUS INCENTIVES AND THEIR MOTIVATIONAL ASPECTS WILL PROVIDE A SOLID BASIS FOR FUTURE POLICY AND PROCEDURAL DEVELOPMENT. THE TEST PROGRAM OFFERS THE OPPORTUNITY TO LEARN WHAT WORKS AND WHAT DOES NOT WORK, AND TO MAKE ADJUSTMENTS ACCORDINGLY. IT FOLLOWS THE "BIAS FOR ACTION" AND THE "DO IT, TRY IT, FIX IT" PHILOSOPHY DISCUSSED IN PETERS' AND WATERMAN'S IN SEARCH OF EXCELLENCE.

PROGRAM PRINCIPLES:

KEY PROVISIONS OF THE DEPUTY SECRETARY OF DEFENSE AUTHORIZATION AND CHARTER FOR TESTING OF THE IMIP ARE AS FOLLOWS:

- o THE TEST OF THE IMIP IS BEING EXECUTED BY THE DoD COMPONENTS AND IS UNDER THE OVERALL PURVIEW OF AN EXECUTIVE-LEVEL STEERING GROUP. REAR ADMIRAL JOSEPH SANSONE, JR., DEPUTY CHIEF OF NAVAL MATERIAL (CONTRACTS AND BUSINESS MANAGEMENT), IS SERVING AS THE CHAIRMAN.
- o TO ENCOURAGE INNOVATION AND EXPERIMENTATION, REASONABLE DEVIATIONS FROM EXISTING DEFENSE ACQUISITION REGULATION (DAR) COVERAGE ARE PERMITTED IN CONDUCTING THE TEST WITH THE APPROVAL OF THE IMIP STEERING GROUP.
- o INCENTIVES ARE AIMED PRIMARILY AT MOTIVATING CONTRACTORS TO INVEST THEIR OWN FUNDS. INVESTMENTS ARE BEING

ENCOURAGED WHICH WOULD NOT OTHERWISE BE MADE BECAUSE OF HIGH RISK OR INSUFFICIENT RETURN-ON-INVESTMENT.

- 0 DOCUMENTATION IN THE FORM OF A DRAFT DoD INSTRUCTION, DRAFT CONTRACT CLAUSES, AND A DRAFT DoD GUIDE ARE BEING EVALUATED DURING THE TEST.
- 0 CRITICAL ISSUES TO BE CONSIDERED DURING THE IMIP TEST HAVE BEEN IDENTIFIED AND ARE TO BE ANALYZED AS CONCEPTS ARE APPLIED.
- 0 A "CASE STUDY" APPROACH IS BEING USED TO DOCUMENT ONGOING EFFORTS AND TO ANALYZE THE COMPLEX ISSUES INVOLVED.

ISSUES

SOME OF THE KEY ISSUES IDENTIFIED IN THE IMIP TEST CHARTER FOR EVALUATION INCLUDE:

- 0 TYPES OF INCENTIVES FOR VARIOUS CONTRACTUAL SITUATIONS (SUCH AS LARGE VERSUS SMALL CONTRACTS, FIXED PRICE VERSUS COST TYPE, NEGOTIATED VERSUS COMPETITIVE, AND MULTI-PROGRAM/MULTI-SERVICE AT A SINGLE CONTRACTOR FACILITY).
- 0 SUBCONTRACTOR/VENDOR FLOWDOWN.
- 0 EFFECTS ON COMPETITION.

- 0 SEPARATION OF PRODUCTION EFFICIENCY ASPECTS FROM PRODUCTION CAPACITY ASPECTS.
- 0 VERIFICATION, TRACKING, AND AUDITING ASPECTS.
- 0 RETURN-ON-INVESTMENT CALCULATIONS.
- 0 RISKS IF SAVINGS DO NOT OCCUR.
- 0 COMBINATION AND INTERACTION WITH OTHER INCENTIVES (SUCH AS VALUE ENGINEERING AND DESIGN-TO-COST).
- 0 RELATIONSHIP TO THE WEIGHTED GUIDELINES.
- 0 INCENTIVES OTHER THAN THROUGH CAPITAL INVESTMENT (HUMAN RESOURCES, OVERHEAD AND INDIRECT COST CONTROL, AND RESEARCH AND DEVELOPMENT.)

FACTORY ANALYSIS:

IMIP ENCOURAGES A SYSTEMS ENGINEERING APPROACH TO MODERNIZATION. AN INTENSIVE INDUSTRIAL ENGINEERING ANALYSIS OF THE MANUFACTURING FACILITY IS NORMALLY THE FIRST STEP OF AN IMIP.

THE FACTORY ANALYSIS DETERMINES THE "AS IS" AND THE "TO BE" FACTORY CONFIGURATIONS. IT DEFINES THE IMPROVEMENTS POSSIBLE AND THE BENEFITS TO BE DERIVED, AND SETS THE STAGE FOR SUBSEQUENT IMPLEMENTATION.

DURING THIS PHASE, THE BEST COMBINATION OF EQUIPMENT AND SYSTEMS MUST BE DETERMINED BASED ON MARGINAL COST/BENEFIT CONSIDERATIONS. ROBOTICS, AUTOMATED MATERIAL HANDLING SYSTEMS, MATERIAL REQUIREMENTS PLANNING SYSTEMS, MANAGEMENT INFORMATION SYSTEMS, COMPUTER-AIDED DESIGN AND MANUFACTURING, AND FLEXIBLE MANUFACTURING SYSTEMS MUST ALL BE EVALUATED FOR APPLICATIONS IN THE PARTICULAR MANUFACTURING SITUATION.

EMPHASIS IS ON FACTORY-WIDE IMPROVEMENTS WITH MULTI-CONTRACT AND MULTI-SERVICE APPLICATIONS. QUANTUM IMPROVEMENTS ARE DESIRED--NOT INCREMENTAL, ISOLATED, MACHINE-BY-MACHINE CHANGES. WE ENCOURAGE CONTRACTORS TO TAKE A LOOK AT THEIR FACILITY IN A MANNER UNCONSTRAINED BY THE "AS IS" SITUATION.

BUSINESS ARRANGEMENTS:

THE IMIP MAY BE VIEWED AS TESTING CHANGES IN NORMAL ACQUISITION PROCEDURES, AND A "BUSINESS ARRANGEMENT" IS THE CRITICAL, AND PERHAPS MOST DIFFICULT, COMPONENT. THE IDEA IS TO NEGOTIATE AN ARRANGEMENT THAT MAKES SENSE TO BOTH PARTIES THAT MIGHT NOT HAVE BEEN POSSIBLE OTHERWISE.

INCENTIVES MAY BE PROVIDED WHEN MORE THAN THE "USUAL" INVESTMENT IS INVOLVED AND WHEN THE RISKS, BENEFITS, AND OTHER FACTORS SHOW THE INCENTIVES CAN BE JUSTIFIED. THE DoD IS WILLING TO PROVIDE INCENTIVES UNDER IMIP IF ACQUISITION COSTS ARE REDUCED.

THERE WILL BE INSTANCES WHERE, FOR A VARIETY OF REASONS, A "BUSINESS ARRANGEMENT" WILL TURN OUT TO BE IMPRACTICAL. THE

IMPROVEMENTS SUGGESTED THROUGH RIGOROUS EXAMINATION OF THE FACILITY MAY BE ONES THE CONTRACTOR WILL UNDERTAKE ON HIS OWN; OR EITHER PARTY MAY FEEL THAT THE DEAL IS NOT SATISFACTORY. IT IS OBVIOUSLY ADVANTAGEOUS TO NEGOTIATE A BUSINESS ARRANGEMENT AS EARLY IN THE PROCESS AS POSSIBLE.

A FRAMEWORK AGREEMENT THAT DESCRIBES THE TYPES OF PROJECTS TO BE CONSIDERED UNDER THE IMIP, INCENTIVE STRUCTURES, METHODOLOGIES, TRACKING AND VERIFICATION REQUIREMENTS, AND THE VARIOUS BASELINES WHICH MUST BE ESTABLISHED IS AN IMPORTANT EARLY STEP IN THE IMIP PROCESS. THIS AGREEMENT DOES NOT COMMIT EITHER PARTY TO SUBSEQUENT ACTIONS; HOWEVER, IT DOES PROVIDE THE GUIDELINES FOR NEGOTIATIONS REGARDING SPECIFIC PROJECT IMPLEMENTATION.

CONTRACTOR PROPOSALS WILL FORM THE BASIS FOR BUSINESS ARRANGEMENT NEGOTIATIONS AND ANY ULTIMATE IMPLEMENTATION. THEY MAY VARY IN DETAIL BASED ON THE STAGE OF NEGOTIATIONS. INITIALLY THEY MAY BE SIMPLE BALLPARK ESTIMATES OF COSTS AND BENEFITS AND BROAD IDEAS ON WHAT IS TO BE DONE. PROPOSAL DEVELOPMENT IS AN ITERATIVE PROCESS AND THEY CAN BE EXPECTED TO BECOME PROGRESSIVELY MORE DEFINITIVE AS AN IMIP PROCEEDS.

RETURN-ON-INVESTMENT MODEL:

ONE TOOL FOR USE IN EVALUATING SPECIFIC RETURNS ON INVESTMENT IS A DISCOUNTED CASH FLOW MODEL THAT IS BEING REFINED BY THE LOGISTICS MANAGEMENT INSTITUTE FOR THE IMIP. IT IS AVAILABLE IN SUPPORT OF IMIP NEGOTIATIONS, AND YOU'LL HEAR MORE ABOUT IT LATER IN THE PANEL.

THE MODEL PROMOTES A COMMON FRAMEWORK FOR THE EVALUATION AND UNDERSTANDING OF THE EFFECTS OF AN INVESTMENT DECISION; HOWEVER, I WANT TO EMPHASIZE THAT THERE ARE OTHER FACTORS THAT ARE NOT INPUTS INTO THE MODEL BUT ARE VERY CRITICAL CONCERNS WITH RELATION TO IMIP. YOU IN INDUSTRY SHOULD HIGHLIGHT THESE AREAS IN YOUR PROPOSALS. THEY INCLUDE THE IMPACT ON THE INDUSTRIAL BASE (THE SUBJECT OF THIS MEETING), AND THE IMPACT ON THE QUALITY AND RELIABILITY OF THE ITEMS PRODUCED. QUALITY AND RELIABILITY IMPACT IS PARTICULARLY IMPORTANT AT A TIME WHEN EVALUATION OF POSSIBLE APPLICATION OF WARRANTY PROVISIONS IS BEING STRESSED. WHO IS TAKING THE REAL RISKS (CONTRACTOR OR THE DoD) AND THE CONFIDENCE IN AND ABILITY TO SET BASELINES ARE ALSO IMPORTANT CONSIDERATIONS.

PROGRAM STATUS:

DISCUSSIONS, FACTORY STUDIES, FRAMEWORK AGREEMENT NEGOTIATIONS, AND PROJECT IMPLEMENTATION ARE UNDERWAY WITH A SIGNIFICANT NUMBER OF CONTRACTORS. HOWEVER, EXPERIENCE IN MANY IMPORTANT RESPECTS IS LIMITED, AND MOST ACTIVITY HAS BEEN IN THE FACTORY STUDY OR DISCUSSION ARENA. GENERAL DYNAMICS, FORT WORTH (F-16), AND WESTINGHOUSE, BALTIMORE (MULTI-PROGRAM) HAVE RECEIVED THE MOST PUBLICITY IN TERMS OF CONCEPT APPLICATIONS. THE NAVY RECENTLY SIGNED THEIR FIRST TO FRAMEWORK BUSINESS ARRANGEMENTS WITH MORTON THIOKOL AND GRUMMAN AEROSPACE. THE ARMY IS ALSO PURSUING A NUMBER OF PROPOSALS ALTHOUGH MOST ARE AT AN EARLIER STAGE. THE SERVICE REPRESENTATIVES ON THE PANEL WILL PROVIDE YOU WITH GREATER DETAIL ON THEIR ACTIVITIES.

THE PROGRAM WILL PROCEED CAUTIOUSLY WHILE IT IS IN THE TEST PHASE AND UNTIL A BASE OF EXPERIENCED PEOPLE (IN BOTH GOVERNMENT AND INDUSTRY) IS AVAILABLE TO HANDLE PROPOSALS. IMIP IS CERTAINLY NOT FOR EVERY CONTRACT AT THIS STAGE. THE CURRENT NEED IS TO WORK THROUGH A FEW MORE DETAILED EXAMPLES AND ESTABLISH MORE PRECISE GUIDELINES AND PROCEDURES BASED ON THIS EXPERIENCE.

OTHER PROGRAMS:

THE IMIP WILL NOT BE THE EXCLUSIVE ANSWER TO PRODUCTIVITY IMPROVEMENT IN THE DEFENSE ACQUISITION PROCESS. THREE AREAS OF EMPHASIS EVOLVING OUT OF THE DEFENSE ACQUISITION IMPROVEMENT PROGRAM ARE MULTIYEAR PROCUREMENT, ECONOMIC PRODUCTION RATES, AND ENCOURAGING COMPETITION. THEY CAN BE EXPECTED TO HAVE A SYNERGISTIC IMPACT WITH AND, AT TIMES, TO MITIGATE THE NEED FOR AN IMIP.

MULTIYEAR PROCUREMENT PROVIDES THE PROGRAM STABILITY SO IMPORTANT TO PROGRAM EFFICIENCY AND PRODUCTIVITY IMPROVEMENT. ECONOMIC PRODUCTION RATES ARE ESSENTIAL FOR UTILIZATION OF FACILITIES IN AN EFFICIENT MANNER. COMPETITIVE PRESSURES PROVIDE THE BEST INCENTIVE OF ALL TO MODERNIZE AND MAINTAIN AN EFFICIENT AND PRODUCTIVE MANUFACTURING FACILITY.

THE MANUFACTURING TECHNOLOGY PROGRAM (MANTECH) IS A WELL ESTABLISHED PROGRAM WITH OBJECTIVES WHICH ARE IN SOME WAYS SIMILAR TO IMIP--I.E., MAKING IMPROVEMENTS IN MANUFACTURING PRODUCTIVITY. BUT THERE ARE SOME VERY SIGNIFICANT DISTINCTIONS AS YOU WILL HEAR IN THE PANEL. AT THIS STAGE I WILL DO THE PANEL ONE FAVOR AND

ANSWER THE FIRST TEN QUESTIONS THAT ARE NORMALLY ASKED ABOUT IMIP--THEY ARE ALL "HOW MUCH MONEY HAS THE DoD PROGRAMMED FOR IMIP." ANSWER: WE DO NOT HAVE A BIG POT OF MONEY PROGRAMMED FOR IMIP. THE MAIN THRUST OF THE IMIP IS TO MOTIVATE A CONTRACTOR TO INVEST HIS OWN FUNDS.

AS SOME OF YOU ARE UNDOUBTEDLY AWARE, WE IN THE DoD ARE TAKING ANOTHER LOOK AT OUR CONTRACT FINANCE AND INVESTMENT POLICIES. COLONEL RON FINKBINER OF MY OFFICE IS HEADING THIS STUDY. CAS-409, CAS-414, PROFIT POLICIES, AND THE IMIP WILL ALL BE EXAMINED.

ADDITIONALLY, AND AS I ALLUDED TO EARLIER, IMIP AND BROADER PRODUCTIVITY IMPROVEMENT PLANS MUST ALL BE INTEGRAL PARTS OF OUR ACQUISITION STRATEGY. THEY CANNOT BE DONE IN ISOLATION. FOR INSTANCE, SECOND SOURCING PLANS AND AN IMIP AGREEMENT MUST BE CONSIDERED WITH RESPECT TO THE IMPACT EACH MAY HAVE ON THE OTHER. EFFICIENCY OF THE MANUFACTURING PROCESS AND MANUFACTURING PLANS NEED MORE VISIBILITY. THEY SHOULD BE CONSIDERATIONS DURING OUR SOURCE SELECTION EVALUATION AND DSARC DELIBERATIONS. WE HAVE RECENTLY ISSUED TWO IMPORTANT DIRECTIVES WHICH HAVE A BEARING IN THIS AREA--DoDD 4245.7, "TRANSITION FROM DEVELOPMENT TO PRODUCTION," AND DoDD 4245.6, "DEFENSE PRODUCTION MANAGEMENT." INDUSTRY AND PROGRAM PERSONNEL SHOULD PAY SPECIAL ATTENTION TO THESE NEW DIRECTIVES.

A FINAL EXAMPLE OF OUR EFFORTS TO IMPROVE PRODUCTIVITY IN THE ACQUISITION PROCESS IS OUR ATTEMPT TO PROMOTE MORE COST-

EFFECTIVE DEFINITION OF REQUIREMENTS IN OUR WEAPON SYSTEM CONTRACTS. FOR EXAMPLE, IN DEVELOPMENT CONTRACTS WE ARE PLACING GREATER EMPHASIS ON SPECIFYING RESULTS REQUIRED RATHER THAN DETAILED "HOW TO" PROCEDURES FOR ACHIEVING THESE RESULTS. WE ARE ALSO WORKING TO EXCLUDE THE APPLICATION OF PREMATURE AND UNTAILORED SPECIFICATIONS, STANDARDS, AND DATA ITEMS FROM OUR REQUESTS FOR PROPOSALS AND CONTRACTS.

CONCLUSION:

THE INDUSTRIAL MODERNIZATION INCENTIVES PROGRAM (IMIP) IS A TOOL FOR ENCOURAGING INCREASED CAPITAL INVESTMENT AND INCREASED PRODUCTIVITY. HOWEVER, AS INDICATED EARLIER, IT IS NOT THE ONLY TOOL. THE IMIP IS A SPECIFICALLY TARGETED AND CONTROLLED WAY OF FOSTERING CAPITAL INVESTMENT AND MODERNIZATION; THE DOD MUST SEE THE PROSPECT OF REDUCED ACQUISITION COSTS AS A RESULT OF ANY "BUSINESS ARRANGEMENT" NEGOTIATED UNDER THE IMIP.

THE IMIP IS NOT A SHORT-TERM PROGRAM OR APPROACH. INDEED, IT IS LIKELY TO BE IN THE TEST MODE FOR AT LEAST ANOTHER YEAR. BROAD IMPLEMENTATION AND MAXIMUM BENEFITS WILL SPAN A MUCH LONGER PERIOD. RECENT CONGRESSIONAL INPUT REGARDING IMIP WAS SUPPORTIVE; HOWEVER, THE TEST NATURE OF THE PROGRAM WAS EMPHASIZED. THE NEED TO CAREFULLY ANALYZE AND DOCUMENT DETAILS, JUSTIFICATIONS, AND RESULTS WAS HIGHLIGHTED.

CHANGES IN IMIP CAN BE EXPECTED--ESPECIALLY THOSE AIMED AT SIMPLIFICATION. THESE WILL OCCUR BECAUSE ALTHOUGH IMIP IS SIMPLE

IN CONCEPT, DEVELOPMENT OF SPECIFIC CONTRACT LANGUAGE TO DATE HAS BEEN TIME CONSUMING, MANPOWER INTENSIVE, AND COMPLEX. TECHNIQUES SUCH AS THE SHARING FACTOR APPROACH (WHEREBY SHARED SAVINGS REWARDS ARE ALLOCATED PROPORTIONATELY OVER ALL CONTRACTS AT A MANUFACTURING FACILITY) ARE ALREADY BEING PURSUED AS A WAY TO SIMPLIFY CONTRACTUAL ADMINISTRATION OF IMIPs. YOU SHOULD HEAR MORE ABOUT THIS LATER IN THE PANEL.

THE IMIP PRESENTS A TREMENDOUS OPPORTUNITY AND CHALLENGE TO SHAPE THE FUTURE OF DEFENSE INDUSTRY. IT CAN BE EXPECTED TO MAKE AN IMPORTANT CONTRIBUTION TO A MODERNIZED, EFFICIENT DoD MANUFACTURING BASE AND REDUCED ACQUISITION COSTS. ONE POPULAR SAYING WHEN TALKING ABOUT PRODUCTIVITY IS THAT PEOPLE NEED TO "WORK SMARTER, NOT HARDER." WE NEED TO DO BOTH. IF IMIP HAS THIS INTENDED EFFECT, IT WILL BE A GREAT SUCCESS.

THANK YOU.

ANALYSIS OF INCENTIVES FOR PRODUCTIVITY-ENHANCING INVESTMENT

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ABSTRACT

There is evidence that Government contractors perform production contracts using high-cost methods leading to higher than necessary prices to the Government. Capital investments which lower total cost of performance are discouraged or at least not encouraged by current policies and market environment.

This paper describes a model of contractor investment behavior within existing DoD contracting principles. A preference for investments which confer low rates of productivity gain is shown to exist under current contracting policies. A discounted cash flow investment analysis model is used to explore a number of correctives to current policies including increased weight on facilities capital employed in Department of Defense (DoD) profit policy, sharing of cost savings, and investment incentives such as accelerated depreciation. Finally, the payoff to the Government and DoD if each corrective were adopted is explored.

INTRODUCTION

Many characteristics of the defense marketplace have historically discouraged industry investment. Among these have been the existence of large stocks of Government-provided plant and equipment, the cyclical nature of defense demand, annual funding of contracts, and, perhaps most importantly, cost-based profit policy. Although some marginal changes have been made over the past few years, the defense system of basing profits largely on the amount of costs expected to be incurred has discouraged contractors from making cost-reducing investments in facilities. In an attempt to counter the negative incentives of program instability and cost-based profit policy, the DoD is experimenting with programs for protecting a contractor from loss on his investments in case of early program termination and with the sharing of savings associated with investments in productivity-enhancing facilities and equipment. This Industrial Modernization Incentives Program (IMIP) test has been ongoing for a year.

As both the Government and industry participants in the IMIP test look to strike "win-win" business deals (those with benefits to both parties), each needs a methodology for evaluating the benefits associated with proposed projects. In our support of the IMIP Steering Group, we at Logistics Management Institute (LMI) have been using discounted cash flow

analysis to examine the role of incentives (savings sharing) in encouraging contractor investment, and, more specifically, to examine the role of various elements of Cost Accounting Standards (CAS) and Weighted Guidelines profit policy in contractor investment decisions. In the balance of this paper, we will give a brief overview of the discounted cash flow analysis model and then discuss what sample results from the model suggest about how shared savings incentives, relevant CAS 409 and 414 and Weighted Guidelines profit policy interact to determine contractor and Government benefits from alternative investments.

OVERVIEW OF DISCOUNTED CASH FLOW ANALYSIS

The procedure employed to analyze a productivity-enhancing investment is to consider its effects on contractor cash flows and Government acquisition costs. The analysis is for incremental effects of a productivity-enhancing investment -- what additional return is earned by placing in service an investment which causes a reduction in the cost of production? The pre-investment profit, based on overall contract cost and facilities already in place, is not considered in the framework employed. Changes in contractor cash flow depend on contracting cost principles, profit policy, tax policy, and the inherent productivity of the investment. Because profit is based mainly on estimated cost of performance, investments which lower cost may lead to insufficient return on investment. Consequently, sharing of cost savings may be required to make the contractor's investment worthwhile. The Government gain from the investment is affected by the same factors except that the Government pays out monies in accordance with cost principles and profit policy. In turn, it receives benefits in the form of lower acquisition price. Net Government benefit is the difference between the total productivity gain and all payments to the contractor, whether costs, profit or shared savings. Discounted cash flow analysis considers the magnitude and timing of all effects on cash flow due to a contractor's investment. It is incremental in that an investment's cash flow effects on a contractor are over and above any investments already in place. Items of cash inflow and outflow are not only quantified in magnitude, but their timing is also considered through discounting. This technique reflects the fact that a dollar of immediate positive cash inflow is of more value than one due in the future. An after-tax stream of cash inflows and outflows is summarized by a single number, the internal rate of return (IRR), representing the value of the

investment to the contractor. The IRR is precisely the discount rate that makes the present value of all cash inflows equal to the present value of all cash outflows. It represents the after-tax earning power of an investment and thus is a standard of comparison with other investment alternatives.

Under Government contracting and tax conventions, an investment by a contractor leads to cash inflows based on allowable costs, profit and tax credits. Under capital cost recovery principles, a contractor is reimbursed for depreciation based on the original acquisition cost of the asset and its life under CAS 409 guidelines. An additional related cash inflow arises as imputed cost of money under CAS 414 based on the asset's remaining book value. Payment for profit also contributes to contractor cash inflow. Profit is paid on annual depreciation expenses, since they are allowable costs, and on facilities net book value under Weighted Guidelines. Profits for annual depreciation costs and on facilities capital are paid at different rates under Weighted Guidelines. Finally, tax policy recognizes an investment tax credit at the time the asset is put in service.

Offsetting the cash inflows occasioned by the facilities investment are a number of outflow items. The major cash outflow is the payment for the facilities themselves at time of acquisition. In the event the facilities are financed by borrowing, there are annual outflows for principal and interest payments. Additional income tax effects also occur. Tax payments are based on the difference between all additional revenues generated by the investment and all expenses recognized for tax purposes. Such expenses are different from contracting costs (e.g., interest and Accelerated Cost Recovery System (ACRS) depreciation are used for tax purposes). Finally, in the event the investment reduces the cost of contract performance, a reduction in cash inflow occurs since pre-investment profit is based in part on cost incurred. A cash outflow representing "lost profit" occurs to the extent that investment lowers the cost base on which a portion of profit is determined.

The net of all cash inflow and outflow items produces a stream of annual flows -- typically negative in the year of facilities acquisition and positive in subsequent years. The IRR associated with this stream indicates the profitability of the investment to the contractor. Sharing then represents additional cash inflows, funded from productivity savings, which can be offered to raise the contractor's IRR if necessary.

A similar analysis can be made from the point of view of the DoD program and the Government in total. The rate of return to the Government is merely that rate associated with the stream of all investment-related cash outflows paid

the contractor by the Government and all benefit inflows received by the Government. Outflows are those associated with capital cost recovery, profits and income tax credits. Benefit inflows to the Government are from reduced acquisition price from cost savings plus any additional income taxes paid less any sharing of savings with the contractor. In the analysis described here, intangible benefits such as product quality improvement or reduced lead times and tangible savings benefits received beyond the program life are not included. Tax effects are counted in the total Government perspective but not in the DoD program analysis. Direct Government funding for Phase I and/or II analysis can be introduced in the model as an up-front cash outflow item to the Government.

The discounted cash flow model is merely a year-by-year tracking of all cash flow items, summed to produce net after-tax cash flows. The model has been constructed using one of the many "spread-sheet" programs available for use on a personal computer. A sample output from the model is presented in Table 1.

TABLE 1. IMIP SHARED SAVINGS COMPUTATION

	Year:	0	1	2	3
1 Contractor Investment		100.00			
2 Cumulative Contractor Investment		100.00	100.00	100.00	100.00
3 Direct Government Funding		10.00			
4 Cumulative Government Funding		10.00	10.00	10.00	10.00
5 Shared Savings			2.17	2.17	2.17
6 + Imputed CAS #14 Interest	14%		13.22	10.99	8.26
7 + Profit on Facilities	18%		17.00	14.13	10.63
8 + CAS #09 Depreciation			11.11	20.83	18.06
9 + Profit on Depreciation	8%		0.89	1.67	1.44
10 - Profit on Savings	12%		-3.60	-3.60	-3.60
11 BEFORE TAX CASH FLOW			40.79	46.18	36.96
12 - ACRS Depreciation			-19.00	-30.80	-22.80
13 Taxable Income			21.79	15.78	14.16
14 Income Tax	46%		-10.02	-7.26	-6.51
15 Investment Tax Credit	10%		10.00	0.00	0.00
16 AFTER TAX CASH FLOW			40.77	38.92	30.45
Cumulative After Tax Cash Flow		-100.00	-59.23	-20.31	10.14
17 Productive Savings at	30%		30.00	30.00	30.00
18 Contractor IRR w/ shared savings	20.0%				
19 Contractor IRR w/o shared savings	17.6%				
20 DOD Program Benefit		-10.00	-10.79	-16.18	-6.96
21 Cumulative DoD Program Benefit		-10.00	-20.79	-36.97	-43.93
22 DOD IRR	15.2%				
23 Total Government Benefit		-10.00	-10.77	-8.92	-0.45
24 Cumulative Government Benefit		-10.00	-20.77	-29.69	-30.14
25 Government IRR	27.7%				
26 Contractor Payback Period	2.7 yrs				
27 DoD Payback Period	6.9 yrs				
28 Government Payback Period	5.3 yrs				

Numerical values employed in Table 1 are essentially similar to those used in the 1982 draft DoD IMIP Guide and include a contractor target or hurdle rate of 20 percent. The values shown correspond to DoD policy guidelines and are intended to be representative.

The model calculates contractor IRR without sharing and IRRs to the DoD program and Government. It also allows for selection among four shared savings streams each of which leads to the targeted 20 percent after-tax return to the contractor. Theoretically, an infinite number of streams to achieve the desired IRR are

possible, and we simply chose four for illustrative purposes.

POLICY IMPLICATIONS OF DISCOUNTED CASH FLOW ANALYSIS

The Role of Shared Savings Incentives. The discounted cash flow model was run under a number of different assumptions for the purpose of assessing returns to the contractor and Government from productivity-enhancing investments. In particular, we are interested in the incremental return to a contractor as he puts in service facilities with varying associated productivity gains and the incremental return to the Government with necessary sharing, again as productivity varies. Within these cases, we also change profit parameters and include inflation savings to assess their effects on contractor and Government returns. All of the analysis reflects incremental effects of productivity-enhancing investments; the absolute level of profit without the investment is not considered.

In Table 2 we have reproduced model results showing for various productivity gains, the after-tax internal rate of return on contractor investment. The values calculated in Table 2 are based on a CAS 414 rate of 14 percent, profit on facilities of 18 percent, profit on depreciation of 8 percent, profit on cost savings of 12 percent and no inflation. The annual cost-saving productivity gain is expressed as a percentage of the original acquisition cost of the facilities investment.

TABLE 2. PRODUCTIVITY GAIN VS. PROFITABILITY: NO SHARING

<u>PRODUCTIVITY GAIN</u> <u>(% of Investment cost)</u>	<u>CONTRACTOR</u> <u>AFTER-TAX IRR</u>
15%	19.6%
30	17.6
45	15.5
60	13.1

Without sharing of savings, the contractor receives the highest incremental return by selecting the investment with the worst productivity gain (worst-first). This result follows from the cost savings' effect on profit; the higher the savings, the lower the cost-based profit, as all other cash inflow items stay the same.

For the parameter values used, the highest after-tax return (19.6 percent) is earned with an investment that annually saves 15 percent of its original acquisition cost. More productive investments earn progressively less. A low of 13.1 percent return after taxes is earned with a highly productive investment of 60 percent.

Contractor sharing of savings from productivity gains offsets the incentive to invest first in the least productivity-enhancing facilities.

Sharing, in effect, offsets the profit-reducing aspects of cost-related profit and adds to the return if it is necessary to raise the contractor IRR to an acceptable level. Consequently, highly productive investments require the most sharing dollars but also provide the necessary funding for such sharing.

The model was used to calculate sharing required to achieve a 20 percent after-tax IRR to the contractor. This target hurdle rate is offered as a prototype and can be increased or decreased depending on such factors as alternative returns available in the economy, program risks, the size of the productivity gain, and overall DoD profit objectives. Results are displayed in Table 3. Values for CAS 414 and profit components are the same as those used for the calculation in Table 2.

TABLE 3. PRODUCTIVITY GAIN VS. RETURN TO THE GOVERNMENT: WITH SHARING (Contractor's After-Tax IRR Set at 20%)

<u>PRODUCTIVITY GAIN</u> <u>(% of Investment Cost)</u>	<u>CONTRACTOR</u> <u>AFTER-TAX IRR</u>	<u>GOVERNMENT IRR</u>
15%	20%	0%
30	20	28
45	20	93
60	20	210

As the productivity of alternative investments improves, more sharing dollars must be awarded to maintain a target of 20 percent after-tax IRR for the contractor. Consequently, the contractor is indifferent to selection among investment opportunities with varying rates of productivity gain -- a 20 percent IRR is always earned. The Government return, however, escalates dramatically with high productivity gains and approaches 100 percent for investments yielding annual savings of 45 percent of original investment cost.

This fixed 20 percent IRR is a convention of the analysis. In practical application, the very high potential return to the Government from investments with high productivity gains suggests that the Government should consider negotiating higher contractor IRRs when the productivity gain associated with the investment is high.

We also used the model to determine the extent of productivity gain necessary, absent inflation, to yield a 10 percent return to the Government. Such a Government return would be necessary to meet the Office of Management and Budget (OMB) guidelines. The model indicated a 23 percent productivity gain (i.e., about a four-year payback period) is necessary to yield a 10 percent IRR to the Government. This finding is specific to the values used in the model as reported in the discussion of Table 2 and should not be construed as a general guideline.

Finally, note that if inflation had been included in the analysis and inflation-avoidance

savings counted, all results would have been magnified. Absent sharing, given productivity gains would lead to lower IRRs to contractors (Table 2); while with sharing, Government returns for a given productivity gain would be higher than rates indicated in Table 3.

The Role of Capital Recovery Policies and Profit Policy. As noted above, contractor facilities investments give rise to cash flows based on Government capital cost recovery policies and profit policy. The return on investment can be examined by considering contractor investment (a cash outflow) relative to the stream of inflows received under capital cost recovery and profit policies as distinct from the inflow occurring because of shared savings incentives. The rate of return on this additional net cash flow stream indicates whether or not an investment, for whatever purpose, is likely to be undertaken in the absence of shared savings incentives. The rate of return earned on the investment must exceed a contractor's hurdle rate to be undertaken.

Capital cost recovery and profit flows, as outlined above, consist of the following elements:

- Reimbursement for depreciation on facilities capital under CAS 409;
- Profit on annual depreciation costs under Weighted Guidelines profit policy;
- Reimbursement for the imputed cost of money on facilities capital under CAS 414;
- Profit on the undepreciated balance of facilities capital through Weighted Guidelines; and
- Change in profit because of changes in costs incurred (lost profit if costs are reduced).

It is clear from the definitions of the aforementioned profit and cost recovery principles that they are interrelated and also related to the level of other costs incurred in contract performance. Recovery for depreciation under CAS 409 calls for use of the same method (e.g., straight-line, sum-of-the-years' digits) as is used by the contractor for financial accounting over an expected service life reflecting the assets' usefulness. Thus, recovery is quicker the shorter the service life used and the more accelerated the depreciation method used. However, the cost recognized under CAS 414 for imputed cost of money is based on unrecovered investment in facilities. Higher depreciation recovery using short service lives and accelerated depreciation methods implies lower undepreciated (book value) balances and thus lower "cost of facilities capital" reimbursements.

A second effect based on this same phenomenon occurs in the determination of profit

objectives. Depreciation raises profit based on cost because depreciation is an element of overhead cost. Depreciation reduces profit based on facilities book value because depreciation lowers facilities book value. Furthermore, depreciation also lowers profit to the extent that a depreciable investment lowers other costs of performance. Any savings in, say, direct labor input resulting from contractor investment in productivity-enhancing facilities implies a reduction in that portion of profit based on lower direct labor costs.

It is evident that total capital recovery under CAS 409, CAS 414 and Weighted Guidelines Profit Policy is composed of many facets, some running counter to others. Trade-offs are evident since faster recovery through rapid depreciation and associated higher profit on depreciation costs imply lower subsequent recovery for those reimbursements which are based on undepreciated balances -- namely CAS 414 cost of money and Weighted Guidelines profit on facilities capital. Furthermore, more immediate recovery is of greater value than equivalent recovery at a later time due to the "time value of money." The timing as well as the magnitude of recovery must be considered.

Once again we used discounted cash flow analysis to examine discounted after-tax cash flow rates of return on contractor investment as asset service life under CAS 409 depreciation, profit rates on facilities capital employed and CAS 414 rates are varied. Cash flows considered are those affected by contractor facilities investment:

- the investment value itself
- imputed cost of money (CAS 414)
- depreciation reimbursement (CAS 409)
- Weighted Guidelines profit on depreciation
- Weighted Guidelines profit on facilities capital
- reduced profit on cost from productivity-enhancing investment (when applicable)
- Federal income taxes
- investment tax credit.

As before, we assume an investment of \$100 with a productivity gain of 30 percent (i.e., \$30 per year). In this case, however, the contractor receives no direct benefit (i.e., retained savings on the instant contract or shared savings incentives). Having all contractor benefits accrue as a result of capital recovery and profit policy enables us to focus on the policy implications of varying these and related elements such as equipment service life.

In order to analyze whether profit or depreciation policies, by themselves, could serve as effective incentives to motivate productivity-enhancing investments, we took the base case of Table 1 (combined CAS 414 and facilities capital rates of 32 percent), two other hypothetical cases (combined rates of 20 percent and 14 percent) and then varied the equipment service lives. The results are presented in Table 4.

TABLE 4. INCREMENTAL RATE OF RETURN ON FACILITIES INVESTMENT: NO SHARED SAVINGS

CAS 414 Rate	PROFIT RATE		CAS 409 Service Life (Years)	Rate of Return
	Facilities Capital	Depreciation Costs		
14%	18%	8%	20	19.2%
14%	18%	8%	10	18.4%
14%	18%	8%	5	15.3%

14%	6%	8%	20	10.4%
14%	6%	8%	10	11.0%
14%	6%	8%	5	8.9%

14%	0%	8%	20	5.5%
14%	0%	8%	10	7.1%
14%	0%	8%	5	5.5%

The results from Table 4 suggest that a reasonable rate of return (about 20 percent) is achievable given a 14 percent CAS 414 rate and 18 percent facilities capital profit rates. In this case, however, shortening the asset service life reduces the contractor's IRR. When the combined CAS 414 and facilities capital profit rates drop to 20 percent or below, returns to the contractor become much less attractive. Faster depreciation recovery does little to improve the contractor's IRR. With the CAS 414 and facilities capital profit rates lowered to the hypothetical combined 20 and 14 percent respectively, there is little difference in contractor IRR between a very long and a very short service life. In fact, the intermediate 10-year asset life yields the best IRR.

This analysis suggests that profit (including CAS 414 considered as profit) based on investment is a more important motivator of investment than rapid write-off for depreciation. It should also be noted that without sharing, the contractor is still motivated to choose the investment that reduces cost least. Thus, sharing is still needed to offset the "worst-first" incentive no matter how high the profit rate on facilities capital.

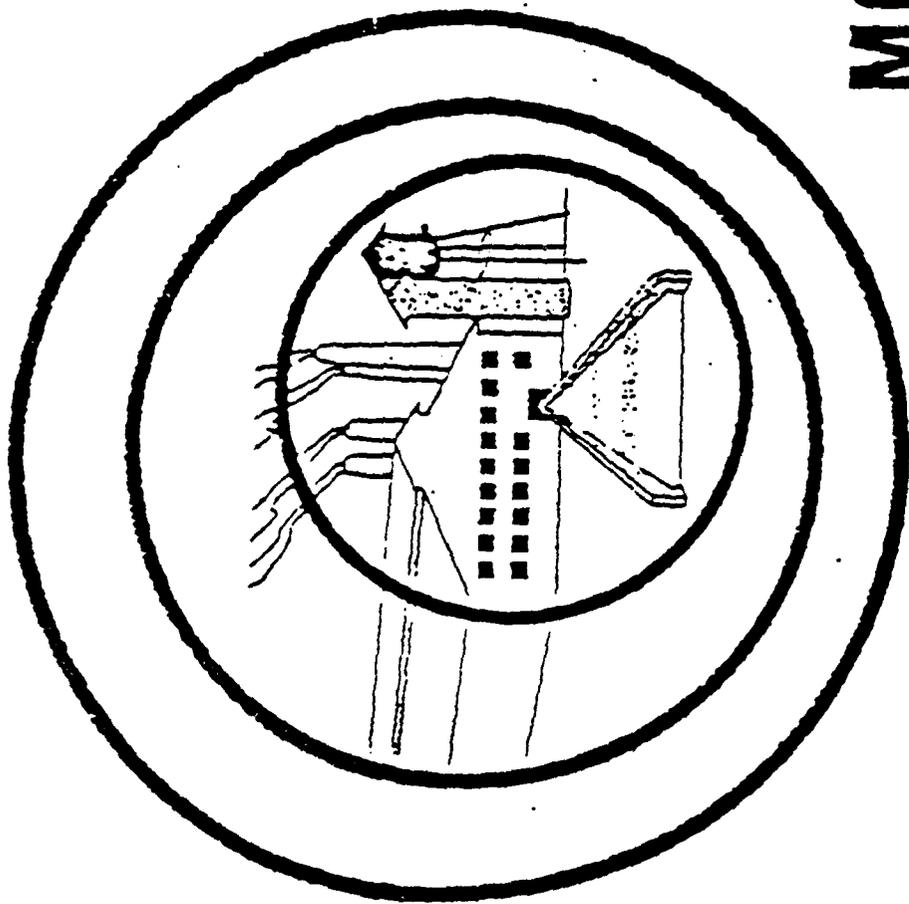
SUMMARY AND CONCLUSIONS

This paper has summarized LMI's use of discounted cash flow analysis to examine the policy implications of various approaches to encouraging defense contractors to make productivity-enhancing investments. Our use of discounted cash flow analysis to date leads us to the following preliminary conclusions:

- Without sharing, "worst-first" low productivity investments are encouraged by

the current largely cost-based profit policy.

- With sharing, a contractor could be offered high rates of return to make investments with high productivity gains.
- Savings from productivity gains can offer high returns to the Government if sufficient cost reduction occurs to provide lower prices to the Government even after it has funded the sharing.
- A short service life does not necessarily increase a contractor's rate of return. In fact, when combined CAS 414 and facilities capital profit rates are relatively high, a longer service life is preferred.
- Generous combined CAS 414 and facilities capital profit rates can be an effective incentive to investment, but sharing is still needed to offset "worst-first."
- Each proposed business deal requires discounted cash flow analysis to determine what terms are necessary to provide a "win-win" situation.

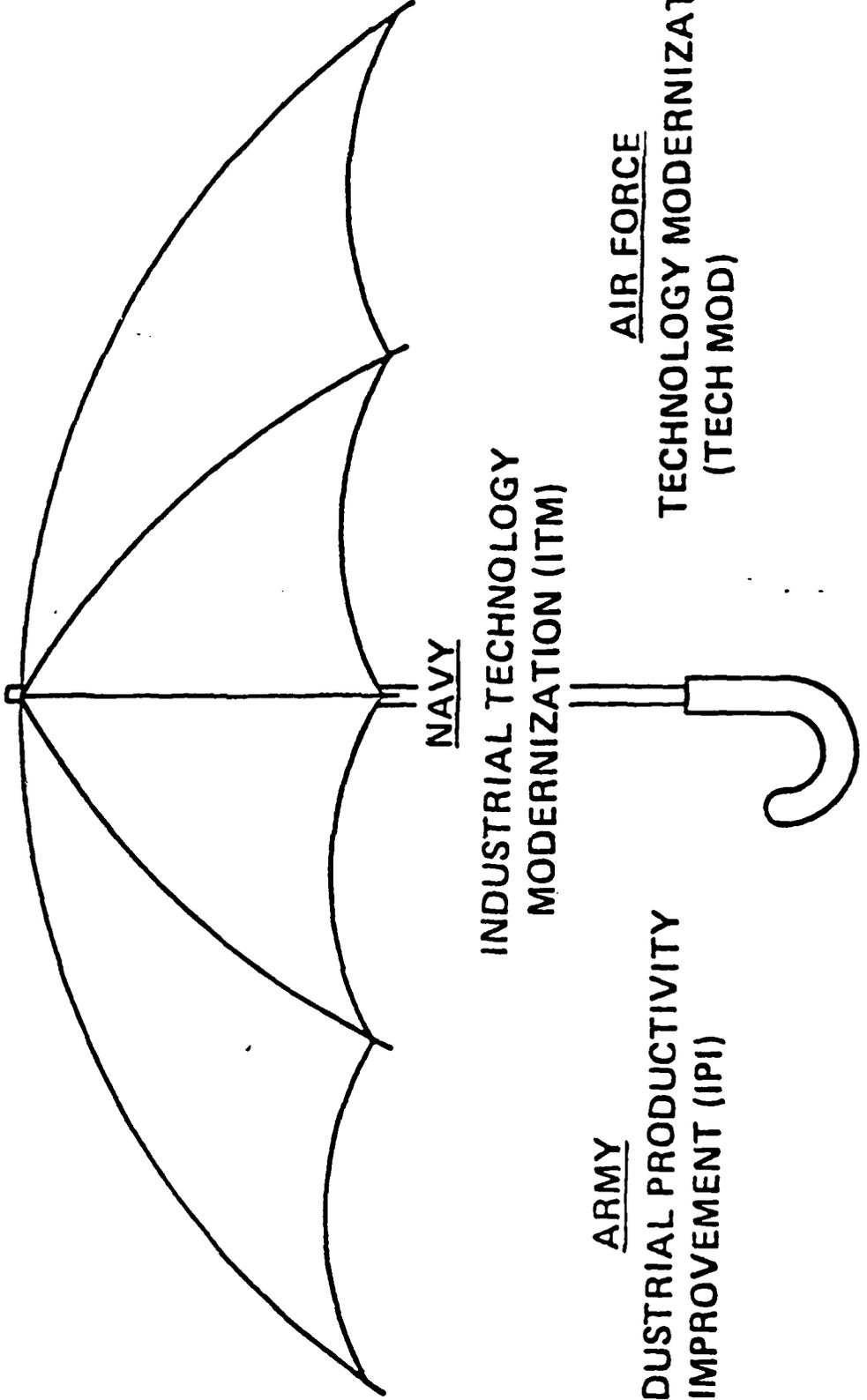


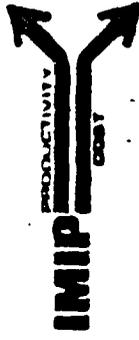
THE DOD INDUSTRIAL MODERNIZATION INCENTIVES PROGRAM (IMIP) AND THE IMIP TEST

BRIEFER:
DR. LINDA BRANDT
NAVMAT IMIP OFFICE

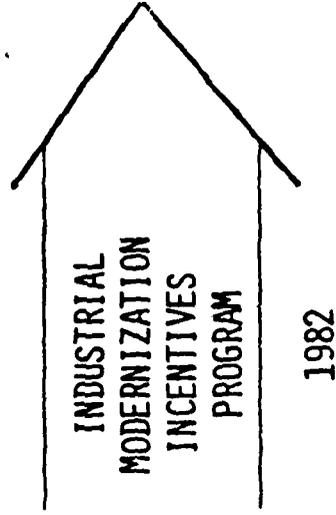
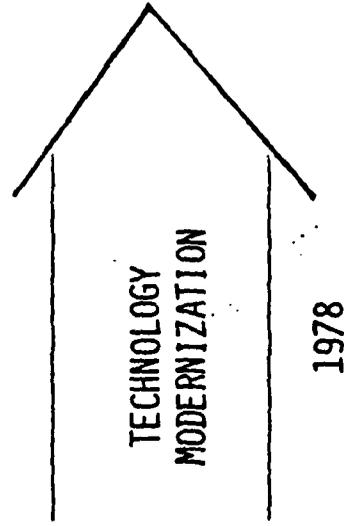
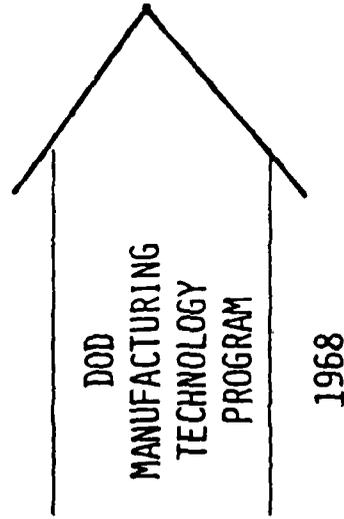
DoD

INDUSTRIAL MODERNIZATION
INCENTIVES PROGRAM (IMIP)





PROGRAM EVOLUTION



COMMON GOALS

- REDUCE COSTS
- PROMOTE IMPROVEMENTS
- NEW TECHNOLOGY IN MANUFACTURING
- STIMULATE INDUSTRY INVESTMENT
- STRENGTHEN INDUSTRIAL BASE

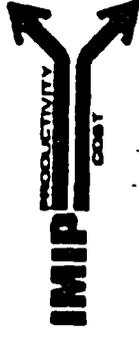
IMIP - WHAT IT IS



A FORMAL AGREEMENT BETWEEN INDUSTRY AND DOD CONTAINING INCENTIVES FOR IMPROVING THE INDUSTRIAL BASE FOR DEFENSE, BASED ON A STRUCTURED ANALYSIS AND IMPLEMENTED THROUGH THE INCREASED USE OF MANUFACTURING TECHNOLOGY, MODERNIZATION AND ENGINEERING OR MANAGEMENT APPLICATIONS (THE SUPPORT EFFORT REQUIRED TO MODIFY AND IMPLEMENT IMPROVEMENTS IN EXISTING PROCESSES, ORGANIZATIONS, EQUIPMENT, OR SUPPORT SYSTEMS INCLUDING SOFTWARE)

- IMPROVEMENTS MUST BE MADE ON THE FACTORY FLOOR TO ENSURE SUCCESS

IMIP OVERALL THRUST

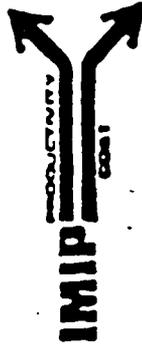


-
- JOINT GOVERNMENT/INDUSTRY VENTURE
 - ENCOURAGE CONTRACTOR CAPITAL INVESTMENT
 - CREATE WIN/WIN ENVIRONMENT
 - INCREASE PRODUCTIVITY, REDUCE COST, IMPROVE QUALITY AND RELIABILITY
 - EXPANSION OF TECHNOLOGY MODERNIZATION (TECH MOD) AND INDUSTRIAL PRODUCTIVITY IMPROVEMENT (IPI) PROGRAMS

 - PRIMARY INCENTIVES
 - PRODUCTIVITY SHARED SAVINGS REWARDS
 - CONTRACTOR INVESTMENT PROTECTION

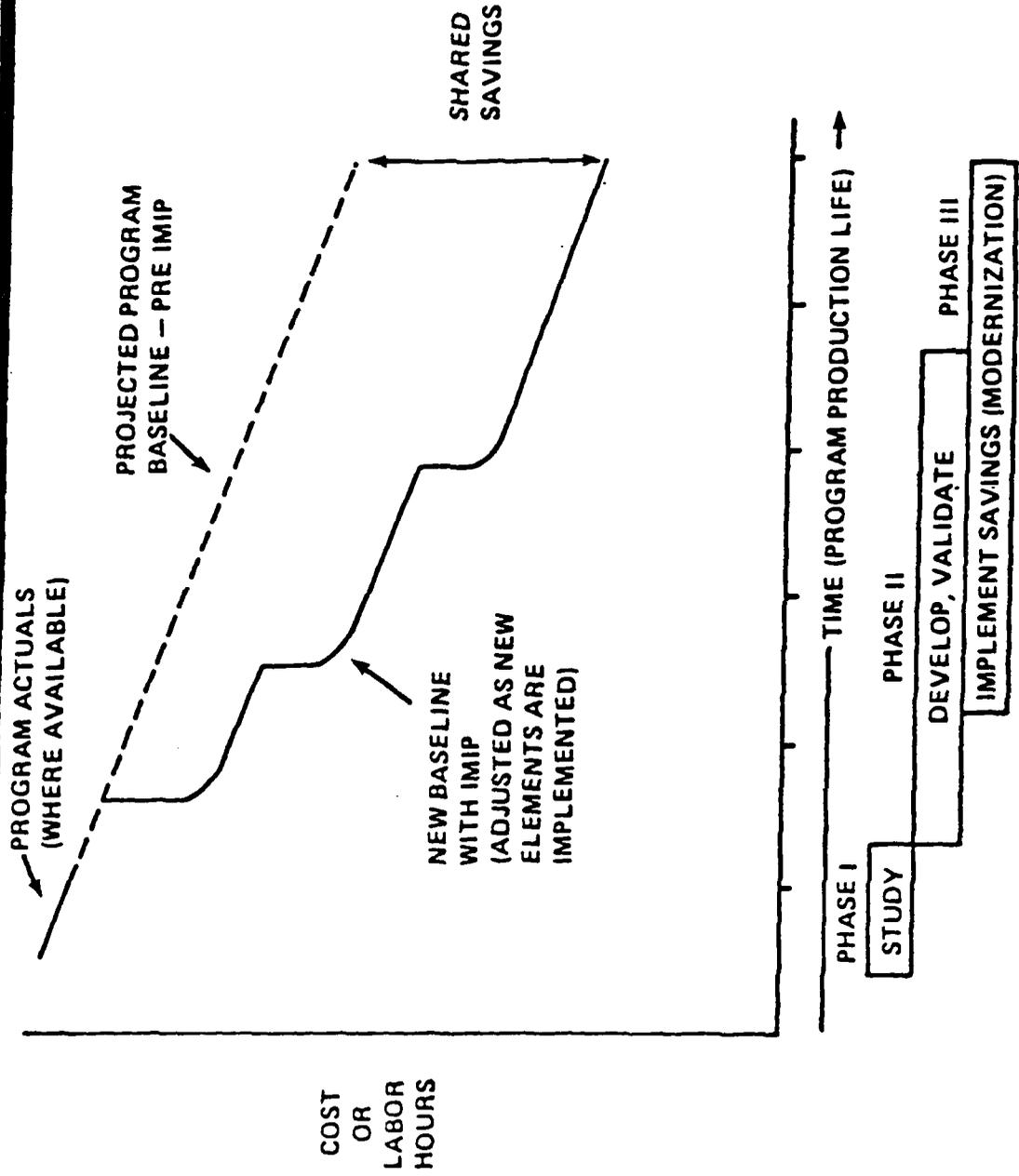
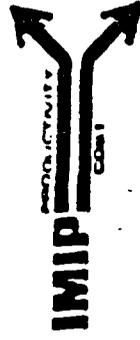
 - SUBTIER EMPHASIS

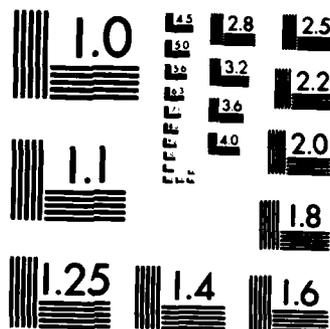
IMIP — KEY FEATURES



- THE IMIP PERMITS INDUSTRY TO BENEFIT FROM THEIR COST REDUCTION EFFORTS
 - THEREBY REMOVING THE IDENTIFIED DISINCENTIVE OF PRICING CONTRACTS ON THE BASIS OF COSTS EXPECTED TO BE INCURRED; AND
 - ELIMINATING THE APPREHENSION THAT ANY REDUCTION IN THE COSTS OF PERFORMANCE WILL CAUSE A RELATED REDUCTION IN NEGOTIATED PROFITS
- THE IMIP PROMISES TO MAKE QUALITY, RELIABLE WEAPON SYSTEMS, EQUIPMENT AND MATERIAL MORE AFFORDABLE, WHILE CONTINUALLY MOTIVATING INDUSTRY THROUGH SHARED SAVINGS REWARDS TO BE MORE PRODUCTIVE

IMIP AND PROGRAM BASELINE ADJUSTMENTS





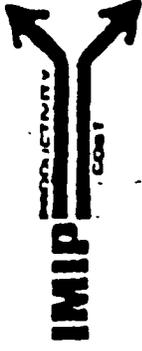
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

IMIP STEERING GROUP

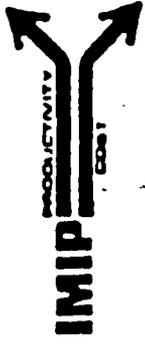


CHAIRMAN	RADM J.S. SANSONE, JR.	NAVMAT
MEMBERS		
OSD	DR. RICHARD A. STIMSON	USDRE (IP)
ARMY	MGEN DAVID W. STALLINGS	DARCOM
	MR. FRED MICHEL	DARCOM
AIR FORCE	BGEN BERNARD L. WEISS	HQ, USAF (ROC)
DLA	MGEN JOSEPH H. CONNOLLY	DD CAS
	MR. RAYMOND F. CHIESA	DLA-P
DCAA	MR. JAMES R. BROWN	DCAA

IMIP WORKING GROUP - SUPPORTS STEERING GROUP



NAVMAT	CDR JOE HERING	MAT 02M
	DR. LINDA BRANDT	MAT 02M
	MR. BOB ACHENBACH	MAT 064
OSD	MR. DOUG REEVES	USDRE (IP)
	LCOL FRANK DOHERTY	USDRE (IP)
ARMY	LCOL SAM MARSH	HQ, USA
	MR. CHUCK KIMZEY	DARCOM
	MR. DAN CUNDIFF	DARCOM
AIR FORCE	COL TOM FIORINO	HQ, USAF
	MAJ RICH WILLIFORD	HQ, USAF
	LCOL GENE KLUTER	AFSC
	MR. GARY POWELL	AFSC
DLA	MR. FRANK MCBRIDE	DLA-PRS
	MR. TOM WEBB	DLA-LR
DCAA	MR. FRANK REXFORD	DCAA



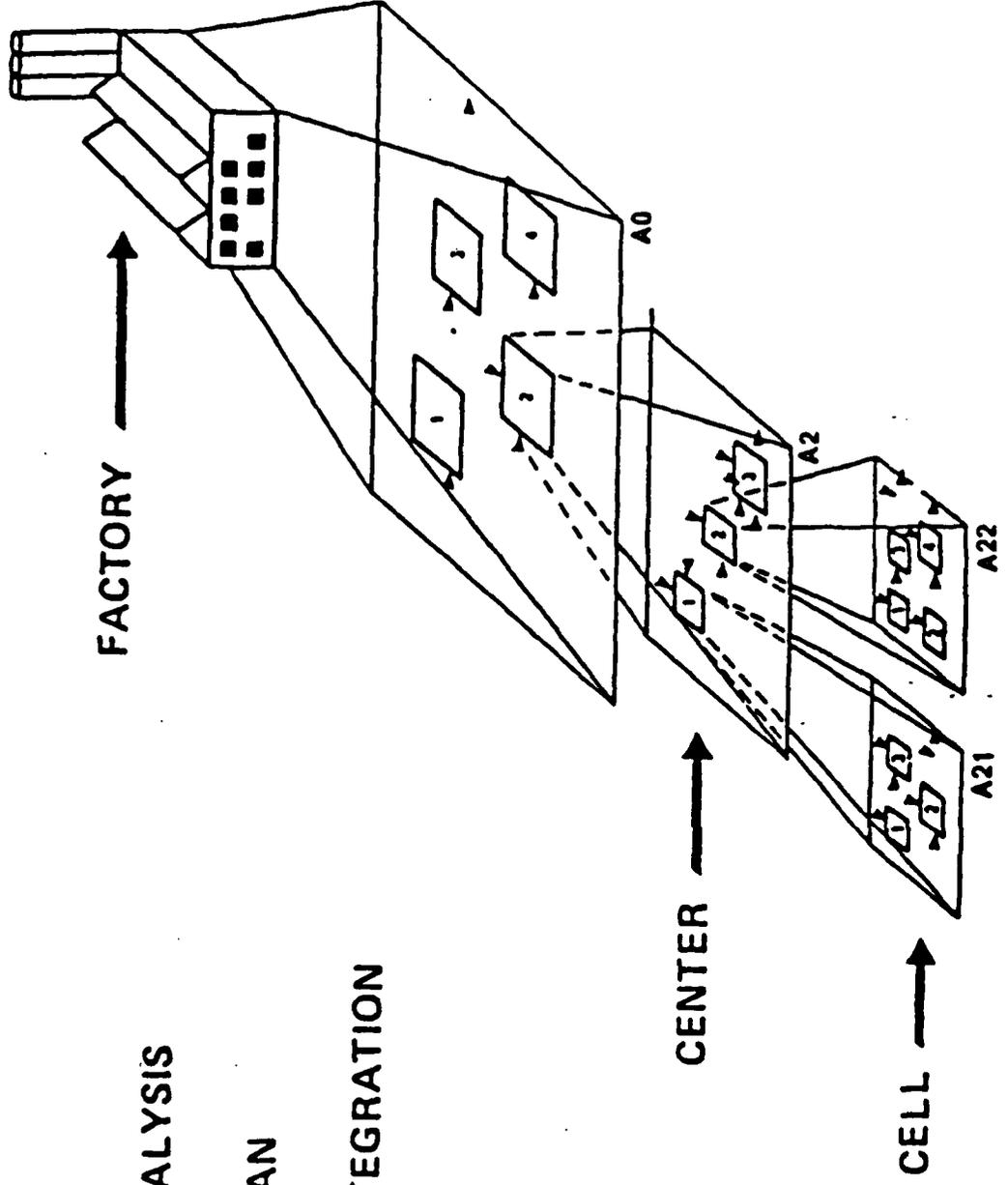
IMIP

HOW IT WORKS

ANALYSIS AND STRATEGIC PLAN



- TOP DOWN ANALYSIS
- STRATEGIC PLAN
- BASIS FOR INTEGRATION



IMIP DEVELOPMENT PROCESS



PHASE I

STRUCTURED ANALYSIS

- EXISTING SYSTEM
- CONCEPTUAL DESIGN
- COST SAVINGS AND OTHER BENEFITS
- CHANGES REQUIRED

PHASE II

DETAILED DESIGN AND

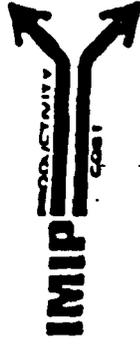
- DEVELOPMENT OF NEW SYSTEM
- CAPITAL EQUIPMENT NEEDS
- VALIDATION OF APPLICATIONS
- UPDATED COSTS AND SAVINGS

PHASE III

IMPLEMENTATION

- ACQUISITION AND INSTALLATION
- EVALUATION OF COSTS AND SAVINGS

IMIP - HOW IT WILL WORK



- AFTER A STRUCTURED ANALYSIS OUTLINING MANUFACTURING TECHNOLOGY, MODERNIZATION AND OTHER IMPROVEMENTS IN THE MANUFACTURING AREA ARE COMPLETED BY THE CONTRACTOR, A VALIDATION WILL BE PERFORMED BY THE GOVERNMENT
- THE MEASUREMENT BASELINE, PROJECTED SAVINGS AND BENEFITS WILL:
 - BE DEVELOPED BY THE CONTRACTOR
 - BE APPROVED BY THE DOD COMPONENT(S)
 - ALLOW FOR PERIODIC PROGRESS REPORTING
 - ALLOW FOR VALIDATION AND AUDIT
- CAPITAL INVESTMENTS MUST BE INCURRED BEFORE DOD ASSUMES CONTINGENT LIABILITY

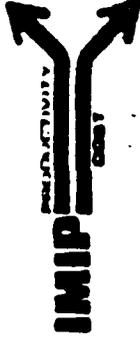
IMIP TEST CONDITIONS



PROGRAM SELECTION CRITERIA INCLUDE:

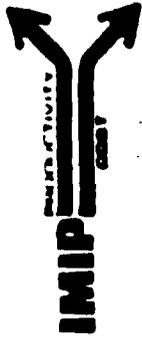
- **A HIGH POTENTIAL FOR SUBSTANTIAL SAVINGS**
- **A REASONABLE CONFIDENCE IN PROGRAM OR BUSINESS BASE STABILITY**
- **THAT THE INVESTMENT WOULD NOT BE MADE BUT FOR THE GOVERNMENT'S AGREEMENT TO SHARE BENEFITS AND/OR ACCEPT CERTAIN RISKS**
- **THERE IS A REASONABLE EXPECTATION THAT FUNDS WILL BE AVAILABLE TO PROCURE PROJECTED QUANTITIES**
- **THE INVESTMENT WILL HAVE DESIRABLE BENEFITS IN OTHER AREAS SUCH AS INDUSTRIAL PREPAREDNESS**

BUSINESS ARRANGEMENTS



-
- ALL IMIP'S ARE COVERED BY BUSINESS AGREEMENTS NEGOTIATED AND EXECUTED BETWEEN GOVERNMENT AND CONTRACTOR
 - PHASE I AGREEMENTS
 - ADVANCED AGREEMENT
 - OR
 - MEMORANDUM OF UNDERSTANDING (MOU)
 - THESE ARE DEVELOPED INTO TERMS AND CONDITIONS INCLUDED IN IMIP MASTER CONTRACT FOR PHASES II AND III
 - CONTRACTOR IMPLEMENTATION PROPOSALS (CIP) WILL BE EXECUTED BY SUPPLEMENTAL AGREEMENTS UNDER THE IMIP MASTER CONTRACT

A BUSINESS DEAL A PROCESS



IMIP PROGRAM —————>

PHASE I

PHASE II

PHASE III

ADVANCE
AGREEMENT/
MOU

IMIP
MASTER
CONTRACT

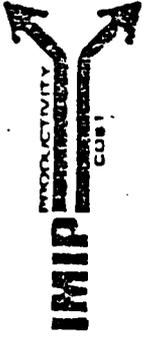
CIP

CIP

CIP



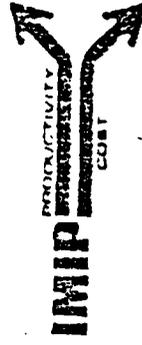
NAVAIR/GRUMMAN IMIP - BUSINESS ARRANGEMENT



MEMORANDUM OF AGREEMENT (MOA) BETWEEN NAVAIR AND GRUMMAN (9 NOV 83)

- ESTABLISHES COMMITMENT AND RELATIONSHIP OF PARTIES FOR REMAINDER OF IMIP
- PROVIDES GUIDELINES FOR IMIP PROJECT VALIDATION
- PROVIDES FRAMEWORK UNDER WHICH PARTIES WILL SHARE THE RISKS, COST, AND SAVINGS OF IMIP
 - INCENTIVE ARRANGEMENTS
 - TARGET ROI AND SAVINGS SHARING PERIOD
 - CONTRACT ADJUSTMENTS
 - TERMINATION OF PROJECT(S)
- ESTABLISHES TECHNOLOGY TRANSFER AND SUBCONTRACTOR IMIP FLOW DOWN GUIDELINES

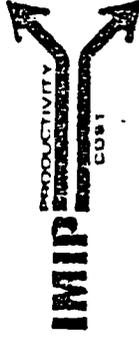
NAVAIR/GRUMMAN IMIP - BUSINESS ARRANGEMENT



PHASE II - CONCEPT DEVELOPMENT/VALIDATION/DEMONSTRATION

- BASIC ORDERING AGREEMENT (BOA) - JUNE 1983
- ENABLES NAVAIR TO CONTRACT FOR ALL 25 IMIP PROJECTS PROPOSED BY GRUMMAN
- EACH PROJECT EVALUATED FOR:
 - TECHNICAL MERIT AND FEASIBILITY
 - PROJECTED SAVINGS
 - RETURN ON INVESTMENT
 - RISK
- FIRM FIXED PRICE TASK ORDERS WILL BE PLACED AGAINST BOA FOR ONLY THOSE PROJECTS EXHIBITING ACCEPTABLE PAYBACK, TECHNICAL FEASIBILITY, AND APPLICABILITY TO CURRENT NAVY/GRUMMAN AIRCRAFT PROGRAMS

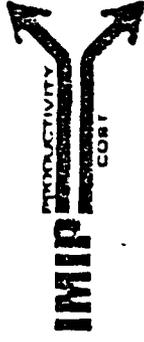
NAVAIR/GRUMMAN IMIP - MOA



IMIP PROJECT VALIDATION

- SPECIFIC VALIDATION PROCEDURE TO BE PROPOSED BY GRUMMAN NO LATER THAN 4 MONTHS BEFORE END OF PROJECT DEVELOPMENT PHASE
- PERFORMED BY GRUMMAN FOR EACH IMIP PROJECT AT CONCLUSION OF DEVELOPMENT PHASE -- BUT BEFORE IMPLEMENTATION
 - DEMONSTRATES READINESS OF PROJECT FOR IMPLEMENTATION
 - IDENTIFIES COST SAVINGS AND PROJECTS SAVINGS THROUGHOUT A/C PROGRAM LIFE SPAN (UP TO 10 YEARS FROM PROJECT IMPLEMENTATION)
 - PROVIDES MEANS TO ESTIMATE AND SEGREGATE FUTURE SAVINGS ATTRIBUTABLE TO IMIP
 - QUANTIFIES PROGRAM INTRODUCTION (IMPLEMENTATION) COSTS
- ALL PROJECT VALIDATIONS TO BE VERIFIED BY NAVPRO BETHPAGE

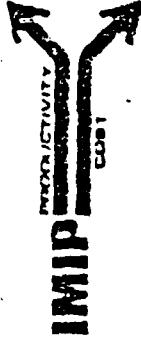
NAVAIR/GRUMMAN IMIP - MOA



INCENTIVE ARRANGEMENTS

- PRIMARY GRUMMAN INCENTIVE IS SAVINGS SHARING
- COST SAVINGS DETERMINATION
 - CALCULATED BY GRUMMAN FOR EACH PROJECT AND EACH AFFECTED A/C SYSTEM AT PROJECT VALIDATION
 - CALCULATED BY COMPARING "AS IS" TO "TO BE" METHOD OF OPERATION
 - VERIFIED BY NAVPRO BETHPAGE
- COST SAVINGS SHARED BETWEEN NAVAIR AND GRUMMAN ON INSTANT AND FUTURE CONTRACTS
- PRIMARY GOVERNMENT RISK IS THAT GRUMMAN WILL BE UNABLE TO IMPLEMENT PROJECTS ON SCHEDULE AND TO ACHIEVE THE PROJECTED VALIDATED SAVINGS

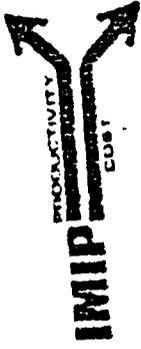
NAVAIR/GRUMMAN IMIP - MDA



CONTRACT ADJUSTMENTS

SPECIFIC LANGUAGE IS INCLUDED TO COVER THE FOLLOWING SITUATIONS:

- INITIAL PRODUCTION CONTRACTS
 - PRICED CONTRACTS
 - FFP/FPI
 - ADVANCED ACQUISITION CONTRACTS
 - LETTER CONTRACTS
 - PRICING OF AAC'S AND LC'S AND PROSPECTIVE CONTRACTS
 - FFP/FPI
- FOLLOW-ON PRODUCTION CONTRACTS
 - INITIALLY EXECUTED AS AAC'S OR LC'S
 - FFP/FPI
 - DEFINITELY PRICED
 - PROSPECTIVELY PRICED
- COST REIMBURSEMENT - N/A



NAVAIR/GRUMMAN IMIP - MCA

TECHNOLOGY TRANSFER AND SUBCONTRACTOR IMIP FLOW DOWN

- TECHNOLOGY DEVELOPED THROUGH IMIP WILL BE TRANSFERRED THROUGHOUT THE AEROSPACE INDUSTRY
 - ANNUAL FORMAL REVIEWS FOR GOVERNMENT AND INDUSTRY REPRESENTATIVES
- GRUMMAN TO MAINTAIN CONTINUING EFFORT TO ENCOURAGE SUBCONTRACTORS, SUPPLIERS, AND VENDORS TO PARTICIPATE IN IMIP
 - CONFERENCES, MEETINGS, AND SOLICITATIONS
 - NAVAIR APPROVAL REQUIRED TO IMPLEMENT IMIP PROJECTS AT SUBCONTRACTOR LEVEL

IMIP FUTURE



- CENTRALIZED GOVERNMENT AUTHORITY/RESPONSIBILITY
- INTEGRATE MULTIPLE PROGRAM INITIATIVES
- CONSERVE KEY RESOURCES
 - PERSONNEL - ACO/AUDIT UP FRONT
 - FUNDING (REDUCE DUPLICATION/FRAGMENTATION OF TECHNICAL EFFORT)
 - FOSTER LONG-TERM PERSPECTIVE
 - BEYOND 'INSTANT' WEAPON SYSTEM CONTRACT(S)
- TECHNICAL/MANAGERIAL RESPONSIBILITY SHIFTING TO CONTRACTOR
 - ANALYSIS/TECHNOLOGY DEVELOPMENT IN 'OVERHEAD'
 - MOTIVATION PROVIDED VIA PRODUCTIVITY SAVINGS REWARDS
- SIMPLIFY CONTRACTUAL PROCESS

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