

Watervliet Arsenal



1999 Presidential Award for Quality
1999 Army Communities of Excellence Award



—A Tradition of Excellence

**WATERVLIET ARSENAL NOMINATION FORM
1999 PRESIDENTIAL AWARD FOR QUALITY
&
ARMY COMMUNITIES OF EXCELLENCE**

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Acronym List



U. S. Industrial Operations Command

DEPARTMENT OF THE ARMY WATERVLIET ARSENAL

22 FEBRUARY 1999



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WATERVLIET NY	12189-4050
TELEPHONE AREA CODE	518
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OPERATOR ASST	266-5111
DSN NUMBER	974-XXXX
DSN OPER ASST	974-5111

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CA PROGRAM MANAGER	JOHN W. MANNING	5702

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SECURITY EMERGENCY	5444
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CANNON CLUB OFFICE	5017
CREDIT UNION	5171
MUSEUM	5805
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EQUAL EMPLOYMENT OPPORTUNITY OFFICE	
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CHIEF	-GC
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PUBLIC AFFAIRS OFFICE	
PUBLIC AFFAIRS OFFICER	-IN
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CHIEF	-PC
RICHARD J. OPPEDISANO	5201

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MICHAEL GRIMALDI	5049
MAJOR COMPS MFG DIV	
	-QDH
JAMES H. HARTER	5820
MINOR COMPS MFG DIV	
	-QDM
JOHN W. HENRY (A)	5546
METAL PROC MFG DIV	
	-QDF
CHARLES H. COLLINS (A)	5717
TOOLS MFG & MNT SVCS DIV	
	-QDR
PHILIP R. LUPE	4217
PROD PLNG & CTRL DIV	
	-QDP
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SUPPLY DIV	
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INFO MGMT DIV	
	-RMI
J. MICHAEL MULLAHEY	6000
OP & APP DEVEL DIV	
	-RMO
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MANAGEMENT DIV	
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FRANK J. MERCURIO (A)	3657
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GEORGE F. BIELKIEWICZ	5348
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ENG RESRCS MGT DIV	
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PROD ASSUR ENG DIV	
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JEFFREY M. PAINE	5675
METROLOGY DIV	
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WILLIAM S. GRATAN	5607
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THOMAS M. BERGIN	5023
SAFETY, HLTH & ENV DIV	
	-ISH
RONALD NEISSEN	5202
TRANS & TRAFF MGT DIV	
	-IST
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ASST DIRECTOR	-CCB
ASSOC DIR FOR OPS	-CCB-O
WILLIAM ROSENBERGER	5002
ASSOC DIR FOR ENG	-CCB-E
GLENN FRIAR	4200
ASSOC DIR FOR DESIGN & DEV	-CCB-D
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ASSOC DIR FOR TECH	-CCB-T
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CHIEF NURSE	MCID-WV
STEPHANIE P. WOLFE	4195
INDUST HYGIENE	MCID-WV-IH
THOMAS J. FRIEDMAN	4517

N.Y. ARMY NATIONAL GUARD	
PUBLICATIONS	MNAG-AS(PS)
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MUSEUM	MNAG-MH
THOMAS C. DUCLOS	786-6056
RECRUITING	MNRR
LTC WILLARD VARIAN	786-4444

DEFENSE REUTIL & MKTG LIAISON OFFICE	
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U.S. MARINE CORPS RECRUITING CMD	
(ASSIG TO 1ST MARINE CORPS DISTRICT-GARDEN CITY, NY)	
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LTC JODY L. OSTERMAN	6101

N.Y.S. URBAN/TECH SEARCH & RESCUE RESPONSE TEAM	
KEVIN TERRY	474-6746

US ARMY RECRUITING COMPANY	
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	6283
CPT HEDGEMAN	-CATSKILL
	6281

U.S. ARMY TMDE SUPT OPERATIONS	
(ASSIG TO USATMDE SUPT ACTIVITY, CONUS, REDSTONE ARSENAL, AL)	
CHIEF	AMSAM-TMD-GA-NWV
WALTER C. LONGLEWAY	4100

(A) = ACTING
- - - = TENANT ACTIVITY

NOT AN OFFICIAL ORGANIZATION CHART.
SUPERSEDES CHART DTD 1 OCT 98.
PREPARED BY MGMT DIV, DSN 974-4587

SIOWV-1b

Overview

On February 27, 1991, during the Gulf War, the U.S. sent a message to Saddam Hussein - a 5000-pound bomb successfully dropped on his heavily fortified bunker. That message was received, and Saddam Hussein agreed to a cease-fire the very next day. The 5000-pound bomb, known as the GBU-28 Hard Target Penetrator or "Bunker Buster" was manufactured at Watervliet Arsenal (WVA).

On Friday, January 25, 1991, WVA received a call for assistance from Lockheed Missile and Space Company. The 2000-pound bombs currently being used in Iraq were merely bouncing off Saddam's thick concrete bunkers. Watervliet assembled a team which quickly determined how to modify an 8" M201 cannon barrel, and made what would eventually become the "Bunker Buster" that effectively ended the Gulf War.

The "Bunker Busters" were delivered on February 17, only 23 days after the initial call for help.

1. BASIC DESCRIPTION OF THE ORGANIZATION

Nature of the Business

WVA is an Army owned and operated manufacturing facility located in upstate New York, near Albany. Operating since 1813, WVA is the oldest continuously active arsenal in the United States. Throughout its long history, Watervliet has had a vital role in our nation's defense. Designated "America's Cannon Factory" in 1887, WVA's name is synonymous with large caliber cannon.

Since 1813, Watervliet has served as America's defense - a symbol of quality ordnance products. Today, the historic site, a registered National Landmark, continues its mission of providing the U. S. armed forces quality products.

Our objective at WVA is to support our soldiers in the field, our ultimate customers. They rely on the quality, performance and dependability of our products. We strive to provide the manufacturing excellence and technology needed to maintain a decisive edge in combat.

In addition to our manufacturing complex, the site

is home to several tenant organizations, the largest being the Army's Benet Laboratories. Benet is a national laboratory whose mission includes design of ordnance and technology.

Watervliet's main mission products include: the 120mm mortar system, 155mm series of howitzers, and the Abrams 120mm tank cannon. These products involve on-going manufacturing and/or prototype development at the Arsenal. The Arsenal has additional mission products such the 175mm howitzer cannon, the 165mm cannon, the 8" gun, 60 and 81mm mortar, and other cannon related products. Services for mission products range from field inspections to co-production with foreign governments/producers.

Support mission products include parts for military vehicles, aircraft, ships, and research projects.

Beyond cannon production, WVA is a sophisticated manufacturing facility capable of providing a variety of products. Our manufacturing services include precision machining, metal fabrication, welding, composite filament winding and braiding, forging, heat treating, precision tool and die making and coating deposition. Technical services are provided for development of manufacturing processes using Computer Aided Design/Computer Aided Manufacturing (CAD/CAM), Rapid Prototyping, Computer Integrated Manufacturing technologies and new plant start-ups.

Installation Size and Location

Located in the heart of the northeast region of the U.S., WVA is situated on the banks of the Hudson River, five miles north of Albany, the capital of New York State.

Watervliet occupies approximately 42 acres of land with 2.2 million square feet of floor space, 1.3 million of which is used for industrial operations. The billion dollar manufacturing complex includes 72 structures, with six major manufacturing buildings.

Major Markets

Watervliet operates in international markets, primarily in the defense industry. Our customers include the U. S. Armed Services, foreign governments, weapon systems prime contractors and system integrators, and private sector companies. Watervliet has a combined vision and strategy for success defined with its partner, Benet Laboratories.

Employee Base

Distribution of 941 Civilian Employees*

Blue Collar	525
White Collar	416
Supervisors	66
Bargaining Unit	695

* Average age – 48

Demographics

Women	132
Men	762
Minorities	47
Associates Degrees	170
Bachelor's Degrees	87
Master's Degrees	23

Watervliet maintains a workforce of 941 civilian employees and two military officers.

Watervliet is home to Local 2109 of the National Federation of Federal Employees (NFFE Local 2109), representing 80% of our workforce.

Much of Watervliet's skill base is the result of extensive in-house training programs. Formal programs for skilled machinists as well as for white collar career positions have kept Watervliet up to date with the skills needed to sustain a modern manufacturing operation and implement the latest technologies. Training for employees has ranged over a variety of business, technical, employee wellness and engineering subjects such as CAD/CAM, blueprint reading, CPR, smoking cessation, managerial skill development and Total Quality Management.

The majority of work our employees do is heavy manufacturing. We also have one of the largest capacity chrome plating facilities in the country. Given these activities, Watervliet is a potentially dangerous place to work. We are subject to intense scrutiny by federal and state environmental and safety agencies. Watervliet takes its responsibility to our employees and

our community very seriously. Our highly effective safety and environmental protection programs, fostered by management, union and employees, have been proclaimed "exceptional" and "outstanding" by New York State, U.S. Environmental Protection Agency (EPA) and U.S. Occupational Safety and Health Administration (OSHA) officials.

Equipment, Facilities and Services

The Arsenal maintains modern industrial facilities with the latest manufacturing technologies. As a world leader in conventional weapons design and manufacturing, we utilize state-of-the-art technologies and unique manufacturing equipment. An inventory of 1430 machine tools includes 260 computer-controlled machine tools, the largest computer controlled equipment inventory in the Department of Defense (Dod). This flexibility and versatility allows the plant to manufacture everything from composite materials to exotic metals in a variety of part configurations.

Several colonies of long-bed computer controlled lathes are capable of virtually any type of turning, boring, precision single-point threading and contouring.

WVA has built a strong reputation for quality products over the years. We utilize a systematic approach to assure quality throughout the manufacturing and fielding of our products. Parts of all sizes and shapes are dimensionally inspected on computer controlled coordinate measuring machines. Performance in the field is simulated on advanced mechanical testing equipment. Statistical Process Control (SPC) and continual process improvement techniques are combined with automated inspection and testing equipment throughout the manufacturing process.

WVA has made extensive advancements in the implementation of CIM. As a winner of the 1990-1991 World Class Manufacturing Award for Strategic Planning, we have integrated state-of-the-art technologies into virtually all facets of our operation.

Among our advanced systems are two Flexible Manufacturing Cells and an eleven machine Flexible Manufacturing System. These systems provide us the capability to handle a wide mix of parts and the capacity to meet surges in workload without decreasing production efficiency.

The latest manufacturing technologies are available for non-conventional machining capability. This

includes Wire Electrical Discharge Machining, Water-jet Cutting, Stereolithography, and Laser Engraving.

Many unique technologies exist for specialized machining of long cylindrical and shaft configurations. Unique capabilities for machining and heat treatment include a computer-controlled automated flowline for shaft forging operations, heat-treat and inspection processes. Our computer-controlled rotary-forging, boring and plating of precision pressure vessels are among the finest available in the world. This advanced manufacturing capability involves the use of many sophisticated technologies, several of which were developed at WVA.

Regulatory Environment

WVA operates in a highly regulated environment that governs not only the manufacture of our products, but the health and safety of our employees, and our surrounding community and environment. We operate within boundaries defined by federal and state laws, and the regulations of our higher headquarters within the Army.

2. CUSTOMERS AND MARKETS

WVA's customer base is very broad due in part to our diverse role as both a prime contractor and subcontractor for products and services. Customers range from end-users of weapons to prime defense contractors. They represent government and private industry organizations, both at home and abroad.

Our primary customer base includes Army program managers, major subordinate commands of the Army Materiel Command, domestic weapon system prime contractors and system integrators, foreign weapon system producers and foreign national governments.

Our customer base for support mission products includes other Army components, Navy, Marines, Air Force, Defense Logistics Agency and commercial industry. An example of our broad customer base was evident during the conflict in the Persian Gulf War, during which over 60 different items produced at Watervliet were in use by U.S. Army, Navy, Air Force and Marine forces, and our allies in the Gulf.

More than anything, our customers expect us to

provide a high quality product. They demand technical support, on-time delivery, and a fair price.

We have many long-term customers who know us well, but our traditional markets are shrinking. In our efforts to increase our customer base within and beyond the Department of Defense, we are working to expand our capabilities and make them known to potential customers. In doing so, we are devoting a significant amount of effort to exploring and entering markets for non-cannon products in the commercial sector. Operating as a government-owned and operated business puts severe constraints on our flexibility, particularly in dealing with private sector customers. We must be particularly diligent in our communication with these customers to ensure we understand each other's expectations and limitations.

American soldiers are our customers at home as well as on the battlefields. Beyond our global manufacturing support mission, we serve in a support role for more local needs. WVA provides administrative, maintenance and quality of life support for active and retired military living on our grounds, in the Rotterdam Housing area, and in the surrounding community. As a designated national treasure, and beautiful facility, Watervliet is a highly sought place of residence for soldiers stationed in the area.

In recognizing that we can only do our best if we work together, we maintain an Internal Customer Satisfaction Program that enables us to identify and solve interdepartmental problems before they impact our external customers.

"Internal customers" include our employees. Our changing marketplace and the political pressure to reduce the size of the federal government compromises our employees' sense of job security. In partnership with our union, we have presented many programs and opportunities designed to maximize our employees potential and quality of life.

Our customers also include our tenants. In addition to those who have been with us for a long time, we offer our space and services to provide a home for other employers as a way of maximizing the use of our own streamlined facilities. We are currently providing support services for the following tenant customers and satellite (off-post) customers:

Base Operations Support Service Provider

Customers:

Benet Laboratories
U.S. Army Medical Command
Army and Air Force Exchange
Service
U.S. Army Recruiting Battalion
U.S. Army Test Measurement
and Diagnostic Activity
U.S. Marine Corps
Defense Automated Printing
Service
General Services
Administration
U.S. Military Entrance
Processing
Station
Division of Military and Naval
Affairs
ROTC - Siena College
N.Y. Army National Guard
U.S. Army Reserves

Services Provided:

Administrative
Personnel
Communications
Mail
Utilities
Environmental
Legal
Security
Resource Mgt.
Public Affairs
Purchasing
Contract Admin.
Fire protection
Transportation
Supply, Storage,
and
Warehousing
Custodial
Refuse Collection
Recycling

3. SUPPLIERS AND PARTNERS

Suppliers

WVA cannot make a high quality product without quality services, materials, and parts, and cooperation from our suppliers.

Purchasing at Watervliet is based on the Federal Acquisition Regulations. We have developed, and are constantly improving, controls and responsibilities to meet our special needs. The resulting supplier system, which includes our Supplier Rating System, meets the requirements of the Army's Contractor Performance Certification Program (CP2) and the International Standards Organization (ISO) 9002 quality certification programs and ensures the continued quality of our suppliers.

Partners

In accomplishing our mission, we work in partnership with Benet Laboratories. The collocation of research, development and manufacturing makes WVA

an ideal site for the production of new products and facilitates concurrent design and manufacturing concepts.

Our partnership with our local labor union (NFFE Local 2109) is well-grounded in trust and respect. Management and labor have accomplished much over the past seven years of working together for the long term viability of the WVA.

Exciting News For Our Future

WVA was approved as a N.Y. State Economic Development Zone (EDZ). We sought this designation as part of our long-term strategy. The EDZ offers us the potential to create partnerships with companies able to work in synergy with WVA and Benet Laboratories.

4. COMPETITIVE FACTORS

We are a U.S. Army organization with a well-defined mission: to perform manufacturing, engineering, procurement, fabrication, and product assurance for assigned materiel, and to provide support services to tenant activities.

The mission of WVA as a producer of cannon has been in place since 1887. Throughout the World Wars, Korea, Vietnam, and the Persian Gulf the large caliber cannon has been an icon of WVA. Today the cannon production mission continues, as Watervliet remains the only domestic producer of heavy, thick-walled cannon in the U.S.

With recent changes in the world's political situation, and the resultant reduction in the need for cannon, we recognize the need to leverage our skills and relationships with Benet Laboratories and other advocates. These associations can augment our workload with non-cannon products necessary to sustain the facilities, equipment and trained workforce needed to meet mission requirements.

Tank cannon, howitzers, and mortars remain our staple products. However, in a time when defense needs demand versatility, the Arsenal has sought to increase its support mission role. To this end it has demonstrated a capability to manufacture products that range from cannon to marine drives, and guided bombs to earthmoving equipment. WVA's wide range of production skills and capacities can be used to support

products on land, at sea, in the air and in space.

The other most significant change affecting us is our pattern of downsizing. Our workforce has been reduced by 60% since 1989. Continuing reductions are likely. Given a choice between giving up or persevering, WVA has made a commitment to accept change as the only constant in our world and be the best organization we can be on any given day.

5. STRATEGIC CONTEXT

The Arsenal has undertaken a strong effort to identify and plan its position in tomorrow's Army. Since 1991, on-going strategic planning efforts have resulted in the establishment of our Enterprise Level Strategic Plan, a plan for executing our business objectives, and a business plan for marketing our products and services.

These efforts have resulted in a re-thinking of Watervliet's mission support role and a focusing of its products and services into defined markets for supplementing its mission work. These markets have been formalized with a promotional program for each market and a prescribed plan for pursuing business opportunities.

It is safe to say that WVA mission efforts will stay aligned with Army doctrine, driven by demands for lethal, versatile, and rapidly deployable weapon products. An increased awareness in continuous improvement with a customer-driven focus will be key to increasing Watervliet's value both as a mission and support mission producer.

The vision of WVA is:

"To be the nation's large caliber cannon manufacturer; to be recognized as the world's leading cannon producer; to partner with Benet Laboratories and others to provide the technology, skills, facilities and quality system needed to meet Defense Readiness Requirements; and to produce cannon and related products for government and commercial customers."

1 Leadership.

1.1 Leadership System.

"Empower employees to make decisions in their areas of expertise and communicate to employees what empowerment means."

Critical Success Factor
WVA Strategic Plan
for Continuous Improvement

1.1a(1) Design and Operation.

The Arsenal has a long-standing and well defined mission, *"To perform manufacturing, engineering, procurement, fabrication and product assurance for (tank cannon, howitzers, mortars, recoilless rifles and components of these end items) and to provide support services to tenant activities."* The facility was designated as "America's Cannon Factory" by an act of Congress in 1887 and has long been renowned as the "free world's" quality producer of these items. However, during these times of relative peace, Arsenal leadership has recognized the need to leverage the skills and capabilities of the facility to augment our workload with non-cannon products in order to sustain the facilities, equipment and trained workforce necessary to meet the mission objectives. To reiterate, our vision, *"To be the nation's large caliber cannon manufacturer; to be recognized as the world's cannon producer; to partner with Benet Labs and others to provide the technology, skills, facilities and quality system to meet Defense Readiness Requirements; and to produce cannon and related products for government and commercial customers,"* expresses our dedication to quality, our customers, and our mission.

Over the last several years, WVA has flattened our organizational structure from 79 supervisory positions to less than fifty. Management structure has gone from six layers to four. Arsenal leadership initiated this flattening process in order to increase organizational flexibility and improve communications throughout the organization. As a result, Arsenal management has transitioned from the traditional role of "getting things done through others," to a true role of

leadership. Organizational structure and individual jobs have been defined based on how well they satisfy both internal and external customer requirements and Arsenal strategic objectives. Cross functional working leaders have replaced middle management and line foreman and a common understanding of customer requirements, Arsenal objectives and improvement effort performance exists at all levels of the organization. Twenty-six cross-organizational committees, councils and teams have been chartered to assure cross-functional alignment with Arsenal strategic and operational objectives. For example, our Quality System Management Team (QSMT) is responsible for the cross-organizational establishment and maintenance of Watervliet's Quality System to assure continued compliance with commercial, industrial, international military and customer quality program requirements; a Training and Development Committee has been established to assure Arsenal-wide training requirements are adequately planned and accomplished; and an Environmental Quality Control Committee has been established to assist the Arsenal environmental coordinator implement environmental controls with local, state and federal laws and regulations. All three of these teams responsibilities are directly tied to defined strategic objectives.

To assure continued focus on customer requirements, a formal internal and external Customer Satisfaction Measurement System has been established. The results of customer satisfaction data are provided to leaders at all levels to assist in improvement efforts. One of the organizational changes which resulted from this focus on the customer, was the formation of our Marketing and Customer Development Office to provide our production customers a single focal point for inquires and communications.

Guided by the Arsenal's Executive Board, leadership is integrated through all levels of WVA. The Executive Board, consists of the Commander, Civilian Executive Assistant, Operations Officer and the directors and office chiefs, depicted in the organizational chart shown following the Table of Contents.

1.1a(2) Senior Leader's Leadership.

The Executive Board is responsible for the development and deployment of the Arsenal's mission,

vision, values and goals and establishes the total quality environment necessary to accomplish the Arsenal's objectives. (Reference Section 2.) Organizational managers and leaders guide the workforce through the successful completion of the Arsenal goals, objectives, and mission and lead the organization toward realizing our vision. As demonstrated in Figure 1.1.1, leaders use a wide variety of media to communicate our objectives to the workforce.

From the Commanding Officer to the working leader on the shop floor, commitment to goals and objectives is demonstrated through personal involvement in our improvement efforts. A wide variety of metrics have been established and are monitored to track performance toward accomplishment of our mission and the defined strategic objectives. Customer, workforce, supplier, quality and market opportunity goals are established, reinforced and reviewed at all levels through continuously updated reports, records, and status meetings. Specifics on the review process are further defined in Section 4. Each organization at Watervliet is responsible for defining, maintaining and analyzing performance objectives for their organization. Organizational performance metrics are displayed in each organization and results, trends and relative importance is discussed with employees. Metrics are used to track performance toward organizational goals, modification of strategies and as a basis for systemic and/or organizational improvements.

The Commander and senior executives meet on a weekly basis to discuss real-time progress toward our goals and on a quarterly basis to discuss key performance measures associated with cost, quality and

cycle time. Performance measures discussed during these reviews include customer satisfaction, product quality, supplier performance, cycle time efficiencies and financial performance. In addition to these regularly scheduled sessions, the Executive Board meets throughout the year to discuss, review and make decisions on a wide variety of topics including acquisition planning, quality system performance, Marketing Plans, Customer Satisfaction Survey results, Internal Operating Budget, Capital Investment Plans, Training and Development Objectives and Strategic Planning. The results of the meetings and reviews are used as the basis for managerial decisions on the modification of strategies and improvement of our leadership system.

Open communications with the workforce are key to Watervliet's success and a wide variety of media, both electronic and written, are used to assure communication channels remain effective. Command Information Bulletins are issued by the Commander to the entire workforce to keep employees informed of important issues and events. Watervliet's internal news magazine, The Salvo, provides the Commander and his staff a means to discuss relevant issues and goals with the entire workforce. The Arsenal's Strategic Plan for Continuous Improvement has been distributed to every employee, primers explaining the Arsenal's quality policy and the requirements of ISO9002 are regularly updated and issued to all employees and posters containing the Arsenal mission and quality policy have been prominently displayed throughout the Arsenal. In addition, a wide variety of other reports, measures and correspondence are dis-

Forum \ Leader	Commander	Civilian Executive Assistant	Directors	Office Chiefs	Division Chiefs	Working Leaders
Presentations	X	X	X	X	X	X
Meetings	X	X	X	X	X	X
Training	X		X	X	X	X
Command Information Bulletins	X					
Local Newsletter Articles	X		X			
Monthly Activity Reports	X		X	X	X	X
Organizational Performance Metrics	X		X	X	X	X
Awards	X	X	X	X	X	
Performance Standards (TAPES)	X	X	X	X	X	X

Fig. 1.1.1

tributed throughout the leadership system on a daily basis to assure all levels understand customer requirements and our performance toward those requirements. Regularly distributed correspondence includes Marketing and Customer Development Activity Reports, Product Assurance and Test Activity Reports, Safety Briefings, Environmental and Energy Usage Updates, Ethics Updates, Monthly Review and Analysis Metrics, and Installation Mission Plan Performance. Electronic mail and the WVA web page provide employees current information on Arsenal strategies and objectives.

Within the Industrial Operations and production Directorate, key leaders meet on a weekly basis to discuss on-going production issues and progress toward our customer requirements. The director distributes a quarterly status report to all employees within the directorate to keep everyone informed on the directorate's performance. On an annual basis, all Industrial Operations leaders meet to discuss performance and review progress toward our overall improvement goals.

Through the use of these forums strategic and operational objectives, as well as Vision, Values, and Customer Focus, are continually reinforced. The resulting discussions and analysis provide the framework for decision making and organizational planning.

Senior leadership is at the forefront of strategic planning, the cornerstone for continuous improvement efforts. Integral to our strategic planning efforts are

the Arsenal's core values. Our core values are the base components of our continuous improvement efforts. Arsenal leadership recognizes that our improvement efforts require all levels of the organization to share and demonstrate a common set of values. Watervliet's core values are shown in Figure 1.1.2.

These core values are presented in terms of both business and individual values. In practice, they do not exist separately, but are intertwined in how we lead, make decisions and perform our day to day duties. Watervliet's values support the Army values and are reinforced throughout the year as part of the Total Army Performance Evaluation System (TAPES).

Through strategic planning sessions, the Executive Board identifies strategic objectives and supporting critical success factors to assure accomplishment of our mission and vision. For the three strategic objectives in Fig. 1.1.3, there are several CSFs, each supported by specific actions which must be taken to meet the objectives. Strategic objectives and CSF are institutionalized in the form of the Arsenal's Enterprise Level Strategic Plan which guides the Arsenal's senior staff in the execution of day-to-day business. The Enterprise Level Strategic Plan concentrates on achievement of our mission and vision through adherence to our quality policy, and is described in the terms of ends, ways, and means. Ends (Strategic Objectives, business results) are achieved by ways (leadership, values, customer and market focus, process control) and means (money, people, plant, equipment, technologies, information and analysis).

The Enterprise Level Strategic Plan is supported by a set of fully coordinated execution plans which detail how we are going to achieve the strategic objectives and CSF's. Organizational and cross-functional leaders are identified to guide efforts for the accomplishment of these plans. As shown in Figure 1.1.3, the objectives are then deployed through the leaders to the workforce by the incorporation of challenging, yet achievable, objectives into organizational and personal performance standards. In doing this, leaders at all levels are made aware of overall strategies and have the opportunity to actively participate in achieving the defined objectives.

Management and leaders continually assess performance against the objectives to measure effective-

Business Values	Employee Values
<ul style="list-style-type: none"> • Ethical behavior • Customer Focus • Excellence through: <ul style="list-style-type: none"> • A competent, motivated workforce • Creativity and innovation • Labor and management partnership • Technological growth • Environmental stewardship 	<p style="text-align: center;">HEARTS</p> <ul style="list-style-type: none"> • Honesty • Ethics • Accountability • Respect • Trust • Support

Figure 1.1.2

ness of the leadership system and determine where improvements can be made. Strategic and operational objectives are institutionalized in each manager's and leader's individual performance objective as part of the Total Performance Evaluation System (TAPES). These objectives are reviewed and updated semi-annually by the individual and the responsible principle staff member to assure the stated objectives reflect and support WVA's overall objectives. Performance against these objectives is evaluated annually. Strengths and areas for improvement are identified and discussed. Objectives and milestones are revised based on environmental factors and changing conditions but the focus always remains on the vision.

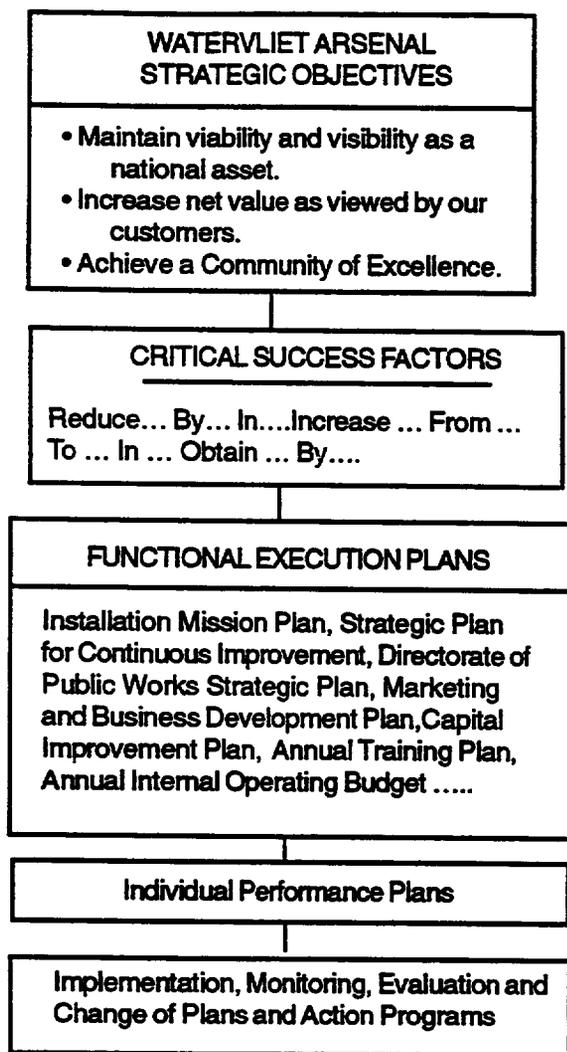


Fig.1.1.3

(Note: The transformation and integration of strategic objectives into functional execution plans through critical success factors is further detailed in Section 7.5

1.2 Organization Responsibility and Citizenship

"Establish strong, mutually beneficial relationships in our community."

Critical Success Factor
WVA Strategic Plan
for Continuous Improvement

WVA has been a model citizen since long before it was fashionable to do so. Right from the beginning, nearly 200 years ago, its unusual location -- a government-owned heavy manufacturing plant right in the heart of an urban area -- meant that the Arsenal had to be an accepted, productive, integral member of this community or perish. Indeed, scores of local neighbors have their yards and garages and even their homes nudged right up to the fences and walls of the Arsenal. Throughout every major conflict of the United States, from the War of 1812 to the Conflict in the Gulf, WVA has been able to accomplish its mission with the full support of the community.

Several years ago, when a consultant was hired by the Army Corps of Engineers to conduct a community survey prior to an environmental clean-up action, they were hard pressed to find anyone who needed or wanted additional information. "We trust the Arsenal to take care of business," was a typical response. On another occasion, during a parade celebrating the Arsenal's 175 birthday, an antimilitary protest group planned a major rally. Local police found they were not so much concerned about the protesters as Arsenal neighbors who insisted on "protecting" their Arsenal from the protesters.

This corporate citizenship is institutionalized.

1.2a Societal Responsibilities

As one of the largest industrial employers in New York's Capital Region, WVA plays a leading role in the community. Nowhere is this presence more exemplary than in the restoration, preservation, and protection of the environment. The Capital region is a hotbed of environmental issues. For example, Polychlorinated Biphenyls (PCBs) levels in the Hudson River remains front page news. WVA's strategic approach

to environmental issues is simple: clean up what may have been done in the past, comply in full with all regulations, and limit or prevent new pollution streams through the innovative use of technology.

WVA was the first Army installation to become PCB-free. More than a decade ago, Arsenal leadership -- years ahead of what was to be an Army-wide mandate -- decided to make the necessary investment to eliminate PCBs from the workplace. All machine

tools containing PCB fluids were drained, cleaned and non-PCB fluids used. The plan for total clean-up action became a government model and was listed as a reference in the Library of Congress.

The Arsenal continues in the vanguard of environmental strategy through the use of new technologies. A Department of Defense test bed has proven the value of new technology for dealing with toxic waste acids used in manufacturing. The Waste Acid

	AWARENESS	IN-PROCESS	COMPLETED	PERCEPTION
COMPLIANCE	Training/Conferences Self-auditing: Tracking Systems: Tankman, Hazmin Inspections: IOC, NYDEC, county, EPA Sampling: SPDES, stack testing	Replace/upgrade storage tanks	Sludge Delisted (Non-hazardous waste) Replaced more than 200 PCB electrical capacitors Retrofilled 10 of 36 PCB electrical transformers	Unbiased local media. EPA: News release Unofficial comment "Best facility I've ever seen."
RESTORATION	Monitoring: Fluids inventory, ground-water wells, underground tanks integrity testing Sampling: Drinking water sources, radon, lead-based paint, suspected asbestos Incident investigations	Soluble oil sewerline near canal wall, replacement Recovery wells (pump and treat): Chromium, diesel fuel, motor oil storage	Surface impoundment closure (sludge bed #1) Lesson learned: "Closed" is a moving target	Local media unbiased: PCBs in storage area Regulatory officials confident in WVA
PREVENTION	Training / conferences. Study (off site uses for chrome-laden sludge) EPA visit for electroplating pollution prevention, Asbestos inventory Plans: Pollution Prevention Hazardous Waste Reduct. Spill Prevention Control	Eliminate cadmium / cyanide plating Off-site recycling of anodes/cathodes (scrap metal) Boilerhouse switching from #2 fuel to natural gas Management of concentrated fuels: Zenon, ion sep, reuse/onsite treat	Boilerhouse switched from #6 to #2 fuel in 1992 Management of concentrated fluids: Refill/replace plating baths guided by analyses	EPA pollution prevention visit. (Came to teach, actually learned)
CONSERVATION	National registry of historic places: 6 historic landmarks Inventory of ozone-depleting substances. Energy conservation. Procedures (public participation): National Environmental Policy Act, Environmental Quality Review Act	Testing alternate refrigerant (Non-CFCs) Upgrade process controls: Boilerhouse Industrial Waste Treatment Plant	In-place encapsulation of asbestos piping insulation Programs: Recycling, Pest/pesticide management	Community protection participation (HazMat Response Team, Fire Dept.) Efficiency of use of raw materials

Fig. 1.2.1

Detoxification and Reclamation system begun in 1996 allows used acids to be recycled saving more than \$90,000 a year and eliminating thousands of gallons of acid-containing waste disposal.

The four basic elements of Army environmental strategy are integral elements of the comprehensive Arsenal policy. Compliance, Conservation, Prevention and Restoration are the foundations for the Arsenal's environmental leadership. (See Fig. 1.2.1)

As a Resource Conservation and Recovery Act Facility, the Arsenal has taken the community lead in not only protecting the environment today and tomorrow but cleaning up the mistakes of past generations. A complete corrective actions investigation and recovery is under way for an area of the Arsenal once used as a storage site. A Community Relations Plan is complete and all plans and actions for the clean-up are publicly posted for community information and participation.

A clean physical environment must be accompanied by a clear, unambivalent ethical environment. Ethics training is conducted throughout the year for all Arsenal employees from the commander to a machine tool operator. The Arsenal monthly news magazine, *The Salvo*, provides articles on ethics from procurement to human resources, from the Hatch Act to the fiduciary responsibility for judiciously spending taxpayers' dollars.

1.2a(1) Information and Analysis

WVA has teamed with several federal organizations to address waste streams produced during manufacturing operations. This team includes USA Construction Engineering Research Laboratories, Benet Labs, The Western Environmental Technology Office (US DOE), Pacific Northwest National Laboratory, and the Industrial Operations Command. Through this partnership, the Arsenal is demonstrating new technologies to address waste across the breadth of the entire Army.

Several projects are funded through the Deputy Undersecretary of Defense for Environmental Security under the Environmental Security Technology Certification Program to demonstrate emerging technologies. First, is the Waste Acid Detoxification and Rec-

lamation System mentioned above. A second system is being installed to address additional acid being generated at the Vessel Plating Facility. This project addresses sodium hydroxide which is the Arsenal's largest waste stream.

In addition to the Waste Acid Detoxification projects, technologies tested and applied at the Arsenal include:

- Donlee Boiler Demonstration: A state-of-the-art boiler which is 85% efficient while reducing emissions.
- Coolant Recovery System recycles 90% of previously unusable coolant. First year savings: \$60,000.
- Industrial Wastewater Treatment Plant upgrade with all new process controls at a cost of \$2 million.
- A phosphoric acid fuel cell has been installed with the highest documented payback in the DoD program, a savings of \$9,000 per month.

1.2b Community Involvement

To paraphrase an old Pogo saying, "We have met the community, and they is us." Arsenal employees are so intricately involved with local community affairs it is difficult to objectively separate the two. Arsenal leaders serve as board members of local companies and organizations. They serve as exalted rulers of the Elks Lodges, governors of the Moose Lodges, Commanders of the American Legion Posts, presidents of several historical societies. Arsenal people teach at local colleges. They lead Boy and Girl Scout Troops. They umpire ball games. They lead charitable organizations.

Partnering and cooperative arrangements with the community are numerous: Center for the Disabled, New York State Department of Transportation, Center for Economic Growth, Brooklyn Polytechnic Institute, Rensselaer Polytechnic Institute, Defense Logistics Agency, Corps of Engineers, Army Reserve and National Guard, National Center for Manufacturing Sciences, American Metalcasting, and several industrial and small business design and engineering firms.

The Arsenal and Benet Labs have partnered with two local high schools in a "Career Exploration Internship Program." WVA is working closely with the Watervliet School District in development of a Busi-

Community Involvement

American Red Cross

- Employees donate 600 units of blood each year
- Aid collected for hurricane/disaster relief

Combined Federal Campaign

- Employees donated \$47,000 (despite continuing deep staff reductions, WVA remains largest per capita donor in region)
- Volunteers provide leadership for CFC regional campaign

Junior Achievement

- Arsenal-sponsored team named "1998 Company of the Year."
- 20-year history of providing volunteer leadership

In-School Programs

- Fire, home safety programs in local schools
- Hundreds of students hosted in special Arsenal Museum programs
- Computers, furniture donated to area schools
- Co-op agreements with area, national colleges

Boy, Girl Scouts

- Hosts Scouting activities
- Employees serve as merit badge counselors, troop leaders

Local Emergency Services

- One of only three Hazardous Materials Emergency Response Teams in county
- Provides HazMat on-scene leadership
- WVA firefighters standby in local fire houses as part of unique mutual aid agreements
- Fire prevention training

Community Services

- Commander is a member of influential The 50 Group made up of top 50 business, education, and community leaders in region
- Historical staff on committee of Regional Urban Cultural Park
- Donations of time and material to environmental sloop "Clearwater," community theater productions, youth groups, etc.

Military, Veterans Organizations

- WVA provides free office space to regional Retirement Services Office
- Provides Army Community Services for region

to the Red Cross, one of the largest corporate donors in the entire region. For decades, the Arsenal has been the single largest donor to the Combined Federal Campaign, the government equivalent of United Way. Despite downsizing, employees remain among the highest per capita donors to community organizations through CFC. WVA employees are leaders, both on-post and in the community. The region's Federal Women's Program, led for years by WVA employees, offers educational opportunities to federal employees. The Federal Managers Association (FMA) chapter at WVA is a leader both in the region and at the national level. They contribute to many charitable organizations and sponsor education awards. NFFE Local 2109 marshals the efforts of employees in many worthwhile endeavors such as the annual Christmas toy drive.

When there is a major fire in the local community, WVA fire trucks standby at local municipal fire houses, a rare display of direct commitment to protecting our community. When a large and dangerous cache of decaying explosives (an old fireworks factory) was discovered in a rural area a few miles from the Arsenal, it was the Arsenal's fire chief (the only one fully qualified to do so) who acted as on-scene commander. He led a large mobilization force of state and local resources who safely removed the explosives, disposed of the material, and cleaned up the site.

Scores of Arsenalites are volunteer firefighters and are allowed liberal leave arrangements for taking on this responsibility. When a local county group announced plans for construction of a Vietnam Veterans Memorial, 16 Arsenalites volunteered to raise the \$1,000 needed to buy a link in the memorial chain. An Arsenal supervisor headed the group and was able to provide the vital funds to help bring the project to reality. No request is too small for an Arsenal helping hand. From parade floats to guest speakers, from donating surplus rope to the environmental Sloop Clearwater to providing excess cargo parachutes to protect the newly-finished gym floors of the city's community center, WVA shows its commitment to being a good neighbor. WVA has a longstanding reputation for keeping residents informed of events and business conditions that affect them as well as ongoing environmental efforts to maintain pollution-free soil, water, and air surrounding the facility.

Fig. 1.2.2

ness Education Alliance Program. The finance office at the Arsenal, working under Executive Order 12821, was able to donate excess computer equipment to a local school with a value of nearly \$12,000.

The Arsenal takes great pride in its efforts to do business locally. Its record on working with small businesses, small disadvantaged businesses, and women-owned businesses has consistently been among the best in the Industrial Operations Command.

The commander of the Arsenal is a standing member of the 50 Group, an influential group of the fifty top leaders in the community from business, education, and community organizations. The Junior Achievement group led by WVA staffers won the prestigious 1998 Company of the Year designation for the region. Employees annually donate 600 units of blood

2 Strategic Planning

2.1 Strategy Development Process

"To be the nation's large caliber cannon manufacturer; recognized as the world's leading cannon producer; to partner with Benet Laboratories and others to provide the technology, skills, facilities and quality system needed to meet Defense Readiness Requirements; and produce cannon and related products for government and commercial customers."

WVA Vision
Enterprise Level Strategic Plan

WVA is recognized as a leading facility in Strategic Planning within the Army and Commercial Industrial community. In 1990, Watervliet won the World Class Manufacturing Industry Award for Strategic Planning and Automation. Watervliet personnel have been benchmarked and called on to consult with the Industrial Operations Command headquarters on the development of their Strategic Plan. In fact, WVA has undertaken a strong strategic planning effort since 1990. On-going strategic planning and business development efforts have resulted in the establishment of a formal process and organization for Strategic Planning and Business Development.

2.1 Strategy Development Process

In the early 1990s, the Executive Board established our Strategic Planning Committee. This committee is comprised of the primary individuals respon-

sible for the development and deployment of the Strategic Enterprise Plan and meets on a regular basis to review, analyze, make decisions and report on developments involving the Arsenal's business strategy. During 1997, the Committee convened for the purpose of establishing its FY98 Business Strategies, and to update the Strategic Enterprise Plan. This same committee is involved in the continuous improvement of the plan.

As a result of Watervliet's experience in Strategic Planning over the last six years, and its continued training in strategic planning techniques, the strategic planning process has become more effective, and has yielded a more robust and encompassing plan.

Watervliet uses a process model for its Strategic Planning initiatives and for the development of the Enterprise Plan. It is based on a model developed by Booz, Allen & Hamilton for the Air Force Quality Institute, modified for WVA's purposes. The twelve-step process is defined as shown in Figure 2.1.1.

During 1997, members of the Strategic Planning Committee met to review and update the Strategic Enterprise Plan. Strategy sessions were held monthly and considered each of the factors described in Figure 2.1.2.

2.1a (1) Review of Current Markets

As part of the strategic planning decision making process, a review of the current markets, customers, market projections, and opportunities were examined. (Refer to Section 3.1 for a description of the markets). During the period of Mar 97-Sept 97 the Strategic Planning Committee designated key individuals to conduct an intensive investigation and assessment

1. Plan to Plan	2. Establish/ Confirm Values	3. Review Mission	4. Develop Vision	5. Assess SWOT	6. Conduct Gap Analysis
7. Develop Strategic Goals	8. Critical Success Factors	9. Develop Tactical Plans	10. Implement Plans	11. Measure Performance	12. Annual Review

Fig. 2.1.1

Customer Requirements	Competitor Info	Risks	Organizational Capabilities	Supplier Data
Customer Satisfaction Surveys	Market Research	Budget Cuts	Unique Skills	Procurement Research
Market Research Contact	Pricing Matrix	Eroding Skills	Highly Equipped	Established Relationships
Customer Profiles	Procurement History	Product Obsolescence	Continuous Improvement	Advanced Planning Document
Contact Management Data	Industry Surveys	Regulatory Constraints	New Technologies	Supplier History
Requirements History Tracking	Customer Feedback	Outside/Political Influence	Integral Engineering	Local Supplier Network
	Benchmarking	Cost Rate Escalation	Cradle-to-Grave Quality System	
	Experience			

Fig. 2.1.2

of potential market areas, market opportunities and their fit to the WVA strengths and overall strategic business objectives. Nine teams were formed to investigate nine target market areas and fully assess and evaluate the potential of each market, along with an independent facilitator to assist in the evaluation. Team member efforts were given top priority. The method for customer identification and market identification is explained in Section 3.1 Customer and Market Knowledge.

The results of the six-month marketing investigation were included in the strategic planning process in order to determine "best fit" markets. Also included in the studies was the identification of typical suppliers and supplier resources needed to meet market and customer requirements. Watervliet's Procurement and Contracting Directorate reviewed the supplier information and contacted suppliers to ascertain their ability to meet market and customer requirements. This information was included in our marketing study and subsequently considered in the strategic planning process.

2.1a (2) Determining Competitive Status

Market studies were performed in each of the areas to determine the Arsenal's competitive status in terms of product pricing, delivery, ability to meet customer technical requirements, technological capabilities needed to meet the market/customer requirements and understanding of customer values in each market area.

2.1a (3) Risk Analysis

The Arsenal's systemic approach to risk analysis includes regular investigation of risk in current and future market endeavors, risk review during annual budget meetings for capital expenditures, and threats identified in the Strengths, Weaknesses, Opportunities (SWOT), and Threats analysis section of the Strategic Enterprise Plan. The Arsenal's commitment to the marketing of non-mission products was evident in that two of the markets initially adopted, Rotary Forging/Steel Conversion and Shipbuilding/Propulsion Shafting (Refer to Section 3.1a for all markets), required substantial investments in equipment and training of personnel. This presented a case for financial, market

and societal risk that was resolved in the strategic planning process. Data was compiled from actual cost estimates and proposals to support an analysis of this case by the Strategic Planning Committee and, after investigation, the markets were approved and business risks incorporated into the overall market plan.

2.1a (4) Individual and Team Potential

Included in the Strategic Plan is the Arsenal's vision to encourage individual and team potential and to develop an empowered work force which respects diversity and functions with a clear purpose for the future. Over the last six years, short and long term training requirements have been identified and incorporated in Arsenal training plans. An example is the skills needed to participate in new market areas such as Shipbuilding/ Propulsion Shafting. Here training needs were identified during market research for specialized manufacturing processes. Training was included in the Strategic Plan, budgeted and conducted on-site in preparation for a contract to produce Propulsion Shafts for U.S. Army Corps of Engineers vessels. Upon performance of the contract, the skills and process were documented through video for internal cross training.

Although WVA has been under a freeze on hiring authority for several years, it has been proactive in cross-training and re-skilling its workers. A variety of in-house training has been and continues to be available for workers. Additional information can be found in Section 5 Human Resource Focus.

2.1a (5) Process Planning Group

Once identified, customer and market technical requirements are forwarded to the process-planning group for evaluation and to assess the ability to meet customer requirements. A thorough review of current Watervliet capabilities and technology is undertaken and matched to customer requirements. Also taken into account is the ability to utilize Benet Labs Research and Development facilities to meet or develop prerequisite technologies for each marketplace. The Arsenal has maximized the synergy of WVA and Benet

Labs in the Strategic Enterprise Plan, citing it as a major strategy for entry into markets where unique, value-added engineering services such as reverse engineering and technical data package development/prove-out are requirements or critical differentiating factors.

2.1a(6) Supplier Relationships

As the defense industrial base shrinks and there are limited resources for specialized materials, partnering concepts and supplier relationships have played a strong factor in Watervliet's Strategy Development Process. In fact, the Arsenal's vision statement, in part, states that we will "partner with Benet Laboratories and others to provide the technology, skills, facilities, and quality system to meet Defense Readiness Requirements."

One of the unique aspects of Watervliet's strategic planning process is our partnership with Benet. During early strategic planning sessions, it became apparent there were significant benefits which could be obtained by both Watervliet and Benet by leveraging each others talents and strengths. As a result, a Joint Strategic Planning Board, consisting of key WVA and Benet Laboratory decision makers was formed and joint strategic planning efforts were initiated, as shown in Fig. 2.1.3. The joint strategic planning process runs parallel and compliments both the WVA and Benet Laboratories strategic planning process. In 1997, the Joint Strategic Planning Board developed and agreed upon a joint vision for the WVA/Benet site. This vision states:

"The Benet Laboratories and WVA Partnership will be recognized by our customers and the Department of Defense as:

- *The world leader for research and development, manufacturing and field support of large caliber cannon.*
- *The enterprise of choice for selected armaments and complementary products.*
- *Providing exceptional value which creates growing demand for our products."*

As in our facility-unique strategic planning process, Strategic Objectives and supporting Critical Suc-

Joint Strategic Planning

Watervliet Arsenal

Mission: To perform manufacturing and product assurance for cannon, howitzers, mortars, and recoilless rifles and their components.

Vision:

- To be the nation's large caliber cannon producer, the recognized world leading cannon producer.
- To partner with Benet Labs and others to provide skills, facilities, and quality systems to meet Defense Planning Guidance.

WVA Strategic Objectives and Critical Success Factors

Benet Labs

Mission: To perform technology, design, development, engineering and production and field support for large caliber armament.

Vision:

- To be recognized as the world's leader for technology, design, development, engineering, and production and field support for large caliber armament systems.
- To be judged by our nation and customers as a center for excellence
- To be valued by our employees for providing challenging and rewarding opportunities

Benet Labs Strategic Objectives and Critical Success Factors

Joint Strategic Objectives, Critical Success Factors and Action Plans

Joint Vision: To be recognized as:

- The world leader for research and development, manufacturing and field support for large caliber cannon.
- The enterprise of choice for selected armaments and complementary products.
- Providing exceptional value which increases demand for our services.

Fig.2.1.3

Success Factors have been developed to assure our advancement toward this vision. Objectives are passed down through the organization and incorporated into each organization's execution plans and performance standards. The Joint Strategic Planning Board meets regularly and performance toward the objectives is monitored and evaluated. Action plans are modified based on changing circumstances and conditions.

In addition to Benet Labs, Watervliet's Strategic Plan outlines strategies for partnering with major prime weapon contractors and weapon system integrators as a sub-system supplier for mission markets and with major DOD shipyards and aircraft suppliers for non-mission markets.

Regarding suppliers, Watervliet has instituted a closer working relationship with its suppliers and has implemented network telecommunications directly to each supplier for faster turnaround with less administrative burden.

In the case of the nine marketing teams, the six month investigation resulted in four of the original nine market areas being formally adopted in the Strategic Enterprise Plan, and earmarked for a formal marketing program. The nine teams also laid the groundwork for the formation of an organizational restructuring that would permit a higher level of Arsenal commitment to the marketing and customer satisfaction effort.

2.2 Organization Strategy

2.2a Strategy and Action Plans

Included in the Strategic Enterprise Plan are a series of subordinate strategies and action plans. Among these plans is a five-year Business Plan that utilizes WVA's potential workload projection and long range workload forecast. The five-year plan allows sufficient planning to occur in order to insure the future year workload can be met within attrition goals, and without sacrificing deliveries of weapon products to it's customers. Other subordinate plans are also included in the Strategic Enterprise Plan. An Advanced Environmental Plan identifies many initiatives which cover environmental projects such as hazardous waste tracking, reduction, and elimination, energy reduction, pollution prevention and clean air act compliance.

A Public Works Strategic Plan details modernization of engineering and housing functions to include implementation of standard Army systems. The Technical Infrastructure & Networking Master Plan encompasses telecommunications, automation, visual information, records management, and publications. The Strategic Plan for Continuous Improvement is a five-year plan which focuses on the Arsenal's Total Quality Management and Continuous Improvement efforts. The Quality Plan focuses on the transition from a reactive inspection intensive quality control program to a proactive program of process control, statistical methods application and continuous improvement in all areas including design and development. The Quality Plan goal is to become certified under Army's Contractor Performance Certification Program (CP2) and ISO 9002 in 1998. A training plan is also included in subordinate plans which details the training schedule for employees and a description of the training courses.

WVA's strategic plans and objectives are deployed internally through a series of task actions to functional areas in a manner that links the strategic planning to individual performance. Due to sensitivity of some of the information in the plan, such as proprietary technologies, DOD security constraints, and competitive intelligence, the plans have not been de-

ployed externally to suppliers (who are also competitors in some market areas). Section 1, Fig. 1.1.3 depicts these flows and linkages from strategy to action plans.

Upon defining the strategic vision, strategic objectives, and a desired future state, Critical Success Factors were identified and tasks were assigned to senior managers in each functional area of responsibility. A Gap analysis, which identifies the gap between the current state and future desired state, outlines specific tasks needed to meet the desired future state. Tasks have been incorporated into the critical job performance elements of each senior manager in the organization. Senior managers then have the responsibility to incorporate these objectives into the performance plans of leaders and employees as necessary. Meetings for this purpose occur between managers and employees at the time of the formation of the performance plans, the mid-year review of performance and at the annual performance review.

A continuously updated Gap analysis ensures that each task is assigned, tracked, and completed. Each Gap task is prioritized according to its overall importance to the plan.

The Strategic Plan is re-focused through several channels. Refocusing of the plan can occur through periodic Strategy Meetings where issues surface and are addressed. External events may occur which will have an impact on the plan. These events can be changes in regulatory or political control and can happen frequently, given the on-going changes within the Army and the Defense Department.

2.2b. Performance Projection

A projection of key measures or indicators over the next two to five year period includes a projected overall increase of 33% in business (mission and non-mission), as identified in WVA's Strategic Plan's Five-Year Business Plan.

This includes partnering opportunities through contracting and subcontracting relationships, synergistic relationships under the New York State Economic Development Zone, and increase in joint R&D developments.

3.0 Customer and Market Focus

"Our customers are the focus of everything we do."

Strategic Plan for Continuous Improvement

3.1 Customer and Market Knowledge

WVA has taken a proactive approach to identify and establish target markets and customers as part of an overall focused marketing program. During the last three years several initiatives have been undertaken to review and analyze various markets, products and customer segments. Market investigations, in-house training programs and planned capital investments have resulted in a well-defined matrix of target markets, customers, and products.

The Arsenal's primary market and mission is to produce tank cannon, howitzer cannon, and mortars for the U.S. Army. Products are provided directly to Army Program Managers and prime weapon contractors. This "mission" market accounts for approximately 80-90% of WVA's current business. Products and services in the mission market are also provided for other military services such as the U.S. Marines as well as "friendly" countries through the provisions of Foreign Military Sale (FMS).

3.1a Customer/Market Knowledge

The market analysis process is depicted in Fig. 3.1.1. The objective is to identify markets, customers and product/service areas for which WVA may seek opportunities and engage with minimal barriers while leveraging its current strengths. A multiple market selection process was intentionally used to diversify our current skill base and to minimize vulnerability of any single market decline. Markets are investigated for "dual use" in potential military and commercial markets, and considered with respect to their immunity to future defense cuts in non-cannon areas.

Formal market analyses are conducted for each candidate market area. A ranking of each market is

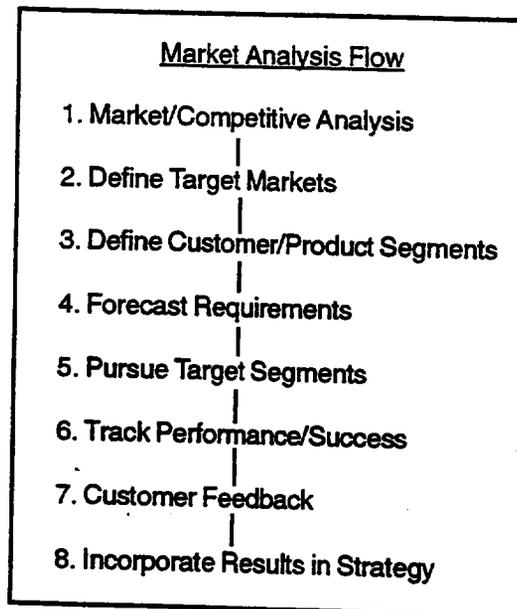


Fig. 3.1.1

performed in 10 major categories and subcategories. Each analysis includes long term forecasting of the market, matching WVA's strengths, our past performance in market related areas, projected regulatory and policy issues as well as political and societal issues.

Based on market analysis, a formal assessment is written for each market with recommendations on what customer and product segments should be targeted within the market.

During the determination of customer and product segments, competitive analysis is performed on two similar components with typical competitors and cost rates associated with the manufacturing of each component. This exercise is instrumental in narrowing down the field of markets to those in which WVA may be competitive.

In determining customer requirements, conversations are held with several prospective customers. These "listening and learning" conversations help to determine the customer's baseline requirements, buying behaviors and values in each of the market areas. Each market assessment includes a five-year forecast of projected market volume and projected revenues.

With all market studies and prerequisite resources identified, promotional campaigns are undertaken in the pursuit of each customer segment. A variety of market media and communications techniques are used to

engage customers, from initial contact through closure of sales.

Upon each successful contract award in the target markets, the product quality, delivery timeliness and customer service quality is closely monitored and documented for further analysis. A quote tracking document and history is developed for each opportunity and related data is documented.

A written customer satisfaction survey is also initiated directly to the customer with the results incorporated in the business decision planning and strategic planning process. Customer suggestions received either through this process or unsolicited have led us to new product areas by offering information on capability expansion. The results and lessons learned of each opportunity, and documentation is incorporated into the follow-on market analysis and into the Strategic Planning Initiatives.

The initial result of this process resulted in the identification of three general market areas as follows: Mission work – Cannon/FMS Production, 70%; Prototype, 15%; Non-mission Work – Various Military Products/Customers, 10%; and Commercial Work - - Various Commercial Products/Customers, 5%. A further breakdown of the non-mission and commercial market areas is shown in Figure 3.1.2.

A formal organization for marketing and research was established which is responsible for market research studies and competitive intelligence information. Over the last two years, WVA has implemented desktop marketing software which provides market and competitor information. In addition, techniques have been expanded to include world wide web searches to obtain company and product information, use of the National Trade Data Bank database maintained by the U.S Dept of Commerce and the National Procurement Database which provides historical information on market volumes for both military and commercial markets. Additionally, Watervliet received expert training on market research techniques and interpreting customer values and requirements.

3.1 a (2) Key Products

During market research efforts, not only are customer values examined but also the key product fea-

Non-Mission Markets

Shipbuilding and Propulsion Shafting – U.S. Navy, U.S. Army Corps of Engr.
Army Aircraft Frame Replacement Parts – U.S. Army Corpus Christi Depot
Guided Penetrator Munitions - U.S. Air Force/ U.S. NavAir
Military Replacement Parts – Defense Logistics Agency

Commercial Markets Shafting –

Shipbuilding and Propulsion Commercial Shipyards
Rotary Forging and Steel Conversion Services – Steel Mills and Forging Houses
Petro/Chemical Drilling Equipment Parts – Oil Drilling Equipment Mfrs
Industrial Food Processing Containers and Cylinders – Equipment Producers
Hydraulic Cylinders, Plating and Refurbishment

Fig. 3.1.2

tures, value added services, and other differentiating factors that will permit Watervliet to stand apart from the competition. One such example occurred during the examination of aircraft replacement parts where it was determined that, in addition to manufacturing capability, customers heavily valued the ability for suppliers to modify and update technical data from older or incomplete drawing packages. Discussions with government and private aircraft suppliers and overhaul facilities showed the consistent need for hard-to-obtain replacement parts. Based on this, Watervliet proposed to offer these engineering services, including complete reverse engineering, as part of the overall services available to customers in this market. As a result Watervliet utilized the strength of it's Joint Strategy (Refer to Section 2) with Benet Labs, to exceed the customers' expectations of available services in the market and secure contracts for replacement parts.

3.1 a (3) "Listening and learning"

"Listening and learning" from customers, potential customers and markets occurs during market research, interpretation of customer requirements, and auditing of customer feedback and satisfaction. Market research data is updated during each revision of

the Marketing Plans Section of the Strategic Enterprise Plan. Customer satisfaction data is evaluated on an on-going basis with annual or more frequent dissemination of customer satisfaction data.

The validity of the data is verified through correlation to historical data, and through third party sources. Provisions are made for intelligence gathering, competitive or otherwise, through attendance at trade shows and discussions directly with competitors through membership in specific trade associations or industry groups. This has proven effective in military markets where an open exchange of information occurs between customers and suppliers at conferences.

Our quote management system, customer satisfaction program and approach to marketing also serve as vehicles for us to learn from our customers.

3.2 Customer Satisfaction and Relationship Enhancement

3.2a Accessibility and Complaint Management

3.2a (1) Do Our Customers Know Who To Talk To?

The establishment of our Marketing and Customer Development Office brought to order specific customer interactions necessary for us to do business effectively. Our Customer Satisfaction procedures define the responsibilities for customer communication. (Fig. 3.2.1) The Marketing and Customer Development Office provides the external customer interface from initial contact to contract.

The Production Planning & Control Division (PPC) of our Industrial Operations and Production Directorate is responsible for communications with

customers through the production and delivery phase.

The Product Assurance & Test Directorate (PA&TD) is responsible for providing field support and assistance for all Arsenal products, and is the designated point of contact for all complaints or inquiries concerning product performance or quality. PA&TD's address and telephone number is provided to field users, field maintenance personnel and Logistics Assistance Representatives (the liaison office between the soldier and the supplier).

Our customer survey identifies customers' level of satisfaction with our communication and problem-solving systems. (Results 7.1)

3.2a (2) Our Complaint Management Process

There are three phases of customer involvement, each with their own problem resolution processes. (Fig. 3.2.2)

During each phase customers are aware of the appropriate contact for problem resolution. During contract development, the customer is working with one individual in our Marketing and Customer Development Office. When a contract is in place, the customer is informed of their point of contact during the production phase. During these two phases, representatives work together to ensure the customer's needs are being met. Customer "complaints" that arise during these two phases are dealt with through informal and formal means. Records are maintained of all issues and their resolution. We make every attempt to resolve disputes at the lowest possible level, which usually means by telephone. During the production phase, In - Process Reviews are held either at the request of Watervliet or the customer, or at regular intervals as stated in the contract. Both parties intend these reviews to be preventive in nature, clarifying issues before they become problems. If necessary, they

Quote management process	Customer satisfaction program	Marketing approach
In process reviews Scope of work Warranty performance Quote tracking system	Review of performance Written/e-mail surveys Telephone follow up Suggestions for improvements	Internet research Networking Trade shows Other Benchmarking

Fig. 3.2.1

Phase of Customer Involvement	Responsible Office	Problem Resolution Processes
1. Contract Development	Marketing and Customer Development Office	Direct Telephone Communication Site Visits
2. Production	Industrial Operations and Production Directorate	Direct Telephone Communications In-Process Reviews Site Visits
3. Post Delivery	Product Assurance and Test Directorate	Quality Deficiency Reporting System Field Support

Fig. 3.2.2

may also be used as a formal problem solving process.

PA&TD is responsible for handling all customer concerns after products have been delivered. Watervliet's complaint management process is documented in our Quality Plan. Complaints are logged in, evaluated, staffed and tracked for timeliness and effectiveness of response. Records of communication with the customer are maintained until closure. The results of the root cause investigation of the problem and corrective action taken to prevent recurrence are reviewed and approved by the process audit office and a follow-up audit is scheduled to verify implementation. (Fig. 3.2.3) The process is evaluated monthly, and recorded graphically. Process cycle time and the number of complaints received are monitored.

Recently, a customer complaint was received describing a problem associated with the assembly of a WVA product. Part of the immediate corrective action taken involved a visit to the customer's facility by WVA representatives. The group was able to identify variation between the assembly procedures used by the customer and WVA and resolve the problem.

Our customer survey process provides the bulk of our aggregate information. That information is analyzed and presented to Watervliet management offi-

cial. The customer survey process is discussed in 3.2.b.

3.2b Customer Satisfaction Determination

3.2b (1) How Do We Measure Customer Satisfaction?

Customer satisfaction with our product is determined through metrics obtained by PA&TD and through our Customer Satisfaction Survey process.

PA&TD is responsible for staffing and resolution of post-production customer complaints. Metrics reflect customer satisfaction with the quality of our product, primarily in the form of Product Quality Deficiency Reports and Reports of Deficiency. Test Incident Reports from the proving ground, while not necessarily customer complaints, provide information that must be responded to in order to affect customer satisfaction. Charts depicting these results are posted on a monthly basis.

The Marketing and Customer Development Office is responsible for coordinating our annual external customer survey. This process includes the development, issuance, analysis, reporting and follow-up of customer satisfaction surveys and their results.

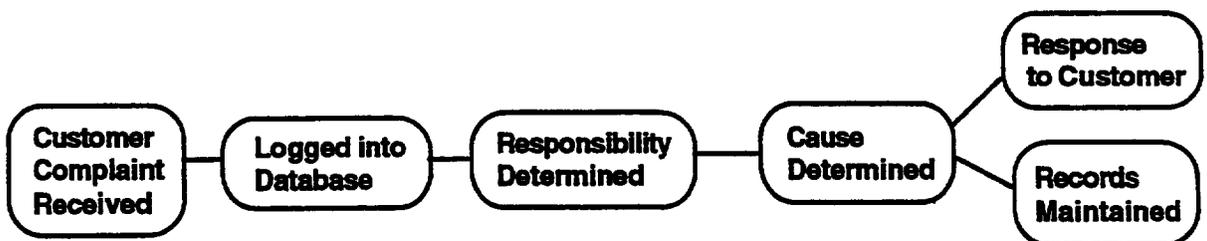


Fig. 3.2.3

Surveys are mailed to 100% of our active customers on an annual basis self-addressed, postage-paid envelopes are included). The survey is divided into several areas, and provides us with information on how our products and organization have performed.

We recently improved our survey process by expanding the capabilities of our customer database. Previously, any "sorting" of customers to provide comparative analysis had to be done manually. We've now automated the process by which customers can be grouped in several ways – by product, length of time, customer service contact, etc. These improvements will assure our survey process is more effective and efficient in the future.

3.2b (2) How Do We Follow Up With Our Customers?

Quotes are entered into our automated Quote Management System which allows the Marketing and Customer Development Office to track expiration date of quotes and follow up on business opportunities. By keeping on top of quotes we have issued, potential customers have sufficient and accurate information to make their decision, ensuring we have the best possible chance of winning bids.

All customer survey responses are reviewed immediately and coordinated with the appropriate organization to address and answer any customer complaints or concerns. Follow up with customers is done using profiles detailed in Fig. 3.2.4 according to urgency and level of response required. Typically by telephone, fax

or letter.

Customer responses are analyzed and presented in both quantitative and narrative form to Watervliet management. Survey results are used in strategic and tactical planning sessions to assist Arsenal management in establishing short and long term goals, objectives and plans of action to address customer concerns, requirements and expectations.

3.2b (3) Customer Satisfaction vs. Competitors

During the market research process, and during the customer requirements phase (See Section 3.1 a Customer/Market Knowledge) potential customers are asked how they value products and services from their existing suppliers, how they rate their current suppliers, and their strengths and weaknesses. Some of this data can be verified through historical databases on procurements and contract pricing data in the CD-Fiche software database and through DOD Procurement databases. Through a consensus of several customers using the same suppliers, and the historical contract data, a reasonable verification of the information is obtained. This information can then be correlated to the results directly obtained from Watervliet's customer satisfaction surveys, and a relative comparison of Watervliet performance to its competitors can be obtained.

3.2c Relationship Building

3.2c (1) Customer Loyalty

Our Quality Policy and Customer Service Standards best exemplify our approach to building loyalty from our customers. (Fig. 3.2.5) Customer loyalty is earned from meeting expectations with respect to cost, quality and delivery performances.

Our Quality Policy is displayed prominently throughout Watervliet. Customer Service Standards are included, along with the Quality Policy, in our Strategic Plan for Continuous Improvement.

Our primary indicators of external customer requirements that must be met to ensure their loyalty come from our Customer Satisfaction Survey.

In response to these needs, certified through the

1998 Customer Satisfaction Survey Form
Customers evaluate our performance in the following areas:

Overall Performance
Customer Focus/Commitment
Product Quality/Performance
Customer Service/Sales Personnel
Technical Support/Warranty Performance
Price/Pricing Policies
Problem Handling/Response
Marketing and Customer Development

Fig. 3.2.4

Quality Policy: *"Quality is our number one priority and every employee's responsibility."*

Our customers are our business. Quality is defined as our ability to satisfy our customers. Quality Excellence is the foundation for our continuous improvement efforts and the cornerstone of our goals for customer satisfaction.

Customer Service Standards:

- Meet or exceed all customer requirements.
- Perform on schedule at a reasonable cost.
- Provide timely immediate response to all customer inquiries, complaints, and emergencies.
- Make it right the first time through emphasis on quality planning.

Fig. 3.2.5

survey, we implemented an automated quote tracking system, improved telephone communications, and restructured to assure more timely responses. Our quote turnaround time has gone from almost 30 days in 1994 to an average of 16 days today.

We have identified internal customer relationships between WVA directorates that are dependent upon each other for supplies, products, materials, and services. The Marketing and Customer Development Office administers the WVA Internal Customer Service Survey on an annual basis, analyzes the results, and provides feedback to directorates. As a goal for internal customer satisfaction improvement, directorates work to resolve these issues to ensure they do not surface in the following year's survey.

Our Community and Family Activities Office (CFA) supports a variety of internal customers – active duty and retired military and dependents, currently employed civilian employees and retirees and several tenant organizations.

Customer needs for both civilians and military are primarily determined by a triennial need assessment survey. Improvements to programs and purchase of equipment are determined by analysis of feedback by the program manager. Our Interservice Support Agreement (ISA) manager establishes and maintains a customer relationship with our tenant organizations in providing agreed-upon services. See chart in overview.

Services to our Army Community are also offered

through the ISAs. ISAs are sent to the 24 military units in the area which are given an opportunity to choose the services they want. Volunteers and contractors administer the services through the Army Community Service director. Customer surveys and meetings determine service improvements. Annual Town Hall meetings are held separately with residents of the Watervliet and the Rotterdam Housing Areas to continually improve customer service to residents and monitor progress via a face-to-face exchange of information.

3.2c (2) Evaluation and Improvement of Customer Satisfaction Processes

The effectiveness of our customer satisfaction program is continually being assessed. Annually, the Marketing and Customer Development Office reviews the previous year's customer surveys, complaints and inquiries and assesses them against internal organizational strategies.

Our goal is to see continual improvement in the results of our Customer Satisfaction Survey from year to year. (Results 7.1) Customers provide the best indicator of the appropriateness of our survey instrument in the way they respond. Follow-up telephone calls are made to customers when surveys are not returned.

In our most recent survey, several non-responders indicated time constraints as a factor in their failure to respond. To address this, an objective has been established to send surveys electronically rather than via hard copy to satisfy customer preferences.

Changes in the way we do business require modification of our survey process, e.g., addition of our Marketing and Customer Development Office provided customers with a new way of "meeting" WVA. By adding a survey section devoted to interaction with this office, we can assess our performance and better identify and meet customer expectations.

After analyzing this year's survey, we developed the following objectives for next year's instrument: Increase Response Rate – benchmark for return rate; simplify form/e-mail; incorporate organization changes; explore process changes such as analyzing by business type; and add formal quote research and analysis.

4.0 INFORMATION AND ANALYSIS

4.1 Selection and use of Information and Data

"We will ensure the metrics we use are aligned with our strategic objectives and business goals."

WVA Strategic Plan for Continuous Improvement

Vital information about WVA is assembled from a wide variety of sources—all driven from our needs to satisfy customer requirements for quality, delivery and cost effective performance.

4.1a(1) Main Types of Information and Data

Data and information are captured on a wide variety of key business indicators which contribute to the satisfaction of customer requirements and needs. See Fig. 4.1.1. "Information and Data Summary" which details relevant business data by source, frequency of update and how it is used by management to control and improve business operations.

Data categories shown in Fig. 4.1.1 also are indicative of those functional proponents and primary users of the data. Employee data is primarily utilized by our Civilian Personnel Activity Center for administrative purposes and is also utilized by functional managers to identify individuals with certain skills, education and physical limitations through online access utilizing Data Warehouse technologies. Financial data is primarily used by the Resource Management Directorate in Cost Accounting and Budgeting, however it is also accessed and utilized by functional managers and technical staff throughout WVA for cost estimating, quote production and a variety of internal budgeting applications. Manufacturing data is primarily used by the Industrial Operations Directorate (OD) to control, manage, analyze and improve their ability to manufacture mission products. Quality data is primarily utilized by PATD and OD. The data is used to monitor supplier and in-process quality, and document final test

and inspection of manufactured parts. This data also assists our Procurement and Contracting Directorate in assessing the selection of quality suppliers through their Contractor Rating System.

Environmental data is mainly used by our Installation Services Directorate to monitor and assure compliance with regulatory constraints on emissions, chemical handling, safety and health, etc. This data is also needed to provide state and federal regulatory agencies with documentation on our compliance with established environmental and safety standards. Technical data is used primarily by engineering and technical staff to access drawings and data needed to manufacture parts from several directorates. Market intelligence and technical data is primarily utilized by our Marketing and Customer Development Office staff to develop business and market plans, analyze procurement histories for potential bid and to gather data on competitors and their suppliers which contribute to new market launches authorized by the Executive Board in our Enterprise Plan.

4.1a(2) Deployment of Information and Data

Individual reports and online data are available to both primary and support users as detailed in column 3 of Fig. 4.1.1. Consolidated data are provided in quarterly Review and Analysis, Quality Systems Management Review, and Installation Mission Review presentations to the Executive Board as well as synopsized into subordinate strategic plans. Certain plans such as the Strategic Plan for Continuous Improvement have been disseminated to all arsenal employees while others are used by operating management for the execution of their duties and measurement of the achievement of goals and objectives of these plans which have been incorporated into their performance standards. Management Information Systems used at WVA to develop and deploy reports were cited by the Navy Best Manufacturing Practices Center of Excellence for our work in Information Systems Modeling.

4.1a(3) Key User Requirements

Access to this data and information detailed in

Information and Data Summary

<u>Data Categories</u>	<u>Service</u>	<u>Frequency</u>	<u>Performance Indicators/Use</u>
Employee Personnel System Skills Safety	Personnel Labor History OSHA reports Accident tracking	Online Weekly Monthly Monthly	Administrative/management Improved employee utilization Safety Awards Reduced accident rate
Financial Cost Rates Operating Budget Product Cost	Labor/pay Operating Managers Work in Process	Weekly/Monthly Annually Weekly/Monthly	Cost Estimating Control by responsible cost center Costs identified to end-item Provides Shop Floor flexibility Responsibility reporting Control performance Net Operating Results Actual cost per item at any time
Installation Mission Review Investment Value	Performance to Plan Std & Actual Cost	Monthly Weekly	
Manufacturing Inventory Product Data Tech. Product Data Tech.	Computer Maint. Mgt System Data Pkg MANMAN	Real-time Real-time Real-time	Complete inventory of maintenance stores Reduce time required for Tech Data Review Materials Requirements Pmg Capacity Requirements Planning Product & Nonproduct Inventory Dispatch raw material and sub-assembly to Manufacturing and Assembly
List of Parts & Materials	Bill of Materials	Daily	
Quality Defect Control Rework Vendors Quality Systems Performance	Nonconforming Material Waiver & Deviation Automated Acquisition Systems Performance	Monthly Monthly Daily Monthly	Defect Reduction Rework Reduction "Best Value" Contracting Over 30 categories ranging from Quote Cycle to Defects Per Million Opportunities
Environmental Hazardous Material Air emissions	HAZMIN Naval Air Emissions Tracking System	Real-time Real-time	Control hazardous material Control air quality
Technical Configuration	JEDMICS TDCMS(E)	Real-time Real-time	Access tech data & drawings Access tech data & drawings
Market Intelligence Suppliers/Competitors Prices Market Analysis	Internet CD Fiche D&B Marketplace	Online Online Online	Market Intelligence Procurement History Competitive Intelligence
Customer Satisfaction Field Quality Test Quality Letters/Questionnaires	QDRs TIRs Surveys	Monthly Monthly Periodically	Corrective Action Corrective Action Customer Relations

Fig. 4.1.1

Fig. 4.1.1 is enabled by a variety of Information Technologies. Rapid access to data contained in Employee files is made available through on-line access to the Defense Civilian Personnel Data System (DCPDS) and our new employee Data Warehouse. Financial data access is facilitated through the development and dissemination of cost rate and product cost reports (available weekly) and the development of WVA annual operating budget. Manufacturing data access is provided in real time on the status of manufacturing progress

as well as cost histories for work incurred to date. Quality data and statistics are compiled monthly for management in the WVA Data Book and is gathered from the manufacturing organization, field operations and from customers.

Copies of letters from customers and gun history records are available from the Quality Systems Division. Environmental data is available in a variety of formats which provide the basis for reporting require-

ments to regulatory agencies. Real time systems such as Hazardous Material Minimization System (HAZMIN) monitor the acquisition and use of chemicals and toxic materials while others provide real time information on air quality and emissions. Any personal computer (PC) wired to our Local Area Network can provide a view of this data. Our Power Monitoring System (PMS) provides real time access to any networked PC on post. Technical data access is provided via specialized data bases and software which access dedicated computers at remote DoD locations, while Market Intelligence data rapid access is enabled via the use of contractor maintained CD ROM data bases and remote network access to commercial data bases.

The WVA Data Book is a composite document that provides timely data to senior management on a myriad of topics including the organizational performance; activities of councils, boards, and committees; assets, financial data, industrial results, personnel statistics, Equal Opportunity statistics, and workload; as well as data on our quality program. The record book goes to directors and the union. Updates for the most frequently changing data are provided monthly or quarterly, while infrequently changing information is updated as needed.

4.1a(4) Evaluating, Improving, Keeping Current Information and Data

Personnel and skills data are automatically kept current through the entry of data into DCPDS and our Data Warehouse. Financial and manufacturing data is evaluated and checked for accuracy via audits and physical inventories which, upon verification, result in the update of electronic data bases for costs, quantity, location and value. Quality data is kept current via customer satisfaction surveys, Test Incident Reports, Quality Deficiency Reports, manufacturing systems and internal audit systems. Environmental data is collected via real time monitoring of emission to the Hudson River at our Waste Treatment Plant and of our Air Emissions. This data is reported to State and Federal regulatory agencies as provided by law. Configuration data is kept timely by other DoD agencies. Subscriptions to marketing data bases are maintained under con-

tract.

4.2 Selecting and Using Comparative Information and Data

WVA has utilized a variety of methods to compare data and information to other government and commercial industries in order to improve operations and to benchmark WVA against other comparable facilities, including comparisons of bids against previous purchase price. (Section 3.1a.)

4.2a(1) Determining Needs and Priorities for Comparative Information and Data

In order to maintain our World Class status, WVA has determined the need to gather and evaluate comparative data for its operations.

Standard benchmarking principles are used and allow flexibility on the part of end users. A wide variety of methods have been employed to conduct comparative analysis including financial statement comparisons, business procedure benchmarking with other government and private companies, and evaluation of capabilities within heavy machining industries. Benchmarking needs and priorities are determined based on identification of performance gaps, investigation of alternative and state-of-the-art technology, and requirements to perform new tasks—typically and most often defined under the duties of the first line supervisor, engineers and senior analysts.

4.2a(2) Sources of Appropriate Comparative Information and Data

Appropriate sources of comparative information include: Contacts with professional organizations and societies, attendance at conferences, symposia and trade shows, tours of government and private sector companies, trade literature, journals and contemporary books. In addition, we utilize the Internet to gather up-to-date information on engineering, technical and managerial topics under investigation. Product literature, advertisements through direct mail, and the Internet provide timely information on the availability of new products and practices. Subject matter experts

in Computer Integrated Manufacturing, organizational design, and manufacturing management systems have lectured and given presentations at WVA.

We have utilized top rated university professors, industry experts, and consultants to guide product and process evaluations including: State University of New York, Louisiana State University, Marist College, and Price Waterhouse to name a few.

4.2a(3) Comparative Data Deployment Used for Stretch Targets and Innovation

As previously mentioned, needs for benchmarking derive directly from GAP Analyses, Critical Success Factors, Strategies and Objectives and Subordinate Strategic Plans detailed in our Enterprise Plan. We have utilized benchmarking, shown in Fig. 4.2.1, to establish our vision, set goals and objectives, develop strategic planning architectures, develop plans on the horizontal organization and empowerment, develop proposals for Virtual Manufacturing for the Joint Flexible Computer-Aided Manufacturing (FCIM) Office, and adoption of Concurrent Engineering practices in the form of Integrated Product Teams in consort with our tenant design agency, Benet Laboratories.

4.2a(4) Part 1. Analysis and Improvement of Comparative Data and Information

Data gathered from benchmarking activities are

Benchmarks	Subject
Baldrige Award Criteria	ACOE Applications
ACOE Feedback Report	ACOE Applications
AT&T	Benchmarking
Calif. Institute of Technology	Strat. Planning Architecture
General Electric	Org. Structure
Foxboro Company	Concurrent Engineering
Foxboro Company	Integration of Bus. Systems
Foxboro Company	Strategic Planning
Comptroller of the Currency	Crit. Success Factors
Air Force Quality Institute	Strat. Plng. Architecture
Navy Best Mfg. Practices	Overall Business Practices
Lehigh University Agility Forum	Agility/Flexibility
Department of Energy	Vision, Strategies
Defense Financial Acct'g Service	Crit. Success Factors
McKinsey Company	Organizational design

Fig.4.2.1

evaluated for their worth to WVA by teams or individuals on a case-by-case basis. Once evaluated and deployed to responsible action officers, the effectiveness and worth of the information gathered is monitored by the individual or, more often, the benchmarking team leader to determine its utility for its intended purpose.

We have continuously improved our information-gathering after training on better ways to access information using the Internet.

4.2a(4) Part 2. Priorities and Criteria for Selecting Benchmarks

Priorities for benchmarking are easily derived from our GAP analysis (the difference between our corporate Vision and evaluation of current capabilities, knowledge and assets), and Critical Success Factor requirements as well as from strategies and goals defined in our Enterprise Plan. Once we've defined what we need to know, we search available information and define best in class. In order to do that we utilize industry experts, evaluate symposia, review current product offerings, and search on the Internet. Our criteria for selecting benchmarks has always been to "find the best there is and start there." Through continuing participation in the Navy's Best Manufacturing Practices Program, we have learned to methodologically audit and evaluate a wide variety of government and private sector firms in almost every aspect of business—from planning through customer satisfaction. Our expertise has grown and we served the DoD for several years as Benchmarking Team Leaders. Keeping current with ever changing technical and business practices is a never-ending process.

Currency is enabled through reworking, routine review of a myriad of professional journals, attendance at conferences and symposia, participation in federal workshops at the National Science Foundation and Defense Manufacturing Conferences including those sponsored by the Army Management Engineering College, and the Industrial College of the Armed Forces.

4.3 Analysis and Review of Performance

4.3a Analysis of Data

Principal financial and non-financial indicators of performance include quarterly reviews which are presented to the Commander and Executive Board by operating management along with corrective actions where needed. Financial data is also provided to higher headquarters on a monthly basis as Installation Mission Review charts, which describe in detail components of our Net Operating Results. Non-financial data such as safety, environmental, quality, workload and personnel statistics are reported to the Executive Board on a monthly basis with verbal presentations being given to the Commander and Board quarterly. Integration of financial and non-financial data takes place in the Data Book, which provides the measuring stick for incremental accomplishment of tasks identified in the GAP Analysis, Critical Success Factors, and Strategies & Objectives.

4.3a(1) Customer-related Performance

Serving national defense and providing our military with top-rated ordnance is why we exist. Our in-house quality program includes: Statistical Process Control, CP2, ISO 9002, and a host of manufacturing checks and balances, all aimed at finding and correcting quality deficiencies before delivery and providing the best in customer service. Quality issues are addressed in a variety of methods including: on-site visits and correction of deficiencies, and evaluation and remedy of Test Incident Reports (quality concerns noted during testing and following acceptance that may or may not be a WVA manufacturing issue) and Quality Deficiency Reports (quality concerns noted in post-test fielding that may or may not be a WVA manufacturing issue). In a proactive mode, WVA solicits customer satisfaction through routine surveys. (Reference Section 3.2.)

4.3a(2) Operational/Human Resource Performance

Product and service performance is addressed in 4.3a(1) above. Operational performance is found in the form of statistics gathered by our on Industrial Operations Directorate which contribute to the quarterly Resource and Analysis input for Executive Board review and comment. Personnel data are maintained and available on-line. Integration of this data is provided in the publication of the Data Book which also includes data on Safety, Equal Opportunity and Employee Assistance programs. Data is analyzed at least monthly and data exceeding established control limits or plans are required to be reported on at Quarterly R & A meetings and the Commander's Staff Meetings. Explanatory notes and commentary on Installation Mission charts and statistics are provided to our Industrial Operations Command (IOC) headquarters monthly.

4.3a(3) Competitive Performance

Section 7.2.2 discusses competitive performance on domestic cannon sales, foreign sales and non-mission sales.

Weapon system suppliers market complete weapon systems to the DoD, and have the option of incorporating applicable cannon/howitzers from any source—domestic (WVA) or a myriad of foreign producers such as those in Great Britain, Germany, France & Egypt to name a few. While cost information can be gathered on the sale of entire weapon systems, pricing on individual components such as cannon is not made available separately. Market research information suggest that our pricing, quality and delivery are among the best in world markets as system suppliers continue to demand ordnance manufactured at WVA.

WVA compared very favorably on cost rates for rapid prototyping using stereolithography, and advanced technology for economical development of accurate product models. Using data gathered from Wohlers Associates, Inc., an internationally recognized consulting firm in this area, we determined that our hourly rates for these services are only 80% of what other commercial firms' charge. This has enticed non-

mission work in this area from the Department of Energy, Air Force as well as other Army installations.

4.3a(4) Financial and Market-related Performance

Financial and market-related performance data are published monthly in the form of R&A charts and presented quarterly to the Commander and Executive Board by functional managers who are required to highlight and address out-of-control financial parameters and conditions for both internal metrics and customer-related performance. Relevant excerpts from FY 97 financial results are shown in Fig. 4.3.1.

4.3b(1) Performance Measurement

The entire Enterprise Plan is required to be revised and was last updated in June 1997. Progress against the strategic plan is continually assessed. Plans, goals and strategies detailed therein are derived from the GAP analysis, Critical Success Factors and Goals & Strategies. Performance measurements detailed in Section 4.1.1 are reviewed by senior leaders in weekly Staff Meetings, and progress is routinely discussed during quarterly R&A meetings; quarterly summaries

of progress against strategies and goals prepared for the Commander; and semi-annual TAPES discussions and in annual performance appraisals. Scheduled updates of subordinate strategies are detailed in the Enterprise Plan. Arsenal capabilities are published for DoD and for marketing our capabilities to the private sector in our "Catalog of Capabilities/Services" which is maintained by the Marketing and Customer Development Office.

4.3b(2) Performance Findings Translated into Priorities for Improvement.

Resources to be applied for the satisfaction of goals and objectives are decided by senior management through their approval of organizations/strengths/skill mix. New business opportunities for manufacturing marine shafts, aviation parts and use of our rotary forging capabilities were developed by intensively managed teams, co-sponsored by our tenant design agency, Benet Laboratories. As a result, a new Marketing & Customer Development Office was created and staffed to manage existing and newly defined business opportunities for complementary and non-mission workload.

Metric	Internal Benchmark	Actual
Energy Cost	\$4.7M	\$4.6M
Nonconforming incoming material (% of Dollars)	8.5	8.4
Deficient in-plant customer surveillance procedure review	28.9%	26.8%
Deficient in-plant customer surveillance component review	5.1%	6.5%
First pass yield	98%	99%
Value Engineering Program	\$1.07M	\$1.1M
Credit card usage	90%	92%
Advanced Acquisition Plan Obligations	\$25M	\$26M
Injury rate per 200,000 man-hours worked	14	11

Fig. 4.3.1

5.0 HUMAN RESOURCE FOCUS

"Create an environment worthy of the men and women who are the Arsenal by achieving a community of excellence in personal, professional and organizational development."

WVA Strategic Objective #3

5.1 Work Systems

5.1a Work Design

5.1a (1) Opportunities for Individual Initiative and Self-Directed Responsibility

Our labor management partnership strongly affects our human resource focus. From a traditional labor management relationship, management and NFFE Local 2109 have built a partnership on trust by working together more cooperatively. NFFE leadership is represented on our executive board and every committee and team, and this cooperation is essential for us to meet our strategic objectives.

Our Strategic Plan states our commitment to quality. Our continuous improvement process has resulted in a streamlined organizational structure, decentralized decision-making, establishment of cross-functional teams, and employee involvement in a variety of scenarios.

Reduction in our management layers has distributed decision-making authority, providing employees at all levels more authority for issues such as work planning. Our partnership has resulted in the successful implementation of several Alternative Dispute Resolution processes, putting more control in the hands of the involved parties, and increasing our ability to solve problems at the lowest level. (Results in 7.5)

The Army's regionalization of Civilian Personnel Offices gave supervisors and employees more authority in training, job classification and development of job descriptions. However, the movement of employee records to Aberdeen, MD created a serious shortage

of data. A showpiece of information management, our Personnel Data Mart (part of our Data Warehouse) was developed to meet this need. Users can access and analyze more information than was previously available

Value Engineering (VE) was born at Watervliet Arsenal in 1956, and because of its success, it became mandatory throughout the Army. The VE program saves millions of dollars each year for its customers and taxpayers by providing a mechanism for employees to identify improvements and/or elimination of unnecessary costs. (Results 7.2).

Watervliet has 26 cross-functional teams or committees, 22 lead and/or managed by non-supervisory employees. The Ergonomics Team was formed to identify, evaluate and correct ergonomic problems. Since December 1990, the team has performed 154 worksite visits. The rate of successful implementation of their recommendations is 95.5%. In giving employees an opportunity to customize their workplace, the Ergonomics Team works hand-in-hand with the Disabled Employees Program.

The Disabled Employees Program helps individuals obtain workplace accommodations. Individuals with mobility issues are provided an action plan in the event of a fire or emergency (co-workers are assigned to each employee to see that they are always safe). Parking, flexible work shifts, and worksite alterations are given high priority.

An alternative work schedule was first proposed by our union. After benchmarking various schedules, and analyzing results of an employee survey, we implemented a compressed workweek, where we work nine-hour days and have every other Friday off. The benefits of this schedule are energy savings and a three-day weekend for employees every two weeks. These benefits are supported by our commitment to schedule no work on the three-day weekend. (Results 7.5)

Within the confines of mission essential needs, we have always provided job sharing, part time work and flexibility in work scheduling when needed. We allow employees to work at home by using laptop computers while recovering from an accident or illness. These accommodations have also been extended to employees using Family Friendly Sick Leave to be home with ill family members. Watervliet Arsenal has a long-stand-

ing policy of finding light duty work for any employee who is injured on the job, provided they are not completely incapacitated.

5.1a(2) Communication

In representing the majority of our employees, our union is truly their voice with Watervliet's management. NFFE is represented on every Watervliet committee, and the union's president is actively involved at the decision making level on all issues.

Our Commanding Officer (CO) and all directors and supervisors maintain an open door policy, which employees make full use of.

Cross-functional teams exist for both on-going efforts and those of short duration. A recent example of a problem solving team was our Smoking Policy Implementation Team. In 1995 we were directed to eliminate smoking at our facility. After one year, a team was chartered to assess the impact and ongoing issues associated with the policy. The team, after interviewing members of the workforce, made recommendations then implemented by our CO. The gradual implementation of this potentially volatile policy allowed us to create a safer workplace while respecting the rights of all employees.

We are in the process of implementing a program to elicit employee feedback on communication, workplace environment and general work issues. The program is an expansion of the Army's Consideration of Others Program, and includes quarterly small group sessions intended to generate ideas for workplace improvement.

5.1a (3) Addressing Customer and Operational Requirements

Our quality policy states "Quality is our number one priority and every employee's responsibility". With the Total Army Performance Evaluation System (TAPES), every employee at Watervliet develops their performance standards and objectives. Quality is inherent to those standards and objectives, and to our continuous improvement efforts. Fig 5.1.1

The foundation of ISO9000 is a well documented effective quality management system that satisfies the quality-related expectations of customers. With that in mind, the Quality Systems Management Team (QSMT) was established in 1994, and given the authority and responsibility to establish a quality system that would satisfy customer requirements. As a result of the team's efforts, our Quality Plan is now aligned with International Quality Standards. An internal audit system is in place to help ensure continuous improvement. While this is an accomplishment in itself, in the course of documenting existing procedures and creating new ones, significant systems improvements were made, and results were seen in all quality and customer satisfaction indicators over the past 3 years. (Results 7.1 and 7.5)

5.1b Compensation and Recognition

Watervliet recognizes individual and group efforts. TAPES encourages employee participation in the development of their performance objectives. Employees, knowing what is expected, can choose to do more and put themselves in consideration for an award. Exceptional performance is recognized with



Fig. 5.1.1

monetary awards, certificates of accomplishment signed by the Commander and presented at employee meetings, and publication of the award and recipient in the Arsenal's newsmagazine.

As part of our effort to operate as a high performing organization, we are moving in the direction of Group Award Programs. Last year, two directorates, with over 100 employees, recognized the contribution of their employees as a group by distributing their performance award dollars throughout their entire organizations.

At least 25% of our employees receive recognition of some sort each year. Beyond development of their TAPES standards, Watervliet employees affect the recognition programs in other ways. Employees are encouraged to submit nominations for recognition of special performance through vehicles such as On-The Spot (OTS) Awards. OTS awards, Special Act or Service Awards, and Time Off Awards are given in recognition of both individual and group accomplishments.

The OTS program saw a tremendous increase in utilization when it was refined at the end of 1994. Prior to 1995 the process had a lengthy paper trail and delayed award check. Our Management-Employee Relations Office, working with NFFE, modified the process so the employee would receive their check the same day – literally On-The-Spot! (Results 7.3)

The Army Ideas for Excellence Program (AIEP) is another venue for our employees to affect their environment. Participation is encouraged through distribution of promotional material and publication in the Salvo of approved ideas with tangible savings. Significant contributions are further recognized with award ceremony presentations by the Commander. (Results 7.3) WVA was the FY95 winner of the IOC Good Ideas Challenge, based on program performance in relation to the Command.

FY96 saw David Bullock, a WVA employee, named Department of the Army Suggester of the Year. He was presented with the Secretary of Defense Productivity Excellence Award based on a first year savings of \$4,212,000.

5.2 Employee Education Training and Development

"Maintain the Core Skills necessary to meet production requirements and respond to defense planning guidance."

Watervliet Arsenal Strategic Plan for Continuous Improvement

5.2a Employee Education Training and Development

5.2a(1) Strategic Planning and Education, Training and Development

Watervliet Arsenal's Strategic Plan for Continuous Improvement recognizes the necessity of maintaining our core skills. Over the last several years, cannon orders have fallen to critically low levels. We have reorganized and "downsized" our workforce. To retain our core skills, we augment our workload with compatible products and, supported by our Commander's policy, look to manpower planning, training and development to address and forestall potential shortcomings.

For manufacturing and other direct labor occupations, the Arsenal has utilized systematic training programs including a four-year apprentice program. Working in partnership with Hudson Valley Community College, this program is a combination of classroom and actual machine operation skill development.

Leadership development objectives are defined in WVA's Strategic Plan and supported by a variety of initiatives. Watervliet maintains a staff of certified Army Leadership trainers. The LEAD program is continuously offered to new, experienced, and potential leaders. WVA leaders are encouraged to develop their skills through the Army's Organizational Leadership for Executives program, advanced business degree programs and cooperative college programs.

5.2a(2) Support of Work Systems

Supervisors and Career Program Managers review organizational structures and career patterns of

the positions in their organization and developing training plans for individual and organizational development.

Employees assess their own strengths and weaknesses, and assist in determining the experience/training they need to be successful in their current position. They are expected to communicate any such needs to their supervisor during their midpoint and annual job performance review. Various proponents throughout Watervliet establish organizational training needs in response to the goals and objectives outlined in our Strategic Plan. These proponents prepare annual training plans to enable us to reach our objectives.

Each year, the Watervliet Arsenal Training Needs Survey is issued. This process drives the development of organizational training plans for the following year. When responding to the needs assessment, organizational leaders review career program goals, assessments provided by their subordinate supervisors and an evaluation of training already presented. When planning, supervisors and employees choose educational and training opportunities from our On-Post Training Catalog, area colleges, and other off-post training opportunities.

Training budgets are approved by our Training and Development Committee, which ensures Watervliet's training direction is consistent with our strategic plans. This cross-functional team includes the directors of all major organizations at the Arsenal, along with NFFE and FMA representatives.

5.2a(3) Delivery of Training

Our Training Catalog describes training offered on post. The catalog was developed after benchmarking similar efforts by other manufacturing companies and Army (i.e. Norton Company, Corpus Christi Army Depot). Our on-post offerings cover technical, administrative, managerial, communication, and personal and career development issues. Other self-directed training is made available through local colleges and contract providers. Specialized training is provided when certification for certain critical skills positions is required.

Our Information Management office maintains a storehouse of current software learning packages, and provides guided instruction on an as needed basis to

individuals or groups. In the past year, the Computer Training Center and this office trained all computer users on post in support of our recent conversion to Microsoft Office software systems.

5.2a(4) How Knowledge and Skills are Reinforced On the Job

The cycle of developing performance objectives, training, and appraising performance has the effect of reinforcing knowledge and skills. Reinforcement of job skills is provided through management assignment of career-enhancing cross-functional developmental tasks. Proficiency and accomplishment at each level allow the employee to move to a higher level.

5.2.a(5) Evaluation and Improvement of Training

In the interest of conserving training dollars and obtaining the best value for our money, Watervliet is moving in the direction of bringing as much training on post as possible. We have begun hosting training for groups including attendees from outside Watervliet to increase our buying power. Before training is presented, the trainer is briefed on the environment in which they will be teaching, including information on previous training and experience of the attendees, and their role in the organization.

Each trainee completes a formal evaluation form, common to all training provided. In addition, trainers are asked to provide their own independent evaluation forms that are completed at the end of the training session. Beyond these evaluations, trainers are debriefed and asked to provide a written summary of their perceptions of the training, with their recommendations for improvement.

We have recently implemented a six month follow-up form that measures the impact and effectiveness of training in on-the-job applications. The form tasks attendees with citing specific examples of circumstances where the training has benefited their performance. This data is then used in assessing the value of training already presented and deciding the subjects and presenters of future training. In improving the quality of training, the input of supervisors and their

employees is solicited in regard to training that should be presented on post. In this way, employees at all levels of the organization, not only training proponents, who are "resident experts" in their respective fields, are working to improve training and education.

5.3 Employee Well-Being and Satisfaction

"Every employee is entitled to an environment that is safe, and free of intimidation, discrimination or harassment of any kind."

COL John R. Rickman,
Commander, 1996-1998

5.3a Work Environment

Our commitment to safety programs is detailed in the WVA Safety Manual, the Commander's Safety Policy and our Strategic Plan which includes a commitment to quality, safety, employee wellness and environmental protection. For the past three years there have been no OSHA Violations and the Area OSHA Director has rated our Safety program an unprecedented "Excellent". We have achieved our safety and health record by taking a proactive approach to prevent accidents and encourage safety and health in the Watervliet workplace:

- Safety and health information is provided through training, safety meetings, Employee Safety Bulletins, and bulletin boards that display safety materials.
- The Safety and Occupational Health Committee reviews safety and health policies and practices. Our Employee Safety Committee, managed by non-supervisory employees, audits safety and health issues, recommending corrective actions that are implemented by our Safety, Health and Environmental Office.
- For the past two years we have dedicated entire workdays to safety, providing formal training to all employees and the opportunity to participate in small group discussions.
- NFFE 2109 has been instrumental in advancing our safety efforts. They are represented on both

the Safety and Occupational Health Committee and the Employee Safety Committee. NFFE also coordinated the Vendor Fair that was part of this year's Safety, Security & Wellness Day.

Our Ergonomics Team, discussed earlier in Section 5, developed one of the first ergonomics regulations in DOD, which was then used as the model for other DOD installations.

Our Health Clinic and Industrial Hygiene Office have a variety of programs designed to protect employee health.

5.3b Work Climate

5.3b(1) Services, Benefits, and Actions to Support Employees

We have undergone significant downsizing since 1990, and that pattern continues. In order to mitigate the impact on the workforce, labor and management collaborated in the development and utilization of several programs, including monetary incentive programs for voluntary resignations and for early retirements. We have worked together to make the best use of vacancies. These programs have been highly effective in reducing the effects of the Reduction in Force (RIF). Other assistance programs include resume preparation, job fairs, Internet access for federal and private sector employment opportunities, posting of government and private sector job opportunities and aggressive utilization of stopper lists. Labor and management also work together in counseling affected employees.

Evidence of partnering for the support of employees is seen in many venues. We are an Army forerunner in the areas of Alternative Dispute Resolution and Alternative to Discipline, with a firmly stated commitment to resolve disputes at the lowest possible level. (Results 7.5) We are one of the first Army installations with an Alternative to Discipline program, which is based on the understanding that when employees exhibit behavioral problems, there is often an underlying personal problem. It is to the benefit of both the agency and the employee to address those issues first. WVA managers and NFFE have been supportive of this program since its inception. All parties believe

that a disciplinary action "negotiated" by the employee and their supervisor, in appropriate circumstances, is in the best interests of the employee and Watervliet Arsenal.

NFFE regularly assists employees, on their own time, with problems outside of work.

Our Employee Assistance Program (EAP) provides confidential services in a private setting. Employees are encouraged to seek help in dealing with any and all types of problems. Drug and Alcohol Abuse training is arranged with local service agencies.

We have a highly visible "zero tolerance" policy in regard to violence and harassment in the workplace. In 1996 our EAP established one of the first Installation Prevention Teams in AMC. This team with representatives from every directorate and NFFE is a cross functional approach to reduce high-risk behavior and violence in the workplace. At its onset, representatives from EEO, EAP, Security and Management/Employee Relations, already trained in conflict resolution and human relations by virtue of their regular job assignments, received specialized training in violence in the workplace.

They then passed on this knowledge (train-the-trainer skills) to the rest of the team. Since then, training has been presented to the entire workforce on violence in the workplace. We were the first installation in AMC to develop its own Workforce Risk Inventory and employee handbook for dealing with violent and high risk behavior in the workplace.

5.3b(2) Managers Encourage Employee Development

A number of Army-wide Career Programs are sponsored at the arsenal and led by senior managers to develop future leaders and technologists in a wide variety of disciplines. Supervisors are responsible for meeting with their subordinates on an as-needed basis and no less than every six months to review their job performance and individual and career development. Working with their employees they identify needed skill and career training and plan appropriately.

Non-traditional developmental assignments include loaned executives and staff in support of community programs including the United Way, Red Cross Blood & Savings Bond drives and Junior Achieve-

ment.

5.3c Employee Satisfaction

5.3c(1) Informal/Formal Measures and Indicators

Watervliet uses various measures as indicators of the well being, satisfaction, and motivation of its employees. Managers and supervisors regularly track safety, absenteeism, turnover, grievances, level of use of our Employee Assistance Program and worker compensation.

The Office of Personnel Management conducts employee climate surveys with an average response rate of 50%. Narrative provided by OPM shows a high level of satisfaction in regard to Human Resource Management. WVA is moving toward programs that recognize group and team activity, and has significantly enhanced the effectiveness of our On-The-Spot award program in response to these results. (Results 7.3)

5.3c(2) How the Company Relates Employee Well-Being, Satisfaction, and Motivation Results to Key Business Results and/or Objectives to Identify Improvement Priorities

Watervliet's senior managers recognize the linkage between employee satisfaction and productivity and the consequent effect upon the achievement of the Strategic Objectives we have identified in Section 2.

Watervliet has instituted a number of initiatives aimed at assessing morale, employee concerns and in providing accurate information. Our Commander has sponsored Safety and Security Standdown days in which employees have the opportunity to voice safety, security and health concerns. The Commander has responded to every employee's expressed concern. In addition, realizing that unfounded rumors foster an inefficient work environment, the Commander, through Command Information Bulletins, has dispelled unfounded rumors in the bud and published accurate information. The Commander has also used Command Information Bulletins to keep employees continually apprised of changing events in our reshaping operations.

6.0 Process Management

WVA's manufacturing services/capabilities are expansive in areas of precision machining, welding, forging, heat treatment, plating, and technical services. Our machining capabilities range from basic machining (drilling, grinding, etc.) to state-of-the-art manufacturing systems (5-Axis machining, water-jet cutting, electrical discharge machining, etc.).

6.1 Management of Product and Service Processes

6.1a(1) Changing Customer Requirements Incorporated into Designs

WVA's principle mission is the manufacture of cannon and artillery from established drawings and technical data. As a "build to print" manufacturing facility design efforts are focused on process development and design for production of new products. In doing so, we partner with Benet Laboratories which has a full engineering and technical staff capable of designing, and supporting the manufacture of complex

weapon systems produced by Watervliet.

Cross-functional teams discuss design requirements with customers prior to developing cost estimates. An illustration of our product design process is shown in Figure 6.1.1. results shown in Section 7 include data from all work performed at WVA (mission and non-mission).

6.1a(2) Production/Delivery Processes Designed to Meet Requirements

When the customer commits to a firm order requirement, the Production Planning and Design Working Group develops the manufacturing costs associated with the product. Automated tools and systems used to assist in developing this process are:

- Computer Aided Process Planning (CAPP)
- Computer Aided Manufacturing (CAM)
- Computer Integrated Manufacturing (CIM)
- Flexible Manufacturing System (FMS)
- Tool Gage Management System (TGMS)
- Material/Product Supplier Quality

6.1a(3) New Product and Service Designs Are Reviewed and Tested to Ensure Trouble-free and Timely Introduction

New product designs and processes are tested to meet customer requirements that are listed in their developmental specifications. All tests are designed to meet guidelines stated in the DOD Series 5000 directive that describes the developmental process from concept to production. Tests that fall under this directive's guidelines include live proof firing and simulation testing.

Production and delivery processes are coordinated to meet customer requirements stated in the contract. The manu-

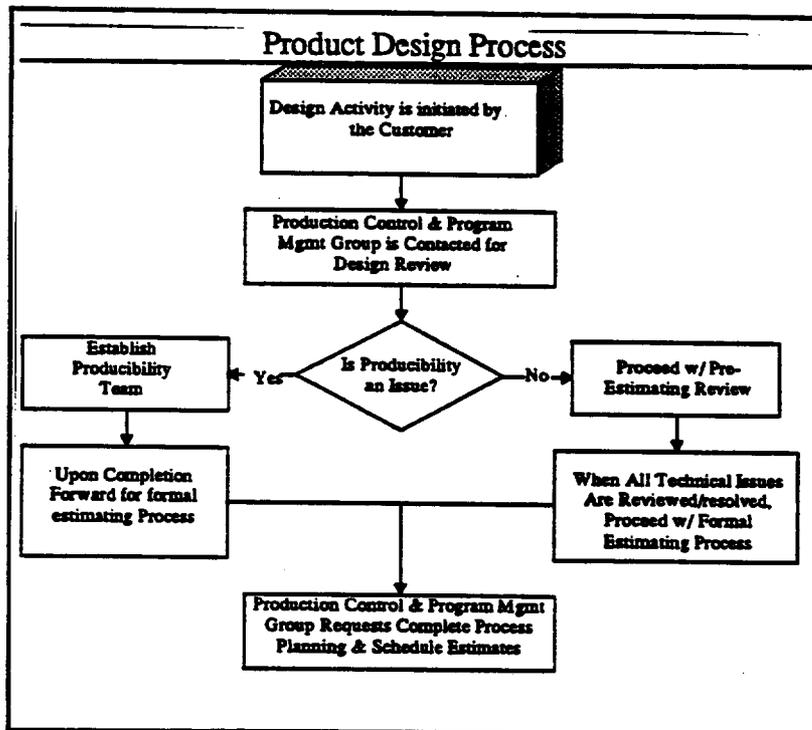


Fig.6.1.1

facturing process normally begins four (4) months prior to shipment.

Each manufacturing operation is inspected and certified for production. The certification process is documented in WVA's quality plan. The underlying principle is that, prior to production, all operations will demonstrate capability and have all the required documentation and gaging at the machine site to produce an acceptable item.

6.1a(4) Evaluation and Improvement

The Arsenal employs several tools to evaluate and improve design processes.

Our Value Engineering (VE) Program has realized over \$4.5M in savings vs. a total program cost of approximately \$508K (a savings-to-investment ratio of 8.9 to 1). During the past three fiscal years, VE proposals were implemented addressing producibility issues, process and packaging improvements, energy conservation, and changes in product testing.

Recently, a proposal was adopted that eliminated live fire testing (off-post), for a mortar program, in favor of simulation testing (on-site). First-year savings for this initiative were \$540,000. Our Suggestion Program encourages employees to submit ideas to improve process, quality and/or cost. Planners regularly submit requests for deviation to Benet Labs that address design improvements. By procedure, repetitive acceptances of the same conditions require a technical data revision or written rationale by the engineer for not effecting a design change. Shop floor personnel regularly submit requests-for-change in planning to improve manufacturing processes.

Statistical Process Control (SPC) is steadily gaining acceptance on the shop floor. Statistical methods are employed to measure the degree of process control and variation. Processes with poor control are targeted for full SPC implementation. SPC, implemented on the shop floor has been utilized to improve process designs, trigger preventative maintenance actions for machine tools, and reduce measurement variation between employees.

6.1b Production/Delivery Processes

Customer satisfaction is based on the execution of a well developed plan to meet the customer's re-

quirements. Once the process has been designed, reviewed and tested, all customer requirements are translated into product and service specifications through the Computer Aided Process Planning system as Manufacturing Process Routings and Quality Certification Documents. These documents are then made electronically accessible by anyone throughout the manufacturing facility through the use of the Computer Integrated Manufacturing System.

6.1b(1) Key Processes and Their Principal Requirements

Key processes for production and delivery are critical to the mission at WVA. Indicators of performance have been developed based on customer requirements. Key processes have been identified to include manufacturing, quality, cost analysis, and labor and resource management and are shown in Figure 6.1.2.

6.1b (2) Key Process Management:

WVA uses a variety of automated systems and measurements to monitor processes and pinpoint areas of potential improvement in quality and operational performance. The product and service production and delivery processes are analyzed and improved to achieve better quality, reduced cycle time, reduced cost, improved delivery performance and increased overall operational performance.

The emphasis during product and service production and delivery is on the maintenance of process capability to ensure that all specifications and customer expectations are met. Watervliet's management has concentrated on implementing a dynamic proactive quality program from the top down. Process Control guidelines (See Figure 6.1.3) have been distributed to all employees and are posted throughout the manufacturing areas. They reflect actions to be taken if there is any question of producing an item that does not meet the customer's requirements.

Our quality process focuses on the theme of 'Say what you do, Do what you say, Prove it'. All processes / services that affect quality have documented

Key Processes	Requirements	Measures	Standards	Mgt. Controls
Manufacturing	Produces the item per contract	Manufacturing schedules	Contract requirements	Reviewed daily
Quality	Assures/verifies that the item is acceptable	Defective parts per million Scrap, Repair, rework	6 sigma Annual target Annual target	Charted monthly Charted monthly
Cost Analysis	Controls costs associated with producing the item	Shop efficiency Overhead expenses Gain/Loss	Internal operating budget Contract estimates	Reviewed weekly Reviewed weekly Reviewed monthly
Labor & Res. Mgt.	Manages personnel strengths and capabilities	Civilian Population Training Plans	TDA Specs 100% execution of training by FY end	Charted monthly Charted monthly

Fig. 6.1.2

procedures (We say what we do). Every effort is made to ensure that all employees work to those procedures (We do what we say). Employees certify the quality of their work they perform (The proof, for anyone to see).

Our quest for continuous improvement and customer satisfaction has led to the use of Statistical Process Control to:

- Identify the risk of producing an item using specific machines, tools and methods.
- Identify the variation in a process to allow management to target adjustments and improvements.
- Control sizes within a specification to allow mating parts to assemble.
- Target specifications for reduced inspection based on level of process control, thereby reducing

the cost to the customer.

A Cost Analysis Plan is utilized within the manufacturing area to monitor performance to budget and predict potential problem areas. Expense and diversion activity is monitored and analyzed on a monthly basis. Overexpenditures are researched and evaluated for conditions that adversely effect cost performance. Errors are identified for correction within our automated data processing systems. Other causes are delineated through analysis and addressed by support activities, e.g., vendor defective material or escalation of cost after budget submission. This information is considered when preparing quotes for subsequent customers.

6.1.b (3) Evaluation and Improvement

The Labor and Resource Management Plan is utilized to ensure delivery schedules. Manufacturing Schedules are used to evaluate the progress of work through the manufacturing process.

The Source Data Collection system provides automated feedback based on the labor reporting of manufactured items. Action is taken to ensure scheduled requirements are met by adding additional labor, utilizing additional machine tools, or conducting training in vulnerable areas. Our goal is to complete the manufacturing process one-month prior to the shipping date, allowing the last month for packaging and shipment of product.

WVA maintains a highly technical training facility with instructional programming for machine tool work application courses ranging from a basic distributed numerical control to an advanced program geared at maintaining continuity with state-of-the-art technologies. Certification testing is required for each student and follow-up training is provided on an as-needed basis.

Watervliet's production and delivery processes

are continuously evaluated to ensure compliance with our quality plan. The Production Planning and Control Office is authorized, by regulation to self-assess

Employee Guidelines for Process Control

1. All first piece inspections will be accomplished using variable inspection equipment and applicable calibrated gages.
2. Adequacy of set up must be confirmed by a person other than the employee (set up person or supervisor). This confirmation includes understanding of each step of process and use of all required inspection equipment, and verification of gage calibration prior to performing the operation.
3. Employees must perform all required inspections specified on the traveler.
4. Employees must record the results of all inspections required.
5. All employee inspected parts must be identifiable for audit purposes at the operation.
6. Stop the process for corrective action anytime that a nonconformance is identified; notify the supervisor.
7. Routings, procedures and travelers must be available and followed at all operations.
8. Changes to operation sequence must be authorized by the supervisor and planner, in writing.
9. Employees will not accept verbal process changes from anyone.
10. Employees will not accept verbal instructions to continue running an operation that is producing nonconforming parts.
11. Employees will not start an operation that is incomplete from the previous operation, shop or lot number is incorrect, or quantities don't match the traveler. Notify the Supervisor.

Fig.6.1.3

work sites to monitor adherence to established procedures by manufacturing division employees. Our Product Assurance & Test Directorate schedule audits of the Industrial Operations and Production Directorate to assure adherence to manufacturing and shipping processes.

WVA employees have found innovative ways to improve production processes through the years. During the Vietnam era, the time required to machine the bore in our large caliber guns was reduced from 28 hrs. to 8 hrs. The traditional 'wood packed reamer' with its high speed cutters gave way to the 'rapid boring' process that utilized carbide technology. Not content to stop there, industrial specialists designed the 'guided bore' that not only improved the cycle time but also incorporated electronic sensors that greatly improved bore quality. Presently, WVA employees are developing the use of state-of-the-art lubricants in breech mechanisms that have the potential to improve performance while reducing our reliance on hazardous and costly coating processes.

6.2 Management of Support Processes

6.2a(1) How Key Support Processes are Determined

The support services within WVA, in conjunction with our manufacturing products and services form a network to provide the ultimate customer with a quality product that meets all expectations and requirements. The customer's requirements are set in the contract review phase. This phase is an interactive process with the customer to identify mutually agreeable terms and conditions and, once established, set the guidelines by which the partnering network must perform to meet the objective. The myriad of support elements at Watervliet operates to focus directly on a customer/partner arrangement and allow more open communication of the customer requirements across all of the functional lines. This type of environment ensures requisite participation by all support elements.

6.2a(2) Key Support Processes Design and Implementation

The key support elements identified at Watervliet include: marketing/sales, procurement, product assur-

ance, personnel management, and supply and maintenance. The design and intent of these organizations relies on meeting customer requirements by providing the services necessary to deliver a quality product, on time, at the right price, safely.

6.2a(3) Key Support Processes and Their Principal Requirements

Key requirements such as providing the correct cadre of personnel to satisfy requisite skills to meet fluctuating workload demands are accomplished by Civilian Personnel Advisory Center (CPAC) through the recruitment, selection, placement, and training of qualified individuals. Having the most qualified people in the correct position is a key element toward maintaining the morale and skills necessary to provide a quality product. Also sustaining these core competencies through a yearly evaluation system provides a measure of how well these needs are met. Additionally, other ancillary organizations such as maintenance and supply have staff dedicated to providing services such as maintaining the machinery, buildings, equipment, grounds, and resources that are responsible for providing the product to the customer.

Maintenance consists of a continuous process to preserve the necessary buildings, facilities, and machinery to support manufacturing. Without this action, equipment breakdown would contribute adversely to delivery schedule performance.

The Marketing & Customer Development Office works to identify changing market trends and identifies technology and capital investments necessary to participate in that market segment.

The Product Assurance & Test Directorate provides gage calibration, field inspection, product record card maintenance, and product warranty services. The gage calibration activity is a system to ensure that gages are recalled on a scheduled basis for a calibration check. The properly calibrated gages are applied to specific characteristics of the customer's product to guarantee conformance to contract requirements.

6.2a(4) Support Services Performance:

The performance of the support services organizations is measured through a variety of resources.

The most prominent tool is a presentation to upper management of trends of customer satisfaction and process improvement during the Arsenal quarterly Review and Analysis sessions. The management analysis session presents data for product quality, schedule performance, cost rate performance, energy consumption, non-conforming material, value engineering, product delivery performance, raw material (contractor) delivery performance, purchasing performance against pre-determined goals and objectives, sick leave and compensation data, and safety performance. In addition, weekly production meetings are held with representation from the major support organizations to discuss manufacturing performance and support performance relative to the manufacturing effort. Above and beyond all of this, the Arsenal is moving to complete ISO9002 manufacturing certification by December 1998.

6.2a(5) Support Processes Evaluation and Improvements

Through the continual surveillance and reporting to upper management referenced in 6.2a(4), all facets of the operation are monitored for performance which drives corrective actions for improvement as shown in Section 7. (Business results.) Through the continued surveillance and reporting mentioned above, all facets of the operation are monitored for performance. Areas such as quality and delivery performance have specific goals to be met. Data is collected and corrective action is taken to ensure the goals are satisfied.

An example of how these support elements contribute to the efficiency of Watervliet is best illustrated by our Procurement Directorate. A review of the reporting data from the purchasing system indicated an inordinate amount of lost time and missed schedules due to defective material being provided by contractors for utilization in the manufacturing process. To gain control over vendor quality, a system of best value contracting was implemented. The purpose of best value contracting is to provide useable raw materials to the manufacturing floor. With best value contracting, a system of weighted values is applied to prospective bids to determine which supplier will best meet our requirements.

In conjunction with this effort, a Contractor Rating

System has been implemented by the Product Assurance & Test Directorate for the purpose of procuring a quality product for use in our manufacturing processes.

6.3 Management of Supplier and Partnering Processes

6.3a(1) Design of Supplier and Partnering Processes

Contracting management at WVA is based upon the Federal Acquisition Regulations. To this additional controls and responsibilities were developed and are constantly improved to meet Watervliet's special needs. At Watervliet quality documentation starts with the facility's Quality System while Procurement uses the Control of Supplier Quality regulations.

WVA partners with Benet Laboratories, the Armament and Chemical Acquisition and Logistics Activity (ACALA) and the Defense Contract Management Command (DCMC) to develop and update Technical Data Package requirements for procurement of weapon components for Integrated Logistics Support (ILS).

6.3a (2) Partnering

The procurement process begins when a solicitation is published and sent to advertise the contract to quality suppliers. Quality suppliers are judged upon their past performance in the Arsenal's Contractor Rating System. Watervliet also uses the Defense Logistic Agency Contractor Alert List, the Report of Contractors Exceeding an Acceptable Level of Non-Conforming Material and the Debarred Bidders List. Supplier queries and on-site visits to WVA are encouraged to ensure that suppliers fully understand contract requirements.

As necessary, on-site visits to the supplier's manufacturing facility are made to audit their compliance to contract requirements. Two-way communications are maintained throughout the contracting and contract administration process as an integral part of WVA's in-

formal partnering relationship with its vendors.

Full cycle contracting process provides a dynamic network for responsive quality improvement between WVA and its suppliers as detailed in the Control of Supplier Quality regulation. The Quality of Incoming Material Nonconforming Rate chart gives an indication of how well Watervliet has coordinated with its suppliers. (See Section 7.5, Figure 7.5.2.13.)

WVA management recognized the necessity to diversify our product mix to expand to the wider DOD community. Market studies were conducted during 1997 to "best-fit" DOD product opportunities that were compatible with our long-term plans. As a result of that analysis, securing of workload for marine propulsion systems became a focal point for future Arsenal business development activities.

While the Arsenal possessed both the equipment and manufacturing expertise for the basic machining of large propulsion shafts, WVA was unfamiliar with many of the associated, highly specialized, processes and quality specifications. Several acknowledged marine industry experts were contacted to obtain the necessary technical and procedural information. WVA established teaming arrangements with sources such as the American Bureau of Shipping and ITW Philadelphia Resins Corporation for appropriate training and certification of Arsenal personnel with regard to weld cladding of shaft bearing surfaces and application of fiberglass wrap coatings. Through this effort, Watervliet has gained the skills necessary to accomplish all phases of the manufacture of marine propulsion shafts.

6.3a(3) Managing and Improving the Supplier and Partnering Processes

WVA continuously evaluates and strives to improve its management of supplier relationships and performance. The bottom line for WVA procurement, is the timely provision of quality materials to the manufacturing process, enabling compliance with the customer's delivery commitments. Key suppliers and performance indicators are shown in Fig. 6.1.4.

WVA has systematically attempted to improve the purchasing process starting with the request for supplies. Towards that end, WVA developed the

Key Product Suppliers		
Products	Suppliers	Performance Indicators
Tube Preform Forgings Open Die	IRI International National Forge Company A. Fink and Sons Erie Forge and Steel Inc. Scot Forge Company	Material Soundness Charpy and Tensile SPC Plans
Block and Ring Forgings Closed Die	Elwood Texas Forge National Forge Lenape Forge Inc.	Material Soundness SPC Plans
Muzzle Brake and Housing Castings	Atchinson Steel Castings Keokuk Steel Castings Waukesha Foundry	Material Soundness SPC Plans
Materials, Stock	American Steel and Aluminum Pierce Aluminum Benedict Miller	Dimensions
Tooling	Saeger Spuck Abrasive Tool Company Barber Tool	Material Properties Dimensions

Fig. 6.1.4

Automated Acquisition System to improve the flow and accuracy of requests for materials. Not only does the Automated Acquisition System channel the requests and require the appropriate approvals but it also allows online access concerning where the procurement is and its historical and current status.

As a means of improving and confirming WVA's quality management, we have pursued registration through both ISO 9002 and the Army's Contractor Performance Certification Program (CP2). The Contractor Rating System provides an historical system currently being linked to the Automated Acquisition System database. Our purchasing process has received high ratings for its documentation and implementation from the Contractor Performance Certifi-

cation Program auditor team.

A monthly review process of key performance indicators is a contracting officer requirement that results in a constant correction process. This internal feedback cycle also extends out to all levels of the Arsenal up to the Commander for their input. As the result of management's monthly quality data analysis, we recently improved our communications with our suppliers and the Defense Contract Management Command by instituting Quality Letters of Instruction and Product Quality Deficiency Reports. This immediate formal feedback will enhance and document our standard contract administration processes. As a result of these actions, continuous improvement efforts such as producibility reviews have been initiated.

7.0 Business Results

7.1. Customer Satisfaction Results

How does a commitment to excellence benefit our customers? Simply put, it results in higher quality and lower cost through improved design and manufacturing from a highly trained staff, in modern facilities, using state-of-the-art equipment. This commitment has increased productivity, product quality, and mobilization capacity. Watervliet's modernization effort has doubled production capacity, and provided a 22% increase in overall productivity while dramatically improving production flexibility. Over the last ten years we have delivered 98.5% of our major products on time. Our

quality performance over the same period has been 98% with only 2% of our work-in-process cost attributed to scrap, rework or repair.

Our commitment to excellence has made us "the choice" within the Department of Defense for quality products and manufacturing technology. We have built upon the motto: "A Quality Product...On Time...At The Right Price...Safely."

Our customers are the ultimate judges of how successful we are. The following charts represent three years of customer survey data and the results of our continuous improvement efforts to date.

Each year, surveys were sent to 100% of our active customers. The average response rate has been 38%, with responses coming from both established and new customers.

Overall Evaluation

All Things Considered, Overall, How Satisfied has your Organization been with WVA During the Last 12 Months?

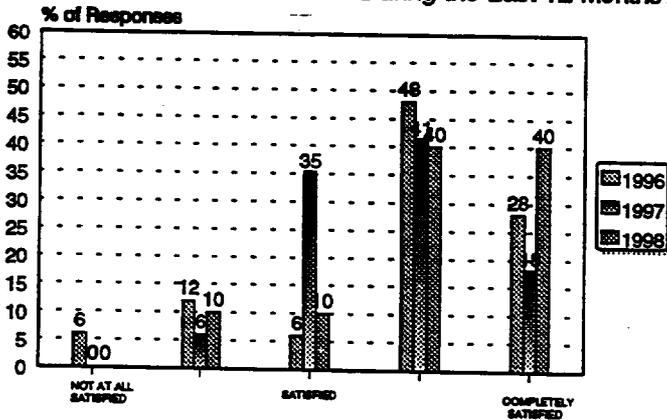
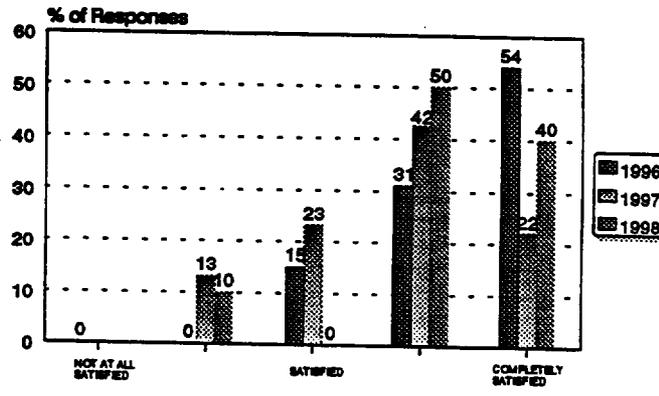


Fig. 7.1.1

1998 Customer Survey Results

Product Quality / Performance



Note: 1997 and 1998 survey form provided 6 choices as opposed to 3 in 1996

Fig. 7.1.3

1998 Customer Survey Results

Schedule / Delivery Performance

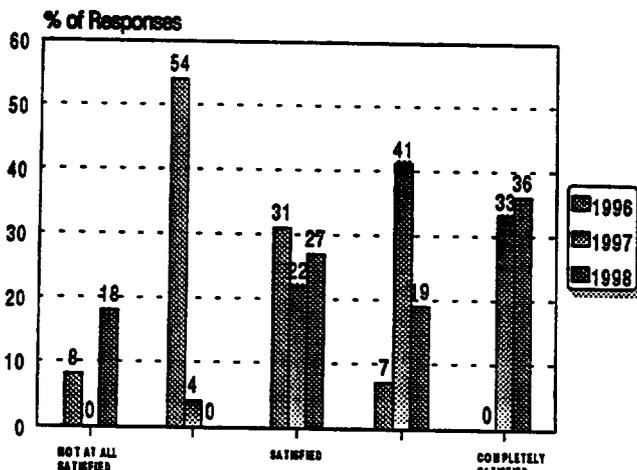


Fig. 7.1.2

Problem Handling Response

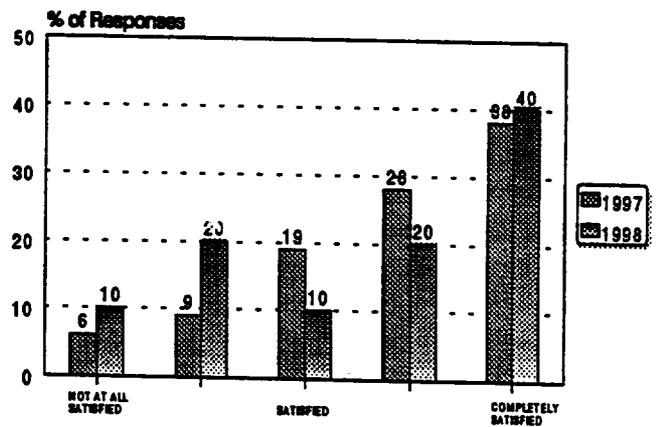


Fig. 7.1.4

1998 Customer Survey Results

Customer Service / Sales Personnel

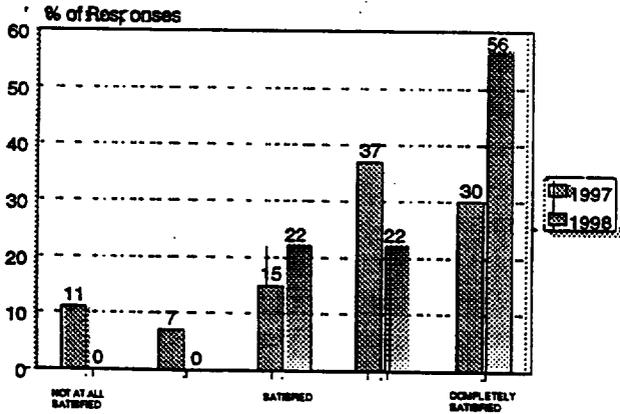


Fig. 7.1.5

Quality Assurance / Technical Support

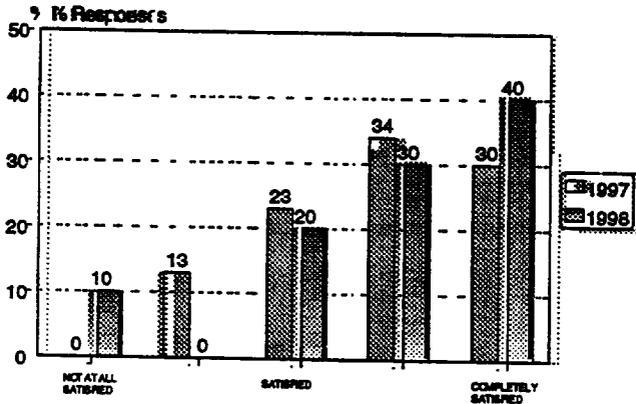
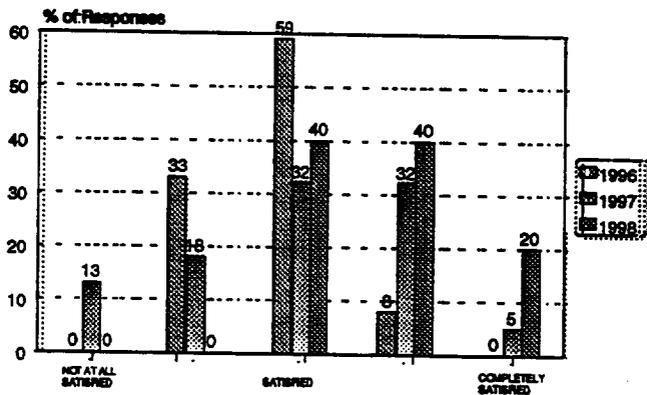


Fig. 7.1.6

Price / Pricing Policies



Note: 1997 and 1998 surveys added an option to each end of the spectrum - 5 choices as opposed to three in 1996.

Fig. 7.1.7

All of our customers indicated a desire to work with us again.
We asked them:

What is the Single Most Important Reason for your Answer?

"Watervliet Arsenal's technical ability."

"Frequent communication and a desire to deliver a quality product."

"Schedule and product quality was met and cost was below quote."

"There seems to be a lot of attention to detail."

"Deliveries have been generally on time and within budget."

"Quality of work nearly always excellent."

"Parts fit like a champ."

"Nothing but positives."

Fig. 7.1.8

7.2 Financial And Market Results

7.2.a (1) Financial Return/ Economic Value

Watervliet Arsenal has taken many steps to demonstrate fiscal responsibility and cost consciousness. It has been able to, despite constant Reductions-In-Force and budget cuts, maintain a complete production capability for its products and keep unit cost increases within levels that are proportionate to its overhead costs.

Since Watervliet is a Government owned and operated manufacturing facility, profit margins, operating margins and profitability are not applicable. However, cost savings programs such as Value Engineering and Efficiency Initiatives demonstrate how cost savings can be considered as an equivalent measure to profit in the private sector. While government mandated overhead costs and administrative charges may not be within Watervliet's control, the efficiency of its operation is within its control, thus offering the opportunity to reduce costs. Within the last three years Watervliet

Arsenal has taken many steps to increase its operating efficiencies and avoid costs through innovative means. As a result of organizational changes, reducing its fixed asset inventory via layaway of capital equipment and introducing more efficient plant maintenance and waste reduction, it has reduced overhead leading to operating expense reductions.

Organizational layers have been eliminated and supervisory jobs have been reduced from 79 to less than 50 positions. Over the last five years Watervliet has reduced its operating expenses substantially, and has strived to maintain its cost rates despite RIFs and defense drawdown. Although fluctuations have occurred in Watervliet's cost rate over the last five years, a snapshot of June 10, 1993 and again on June 10, 1998 shows the cost rate has remained essentially stable. The Arsenal has actively participated in the Industrial Operations Command's (IOC) Efficiency Gain Program since its inception in FY96. This program focuses on the identification and quantification of performance efficiencies derived from proactive programs and initiatives. It has a goal of improving the efficiency of operations and to provide better economic value to tax payers. On a quarterly basis, WVA collects effi-

**Five-Year Cost Reduction Plan
(Performance since 1 Oct 95)**

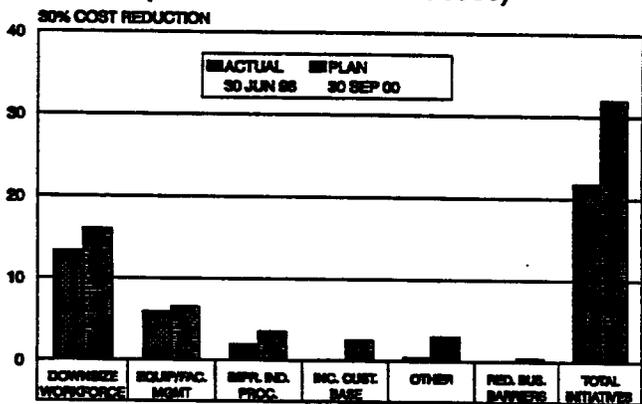


Fig. 7.2.1

ciency gain data from operating management throughout the Arsenal and compiles this data for headquarters IOC. Since its inception in FY 96 this program has achieved over \$11.5M in documented efficiency savings.

Watervliet has established its own five-year cost reduction program as shown in Figure 7.2.1. The program is aimed at a 30% reduction in costs over

the five year period from FY 1995 to FY 2000. As shown in the figure progress in all major categories is on target to meet the planned overall 30% reduction.

Figure 7.2.2 shows a more detailed look at one category, "Energy Cost Reduction". The downward trend shows the reduction of costs associated mainly with implementation of a compressed work week.

The Army's Value Engineering Program was established at WVA 42 years ago and has been a successful program for cost reduction at Watervliet since its inception. Watervliet's Value Engineering savings has exceeded its goal for these 42 consecutive years resulting in over \$155M in savings for the Army and tax payers. The Value Engineering cumulative savings against its assigned goal is 267%. During FY97 the Value Engineering program produced \$1.1M in savings. Likewise, the Ideas Program Cost Savings also has produced savings of \$3.8M in tangible savings.

To further its cost control efforts, Watervliet has been conducting an extensive equipment layaway program since 1993. This program has involved the layaway-in-place of 224 pieces of industrial equipment resulting in a net savings of \$2.6M. This program has the added benefit of better equipment utilization, reduced overhead costs, reduced cost rate without sac-

Energy Cost Reduction

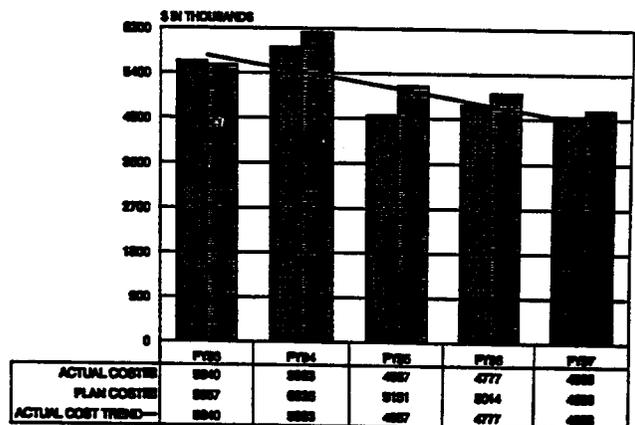


Fig. 7.2.2

rificing long-term manufacturing capability.

7.2.a (2) Market Share /New Markets

WVA is number one in the domestic cannon market, and has approximately 90% of the market share,

with the remaining 10% market share belonging to a naval ordnance manufacturer which has a limited production capability for large cannon. WVA compares favorably in terms of cost and capability to its domestic competition. Recent competitive intelligence information and data in the domestic market demonstrates WVA's cost competitiveness as much as 40% under the unit cost of domestic competition.

In the world market, off-shore competition presents a more serious threat to WVA's position as a world supplier of cannon. Only limited cost comparisons to off-shore suppliers can be made since international military sales often involve political and economic leveraging and is seldom a case of direct competitive pricing only. From data that is available, a cost comparison on the 120mm M256 cannon involving Watervliet and a German competitor, showed Watervliet's price approximately 40% lower than the German competitor.

Within non-mission markets, Watervliet was recently able to obtain competitive pricing information on propulsion shafts it furnished to the Army Corps of Engineers. According to customer provided information, the Watervliet cost for the propulsion shafts was 25% lower than what they expected to pay from their previous commercial source. More information is provided in Section 4.3a(3) on this topic.

The performance in the 10% non-mission (new) market areas is further defined in Figure 7.2.3. New Market Results. Watervliet's new markets are identified in Section 3.1 and include shipbuilding propulsion shafting, airframe components, rotary forging services, military replacement parts, and others. The Arsenal tracked its business performance in the new markets from June 1995 to Jan 1998. Out of 352 opportunities in new non-mission and commercial markets, the "award" hit rate was approximately 20% of all opportunities tracked. The win-loss ratio of approximately .45 (70 wins / (84 rejections + 69 withdrawals), is very respectable for new market entry and development.

New Market Results

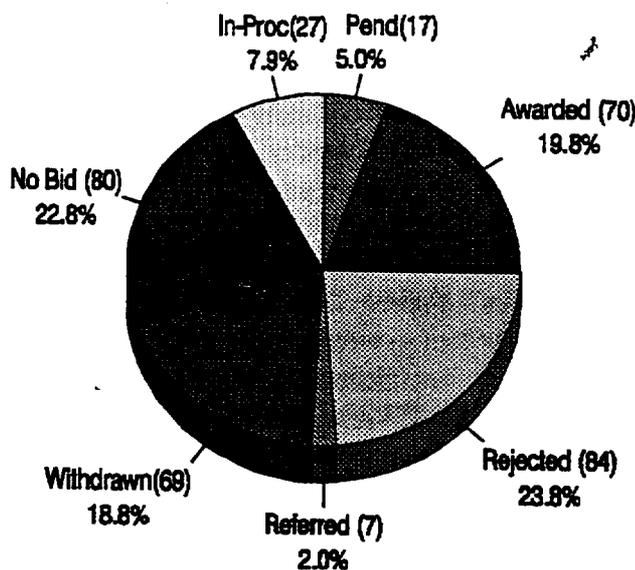


Fig. 7.2.3

7.3 Human Resource Results

WVA's Employee Assistance Program (EAP) has earned the trust of Watervliet employees. Since its beginning, there have been no grievances filed or concerns expressed in regard to the confidentiality of employee visits. The program's approach is proactive in that they conduct an annual assessment of employees' mental health, querying lifestyle issues such as alcohol abuse and domestic violence. The EAP, in conjunction with our Management-Employee Relations Office, has also trained all employees in Preventing Violence in the Workplace. (Reference Section 5)

In the past 5 years, the EAP, which was reduced from two counselors to one in 1995, has had almost 1000 employee visits.

Figure 7.3.1 demonstrates the effects of our efforts to reduce the impact of workforce reductions. "Total Separations" includes involuntary separations as well as individuals who took advantage of separation incentives - Voluntary Early Retirement and Voluntary Separation Incentive.

Figure 7.3.2 depicts the dramatic increase in On-

The-Spot awards as a result of program improvements implemented in 1996 (Reference Section 5).

In our employee suggestion program the number of submissions has declined as a result of our reduced workforce, however, the percentage of adoptions and value of savings has been increasing. This indicates an improvement in the quality of the ideas submitted, and an increase in employee and management willingness to accept change.

WVA has reduced long term compensation rolls from 60 in FY95 to 33. This was accomplished through a return to work program, and a thorough review of long-term claimant's qualifications and medical information. WVA will save \$200,000 - 300,000 yearly for the next several years, and see 3 to 4 million dollars in lifetime savings.

Our Light Duty Policy requires all injured employees to report to our Health Clinic for either evaluation or treatment, which gives us first hand knowledge of their work limitations. All employees injured on the job are placed in light duty positions unless completely incapacitated. The program has enabled us to reduce continuation of pay benefits from \$60,000 in FY94 to \$13,500 in FY97. The injury frequency rate has gone down steadily for several years. See Fig. 7.3.3.

Our Hearing Conservation Program alerts the workforce of potentials for hearing loss. Our testing of over 800 employees has reduced claim dollars from an average of \$15-20 thousand dollars in FY-95 to an average of \$2-4 thousand dollars in FY-98.

Our Industrial Operations and Production Directorate has dedicated an average of 6,000 hours per year to training and reskilling its workforce.

WVA provides a variety of morale, recreation and community service activities for the military and civilian workforce. Recreational facilities include: Pavilion and picnic area, swimming pool, tennis courts, outside recreation facilities, pitch and putt golf course, summer day camp, gymnasium, community club and restaurant and snack bars. Health Promotional activities include: smoking cessation classes, stress reduction training and aerobics fitness classes.

Reshape Actions FY 90-FY98

Effects of Efforts to Reduce Impact of Mandated Personnel Cuts

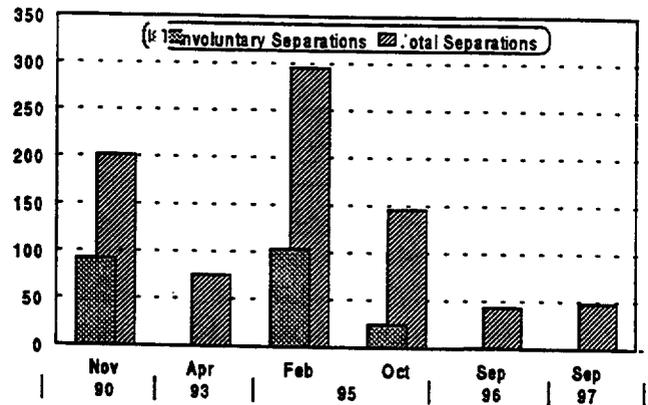


Fig.7.3.1

On-The-Spot and Special Act Awards

FY93 - FY97

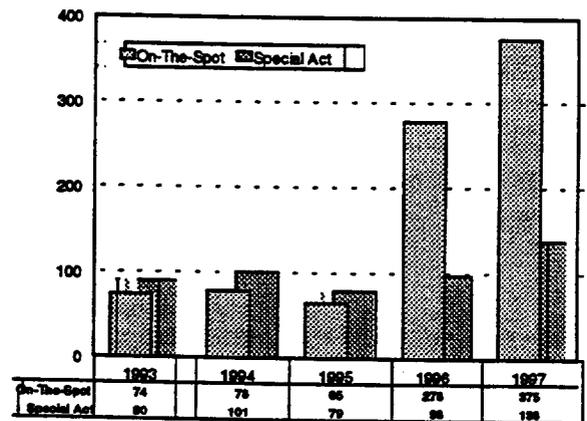
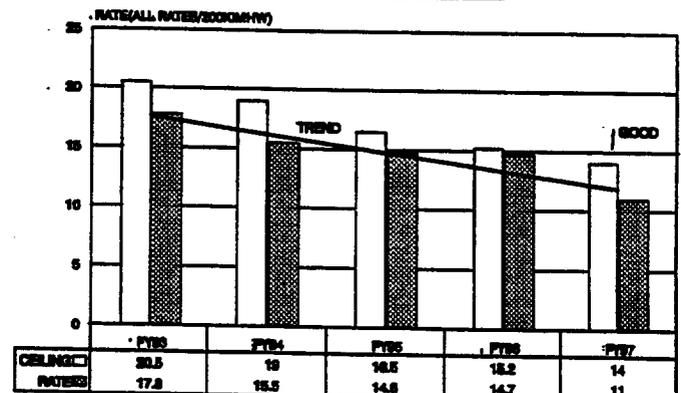


Fig. 7.3.2

INJURY FREQUENCY RATE



THIS CHART DEPICTS ALL OCCUPATIONAL ACCIDENTS/INJURIES WITH A VERY POSITIVE TREND DUE TO A VERY VISIBLE SAFETY PROGRAM AT WVA.

7.4 Supplier and Partner Results

As part of Watervliet's CP2 and ISO9002 Certification efforts, a substantial number of initiatives have been taken to improve relations with our suppliers and to more efficiently control our purchasing system and improve the quality of incoming material. Watervliet has implemented a Contractor Rating System (CRS) which rates past suppliers based on previous histories for quality, delivery and price. This data is used for best value contracting consideration and provides a listing of qualified vendors for solicitations. Contractors with CRS Ratings of I or II are proven high quality, on time providers of services and products. As shown in Figure 7.4.1, over the last two years, Watervliet has been successful in steadily increasing the percentage of contractors rated at a CRS level of I or II.

Contractor Rating System Level I and II Subcontractors
(Percent of total contracts for production materials.)

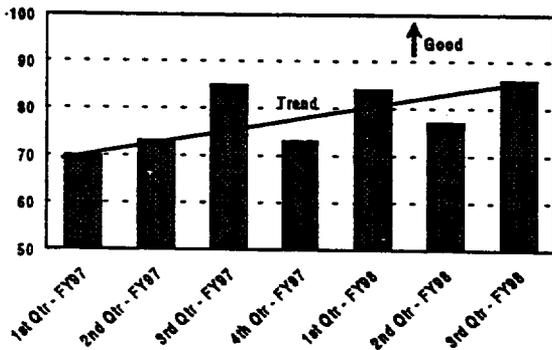


Fig. 7.4.1

As a result of the arsenal's increased attention to subcontractor performance, improvements have been realized in quality and deliveries. As shown in Figures 7.4.2 and 7.4.3, respectively, on-time deliveries and initial acceptance rate for contracted material have improved considerably during the last two years.

Watervliet also has established goals to awarding contracts to small disadvantaged businesses. As shown in Figure 7.4.4, Watervliet has continually increased small disadvantaged awards over the last five years. Partnering with Benet Labs has resulted in new business opportunities, new technology development, and joint strategic plans. One example is a recent contract obtained through partnering with Benet via a Cooperative Research and Development Agreement

Subcontractor On-Time Deliveries
(Percent of total production material procured)

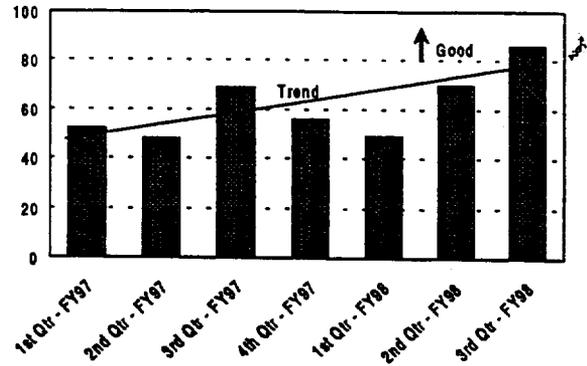


Fig. 7.4.2

Initial Contract Acceptance Rate
(Percent of total lots received.)

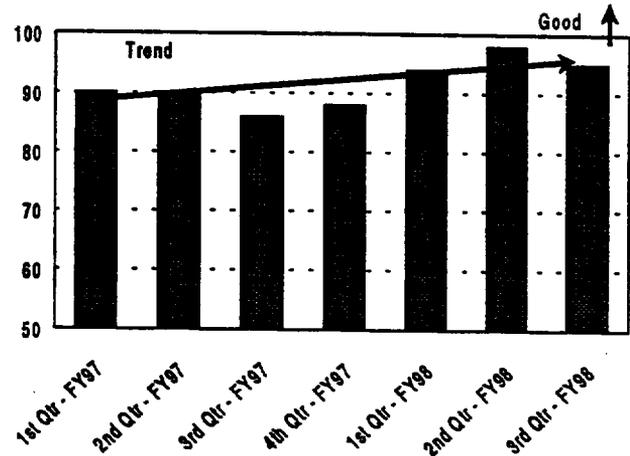


Fig. 7.4.3

SMALL DISADVANTAGED BUSINESS AWARDS (CUM)

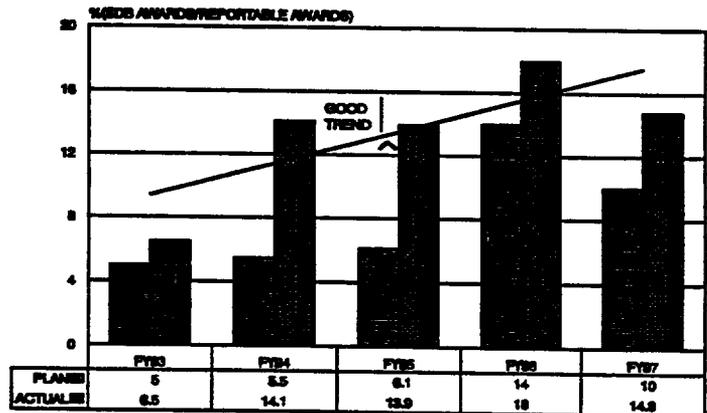


Fig. 7.4.4

(CRADA) to manufacture food processing cylinders for a commercial firm.

7.5 Company Specific Results

"Once a goal is reached, a new goal must be set. When the new goal is reached, another goal is set. After a while, the process of setting, reaching, setting and reaching becomes a direction of movement — of improvement"

Ends - Where we are going...
Watervliet Strategic Plan
for Continuous Improvement

Watervliet uses a wide variety of formal and informal reports and metrics for the evaluation and improvement of our processes, products and services. As shown in Figures 7.5.1 through 7.5.3 key perfor-

Strategic Objective #1 – Maintain Watervliet's viability and visibility as a national asset.

Supporting Strategy	Critical Success Factors	Result
<ul style="list-style-type: none"> • Maintain Core Skills • Provide a capable cost-efficient industrial facility 	<ul style="list-style-type: none"> • Entry into new markets • Leverage Partnership with Benet Labs • Identify and continually assess Core Skill requirements and maintain database of available skills • Ensure facility is maintained in a mission-ready status • Attract new tenants 	<ul style="list-style-type: none"> • Market Assessments completed (Reference Section 3) • Potential market areas identified (Reference Section 3) • Dedicated Marketing Office formed (Reference Section 3) • Total Number of New Quotas (Fig. 7.5.2) • Joint Strategic Plan Developed/On-Going Strategic Planning Efforts (Reference Section 2) • Establishment of Personnel Data Warehouse (Reference Section 5) • Facility Maintenance Investment (Fig.7.5.3) • Number of new tenants (Fig. 7.5.4)

Fig. 7.5.1

mance indicators are aligned with our three universal strategic objectives. These key indicators focus on our ability to meet customer expectations, improve our key processes and monitor our improvement initiatives.

Critical to Watervliet's survival is our ability to generate new workload. As a result of this objective, Watervliet has performed in-depth market assessments and identified high potential market areas. A dedicated marketing office was established in early 1998 to aggressively market Watervliet's capabilities in these areas. As demonstrated in Figure 7.5.2, opportunities to quote on new workload has increased due to these efforts.

Total Number of New Requests for Quote Received (FY97-FY98)

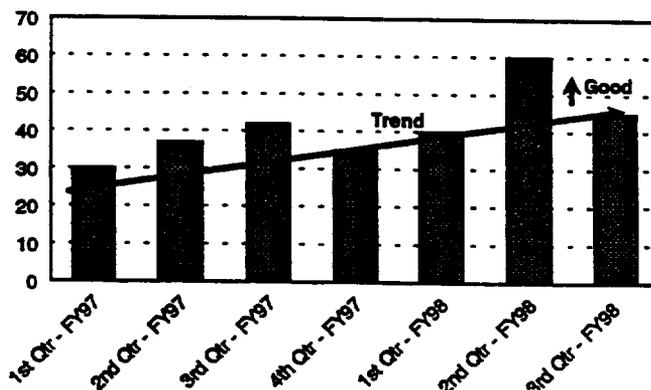


Fig. 7.5.2

To assure the facility is capable of responding in case of a national emergency, Watervliet invests heavily in the maintenance of the building and infrastructure. Figure 7.5.3 shows annual investments in maintenance of the facility as a percent of the annual operating budget have continued to increase.

Annual Investment in Updates/Maintenance to Arsenal Infrastructure and Facilities (Percent Operating Budget)

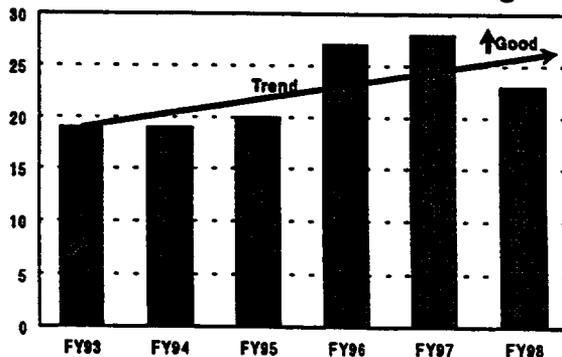


Fig. 7.5.3

As shown in Figure 7.5.4, Watervliet Arsenal has several long standing tenants, the largest of which is our strategic partner, Benet Labs. Recent strategic planning efforts have resulted in a strategic goal to attract new tenants in order to make the most efficient use of the facility. As a result increased efforts have been undertaken to market the arsenal site and attract new tenants. In 1997 both the US Marine Corp Recruiting Station and the National Guard have moved onto the arsenal site. Additionally, in 1998, Watervliet was designated a NYS Economic Development Zone, providing incentives to companies who want to move onto the site. During 1998 and beyond, we intend to continue this trend by bringing partners and tenants to the facility which will add to the synergy and strengths

Tenant	Occupation Date	Square Foot Requirements	Number of People
Health Clinic	--	8457	11
Post Exchange	--	1579	4
Benet Laboratories	1976	200519	213
TMDE	1985	1400	3
Marine Recruiting Station	Oct 97	5665	17
National Guard	Nov 97	17010	7

Fig. 7.5.4

of the Watervliet Arsenal – Benet site.

In order to improve Watervliet's competitive position, one of our primary strategic goal's is to have our Quality Management System certified to the Army's Contractor Performance Certification Program (CP2) and the International Organization of Standards Model for Quality Assurance in Production, Installation and Servicing, ISO9002. Over a three year period, a cross organizational team of arsenal employees identified requirements, implemented quality system procedures, trained employees and continually improved the system to prepare for certification. As shown in Figure 7.5.6, in September 1996 the arsenal underwent it's initial baseline assessment for certification. During the course of the following year, all corrective actions were taken to correct identified deficiencies and in May 1998, Watervliet was recommended for CP2 certification. Subsequently, the ar-

Strategic Objective #2 Increase Net Value to Customers

Critical Success Factor	Key Indicator	Result
Manage our Quality System.	• CP2/ISO9002 Certification	• Corrective Action Requests found during audit (Figure 7.5.2.1)
	• System Improvement	• Defects per Million Opportunities (Figure 7.5.2.2) • First Pass Yield (Figure 7.5.2.3) • Scrap, Repair & Rework (Figure 7.5.2.4) • Gages Overdue for Calibration (Figure 7.5.2.5) • Test Incident Reports (Figure 7.5.2.6)
	• Assist Benet Lab's ISO9001 Certification Efforts.	• Provide in-house consulting services to Benet Labs. Drafted Benet Quality Manual and performed ISO9001 Baseline Assessment on Benet's Quality System.
	• Create a competent supplier network	• Incoming Material Non-conforming Rate (Figure 7.5.2.7) • % Supplier Base rated 4 or 5 in Contractor Rating System (Reference Section 7.4).
	• Model Efforts after Malcolm Baldrige Award Criteria	• Self Assessment in 1996 & 1998 • ACQE Application in 1996
	• Protect our environment.	• Environmental Program Annual Investments (Figure 7.5.2.8)
• Identify and partner with our Advocates	• In conjunction with Benet established partnerships and working relationships with Private Sector (Figure 7.5.2.9)	

Fig. 7.5.5

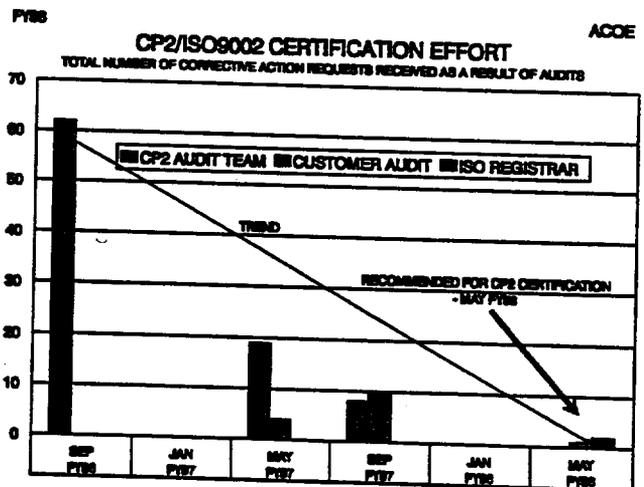


Fig. 7.5.6

arsenal has contracted for an independent registrar for ISO9002 certification. The initial baseline revealed only two minor documentation deficiencies. Based on these results, the arsenal expects to obtain certification to the international standards by the end of FY98.

Defects per million opportunities (DPMO) is a recognized quality performance metric among world class manufacturers. The arsenal has measured DPMO for over three years to portray the quality of products produced and shipped by the facility. The metric is calculated using the following data: total op-

arsenal is quickly approaching a 5 sigma level, or in more simple terms, a 99.95% defect free product acceptance level.

Figure 7.5.8 represents items shipped for final functional test and physical inspection at the Army Proving Grounds which have passed initial testing with no identified deficiencies. Over 98% of the items shipped for proof fire in FY97 were accepted on first pass and FY98 performance to date exceeds 99%. This represents a all time high and exceeds the arsenal goal of 98%.

Figure 7.5.9 depicts the dollars Watervliet spends to correct errors. The metric is represented as the cost of scrap, rework and repair as a percent of direct labor workload. As a result of improvements in our quality system associated with our ISO9002 and CP2 certification efforts, the cost of scrap, repair and rework has been reduced from over 9% in FY94 to 3.8% in FY98.

Defects Per Million Opportunities (DPMO)
(Average DPMO per month)

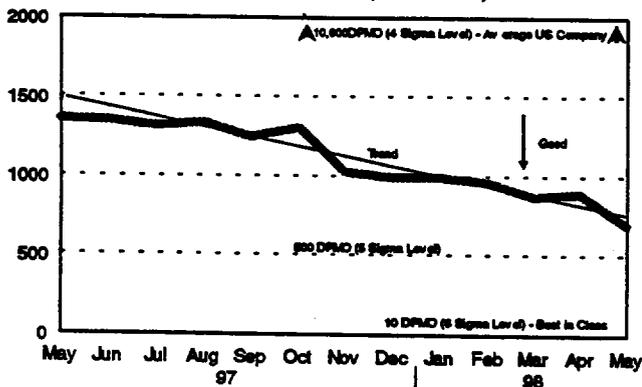


Fig. 7.5.7

portunities for error, monthly shipping quantities and total defects discovered by component. Figure 7.5.7 shows the DPMO trend for arsenal products for the period of May 97-May 98 and demonstrates that the

FIRST PASS YIELD
(FY94 THRU FY97)

FIGURE 7.5.2.3

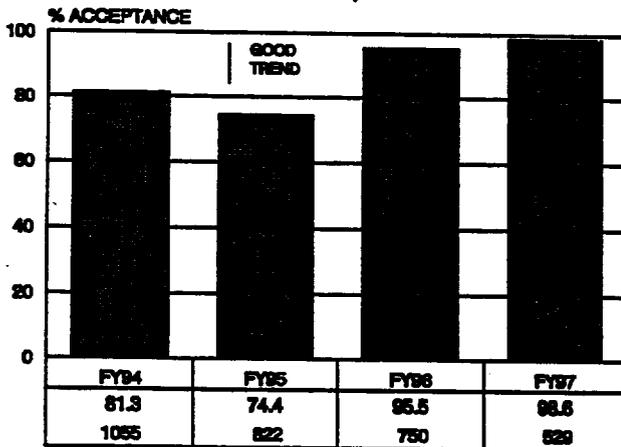


Fig. 7.5.8

SCRAP, REPAIR & REWORK

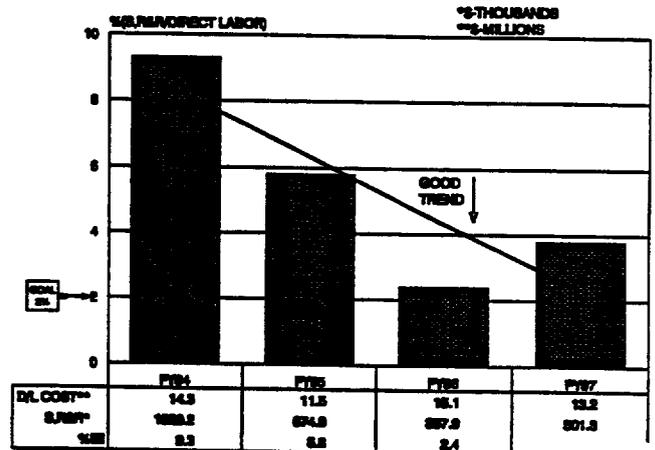


Fig. 7.5.9

INSPECTION EQUIPMENT RECALL DELINQUENCIES

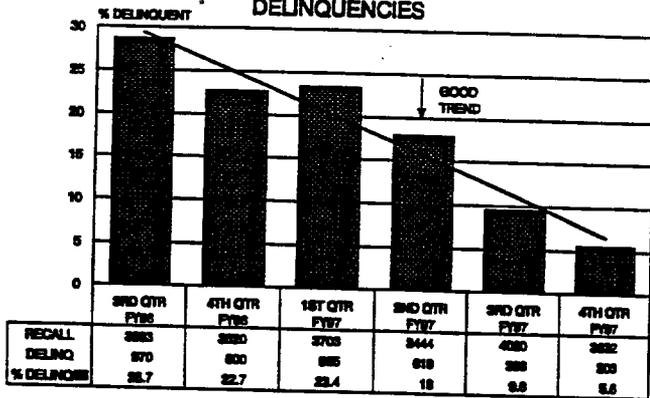


Fig. 7.5.10

Prior to the Arsenal's emphasis on ISO9002 and CP2 certification, employees were less than diligent about turning inspection equipment in on schedule for calibration and repair. As a result of more clearly defined and available procedures which were an outcome of certification, recall delinquencies have been reduced from over 28% to less than 6% during the period shown in Figure 7.5.10. To date, FY98 delinquencies have been further reduced to less than 3% which exceed specified CP2 goals.

TEST INCIDENT REPORTS (FY94 THRU FY97)

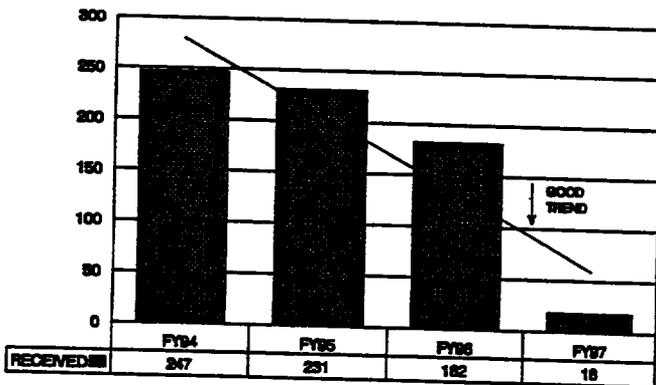


Fig. 7.5.11

Figure 7.5.11 shows the level of Test Incident Reports (TIRs) generated for non-conformities identified during final testing at the Proving Grounds. As a result of our quality improvement efforts, the annual quantity of TIRs received has continuously declined since 1994.

Only 18 TIRs were received in FY97, an all time low for the Arsenal.

Credit Card Transactions (Percentage of contracts under \$2500)

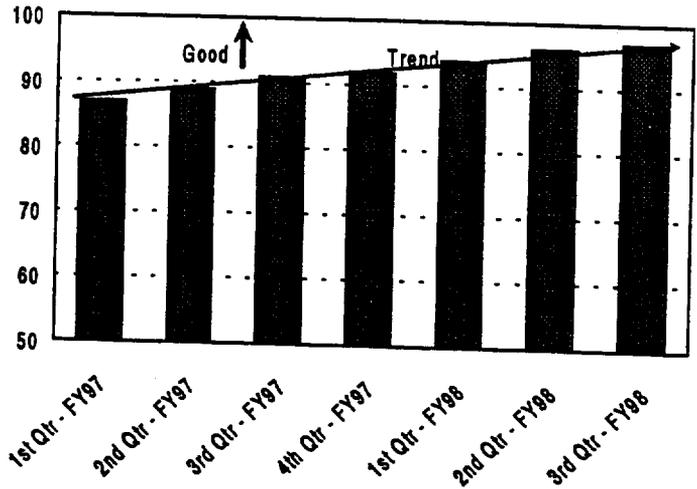


Fig. 7.5.12

As depicted in Fig. 7.5.12, Watervliet has embarked on an aggressive program to reduce procurement complexity, paperwork and administrative time through the utilization of credit cards for most items procured under \$2500 in value. Credit card buyers and approvers have received training in the use of the government credit cards and in recording of information needed for audits of financial responsibility.

Over the last several years, initiatives have been made to improve the quality of purchased material used in production. Improvement initiatives have included the establishment of a Contractor Rating System to

INCOMING MATERIAL NONCONFORMING RATE

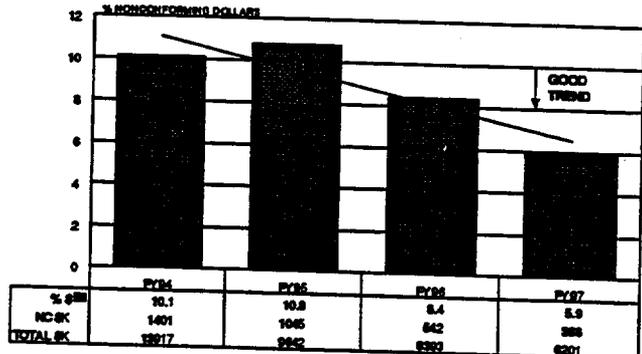


Fig. 7.5.13

assure we only solicit from quality suppliers, use of best value contracting techniques and building partnerships

with key suppliers and resident in-plant Defense Logistic Agency personnel. As a result of these efforts substantial improvements have been made in the quality of purchased material. Figure 7.5.13 shows incoming material nonconforming as a percentage of total material purchased. As is demonstrated by this metric, the improvement efforts undertaken by Watervliet have resulted in a non-conforming material rate reduction of almost 50 percent in the last four years.

Watervliet has a highly aggressive environmental protection program and is recognized by the local community and Army, state and federal authorities as a good environmental steward. As Figure 7.5.14 demonstrates, the facility has continually increased the investment we apply toward our environmental program. Because of this focus on the environment, Watervliet has not received a single deficiency from New York State Environmental Conservation in the last three state inspections and recent EPA evaluations revealed

Annual Environmental Program Investment
(Percent Operating Budget)

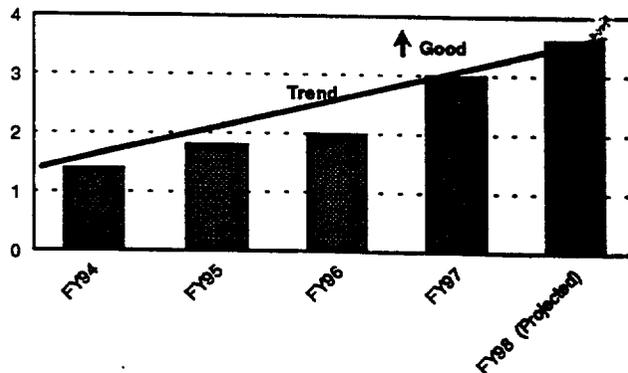


Fig. 7.5.14

that the facility was in compliance with the requirements of Resource Conservation and Recovery Act. This exceptional record is unprecedented for any Army facility.

PARTNERING AND WORKING WITH PRIVATE SECTOR WATERVLLET - BENET PARTNERSHIP

<p><u>State and Local Activities</u></p> <ul style="list-style-type: none"> * Center for Disabled * NYS Department of Transportatin * Center for Economic Growth <p><u>Academic Institutions</u></p> <ul style="list-style-type: none"> * Brooklyn Polytechnic Institute * Rensselaer Polytechnic Institute Hudson Valley Community College <p><u>Other Department of Defense</u></p> <ul style="list-style-type: none"> * Defense Logistics Agency * US Army Corp of Engineers *US Army and National Guard 	<p><u>Industry</u></p> <ul style="list-style-type: none"> * Weapon System Integrators * Cannon System Designers * Castings and Forging Industry * Steel Industry <p><u>Small Business</u></p> <ul style="list-style-type: none"> * Local Engineering Design Companies * Local Machining Companies <p><u>Consortium</u></p> <ul style="list-style-type: none"> * National Center for Manufacturing Sciences * American Metalcasting Consortium
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Fig. 7.5.2.15

**Strategic Objective #3
Achieve a Community of Excellence**

Critical Success Factor	Key Indicator	Result
Encourage an environment of organizational excellence.	<ul style="list-style-type: none"> Communicate and minimize downsizing impact on the workforce. Create a workplace free of intimidation and harassment. Increase and improve internal and external customer communications. 	<ul style="list-style-type: none"> Minimized % of workforce involuntarily separated as result of Reductions (Reference Section 7.3) Total number of employee grievances reduced (Figure 7.5.3.1) Established and institutionalized a formal customer satisfaction system.

Fig. 7.5.16

One of Watervliet's key strategies is to build partnerships with industry, academia and other government organizations in order to build on the reputation and value of the facility. One of our key partnerships is with our tenant design activity, Benet Laboratories. Building on this partnership, we have brought other organizations and advocates into this partnership. Fig. 7.5.2.15 shows some of our other partners.

One of the arsenal's primary goals is to create a workplace free of intimidation and harassment. Figure 7.5.17 depicts the results of some actions taken

toward this goal. Watervliet's Labor- Management partnership has resulted in drastic reductions in grievances over the last five years and the arsenal is one of the first Army installations to make use of Alternative to Discipline program.

The past four years have seen a renewed emphasis on quality and associated continuous improvements at WVA. In the past two years, we have had no repeat complaints from manufactured items shipped to customers. This is a direct result of our involvement of employees at the lowest level in problem resolution and institutionalizing the subsequent process improvements.

Our strategic objectives and emphasis on quality in every aspect of business demonstrate our commitment to the achievement of customer satisfaction. Expanding our business horizons into complementary markets will assure that we maintain the skills and technologies needed to execute our Army mission.

GRIEVANCES/APPEALS/ULP'S

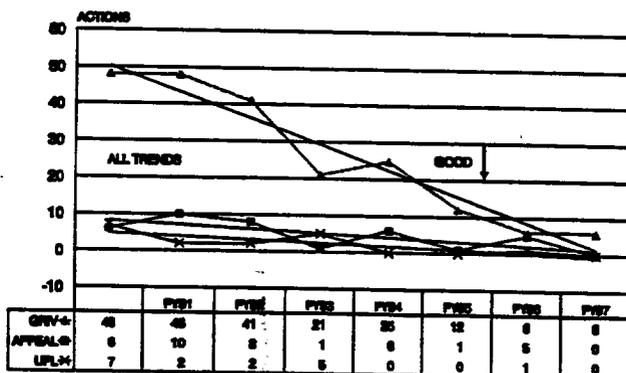


Fig. 7.5.17

Acronym List

(by alphabetical order)

ABS – American Bureau of Shipping
ACALA – Armament Chemical and Logistics Activity
ACTEDS - Army Civilian Training Education & Development
APIC – Army Performance Improvement Criteria
AMC – Army Material Command
CAD/CAM – Computer Aided Design/ Computer Aided Manufacturing
CAPP – Computer Aided Process Planning
CD ROM – Compact Disc Read Only Memory
CFC - Chlorofluorocarbons
CIM – Computer Integrated Manufacturing
CSF- Critical Success Factors
CP2 – Army Contractor Performance Certification Program
CPOC – Civilian Personnel Operations Center
CPR – Cardio Pulmonary Resuscitation
CO – Commanding Officer
DCMC – Defense Contract Management Command
DCPDS – Defense Civilian Personnel Data System
DOD – Department of Defense
DOE – Department of Energy
EAP – Employee Assistance Program
EDZ - Economic Development Zone
EPA – Environmental Protection Agency
FCIM – Flexible Computer Integrated Manufacturing
FMS – Foreign Military Sale
HAZMAT – Hazardous Material
HAZMIN – Hazardous Minimization System
ILS – Integrated Logistics Support
IOC - Industrial Operations Command
ISO – International Standards Organization
JEDMICS – Joint Engineering Data Management System
LEAD – Leadership Education And Development
NAFE – National Association of Federal Employees

NFFE- National Federation of Federal Employees
NYS – New York State
NYSDEC – New York State Department of Environmental Conservation
OPM – Office of Personnel Management
OSHA – Occupational Safety and Health Administration
OTS – On-The-Spot
PA&TD - Product Assurance & Test Directorate
PCBs – Polychlorinated Biphenyls
PM – Program Manager
PPE – Personal Protective Equipment
QDR- Quality Deficiency Report
QSMT- Quality System Management Team
R&A – Review and Analysis
R&D – Research and Development
RIF – Reduction In Force
SOP – Standard Operating Procedure
SPC – Statistical Process Control
SWOT – Strength, Weaknesses, Opportunities, and Threats
TAPES – Total Army Performance Evaluation System
TDCMS – Technical Data Configuration Management System
TGMS – Tool Gage Management System
TQM – Total Quality Management
VE – Value Engineering
WVA – Watervliet Arsenal



- **A quality product**
- **At the right price**
- **On time**
- **Safely**