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**Survey of Industrial Coal Conversion
Equipment Capabilities: Valves**

W. A. Bush
E. C. Slade

OAK RIDGE NATIONAL LABORATORY
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Printed in the United States of America. Available from
National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road, Springfield, Virginia 22161
Price: Printed Copy ~~\$9.00~~ 8.00; Microfiche \$3.00

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Contract No. W-7405-eng-26

UCC-ND Engineering

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EQUIPMENT CAPABILITIES: VALVES

W. A. Bush
E. C. Slade

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Date Published: June 1978

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CONTENTS

	<u>Page</u>
Foreword and Acknowledgments	v
Abstract	1
1. INTRODUCTION	1
2. SUMMARY	3
3. COAL CONVERSION PROCESSES	5
4. VALVE SURVEY	15
4.1 Method	15
4.2 Response to Survey	16
4.3 Valve Survey Results	16
Lock-Hopper Feed Valves	16
Slurry Feed Valves	21
Slag-Char Letdown Valves	21
Gas, Steam, Oxygen Valves	21
Flow Interruption and Equipment Isolation Valves	22
5. VALVE ACTUATOR SURVEY	23
5.1 Method	23
5.2 Response to Survey	23
5.3 Actuator Survey Results	24
6. ANALYSIS OF SURVEY RESULTS	25
6.1 Background	25
6.2 Technology	25
6.3 Valve Specification	26
6.4 Limiting Factors	27
Materials	27
Design	27
Testing Facilities	28
6.5 Impact	28
6.6 Potential Problem Areas	28
Industrial Economic Improvement	29
Alloy Availability	29
6.7 Availability Summary	29
Valves	29
Actuators	30
7. RECOMMENDATIONS	31
REFERENCES	33

	<u>Page</u>
Appendix A. CAPABILITY RESPONSES OF VALVE MANUFACTURERS	35
Appendix B. CAPABILITY RESPONSES OF VALVE-ACTUATOR MANUFACTURERS	119
Appendix C. SAMPLE LETTER OF INQUIRY TO BALL VALVE MANUFACTURERS	141
Appendix D. SAMPLE LETTER OF INQUIRY TO BLAST/SLIDE/KNIFE EDGE VALVE MANUFACTURERS	147
Appendix E. SAMPLE LETTER OF INQUIRY TO VALVE-ACTUATOR MANUFACTURERS	155
Appendix F. VALVE SIZE DETERMINATIONS	161

FOREWORD AND ACKNOWLEDGMENTS

This is one of four reports describing surveys of industrial coal conversion equipment capabilities which were conducted for and supported by the Equipment Branch (James Powell, Branch Chief, and T. K. Lau, Project Manager) of the Fossil Energy Major Facilities Project Management Division (MFPM)* of the Energy Research and Development Administration (ERDA).^{*} This report describes the results of the survey relating to valves; other reports in this series are:

- J. P. Meyer and M. S. Edwards, *Survey of Industrial Coal Conversion Equipment Capabilities; High Temperature, High Pressure Gas Purification*, ORNL/TM-6072, Oak Ridge National Laboratory (1978).
- W. R. Gambill and W. R. Reed, *Survey of Industrial Coal Conversion Equipment Capabilities: Heat Recovery and Utilization*, ORNL/TM-6073, Oak Ridge National Laboratory (1978).
- W. R. Williams, J. R. Horton, W. F. Boudreau, and M. Siman-Tov, *Survey of Industrial Coal Conversion Equipment Capabilities: Rotating Components*, ORNL/TM-6074, Oak Ridge National Laboratory (1978).

This is the first of two reports planned on the subject of valves for the coal conversion industry. The report is limited to the availability of large, high-temperature stop valves. A second report will cover valve reliability, valve industry economics, and availability of pressure-reducing (letdown) valves for application in coal conversion plants.

The authors express their appreciation to The Valve Manufacturers Association and to those in the industry who have given their time and effort to reply to our questionnaires and have met with us to discuss availability and problems of valves required by the coal conversion

^{*} Effective October 1, 1977, ERDA became part of the Department of Energy (DOE); MFPM has since become part of the Division of Coal Conversion of DOE.

industry. Without their cooperation, this report would not have been possible.

We also express our appreciation to many people in the Department of Energy, especially those at Morgantown Energy Research Center, and to many people in the Union Carbide Nuclear Division who have provided assistance during this study.

SURVEY OF INDUSTRIAL COAL CONVERSION
EQUIPMENT CAPABILITIES: VALVES

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ABSTRACT

A survey of the industrial capabilities of the valve and valve-actuator industry to supply large, high-pressure stop valves for the future coal conversion industry is presented in this report. Also discussed are development and testing capabilities of valve and valve-actuator manufacturers and anticipated lead times required to manufacture advanced design valves for the most stringent service applications. Results indicate that the valve and valve-actuator industry is capable of manufacturing in quantity equipment of the size and for the pressure and temperature ranges which would be required in the coal conversion industry. Valve manufacturers do not, however, have sufficient product application experience to predict the continuing functional ability of valves for some of the required applications.

INTRODUCTION

With the increased realization of shortages of oil and natural gas and with increased U.S. dependence on foreign oil, serious attention is being given to the commercialization of advanced processes for the conversion of coal to clean liquids and gases. A number of these processes have been under development for many years; many additional processes are currently being studied. Of these processes, some are in the pilot-plant stage, others are ready for scale-up to demonstration-size units, and still others are ready for commercialization. There are many existing conceptual designs for coal conversion facilities based on such processes. The question now is whether or not the equipment specified in such designs is indeed readily available from U.S. industry. If not, the question becomes one of determining how much lead time is required to develop such equipment.

The potential to have demonstration and commercial coal conversion facilities in timely production depends in part on the availability of the necessary equipment and in part on the time required for construction of the facilities. The Major Facilities Project Management Division (MFPM) of the Energy Research and Development Administration, Fossil Energy Division, was charged with the task of overseeing the commercialization of coal conversion in the United States. This study, which supports the efforts of MFPM, was initiated with a twofold objective:

1. determination of present capabilities of U.S. industry to supply equipment needed for future demonstration and commercial coal conversion facilities and
2. identification of problem areas as well as determination of research and development needs for producing equipment of advanced design, including lead time requirements.

The total project includes all types of equipment found in a coal conversion plant; however, only four categories have been studied this year: valves, hot-gas cleanup devices, heat recovery equipment, and rotating equipment. This report addresses only the first category, valves and their actuators. Three additional reports covering the other equipment categories are being issued concurrently with this report.¹⁻³

This report on valves is limited to the capability of the valve industry to manufacture 6-in.-diam and larger stop valves for applications at temperatures above 300°F. Sections of this report concern coal conversion processes, methods used in surveying the valve and valve-actuator industry, responses to the survey, and an analysis of the survey results, which includes limiting factors in the availability of valves as well as potential problem areas.

SUMMARY

To evaluate the valve requirements associated with coal conversion, seven prospective coal conversion design concepts were studied, flow streams were determined, valve types were assigned, and the valves were sized. It currently appears that the coal conversion processes operate in the range of the petrochemical industry, except for that portion of the process in which coal is converted to gas and oil. The analysis resulted in the identification of 24 high-temperature stop-valve applications that appeared to be more stringent than needed by the petrochemical industry. To determine the industry's capability to supply valves for these applications, questionnaires were mailed to 231 valve manufacturers and to 49 valve-actuator manufacturers.

Results of the survey show that the valve and valve-actuator industry is capable of manufacturing equipment in quantity of the size and for the pressure and temperature ranges required by the coal conversion industry. Valve manufacturers do not, however, have sufficient product application experience to predict the continuing functional ability of valves used for lock-hopper feeders, slurry feeders, and slag-char letdown service. Developmental and testing efforts to modify existing valve designs or to develop new valve concepts for these applications were estimated to range from 1 to 6 years. A testing facility to simulate actuation of critical valves under service conditions would be beneficial.

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3. COAL CONVERSION PROCESSES

To determine the valve requirements of the coal conversion industry, a study was made of selected processes under development by DOE and considered to be candidates for demonstration plants. Following are the processes studied and the pressure-temperature requirements at the coal conversion reactor.

<u>Process</u>	<u>Reactor condition</u>	
	<u>Pressure (psi)</u>	<u>Temperature (°F)</u>
High Btu gasification		
BCR BI-GAS	1250	1700-2700
IGT HYGAS	1200	850
Fischer-Tropsch	470	1700
Low Btu gasification		
Lurgi	450	1000
Liquefaction		
Coalcon	1000	1000
Hydrocarbonization (U.S. Steel clean coke)	150	1380
Synthoil	4500	850

Plant designs for these processes are not complete enough to delineate the type of valves, valve sizes, or duty requirements. To predict these valve parameters, preliminary process design concepts that listed material flow quantities and operating conditions were studied, major lines were sized, and valves were assigned at conventional locations.

In a simplistic description, a coal conversion plant consists of a series of processing blocks. Figures 1 through 7 show the blocks for the seven processes studied. The operational conditions at most of these blocks are fairly well defined from an existing technological base - the petrochemical industry. As such, the valves in these portions of the plant are fairly standard, they exist, they function fairly well, and they are continually being improved upon as problems are recognized and as new materials are developed. However, the operational conditions in

Fig. 1. Bituminous coal research BI-GAS process evaluation. Source: Energy Research and Development Administration, *250-Million-SCFD High BTU Gas Plant*, ERDA-76-48, Process Evaluation Group — Mineral and Material Research and Development, Morgantown, W. Va. (March 1976).

ORNL-DWG 78-3970

Fig. 2. IGT HYGAS process evaluation. Source: Energy Research and Development Administration, *IGT HYGAS Hydrogasification Process*, ERDA 76-47, Process Evaluation Group — Mineral and Material Research and Development, Morgantown, W. Va. (March 1976).

ORNL-DWG 78-3969

Fig. 3. Fischer-Tropsch process evaluation. Source: The R. M. Parsons Company, *Fischer-Tropsch Complex Conceptual Design/Economics Analysis: Oil and SNG Production*. R&D Report No. 114 — Interim Report No. 3, FE-1775-7, Pasadena, Calif. (January 1977).

Fig. 4. Lurgi process evaluation. Source: Energy Research and Development Administration, *250-Million-SCFD Gas Plant*, ERDA 76-7, Process Evaluation Group - Mineral and Material Research and Development, Morgantown, W. Va. (August 1975).

ORNL-DWG 78-3967

Fig. 5. Coalcon conceptual design analysis. Source: E. T. Coles, *Commercial Plant Process Evaluation*, report prepared under Contract No. E(49-18)-1736 with Energy Research and Development Administration, Coalcon, New York (August 1975).

Fig. 6. Hydrocarbonization (U.S. Steel clean coke process). Source: J. M. Holmes et al., *Hydrocarbonization Process Evaluation Report*, ORNL-5212 (Draft) (September 1976).

ORNL-DWG 78-3965

Fig. 7. Synthoil process evaluation. Source: R. Salmon et al., *Evaluation of the Synthoil Process*, ORNL-5209 (September 1976).

the blocks in which coal conversion takes place are not well defined. Valve duty requirements are not fully known; there is no application or closely allied experience with which to ascertain the type of valve that should be used.

The charts of the individual conversion processes (Figs. 1-7) show the potential problem areas. Valves that were considered to be representative of the most stringent service requirements are denoted on the figures by a "V-number."

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4. VALVE SURVEY

4.1 Method

The large high-pressure, high-temperature valves that appear to present new applications and would have the most stringent service requirements in the coal conversion industry have been identified on the block diagrams presented in the previous section. These valves can be classified as follows:

- Lock hopper valves
- Slurry feed valves
- Slag-char letdown valves
- Gas, steam, and oxygen valves
- Flow-interruption valves
- Equipment-isolation valves

The most likely valve configuration, valve size, and operating condition were sent to 231 valve manufacturers with the request that they identify products that they manufactured and that could be used for these service applications. The manufacturers were also requested to furnish information on their production, developmental and testing capabilities, and long-range plans for product development (see Appendixes C and D).

The valve manufacturers surveyed were identified from the following sources:

- Morgantown Energy Research Center's previous state-of-the-art valve survey⁴
- The Valve Manufacturers Association's membership list⁵
- Chemical Engineering Buyer's Guide⁶
- Heating, Piping, and Air Conditioning's Product Directory⁷
- Thomas Register's catalog of companies⁸

4.2 Response to Survey

A majority of the valve manufacturers responded to the survey (see Fig. 8). In general, no responses were received from companies that do not manufacture the large high-pressure, high-temperature type of valves itemized in the questionnaire.

Table 1 lists the companies who responded that they either manufactured or were interested in manufacturing the valves identified in the questionnaire.

4.3 Valve Survey Results

Results of the survey show that manufacturers have facilities to manufacture valves to the pressure-temperature conditions required for the most stringent applications in a coal conversion plant. Many of these manufacturers who have the facilities, however, are concerned by the service applications, particularly the solids in the flow stream. A summary of the responses, which indicates an availability of facilities and designs for the selected critical valves, is given in Table 2. Following is an overview of the responses.

Lock-Hopper Feed Valves

<u>V-number</u>	<u>Pressure (psi)</u>	<u>Temperature (°F)</u>	<u>Sizes (in.)</u>
V1	600	660	6,12,24
V2	1000	660	6,12,24
V3	1600	660	6,12,24

The Morgantown Energy Research Center's (MERC) State-of-the-Art Valve Program and various DOE coal conversion pilot plants have been buying and testing valves for coal conversion application. In general, they have been dealing with valves smaller than 12 in., but most manufacturers feel confident that their products will prove to be satisfactory and that redesign of their products to larger sizes and for higher pressures and temperatures can be accomplished.

ORNL-DWG 78-3964

Fig. 8. Valve survey response.

Table 1. Valve survey summary

Available with qualifications: full, partial, or custom fabrication	Not available: currently developing or interested in developing
ACF Industries, W-K-M Valve Division Anchor/Darling Valve Co. Andco Industries Atwood & Morrill Co., Inc. Blaw-Knox Equipment, Inc. Cameron Iron Works, Inc. Clow Corp., Engineering Products Division Consolidated Controls Corp. Crane Co. DeZurik, Unit of General Signal Dresser Industrial Valve & Inst. Division Environmental Elements Corp. Everlasting Valve Co. Fabri-Valve Fairchild Stratos Fetterolf Corp. Fisher Controls Co. Fox Valve Development Co. Gemco, the General Machine Co. Hills-McCanna Co. Honeywell, Inc. Kamyr Valves, Inc. Kicley and Mueller, Inc. Powell, Wm., Co., The RKL Controls, Inc. Rockwell International Corp. Rockwood Systems Corp. Sigmon Corp. Sulzer Bros., Inc. TAPCO International, Inc. TK Valve & Manufacturing, Inc. Valtek, Inc. Walworth Co. Westinghouse Electro-Mech. Division Willis Oil Tool Co.	AiResearch Manufacturing Co. Anderson, Greenwood & Co. Bingham-Willamette Co. Carborundum Controlmatics Division, Litton FMC Corp. Honeywell, Inc. Keystone Valve Lockheed Palo Alto Laboratory RP&C Valve, Inc. Rockwood Systems Corp. TXT/Division Vapor Corp. Yarway Corp.

Table 2. Valve availability for "most stringent" service applications

(Code: A = available in sizes as requested in questionnaire; X" = largest size available; N = see note in last column)

Manufacturer	Service Designation Pressure, psig Temperature, °F	Lock hopper			Slurry feed				Slag letdown			Gas	Steam	O ₂	Flow interrupt		Equipment Isolate V20-24 600-1600 660-1700	Limiting factors	Notes
		V1 600 660	V2 1000 660	V3 1600 660	V4 1250 660	V5 1600 660	V6 4300 625	V7 1250 700	V8 1250 700	V9 1250 1250	V10 1150 600	V11 1250 700	V12 1250 600	V13 1300 300	Coal V14-16 600-1000 660	Slag V17-19 1150-1250 660-1200			
ACF Industries, W-K-M Valve Division Anchor/Darling Valve Co. Andco Industries		A A N	A A N	A A N	N A N	N A N	N A N	N A N	A A N	A A N	A A N	A A N	A A N	A A N	N N N	N N N	N	Commercial incentives Castings	Designs require adaptation, 1 to 2 years Custom high-temperature valve manufacturer
Atwood & Morrill Co., Inc. Blaw-Knox Equipment, Inc. Cameron Iron Works, Inc.		N 6" 6"	N 6" 6"	N 6" 6"	N 6" 6"	N 6" 6"	N 6" 6"	N 6" 6"	N 6" 6"	N 6" 6"	N 6" 6"	A 6" 6"	A 6" 6"	A 6" 6"	N A A	N A A	A	Materials High-temperature testing facility	Ball valve under development Custom designs Development capability for larger sizes
Clow Corp., Engineering Products Div. Consolidated Controls Corp. Crane Co.		N 4" A	N 4" A	N A A	N 4" A	N 8" A	N A A	N 6" A	N 6" A	N 6" A	N 6" A	A A A	A 10" A	A A A	N N N	N N N	N	Facility, manpower	Potential designs Larger sizes under development Particulate testing required
DeZurik, Unit of General Signal Dresser Industrial Valve & Inst. Div. Environmental Elements Corp.		A N N	N N N	N N N	N N N	N N N	N N N	N N N	N N N	N N N	N N N	N N N	N N A	N N N	N N N	N N N	N	Commercial incentives	Development capability, 3 to 6 years Custom design as required
Everlasting Valve Co. Fabri-Valve Fairchild Stratos		12" 14" N	N 10" N	N N N	N N N	N N N	N N N	N N N	N N N	N N N	N 10" N	N N N	N N N	N N N	N N N	N N N		Materials, manpower	Design engineering required for higher pressure Design engineering required for larger sizes Custom designs, to 12 in.
Fetterolf Corp. Fisher Controls Co. Fox Valve Development Co.		A 8" 8"	A 8" 8"	A 8" 8"	A 8" 8"	A 8" 8"	A 8" 8"	A 8" 8"	A 8" 8"	A 8" 8"	A 8" 8"	A 16" 8"	A 8" 8"	A 8" 8"	N N N	N N N		Materials	Custom designs Custom designs
Gemco, The General Machine Co. Hills-McCanna Co. Honeywell, Inc.		A 10" N	A 8" N	A 8" N	A 8" N	A 8" N	A 8" N	A 8" N	A 8" N	A 8" N	A 8" N	8" 12"	8" A	A A	A A A	A A A		Materials Materials	Design engineering required for high pressure Development required for larger sizes, 1 to 1-1/2 years Development capability, 1 to 4 years
Kamyr Valves, Inc. Kieley and Mueller, Inc. Powell, Wm., Co., The		A 12" A	A 12" A	A 6" A	A 6" A	A 6" A	A 6" A	A 6" A	A 6" A	A 6" A	A 6" A	A A A	A 6" A	A A A	N N N	N N N		Materials Materials	Over 16" requires finished ball import Development capability for larger sizes, 9 months
RKL Controls, Inc. Rockwell International Corp. Rockwood Systems Corp.		6" 6"	6" 6"	4" 6"	4" 6"	4" 6"	4" 6"	6" 6"	6" 6"	6" 6"	4" 6"	6" 12"	6" A	6" A	N N N	N N N		Patterns	Development capability for larger sizes, 1 to 2 years Prefer development for larger sizes, 1-1/2 years
Sigmon Corp. Sulzer Bros., Inc. TAPCO International, Inc.		A A A	A A A	A A A	A A A	A A A	12" A A	A A A	A A A	A A A	A A A	A A A	A A A	A A A	N N N	N N N		Materials, manpower Design	Valve life unknown Requires in-field development, 1 year
TK Valve & Manufacturing, Inc. Valtek, Inc. Walworth Co.		A A A	A A A	A A A	A A A	A A A	12" A A	A A A	A A A	A A A	A A A	A A A	A A A	A A A	N N N	N N N		Foundry Manpower, machinery	Seal development required, 1-1/2 years New designs in progress New ball valve under development, 1-1/2 to 2 years
Westinghouse Electro-Mech Div. Willis Oil Tool Co.		6" 6"	6" 6"	6" 6"	6" 6"	6" 6"	6" 6"	6" 6"	6" 6"	6" 6"	6" 6"	12" 6"	A 6"	6" 6"	N N N	N N N		Design testing	Development capability for larger sizes

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Slurry Feed Valves

<u>V-number</u>	<u>Pressure (psi)</u>	<u>Temperature (°F)</u>	<u>Sizes (in.)</u>
V4	1250	660	6,12,24
V5	1600	660	6,12,24
V6	4300	625	6,12,24
V7	1250	700	6,10,12

The confidence of companies to manufacture valves for V4, V5, V6, and V7 operating conditions is as high as it is for the conditions for types V1, V2, and V3. Pressures of 4300 psi (V6) and temperatures of 700°F (V7) reduce only slightly the number of manufacturers who offer suitable designs.

Slag-Char Letdown Valves

<u>V-number</u>	<u>Pressure (psi)</u>	<u>Temperature (°F)</u>	<u>Sizes (in.)</u>
V8	1250	700	6,10,12
V9	1250	1200	6
V10	1150	600	6,10,12

The confidence of companies to manufacture valves for V8, V9, and V10 operating conditions is as high as for types V1 through V7. The 700°F (V8) and 1200°F (V9) reduce only slightly the manufacturers' confidence in their valve designs.

Gas, Steam, and Oxygen Valves

<u>V-number</u>	<u>Pressure (psia)</u>	<u>Temperature (°F)</u>	<u>Sizes (in.)</u>
V11	1250	700	12,24
V12	1250	600	6,10,12
V13	1300	300	8

Many manufacturers have the capability to manufacture and furnish valves for V11, V12, and V13 operating conditions, which are not unusual

in the petrochemical industry. If the process flow stream composition is fairly free of abrasives and contaminants, the valves for these applications will be readily available.

Flow Interruption and Equipment Isolation Valves

<u>V-number</u>	<u>Pressure (psi)</u>	<u>Temperature (°F)</u>	<u>Sizes (in.)</u>
V-14	600	660	6,12,24
V-15	1000	660	6,12,24
V-16	1600	660	6,12,24
V-17	1250	700	6,10,12
V-18	1250	1200	6
V-19	1150	660	6,10,12
V-20	600	660	54,60
V-21	1000	660	54,60
V-22	1250	1700	54,60
V-23	1600	660	54,60
V-24	4200	850	36,48

Valves of the types most likely to be applied for the V-14 through V-24 operating conditions would be blast, slide, and knife-edge types, which are, in general, custom-built designs. Design staffs and fabricating facilities are available to provide these types of valves for coal conversion plants.

5. VALVE ACTUATOR SURVEY

5.1 Method

The valve, complete with actuator, is generally purchased from a valve manufacturer. As such, valve-actuator manufacturers sell their products to the valve manufacturer directly rather than separately to a valve user. Although some valve manufacturers produce actuators for their own valve line, this is not the common practice for the majority of coal conversion valves used in the most stringent service applications.

In coal conversion plant applications, the valve with actuator would probably be located in either an outdoor location or a shed-type enclosure and might be subjected to explosive vapors or explosive dust. As such, the mechanism would be sealed and perhaps purged with an inert gas to negate both dirt intrusion and ignition sources.

To ascertain the capability of the valve-actuator industry to supply actuators for the most stringent applications in a coal conversion plant, a questionnaire was sent to 49 valve-actuator manufacturers. They were requested to furnish information on their facilities, standard products, developmental and testing capabilities, and long-range plans for product development (see Appendix E).

5.2 Response to Survey

Responses to the survey (Appendix B) include most of the major actuator manufacturers. In general, no responses were received from companies that do not manufacture the large actuators important to coal conversion plants.

Table 3 lists the companies who stated that they manufactured actuators suitable for critical application in coal conversion plants. Included in the listing are names of manufacturers who also noted applicable actuator manufacturing capability in their response to the valve questionnaire. Some valve companies who manufacture actuators possibly are not included because the valve questionnaire inadvertently did not request information on actuators.

Table 3. Valve actuator survey summary

(Companies who manufacture actuators
suitable for severe environmental
applications in coal conversion plants)

Anchor/Darling Valve Co.
Andco Actuator Products, Inc.
Arral Industries, Inc.
Automated Valve & Control
Becker Precision Equipment, Inc.
Bellows International
Beswick Engineering
Bettis Corporation
EIM Company, Inc.
Limatorque Corporation
Newbrook Machine Corp.
Raco International, Inc.
Raymond Control Systems, Division Vapor Corp.
Rotork Controls, Inc.
Sulzer Bros., Inc.

5.3 Actuator Survey Results

Valve-actuator manufacturers have the capability to produce in quantity the types of actuators that would be required by the coal conversion industry. Manufacturers have standard actuator designs capable of actuating valves of the largest size and at the highest pressures required in coal conversion plants. Available are designs that use either pneumatic, hydraulic, or electromechanical force and produce either rotary or linear motion. Manufacturers also provide complete pre-engineered actuator control assemblies with remote position indication. Facilities are also available for design, development, manufacture, and testing of new concepts as required.

6. ANALYSIS OF SURVEY RESULTS

6.1 Background

The United States has between 500 and 600 valve manufacturers who produce industrial valves applicable to coal conversion. The valve industry is large, divergent, competitive, and responsive to the economics of industry. Manufacturers vary from large integrated companies to the small machine-shop assembly companies who subcontract their major metal-forming operations.

In general, the smaller manufacturers are more available to produce a custom valve for a particular application than are large companies with well-established commercial markets. However, the economic potential of a new large industrial market, such as the coal conversion industry, is an incentive for large companies to develop new product lines.

6.2 Technology

With the advent of the nuclear industry and its demanding requirements for pressure integrity, operational assurance, and leak-tightness, a program of fundamental research was instigated, which included both analytical techniques and testing. As such, the major manufacturers have greatly improved their plant capabilities, testing facilities, and technical personnel capabilities. The results of this nuclear-instigated program have found their way into the general industrial markets; consequently the quality of valves available for the future coal conversion industry has improved dramatically in the past few years. Plant capacity is larger, precision machines are more available, testing equipment is available, and — most important — the industry has improved its technical capability in design and metallurgy.

Most valves that have been and will be used in coal conversion process applications are modified standard water-oil-gas commercial industrial valves. Manufacturers of these types of valves have recommended combinations of materials, disk assemblies, guides, and packing arrangements applicable to various process requirements. Each combination and modification responds under service differently, depending on the material, temperature, pressure, valve orientation, applied loadings to the valve, induced

vibration in the valve assemblage, and speed of operation. These effects in conjunction with modifications required for coal conversion operating conditions and installation restraints can be determined only by in-service experience; however, individual effects could be determined by establishing a controlled variable testing facility.

6.3 Valve Specification

Valves used in general industrial applications are required by law to meet applicable safety piping codes. For the coal conversion industry, this will probably mean conformance with the *American National Standard Code for Pressure Piping, Chemical Plant and Petroleum Refinery Piping*, ANSI B31.3 (ref. 9). This code, by reference, requires the valves either to conform with ANSI B16.5 (ref. 10), ANSI B16.34 (ref. 11), or API 600 (ref. 12) or to be in accordance with design rules established in the text of the code.

These codes and standards address only the structural integrity of the valve, not its operability. Factors¹³ important to the full identification of valve designs and materials for use in the manufacture of valves are:

- Design pressure and temperature
- Operating pressure and temperature, normal and abnormal
- Process chemistry, normal and abnormal
- Valve application
- Valve orientation
- Valve use frequency
- Valve leakage acceptability
- Flow capacity
- Significant thermal transients
- Dynamic loadings
- Structural support loading
- Environmental conditions
- Material requirements
- Special provisions for maintenance

The limited information furnished to the valve manufacturers in this survey included only normal operating pressure and temperature, valve application, and normal process chemistry. This descriptive information is inadequate to identify fully a satisfactory valve design.

6.4 Limiting Factors

The factors identified most frequently by valve manufacturers as limiting their capability to manufacture valves for the coal conversion industry were materials, design, and testing facilities (see Table 2).

Materials

Only a few manufacturers of large-size high-temperature, high-pressure valves have facilities with which to cast or forge the valve body. This valve part is procured by contract individually from various material suppliers. Procurement time and production quantities depend on the material suppliers.

Several years ago a major problem in procuring valves was the withdrawal from production by many of the suppliers rather than retrofitting their facilities to conform with the standards of the Occupational Safety and Health Administration (OSHA). However, this problem has been solved by the valve manufacturers, who have developed alternative sources of materials.

Changes to a valve body configuration, larger sizes, or thicker walls require modifications of forging dies and casting patterns, which creates time-consuming and expensive constraints to the development of new valve types and limits production quantities.

Design

Most manufacturers are limited by the number of design personnel they are willing to commit to preparing a revised valve design. Increases in both valve size and pressure-temperature ratings are major undertakings, which require analysis, drawings, work procedures, scheduling, new holding fixtures, cleaning facilities, material subcontracts, etc. For most valve manufacturers, especially for those who manufacture a nationally

advertised type of valves, there must be a strong commercial incentive for adoption of such a program.

Testing Facilities

In general, most valve manufacturers are equipped for very limited testing. Pressure (structural) and leakage testing is standard. Material examination using x-ray, magnetic-particle, and liquid-penetrant techniques is available to all manufacturers, but operational and temperature tests are not. Recirculating loops for testing valves with simulated process fluids are so limited as to be almost unavailable in any manufacturing facility. It currently appears that valve operational testing can be accomplished only in actual service after the coal conversion plant is constructed and in operation or in DOE-sponsored valve test facilities such as the Morgantown Energy Research Center Facility (see Sect. 4.3).

6.5 Impact

The health of the valve industry currently reflects the general industrial economic conditions in the United States. Industrial construction is very low compared to the 1973 era, and excess capacity is readily available in major valve manufacturing plants. The construction of several billion dollars of commercial coal conversion plants would not drastically alter this situation. The U.S. Department of Commerce estimated that the dollar volume of sales of industrial-type valves was \$1.7 billion per year in 1975. Using an estimating rule of thumb that valves account for 3% of the capital cost of an industrial-type facility somewhat comparable to a coal conversion plant, a billion-dollar facility would use about \$50 million for valves. During a 3-year construction period, each coal conversion plant would use about 1% of the industrial valve annual sales volume.

6.6 Potential Problem Areas

Understandably, no one can foresee the impact of a coal conversion industry on the valve manufacturing industry. The following situations,

however, could change in the future and could therefore create availability problems.

Industrial Economic Improvement

If the coal conversion industry construction period should coincide with other major industrial construction programs or with a major expansion in nuclear energy, the surplus valve manufacturing capacity would diminish rapidly.

Alloy Availability

Materials such as nickel, cobalt, chromium, and molybdenum that are needed for high-temperature valves are a world-wide problem, with economic, social, and political implications. If these materials should become scarce, they would probably be limited to "high-technology" applications, and substitutes would have to be developed for normal commercial use.

6.7 Availability Summary

Valves

The questionnaire responses in Appendix A denote the size and manufacturing capability of 77 of the 500 or more industrial valve manufacturers in the United States. Included in the 77 are most of the largest manufacturers; in dollar volume of sales, these 77 manufacturers account for over 90% of the industrial valve sales in this country. Table 2 lists availability responses from 35 of these 77 companies, who indicated that they produce valves applicable to the 24 operating conditions judged to be the "most stringent" service applications for shut-off type valves in future coal conversion plants.

Although Table 2 tends to indicate "availability" from numerous valve manufacturers, the term *availability* is ambiguous. As can be discerned from the Notes column, availability is readiness and capability to manufacture custom valves or a particular (patent) design, which may or may not have a prolonged satisfactorily life.

Results of the survey show that the valve industry has the capability to manufacture valves of the size and to the pressure-temperature

conditions that will be required for the coal conversion industry. However, to ascertain the continuing functional ability of valves, especially with flow streams containing particulates, development and testing will be required to optimize the available valve designs.

Actuators

The questionnaire responses in Appendix B denote the size and manufacturing capability of 18 valve-actuator manufacturers. The valve-actuator industry is apparently capable of supplying actuators of the size and for applications that will be required in future coal conversion plants.

7. RECOMMENDATIONS

The response to this survey indicates that the valve industry is capable of manufacturing in quantity valves of the size and for the pressure-temperature conditions that will be required for the coal conversion industry; however, the valve configuration and the optimization of material combinations for specific application is indeterminate. To adequately prepare the valve industry to supply valves for the coal conversion industry, finite functional valve specifications should be prepared for critical service applications. To accomplish this task, the following future studies should be undertaken:

1. define the specific valve application and function for critical service applications in specific coal conversion processes, including pressure letdown valves;
2. determine the potential commercial market for valves specific to the coal conversion industry;
3. disseminate information on coal conversion valve experiences to avoid repetition of misapplication of valve designs and to contribute to advanced configuration-material valve designs; and
4. analyze successful valve applications in similar industrial applications to stimulate transfer of valve technology.

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7. "Products Directory," *Heat. Piping Air. Cond.* 48(6) (June 1976).
8. Thomas Publishing Company, *Thomas Register of American Manufacturers and Thomas Register Catalog File*, 1977.
9. The American Society of Mechanical Engineers, *ANSI Standard Code for Pressure Piping, Chemical Plant and Petroleum Refinery Piping*, ANSI B31.3 - 1976, New York, 1976.
10. The American Society of Mechanical Engineers, *Steel Pipe Flanges and Flanged Fittings*, ANSI B16.5 - 1973, New York, 1973.
11. The American Society of Mechanical Engineers, *Steel Butt-Welding End Valves*, ANSI B16.34 - 1973, New York, 1973.

12. American Petroleum Institute, *Steel Gate Valves — Flanged or Butt-Welding Ends*, API 600 — 1973, Division of Refining, Washington, D.C., 1973.
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Appendix A

CAPABILITY RESPONSES OF VALVE MANUFACTURERS

Appendix A

CAPABILITY RESPONSES OF VALVE MANUFACTURERS

	<u>Page</u>
ACF Industries, Inc.	41
Abex Corporation	42
AiResearch Mfg. Co.	43
AMETEK/Schutte & Koerting Div.	44
Anchor/Darling Valve Co.	45
Andco Actuator Products, Inc.	46
Anderson, Greenwood & Co.	47
Atwood & Morrill Co., Inc.	48
Automatic Switch Company	49
Bingham-Willamette Company	50
Blaw-Knox Equipment, Inc.	51
C-E INVALCO	52
Calmec	53
Cameron Iron Works, Inc.	54
THE CARBORUNDUM COMPANY	55
CIRCLE SEAL CONTROLS	56
Cleveland Armstrong Company	57
Glow Corp., Engineered Products Div.	58
CODECAL Inc.	59
Consolidated Controls Corp.	60
Contromatics Division	61
Crane Co.	62
Crosby Valve & Gage Company	63

	<u>Page</u>
DALLY ENGINEERING-VALVE COMPANY	64
DeZURIK, A Unit of General Signal	65
Dresser Industrial Valve & Inst. Div.	66
Environmental Elements Corporation	67
Everlasting Valve Company	68
FMC Corporation	69
Fabri-Valve	70
Fairchild Stratos Division	71
Fetterolf Corporation	72
Fisher Controls Company	73
Fox Valve Development Co., Inc.	74
Gas Machinery Division, Modern Equipment Co.	75
Gemco, The General Machine Co. of N.J.	76
Gould Inc., Valve and Fittings Div.	77
Halliburton Services	78
Henry Valve Co.	79
Hills-McCanna Company	80
HONEYWELL, INC.	81
KAMYR VALVES, INC.	82
Kerotest Manufacturing Corp.	83
Keystone Valve Division, Keystone International, Inc.	84
Kieley and Mueller, Inc.	85
LADISH CO.	86
Lockheed Missiles & Space Co., Inc., Palo Alto Research Laboratory	87
J. E. Lonergan Company	88

	<u>Page</u>
Lunkerheimer Company, The	89
MCC MARPAC, A Unit of Mark Controls Corp.	90
PEABODY DORE' CORP.	91
Powell, Wm., Co., The	92
RKL Controls, Inc.	93
Red Valve Co., Inc.	94
Rockwell International Corporation	95
Rockwood Systems Corporation	96
Royal Industries, Energy Products Division	97
Shan-Rod, Inc.	98
Sigmon Corporation	99
Smith Valve Corporation	100
Specialty Valve & Controls, Inc.	101
Sperry Vickers	102
Stockham Valves & Fittings	103
Sulzer Bros., Inc.	104
TAPCO International, Inc.	105
TK Valve & Manufacturing, Inc.	106
TXT/Division Vapor Corporation	107
Teledyne Farris Engineering	108
Tufline Div., Xomox	109
VALTEK, INCORPORATED	110
WALWORTH Company	111
Watts Regulator Company	112
Westinghouse Electric Corporation, Electro-Mechanical Division	113

	<u>Page</u>
Willis Oil Tool Co.	114
Worcester Controls Corporation	115
Yarway Corporation	116
Zidell Explorations, Inc.	117

FIRM NAME/ADDRESS/PHONE ACF Industries, Inc. W-K-M Valve Division P.O. Box 2117 Houston, TX 77001 (713) 499-1511		YEAR PRESENT FIRM ESTABLISHED 1901 - Formation of original W-K-M Company	SURVEY DATE 7/12/77
		CONTACTS: NAME/TITLE/PHONE W.E. Kemp - General Mgr. - ext. 223 A.M. Williamson - Director - Eng & Res. X340 M.S. Kalsi - Manager - Res & Dev - ext. 515	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED			
PARENT COMPANY ACF Industries, Inc.			
VALVE PLANT LOCATIONS Houston, TX Richmond, TX Shreveport, Louisiana Scotland	NUMBER OF EMPLOYEES approx. 2500		PLANT FLOOR SPACE 12 acres - Houston Plant 6 acres - Richmond Plant
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Small (1"-6") Gate Valves - "Pow-R-Seal" and "Saf-T-Seal" type Small (1/4"-12") Floating Ball Valves & Trunnion Ball Valves Cylindrical, Lubricated Plug Valves (1/2"-12") Large (14"-48") Trunnion Mounted Ball Valves Large (6"-48") Gate Valves Control Valves			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Excellent Developmental & Test Facilities Include the Following: <ul style="list-style-type: none"> - Experimental Stress Analysis - Bending Moment Tests to Simulate Pipe Loads - High Temp Testing - Stem to 600°F, N₂ to 1200°F - High Volume Flow Simulation Blow-down Chambers - Cold Testing Down to -75°F - Abrasion Testing with Sand Slurry - Fire Testing 			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? 1982 - High Temp Ball Valves - Large Sizes 14" & up Good upto 1200°F 1987 - Through Conduit Valves for Higher Temperatures - upto 1800°F			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT A. M. Williamson Director - Engrg & Research ACF Industries, Inc. W-K-M Valve Division P.O. Box 2117 Houston, TX 77001			

FIRM NAME/ADDRESS/PHONE*		YEAR PRESENT FIRM ESTABLISHED	SURVEY DATE
Abex Corporation Engineered Products Division Valley Road Mahwah, NJ 07430 (201) 529-3450		1902	8-16-77
		CONTACTS: NAME/TITLE/PHONE R. Daniel Gladding, Manager, Marketing & Planning/(201) 529-3450	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED American Brake Shoe Company (1902)			
PARENT COMPANY IC Industries			
PLANT LOCATIONS Eng'd Prods' Division Elyria, OH Rochester & Mahwah, NJ Medina, NY Meadville, PA	NUMBER OF EMPLOYEES 1,700	PLANT FLOOR SPACE	
BRIEF STATEMENT AS TO ACTUATOR PRODUCTS The Engineered Products Division is primarily a manufacturer of castings, many of which are used by valve manufacturers. The Division can also machine and fabricate components as required.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Abex has a strong background in alloy development, particularly in the heat, corrosion, and abrasion resistant areas. Creep-rupture, abrasion and corrosion-erosion testing is available at the Research Center in Mahwah, NJ.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982? BY 1987? We anticipate to continue work on alloys for better resistance to heat, corrosion, and abrasion.			

* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE IT LISTED IN THE REPORT

FIRM NAME/ADDRESS/PHONE AiResearch Mfg. Co. 402 South 36th Street Phoenix, Az 85034		YEAR PRESENT FIRM ESTABLISHED 1941	SURVEY DATE Jan. 13, 1977
		CONTACTS: NAME/TITLE/PHONE W. E. Sullivan, Manager Govt. Relations (202) 331-1873	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None			
PARENT COMPANY The Signal Companies, Inc. 9665 Wilshire Boulevard Beverly Hills, Ca 90212			
VALVE PLANT LOCATIONS 402 S. 36th St. Phx., Az 85034	NUMBER OF EMPLOYEES 5,000	PLANT FLOOR SPACE 1,000,000 sq. ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS AiResearch Manufactures approximately 3,000 valve configurations and is presently in production with approximately 1,000 configurations in sizes from $\frac{1}{4}$ " to 17".			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES AiResearch has a large engineering group with laboratory facilities for research, development, and production. A remote hazardous testing site is also available.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? High temperature valves of the order of 2500°F by 1982, to 3000°F by 1987.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT AiResearch Manufacturing Company 402 South 36th Street P. O. Box 5217 Phoenix, Az 85010			

FIRM NAME/ADDRESS/PHONE AMETEK/Schutte & Koertling Div. Cornwells Heights, PA 19020 (215) 639-0900		YEAR PRESENT FIRM ESTABLISHED 1971	SURVEY DATE 7-7-77
		CONTACTS: NAME/TITLE/PHONE E. C. Busfield, Sales Engineer/(215)639-0900	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Schutte & Koertling Company - 1876			
PARENT COMPANY AMETEK, Inc.			
VALVE PLANT LOCATIONS Cornwells Heights, PA	NUMBER OF EMPLOYEES 400 approximately	PLANT FLOOR SPACE Mfg. 128,500 Sq. Ft. Office 33,500 Sq. Ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Mainly for steam service for electric utilities and industrial power plants. Types swing check, relief, emergency trip, threeway valves for boiler feedwater. Do not make valves for fluids or gases containing solids.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Hydrostatic testing. Magnetic particle testing. Dye penetrant testing. Radiography facilities. See Attached Facilities List.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Nothing planned at present.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT AMETEK/Schutte & Koertling Div. Cornwells Heights, PA 19020			

FIRM NAME/ADDRESS/PHONE Anchor/Darling Valve Co. 1 Belmont Avenue, Suite 320 Bala Cynwyd, PA 19004 (215) 667-9090	YEAR PRESENT FIRM ESTABLISHED 1968	SURVEY DATE 6/20/77
CONTACTS: NAME/TITLE/PHONE R. E. Bergman, Proposal Mgr. (215) 667-9090 R. E. Rinehart, Mgr. Marketing/Operations		
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Darling Valve & Manufacturing Co. 1888 Anchor Valve Co. 1946		
PARENT COMPANY Anchor/Darling Industries One Belmont Avenue, Suite 406 Bala Cynwyd, PA 19004		
VALVE PLANT LOCATIONS Williamsport, PA Hayward, CA	NUMBER OF EMPLOYEES 231 202	PLANT FLOOR SPACE 90,000 Sq. Ft. 40,000 Sq. Ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS <p>A/DV is a custom engineered valve manufacturer and has designed a large variety of specialty valves for the nuclear and fossil power, petro chemical and marine industries. We normally supply gate (both flex wedge and double disc), globe (horizontal, Y-globe, angle and Y-angle), and check (swing, tilting disc, lift check) valves in sizes 2 1/2" to 54", 150 to 4500 lb. pressure ratings, in carbon steel and a wide range of special alloys.</p>		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES <p>Both facilities have a large engineering staff under the direction of a chief engineer and are capable of designing valves for most critical services. In addition, our corporate staff includes a technical director and a design director in charge of research and development.</p>		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? <p>A/DV is continuously performing R&D, investigating modifications to existing designs, and performing prototype tests on new designs. We are currently involved in work on a laminated metal seat top entry butterfly valve for high temperature service. We are also investigating the feasibility of adapting our unique double disc wedging mechanism for use in our conduit design gate valve.</p>		
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT		

FIRM NAME/ADDRESS/PHONE Andco Actuator Products, Inc. P. O. Box 988 Buffalo, New York 14240 (716) 681-7400		YEAR PRESENT FIRM ESTABLISHED 1977	SURVEY DATE 8-9-77
		CONTACTS: NAME/TITLE/PHONE Douglas D. Schumann/Vice President (716) 681-7400	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Andco Incorporated - 1907			
PARENT COMPANY Andco Industries, Inc.			
VALVE PLANT LOCATIONS Buffalo, NY	NUMBER OF EMPLOYEES 105		PLANT FLOOR SPACE 14,000 Sq. Ft.
BRIEF STATEMENT AS TO ACTUATOR PRODUCTS The Andco Actuator is an electro-mechanical device to provide linear force in the range of 50 to 10,000 pounds and motion up to 60 inches. It uses a standard electric motor, conventional drive screw and a patented thrust overload protection device. It can be equipped with various position control options. It requires only electric power for operation. <i>NOTE: Andco Metal Industry Products in conjunction with Andco Technical Services, Ind., has provide specially designed high temperature valves and is capable of designing and producing valves of the type required for coal conversion.</i>			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Testing facilities currently exist for both production usage and ongoing product development. The personnel possess the knowledge and experience to construct additional testing facilities for any special requirements which may develop from an inquiry such as the Oak Ridge National Laboratory letter of July 15, 1977.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Improvements, modifications and extensions of the actuator's capabilities are an ongoing process. A rotary actuator incorporating the same design and integral overload device is under development at this time.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT			

FIRM NAME/ADDRESS/PHONE Anderson, Greenwood & Co. 5425 S. Rice Ave. Houston, TX 77081 713/668-0631		YEAR PRESENT FIRM ESTABLISHED 1947	SURVEY DATE 7/1/77
		CONTACTS: NAME/TITLE/PHONE Lomis Slaughter, Vice Pres. -Gen. Mgr. Special Products Phone: 713/668-0631	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Same			
PARENT COMPANY Same			
VALVE PLANT LOCATIONS Same	NUMBER OF EMPLOYEES 520		PLANT FLOOR SPACE 169,376
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS High and low pressure relief valves, gas and liquid pressure regulators. Powerplant hand and powered globe valves to 4 inches packed and bellows sealed packless Instrument valves & manifolds. Check valves to 36-inch vacuum breaker fast response check valves.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Test Facilities: ASME Certified All pressures, flow test to 500 psi, low pressure flows to approximately 50 lbs. air/sec. Product line in constant state of test and development 1957 to 1977 and continuing.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? As our management determines to be required by Petro-Chemical and Power Industry.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Anderson, Greenwood & Co. P. O. Box 1097 Bellaire, TX 77401 Attn: L. Slaughter			

FIRM NAME/ADDRESS/PHONE Atwood & Morrill Co., Inc. 285 Canal Street Salem, Massachusetts 01970 (617) 744-5690		YEAR PRESENT FIRM ESTABLISHED 1900	SURVEY DATE 8-9-77
		CONTACTS: NAME/TITLE/PHONE Robert A. Genier, Manager, Business (617) 744-5690 Development	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None			
PARENT COMPANY Foster Wheeler Energy Corporation			
VALVE PLANT LOCATIONS Salem, Massachusetts Washington, North Carolina	NUMBER OF EMPLOYEES 290	PLANT FLOOR SPACE 115,000 s.f.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Atwood & Morrill manufacturers valves for the nuclear and fossil power plants. Our principal lines are Steam Extraction Check, Feedwater Checks, and Heater By-Pass for fossil stations; Main Steam Isolation valves, Feedwater Isolation and Testable Check valves for nuclear stations. In addition, Atwood & Morrill supplies standard Check and Gate valves for various systems in both.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Team of Design Engineers engages in developmental and testing activities as dictated by contract needs. No fixed testing facilities are in use, except for production fixtures and tests. In the last year, we have undertaken gas flow testing at 10 million #/hour nitrogen, bending and torsion testing to 2.3 million #ft. and are presently designing steam test equipment for 900 psig sat. in a 32" valve as a production test.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? It is anticipated that our current designs will be expanded to serve new applications as the need arises. We also anticipate some participation in designs as developed under contract for ERDA by Foster Wheeler.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Atwood & Morrill Co., Inc. 285 Canal Street Salem, Massachusetts 01970			

FIRM NAME/ADDRESS/PHONE Automatic Switch Company Hanover Road Florham Park, NJ 07932 (201) 966-2000		YEAR PRESENT FIRM ESTABLISHED 1888	SURVEY DATE 7/6/77
		CONTACTS: NAME/TITLE/PHONE H. H. Kaemmer, Manager, Valve Department (201) 966-2050	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None			
PARENT COMPANY None			
VALVE PLANT LOCATIONS Florham Park, NJ Chicago, IL, Los Angeles, CA	NUMBER OF EMPLOYEES 1400		PLANT FLOOR SPACE 450,000 Sq. Ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Solenoid and air operated valves, electromagnetically or air operated control equipment used to deliver or interrupt the flow of liquids and gases automatically or on command to operate all kinds of tools, equipment, machinery, and processes. These valves are also utilized to pilot large valves which are diaphragm or piston controlled.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Great emphasis is placed on research, development, and engineering. Of the company's total US staff of more than 1400, some 250 are graduate engineers, draftsmen, and laboratory personnel engaged in R&D and engineering activity.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Constantly updating present products and adding new designs as field technology changes dictate.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT H. H. Kaemmer, Manager, Valve Department Automatic Switch Company Hanover Road Florham Park, NJ 07932			

FIRM NAME/ADDRESS/PHONE Bingham-Willamette Company 2800 N.W. Front Avenue Portland, OR 97210 (503) 226-5200	YEAR PRESENT FIRM ESTABLISHED 1946	SURVEY DATE 6/23/77
CONTACTS: NAME/TITLE/PHONE Paul S. Nieswander, Manager Valve Department (503) 226-5215		
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Willamette Iron Works 1865		
PARENT COMPANY Guy F. Atkinson Company		
VALVE PLANT LOCATION 2800 NW Front Avenue Portland, OR 97210	NUMBER OF EMPLOYEES 1000	PLANT FLOOR SPACE 250,000 Sq. Ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Willamette List 26 Ball Valve - Metal Seats, 150 psi and 300 psi pressure range - Max. Temperature 180°F		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES 2 Nuclear Test Loops Seal Test Area Pump Test Area Valve Test Area		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Slurry Valves		
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Bingham-Willamette Company 2800 NW Front Avenue Portland, OR 97210		

FIRM NAME/ADDRESS/PHONE Blaw-Knox Equipment, Inc. P.O. Box 11450 Pittsburgh, PA 15238 Phone: 412/781-2700		YEAR PRESENT FIRM ESTABLISHED 1917	SURVEY DATE 7-29-77
		CONTACTS: NAME/TITLE/PHONE C. H. Freudenrick, Product Manager, Steel Plant-Bucket Equipment 412/781-2700, Ext. 211	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED			
PARENT COMPANY White Consolidated Industries, Inc. 11770 Berea Road Cleveland, Ohio 44111			
VALVE PLANT LOCATIONS Blawnox, Pennsylvania	NUMBER OF EMPLOYEES Average 600 to 700	PLANT FLOOR SPACE 350,000 sq. ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS We would be interested in quoting and furnishing Straight Blast Gates in the sizes 48 thru 60 inch. We have furnished blast gates to the Metals and Glass Industry and are well-known for the gate valves we furnish for blast furnaces, open hearths, BOF's, electric furnaces, etc.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES 			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? We would be very much interested in quoting you on any type of heavy steel fabrication, and we are attaching, herewith, a product line booklet showing the types of equipment that we do manufacture.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT 			

FIRM NAME/ADDRESS/PHONE C-E INVALCO P. O. Box 556 1305 N. Louisville Tulsa, OK 74101	YEAR PRESENT FIRM ESTABLISHED INVALCO Since 1962	SURVEY DATE 7-12-77
CONTACTS: NAME/TITLE/PHONE		
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED INSTRUMENTS, INC., Established in 1948		
PARENT COMPANY Combustion Engineering, Inc.		
VALVE PLANT LOCATIONS 1305 N. Louisville Tulsa, OK	NUMBER OF EMPLOYEES 200	PLANT FLOOR SPACE 175,000 Sq. Ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS (1) 1/4" through 6" Diaphragm Actuators; 2 & 3 way Globe and Angle bodied valves. Pressures up to 6000 psi. Body materials Steel and Ductile Iron. (2) Long Nose Chokes. Maximum Working Pressure 6500 psi. (3) 2" Coal Slurry Control Valve		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Fully equipped Research and Development Departments. Testing facilities for hydrostatic pressure tests up to 15,000 psig.		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? We do not anticipate at this time, that Invalco will be manufacturing the types of products which will meet your requirements.		
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT C-E INVALCO P. O. Box 556 Tulsa, OK 74101		

FIRM NAME/ADDRESS/PHONE Calmec 8401 E. Slauson Pico Rivera, CA 90660 (213) 723-8581		YEAR PRESENT FIRM ESTABLISHED 1928	SURVEY DATE
		CONTACTS: NAME/TITLE/PHONE Keith Rogers Marketing Manager	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None			
PARENT COMPANY Ametek			
VALVE PLANT LOCATIONS Pico Rivera, CA	NUMBER OF EMPLOYEES 186	PLANT FLOOR SPACE 100,000 sq. ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Specialty products used in Aerospace, nuclear and commercial applications from -423°F to +1200°F, pressures to 30,000 psi. Includes ball, globe and butterfly types for cryogenic liquids, steam, water, corrosives, molten metals and gases.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Capabilities include a class 1 clean room, liquid nitrogen and water flow facilities, gaseous helium and air. Calmec has a staffed Engineering Department and a short order shop for development parts fabrication. More exotic test facilities are available locally.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Product line will include a full complement of nuclear rate globe, ball and butterfly valves, in addition to ASNI rated specialty bellows seal valves. Cryogenic control valves, regulators and automatic disconnect valves are currently in the product line, as are burst disc and relief valve assemblies.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT			

FIRM NAME/ADDRESS/PHONE Cameron Iron Works, Inc. P. O. Box 1212 Houston, Texas 77001 (713) 683-2211	YEAR PRESENT FIRM ESTABLISHED 57	SURVEY DATE 7-13-77
CONTACTS: NAME/TITLE/PHONE A. R. Laugier/Mktg. Mgr. (713) 683-2925 A. F. Harvey/Chief Engr (713) 683-2733		
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None		
PARENT COMPANY None		
VALVE PLANT LOCATIONS Houston, Texas Livingston, Scotland UK Beziers, France	NUMBER OF EMPLOYEES 1,200	PLANT FLOOR SPACE 150,000 sq. ft. (Houston, TX Plant Only)
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Ball Valves in Sizes 2" thru 56" 150# Class thru 2500 - 2" thru 12" 150# Class thru 1500 - 2" thru 24" 150# Class thru 600 - 2" thru 56"		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Various pressure test facilities Abrasive flow test load Currently do not have high temperature test facility		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? None		
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Per Contact Names Above		

FIRM NAME/ADDRESS/PHONE THE CARBORUNDUM COMPANY P. O. Box 337 Niagara Falls, NY 14302 (716) 278-2000		YEAR PRESENT FIRM ESTABLISHED	SURVEY DATE 6-28-77
		CONTACTS: NAME/TITLE/PHONE M. R. Gray, Manager-Business Development (716) 278-6380	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None			
PARENT COMPANY None			
VALVE PLANT LOCATIONS None at Present	NUMBER OF EMPLOYEES -		PLANT FLOOR SPACE -
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS None at Present			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Ceramic bodies are developed at - Niagara Falls, NY - Research Center Keasbey, NJ Plant Latrobe, PA Plant			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Current product line includes high-density alumina and nitride bonded silicon carbide; high density, sintered alpha silicon carbide is presently in the development stage. These products would provide wear and corrosion resistant structures for handling particulate and slag streams.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT As above			

FIRM NAME/ADDRESS/PHONE CIRCLE SEAL CONTROLS Brunswick Corp, Technetics Div. P. O. Box 3666 Anaheim, CA 92803 (714) 774-6110		YEAR PRESENT FIRM ESTABLISHED 1977	SURVEY DATE
		CONTACTS: NAME/TITLE/PHONE Bob Crowell, Product, Mgr., Hex Engineering Frank Distel, Sr. Application Engineer	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Circle Seal Corporation - 1969 James-Pond-Clark - 1951			
PARENT COMPANY Brunswick Corporation, Technetics Div. One Brunswick Plaza, Skokie, IL 60076			
VALVE PLANT LOCATIONS Anaheim, CA	NUMBER OF EMPLOYEES 400	PLANT FLOOR SPACE 90,000 Sq. Ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Check valves, relief valves, pressure regulators, metering valves, manually operated shutoff valves, solenoids, filters (in line sizes up through 2"). We manufacture these in various types of stainless steel, carbon steel, brass, aluminum and, on special request, will furnish these in other more exotic materials.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Our in-plant sources for high pressure testing include both pneumatic systems up to 6000 psi operating pressure for air and helium. We have a hydraulic test capability up to 500 psi with flow rates as high as 5000 psi. Our pneumatic system has a capability of flowing upwards to 10,000 standard cubic feet per minute for short durations.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? We have made plug type and shutoff valves which are capable of being used for sampling high pressure process streams and/or being rodged out.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT CIRCLE SEAL CONTROLS Brunswick Corp., Technetics Div. P. O. Box 3666 Anaheim, CA 92803			

FIRM NAME/ADDRESS/PHONE Cleveland Armstrong Company 1108 So. Kilburn Chicago, Ill. 60624 (312) 826-0406		YEAR PRESENT FIRM ESTABLISHED 1963	SURVEY DATE 7-5-77
		CONTACTS: NAME/TITLE/PHONE Peter Coster, General Mgr.	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Armstrong Valve Company 1959			
PARENT COMPANY Research Cottrell			
VALVE PLANT LOCATIONS Same Address	NUMBER OF EMPLOYEES 25	PLANT FLOOR SPACE 200,000 sq. ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Valves for dry dulk material 1. Shut-Off Gates. 2. Diverters 3. Air lock on pressure differential			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Test for sealing capability			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Valves for pulverized fuels - 1902			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Same as above			

FIRM NAME/ADDRESS/PHONE Clow Corp., Engineered Products Div. 40 Chestnut Avenue Westmont, IL 60559		YEAR PRESENT FIRM ESTABLISHED 1974	SURVEY DATE 17 Aug. 1977
		CONTACTS: NAME/TITLE/PHONE J. Phillip Ellenberger, Marketing Manager (312) 325-6000	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None			
PARENT COMPANY Clow Corporation			
VALVE PLANT LOCATIONS Westmont, IL	NUMBER OF EMPLOYEES 50+		PLANT FLOOR SPACE 47,000 sq ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Clow, Engineered Products manufactures the Clow Tricentric, basic design. They also make special adaptations of valves of special materials and designs and related systems designed to the specific process requirements. All products are fabricated.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Clow, the parent company, has R&D section. Engineered Products has internal stress, seismic, etc. capabilities. Standard hydro tests and NDE are performed in-house. We have relationships with several testing laboratories. Clow also has relationships with firms in Europe for development.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Engineered Products is seeking product lines that relate to high temp, corrosive atmosphere, severe service flow control.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT As stated in CONTACTS			

FIRM NAME/ADDRESS/PHONE CODECAL Inc. PO Box 428 382 Springfield Avenue Summit, New Jersey 07901 (201) 273-2434	YEAR PRESENT FIRM ESTABLISHED 1968	SURVEY DATE 9/1/77
CONTACTS: NAME/TITLE/PHONE Howard W. Johnson General Manager (201) 273-2434		
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Control Devices, Inc. 1968		
PARENT COMPANY CODECAL Inc.		
VALVE PLANT LOCATIONS 637 W. Valencia Drive Fullerton, California	NUMBER OF EMPLOYEES 10	PLANT FLOOR SPACE 4,000 sq. ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS As manufacturers, the following: Pressure limiters (see attached catalog), check valves, relief valves, pressure regulators, excess-flow valves, etc. As engineers we are valve designers.		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES See attached copy of our Capabilities & Facilities brochure.		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987?		
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT CODECAL INC. P.O. Box 428 Summit, New Jersey		

FIRM NAME/ADDRESS/PHONE Consolidated Controls Corp. 2338 Alaska Avenue El Segundo, CA 90245		YEAR PRESENT FIRM ESTABLISHED 1958	SURVEY DATE 7-12-77
		CONTACTS: NAME/TITLE/PHONE T. E. Jackson/Sr. Contract Administrator (213) 776-5301, X 233	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None			
PARENT COMPANY Condec Corp., 1700 Post Road, Old Greenwich, CT 06870			
VALVE PLANT LOCATIONS El Segundo	NUMBER OF EMPLOYEES 106	PLANT FLOOR SPACE 40,000 Sq. Ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS See enclosed document "FLOW CONTROL DEVICES FOR COAL CONVERSION PROCESSES". <i>NOTE: (1) Supplier of high temperature, high pressure valves for aerospace. (2) Products include ceramic and castable aluminum lined valves. (3) Has ERDA lined valve development contract.</i>			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES CCC has specialized in the design and development of unique flow control devices for over 25 years. All of the flow control equipment produced by CCC has been developed to specific customer requirements. All equipment is tested to the max. operating condition. Equipment size range up to 6 tons and testing from -320 to +2000°F and pressure up to 10,000 psig gas and 20,000 psig fluid.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Currently we have production capability for our Solids Control Valve 7440, Main Steam Root Valve 73405, and Rotary Feeder Valve 74450. In addition, we have an ongoing program for design and manufacture of 24-inch coal gasification control valves used in the coal lock-hopper feed system. Production capability for these valves will be available by 1978.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Consolidated Controls Corporation 2338 Alaska Avenue El Segundo, CA 90245			

FIRM NAME/ADDRESS/PHONE Contromatics Division Litton Industrial Products 222 Roberts Street East Hartford, CT 06108 (203) 528-9935		YEAR PRESENT FIRM ESTABLISHED 1968	SURVEY DATE 7-15-77
		CONTACTS: NAME/TITLE/PHONE D. E. Platt, Prod. Planning Mgr. J. M. Koss, Sales Manager (203) 528-9935	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Contromatics Corp. established in 1961, now Contromatics Division, Litton Industrial Products			
PARENT COMPANY Litton Industries			
VALVE PLANT LOCATIONS East Hartford, CT	NUMBER OF EMPLOYEES 200		PLANT FLOOR SPACE 60,000 Sq. Ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Contromatics manufactures and markets a complete line of ball valves (1/4" through 8" size standard and fullport), hi performance (pressure seated) butterfly valves (3" thru 36" size) and pneumatic and hydraulic actuators. Currently supplying products to various end use markets including chemical and petrochemical, Marine (government and commercial), power generation (qualified and authorized to ASME Section III, Class 1, 2, & 3 as well as Mil. 4520A).			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Facility has currently full range of testing equipment for valves and actuators including hydrostatic and pneumatic valve test equipment capable of 2000 psi thru 30" size. Also fire test equipment capable of 2000°F thru 10" size valves. In addition numerous qualified sub vendors locally who do testing for such companies as United Technologies, Combustion Engineering, and Hamilton Standard.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Contromatics is currently 30% completed through a completely funded R&D program for high temperature ball and butterfly valves. This effort includes soft seated valves capable of 750°F and metal seated ball and butterfly valves capable of 1000°F. These programs are currently scheduled for completion in late 1978 and early 1979.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Contromatics Division Litton Industrial Products 222 Roberts Street East Hartford, CT 06108			

FIRM NAME/ADDRESS/PHONE Crane Co. 300 Park Avenue New York, New York 10022	YEAR PRESENT FIRM ESTABLISHED 1855	SURVEY DATE 6/30/77
CONTACTS: NAME/TITLE/PHONE Mr. William C. Dackis, Vice President 212-980-7204		
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED ---		
PARENT COMPANY ---		
VALVE PLANT LOCATIONS Chicago; Chattanooga; Indian Orchard, Mass.; Washington, Iowa; Rogers, Ark.	NUMBER OF EMPLOYEES Total - 21,850 Valve Div. Crane USA - 2,465	PLANT FLOOR SPACE Valve Plants -- 2,541,000 sq.ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Full line of gate, globe, check, ball and butterfly valves of steel, iron and bronze materials in size ranges 1/8" up to 108" as appropriate for pressure ranges from vacuum to 30,000 psi and temperatures from ambient to 1600 F.		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Hydrostatic pressure to 50,000 psi. Steam testing to 350 psi saturated steam. Operational test stands for a wide variety of conditions including performance testing with applied nozzle loads. Flow test capability for pressure drop and throttling performance determination. Strain gage and related structures testing.		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987?		
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Crane Co. 300 Park Avenue New York, New York 10022		

FIRM NAME/ADDRESS/PHONE Crosby Valve & Gage Company 43 Kendrick Street Wrentham, MA	YEAR PRESENT FIRM ESTABLISHED 1871	SURVEY DATE 7-6-77
CONTACTS: NAME/TITLE/PHONE T. H. Teplow, Executive Vice President (617) 384-3121		
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED The Ashton Valve Company - 1871 Crosby Steam Gage & Valve Company - 1874		
PARENT COMPANY Crosby Valve & Gage Company		
VALVE PLANT LOCATIONS Wrentham, MA Houston, TX	NUMBER OF EMPLOYEES 535	PLANT FLOOR SPACE Approx. 225,000 Sq. Ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Safety, safety relief and relief valves from 1/2" screwed inlet to 18' flanged inlet sizes. Pressure ranges to 15,000 psig. Temperature ranges from -450F to 1000F. Orifice areas from .015 sq. in. to over 200 sq. in. Both spring loaded and pilot operated. Also furnish rupture disc pressure relieving devices.		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Engineering Department numbers over 100 people. See list of test facilities attached.		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987?		
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Crosby Valve & Gage Company 43 Kendrick Street Wrentham, MA 02093		

FIRM NAME/ADDRESS/PHONE DALLY ENGINEERING-VALVE COMPANY 1200 Century Building Pittsburgh, PA 15222 (412) 232-3700		YEAR PRESENT FIRM ESTABLISHED 1966	SURVEY DATE 6-22-77
		CONTACTS: NAME/TITLE/PHONE C. A. Dally, President (412) 232-3700	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None			
PARENT COMPANY None			
VALVE PLANT LOCATIONS Pittsburgh District	NUMBER OF EMPLOYEES 21	PLANT FLOOR SPACE 15,000 Sq. Ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Butterfly Valves - standard and custom engineered Slide Valves - custom engineered			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Designed, manufactured and tested special butterfly valves and slide gates installed at coal gasification pilot plants Rapid City, SD Homer City, PA			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987?			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT DALLY ENGINEERING-VALVE COMPANY 1200 Century Building Pittsburgh, PA 15222			

FIRM NAME/ADDRESS/PHONE DeZURIK, A Unit of General Signal Sartell, MN 56377 (612) 251-0221		YEAR PRESENT FIRM ESTABLISHED 1928	SURVEY DATE 6-30-77
		CONTACTS: NAME/TITLE/PHONE Glenn Bowman - Vice President - Sales H. Dean Olson - Industrial Sales Manager	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED DeZURIK Shower Company DeZURIK Corporation			
PARENT COMPANY General Signal High Ridge Park, Stamford, CT 06904			
VALVE PLANT LOCATIONS Sartell, MN McMinnville, TN LaGrange, GA	NUMBER OF EMPLOYEES 1200 (Total)		PLANT FLOOR SPACE Sartell 270,000 Sq. Ft. McMinnville 178,000 Sq. Ft. LaGrange 68,000 Sq. Ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS The original DeZURIK valve, the eccentric plug valve is still the major line with applications in all process industries and utility markets. Bonnetless knife gate valves are primarily intended for slurry and other abrasive applications. Two butterfly lines, a resilient seated and a teflon seated design for abrasive and high pressure applications. Finally, the only fully flanged segmented V-ball valve on the market for applications to 1000°F and pressures to 740 psi.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES DeZURIK engineering product development consists of four development teams of three engineers each that specialize in various valve styles. The laboratory for research and development includes test facilities for pumping up to 100,000 GPM. Valve pressure drop capabilities, capacity, noise suppression, application condition, and cycle testing are some of the common types of activities carried on.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? DeZURIK has grown at the rate of 15% per year for more than a decade adding new products almost yearly. Higher pressure and temperature capabilities are an integral part of this expansion story. Abrasive slurries as found in mining and wet scrubber installations are DeZURIK specialties. 1500# applications should be realistic for DeZURIK by 1982.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT DeZURIK, A Unit of General Signal Sartell, MN 56377			

FIRM NAME/ADDRESS/PHONE Dresser Industrial Valve & Inst. Div. 250 East Main Street Stratford, Conn. 06497 (203) 378-8281		YEAR PRESENT FIRM ESTABLISHED 1964 (Dresser IVI Div.)	SURVEY DATE 7-13-77
		CONTACTS: NAME/TITLE/PHONE C. E. Muller, Vice President-Marketing 203-378-8281	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Manning, Maxwell & Moore - 1880 Dewrance & Co. - 1844			
PARENT COMPANY Dresser Industries, Inc.			
VALVE PLANT LOCATIONS Alexandria, Louisiana Skelmersdale, England	NUMBER OF EMPLOYEES 985 500	PLANT FLOOR SPACE 270,000 sq. ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Forged and cast steel globe, gate and checks, safety and safety relief valves. Media operated globe and gate valves.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Design Departments at both locations carry out continual developmental and test programs, mainly for fossil and nuclear power plant applications. Testing capabilities include normal hydro test and steam test at Alexandria.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Extend range of existing lines. Develop specialized products.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT			

FIRM NAME/ADDRESS/PHONE Environmental Elements Corporation 3700 Koppers Street Post Office Box 1318 Baltimore, MD 21203 (301) 368-7000		YEAR PRESENT FIRM ESTABLISHED 1974	SURVEY DATE 8/8/74
		CONTACTS: NAME/TITLE/PHONE Larry D. Anson, Supervisor, Accessory Products (301) 368-7244	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED			
PARENT COMPANY Koppers Company, Inc.			
VALVE PLANT LOCATIONS Baltimore, MD	NUMBER OF EMPLOYEES 1,300	PLANT FLOOR SPACE 30,000 Sq. Ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Standard valve products include custom slide gate dampers, louver dampers, and butterfly valves. These are designed and constructed on contract to specified requirements. These valves are used in flue gas and process gas applications where pressures do not generally exceed 25" W.C.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES The company has no significant testing facilities for damper testing. A 12-man staff group is responsible for testing and development of products as the need arises.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987?			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Environmental Elements Corporation Post Office Box 1318 Baltimore, MD 21203			

FIRM NAME/ADDRESS/PHONE Everlasting Valve Company 70 Myrtle Street Cranford, N.J. 07016 (201) 272-5566		YEAR PRESENT FIRM ESTABLISHED 1906	SURVEY DATE 7/15/77
		CONTACTS: NAME/TITLE/PHONE D. J. Easton, Engineer (201) 272-5566, Ext. 5	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Patterson & Allen Engineering Company (1903)			
PARENT COMPANY Aeroil Products Company Inc. 69 Wesley Street South Hackensack, N.J. 07606			
VALVE PLANT LOCATIONS Cranford, N.J.	NUMBER OF EMPLOYEES 30	PLANT FLOOR SPACE 30,000 Sq. Ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Valves for Boiler Blowdown, General and Marine Steam, Steam Service for District Heating, Coke Oven and Coal Fines Service, Abrasive Slurries, Food Service, Fire Protection, and valving to the Chemical and Petrochemical Industries.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Development of new valving and valve systems, compatible with the Everlasting Valve operating principle and design philosophy, in co-operation with industry's specifying engineers. In-house hydrostatic shell testing of valves and pressure vessels to any pressure dictated by ANSI classification and hydrostatic, or air, seat leakage testing as required including low vacuum capabilities.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Similar conceptually to those now offered but extended to cover greater pressure and temperature extremes at each end of the respective scales. Greater coverage of highly corrosive service through increased use of "exotic" alloys. Various valve linings and inserts to be developed for highly abrasive services.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Everlasting Valve Company 70 Myrtle Street Cranford, New Jersey 07016			

FIRM NAME/ADDRESS/PHONE FMC Corporation Petroleum Equipment Group 1717 Greens Road, P.O. Box 3091 Houston, TX 77001 (713) 448-0211		YEAR PRESENT FIRM ESTABLISHED 1951	SURVEY DATE 7-77
		CONTACTS: NAME/TITLE/PHONE Lionel J. Milberger, Project Engineer (713) 444-3444	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED			
PARENT COMPANY FMC Corporation			
VALVE PLANT LOCATIONS Houston, TX	NUMBER OF EMPLOYEES 1275		PLANT FLOOR SPACE 350,000 Sq. Ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS High performance Butterfly valves, check valves, and related piping unions and swivel joints, marine loading arms, valves and actuators for oil field well production both surface and subsea.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Complete testing facilities for current product lines. A well staffed new products oriented R&D department responsive to FMC's Petroleum Equipment Group. Extensive and sophisticated Engineering Laboratories in Santa Clara, California.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? High temperature and high pressure butterfly valves. Ball valves, fabricated valves, offshore loading equipment, other high performance valves.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT			

FIRM NAME/ADDRESS/PHONE Fabri-Valve P. O. Box 4367 Portland, OR 97208 (503) 284-1131		YEAR PRESENT FIRM ESTABLISHED 1948	SURVEY DATE 7/15/77
		CONTACTS: NAME/TITLE/PHONE Day Tooley Market Manager (504)284-1131	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Albina Engine & Machine			
PARENT COMPANY Dillingham Corporation			
VALVE PLANT LOCATIONS Portland, Oregon Amory, Mississippi	NUMBER OF EMPLOYEES 273		PLANT FLOOR SPACE 125,000 Sq. Ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Fabricated wedge gate, knife gate, check and butterfly valves from 2" to 120" size. Wide range of materials available since valves are fabricated from wrought materials			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Flow loop, stress analysis laboratory available to verify new and existing designs.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Trend in industries we serve is: (1) Toward higher pressures (2) Increasing valve size			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Fabri-Valve P. O. Box 4367 Portland, Oregon 97208			

FIRM NAME/ADDRESS/PHONE Fairchild Stratos Division 1800 Rosecrans Avenue Manhattan Beach, CA 90266 (213) 675-9111	YEAR PRESENT FIRM ESTABLISHED 1954	SURVEY DATE Nov. 2, 1977
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED --		
PARENT COMPANY Fairchild Industries, Inc.		
VALVE PLANT LOCATIONS 1800 Rosecrans Avenue Manhattan Beach, CA 90266	NUMBER OF EMPLOYEES 500 - approximately	PLANT FLOOR SPACE
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Many years in aerospace industry making valves and disconnects. Recent contracts for design and fabrication of large high-vacuum valves and large valves to be used in coal gasification processes.		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Extensive facilities for high and low pressure gas valves. Pressurization and instrumentation capability suitable for all types of industrial valves. A multi-million dollar, large valve fabrication facility is being added to the existing Fairchild Stratos Division plant.		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Future valve product lines will be centered around hostile environment block valves, pressure let-down valves and lock-hopper valves. High vacuum valves for the nuclear industry will also be manufactured.		
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Fairchild Stratos Division 1800 Rosecrans Avenue Manhattan Beach, CA 90266 (213) 675-9111		

FIRM NAME/ADDRESS/PHONE Fetterolf Corporation P. O. Box 156 Fairview Village, PA 19409		YEAR PRESENT FIRM ESTABLISHED 1968	SURVEY DATE 7/29/77
		CONTACTS: NAME/TITLE/PHONE A. M. Ritter, Vice-President, (215) 539-7055	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED			
PARENT COMPANY			
VALVE PLANT LOCATIONS Royersford, PA Fairview Village, PA	NUMBER OF EMPLOYEES 45		PLANT FLOOR SPACE
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Valve products that are currently standard are continuations of specialty valves developed and fabricated for specific applicational needs. All are of Ram-Seal patented design for use on slurry or other aggressive fluid media applications. All are custom built.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Fetterolf Corporation Development Group has high capability for problem analysis and conceptual development of unique valve products to satisfy long-standing needs. Current projects for ERDA are typical.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Valves of many configurations for hostile media. Large blind flanges and valves Knife gate			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Fetterolf Corporation P. O. Box 156 Fairview Village, PA 19409			

FIRM NAME/ADDRESS/PHONE Fisher Controls Company P.O. Box 190 Marshalltown, Iowa 50158		YEAR PRESENT FIRM ESTABLISHED 1880	SURVEY DATE 7-29-77
		CONTACTS: NAME/TITLE/PHONE Ernest E. Allen, Director of Research (515) 754-3195	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED			
PARENT COMPANY			
VALVE PLANT LOCATIONS Marshalltown, IA. Corapolis, PA **	NUMBER OF EMPLOYEES 3750	PLANT FLOOR SPACE 1,460,000 sq. ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Standard valve products include globe style, ball valves and butterfly valves. Valve sizes range from 1/2" to 24" with ANSI pressure ratings from 150 lb. to 2500 lb.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Engineering and Research staff of 400 people. Test facilities. largest test line 16" maximum metered flow, water 10,000 GPM maximum metered flow, air 12.5 x 10 ⁶ SCFH maximum pressure test media 2500 psig			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987?			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Fisher Controls Company Box 190 Marshalltown, Iowa 50158 ** Valve Plant Locations: Sherman, TX, Woodstock, Canada			

FIRM NAME/ADDRESS/PHONE Fox Valve Development Co., Inc. 2 Great Meadow Lane Hanover, New Jersey 07936		YEAR PRESENT FIRM ESTABLISHED 1960	SURVEY DATE 6-22-77
		CONTACTS: NAME/TITLE/PHONE Zola Fox, President, (201) 887-7474	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED 			
PARENT COMPANY 			
VALVE PLANT LOCATIONS 1	NUMBER OF EMPLOYEES 12	PLANT FLOOR SPACE 2000	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Venturi Type Throttling & Shut-Off Valves. High Temperature (~ 2000°F) Shut-Off, Throttle & Relief Valves Rapid Response, High Pressure Valves (.010 MS @ 10,000 PSI Typ.) Pressures to 25,000 PSI			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Two water flow test stands; H _e , N ₂ to 3500 PSI pressure test, life cycle test			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Continued development of existing lines including binary type (digital) valves			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Fox Valve Development Co., Inc. 2 Great Meadow Lane Hanover, New Jersey 07936			

FIRM NAME/ADDRESS/PHONE Gemco The General Machine Co. of N.J. 55 Evergreen Avenue Newark, NJ 07114 (201) 242-7405		YEAR PRESENT FIRM ESTABLISHED 1945	SURVEY DATE 7/6/77
		CONTACTS: NAME/TITLE/PHONE G. R. Sweitzer - General Manager - (201) 242-7405	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None			
PARENT COMPANY None			
VALVE PLANT LOCATIONS Newark, NJ	NUMBER OF EMPLOYEES 41		PLANT FLOOR SPACE 15,000 sq. ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS See Catalog <i>NOTE: DUST-TITE spherical valves for solids, slurries and contaminated liquids sizes 3" to 24" Special valves to 1800F, 50 psi, differential pressure. Features include jacketed, special alloys, platings, coatings, and synthetics</i>			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES See Letter Information <i>NOTE: Facilities for pressure and temperature testing</i>			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? See Letter Information			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Gemco The General Machine Co. of NJ 55 Evergreen Avenue Newark, New Jersey 07114 Attn: Mr. G. R. Sweitzer - General Manager			

FIRM NAME/ADDRESS/PHONE Gould Inc. Valve and Fittings Div. 6300 W. Howard St. Chicago, IL 60648 A/C 312/967-4500	YEAR PRESENT FIRM ESTABLISHED 1869	SURVEY DATE 7-6-77
CONTACTS: NAME/TITLE/PHONE Carl Sutherland - Manager Process Control Sales A/C 312/967-4606		
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Imperial-Eastman Corporation Established: 1901		
PARENT COMPANY Gould Inc. (See enclosed Annual Report)		
VALVE PLANT LOCATIONS 6300 W. Howard St. 7401 N. Croname Rd. Chicago, IL 60648	NUMBER OF EMPLOYEES 990	PLANT FLOOR SPACE 300,000 sq. ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS (See enclosed catalogues) Instrument BY-Pass Manifolds (1/2" Fem. Pipe Max.) (6,500 psi Max.) One (1), Three (3) and Five (5) Valve Models Brass, Carbon Steel, 316 SS, Monel, Inconel, Alloy 20 and Hastelloy "C". Temp. Range: -60°F to 1200°F Instrument Hand Valves (1" Fem. Pipe Max.) (10,000 psi Max) Carbon and 316 SS Temp. Range: -60°F to 1200°F Manufactured to: API, ANSI, B31.1, ASME Sec. III Nuclear Class 1, 2 & 3		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Have extensive development and testing capabilities within Gould Inc. We here at the Valve and Fittings Div. work closely with The Materials Research Laboratory, Cleveland, Ohio.		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? It is our intention to expand our size range to 2" by 1982. Our concentration will be in the area of Isolation and/or Root Valves for Hi-Pressure/Hi-Temperature/Corrosive Service.		
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Gould Inc. Valve and Fittings Division 6300 W. Howard St. Chicago, IL 60648		

FIRM NAME/ADDRESS/PHONE Halliburton Services Drawer 1431 Duncan, Oklahoma 73533 Stephens County Phone: (405) 251-3760		YEAR PRESENT FIRM ESTABLISHED 9-15-67	SURVEY DATE 7-11-77
		CONTACTS: NAME/TITLE/PHONE Leonard Leon, Exec. V.P. (405) 251-3165 Bobb Diggs Brown, VP (405) 251-3369	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Halliburton Oil Well Cementing Company Incorporated in 1924			
PARENT COMPANY Halliburton Company 3211 Southland Center Dallas, Texas 75201			
VALVE PLANT LOCATIONS P. O. Drawer 1431 Duncan, Oklahoma 73533	NUMBER OF EMPLOYEES 2200		PLANT FLOOR SPACE 600,000 sq. ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Halliburton faced a need for handling, manifolding, and controlling some of the highest sustained pressures ever attempted. There were none available commercially to meet our specifications - so Halliburton designed, developed, and manufactured the Halliburton Lo Torc Plug Valve. The success of this line of valves in our service created a demand by other industries. The current product line is 1" thru 4" with working pressures ranging from 1000 PSI through 15,000 PSI.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES The Halliburton Services Research Development and Manufacturing Capabilities are more than adequate to develop services or products related to Oil Well Servicing and other areas of opportunity.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? As noted, our current line of valves is not compatible with specifications of this survey. Halliburton Services would review the findings of this survey with interest to determine if the future demand would indicate a sufficient demand for development of product.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Leonard Leon, Executive V.P., P. O. Dr. 1431, Duncan, Oklahoma 73533 Bob Diggs Brown, Vice President, P. O. Drawer 1431, Duncan, Oklahoma 73533			

FIRM NAME/ADDRESS/PHONE Henry Valve Co. 3215 North Avenue Melrose Park, IL 60160		YEAR PRESENT FIRM ESTABLISHED 1914	SURVEY DATE 6/17/77
		CONTACTS: NAME/TITLE/PHONE R. S. Dickert, Sales Manager (312) 261-3668	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED NONE			
PARENT COMPANY NONE			
VALVE PLANT LOCATIONS Melrose Park, IL	NUMBER OF EMPLOYEES Under 300	PLANT FLOOR SPACE	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS We manufacture a complete line of shut-off valves for the Refrigeration and Air Conditioning Industry. We do, however, make special items for other industries To the best of my knowledge, we are not supplying any items to the coal industry.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987?			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT			

FIRM NAME/ADDRESS/PHONE Hills-McCanna Company 400 Maple Avenue Carpentersville, IL 60110 (312) 426-4100		YEAR PRESENT FIRM ESTABLISHED 1898	SURVEY DATE
		CONTACTS: NAME/TITLE/PHONE Rich Anderson, Senior Vice President (312) 426-4100, Ext. 200	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Northside Brass Works, 1870			
PARENT COMPANY This company is a subsidiary of IU International since 1972			
VALVE PLANT LOCATIONS Carpentersville, IL	NUMBER OF EMPLOYEES 725	PLANT FLOOR SPACE 214,130 Sq. Ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Ball Valves: Top entry ball valves in sizes 1/2" through 10" in ANSI classes 150, 300 and 600, in carbon steel, stainless steel, bronze, aluminum, ductile iron, Alloy 20, Monel, nickel, Hastelloy C. titanium. End entry ball valves in sizes 1/4" through 16", in ANSI classes 150 and 300. Butterfly Valves: High pressure butterfly valves in some of the sizes 3" through 30", in ANSI classes 150, 300 and 600, in carbon steel and stainless steel. Diaphragm Valves: Saunders type diaphragm valves in sizes 1/2" through 16" in a multitude of materials and linings. High pressure (nuclear) diaphragm valves 1/2" through 4". Class 2 and 3 nuclear valves.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Product and development Engineering Department of 60 people of which 24 people are assigned to development projects which includes 6 people in Model Shop and testing laboratory. Laboratory performs cycle tests, flow tests, fire tests, cryogenic valve performance tests, pressure/temperature rating tests, etc.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? <u>By 1982:</u> Ball valves in sizes 1" through 8" in ANSI classes 900 and 1500 with carbon-graphite and metal seats. High pressure butterfly valves in ANSI Class 150, extension of present size range to 48"; in ANSI classes 300 and 600, extension of present size range to 24". <u>By 1987:</u> Depending on 5-year long range plans established during the years 1978 to 1982.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Hills-McCanna Company 400 Maple Avenue Carpentersville, IL 60110			

FIRM NAME/ADDRESS/PHONE HONEYWELL, INC. 1100 Virginia Drive Ft. Washington, Pa. 19034 Tel: 215-643-1300	YEAR PRESENT FIRM ESTABLISHED 1950	SURVEY DATE 7/6/77
CONTACTS: NAME/TITLE/PHONE John T. Emery, Product Manager Tel: 215-643-1300, ext. 349		
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED		
PARENT COMPANY HONEYWELL, INC. Minneapolis, Minnesota		
VALVE PLANT LOCATIONS Ft. Washington, Pa. - Samakawa, Japan - Doernigheim, Germany	NUMBER OF EMPLOYEES approx. 700	PLANT FLOOR SPACE approx. 300,000 sq. ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Control Valves: 1/2 - 16 inch Globe Type... 125# rating thru 600# 1 - 8 inch Angle Type.... 125# rating thru 600# 1/2 - 12 Three-Way.... 125# rating thru 600# Valve Actuators: 38 sq. in. thru 435 sq. in. Valve Positioners: Electro/Pneumatic... Pneumatic a) Single Acting b) Double Acting c) Rotary		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES A) Large valve design and development engineering staff at the three valve factory locations. B) Individual flow, CV and noise testing facilities at the three valve factory locations. C) Large corporate research facilities in Minneapolis, Minn.		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? More advanced globe valve designs, i.e., high pressure, noise.		
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT John T. Emery, Product Manager, Valves Honeywell, Inc. 1100 Virginia Drive Ft. Washington, Pa. 19034		

FIRM NAME/ADDRESS/PHONE KAMYR VALVES, INC. Ridge Center Glens Falls, New York 12801 (518) 793-5111		YEAR PRESENT FIRM ESTABLISHED Jan. 1, 1976	SURVEY DATE June 1977
		CONTACTS: NAME/TITLE/PHONE P. Kindersley, Exec. Vice Pres. (518) 793-5111 W. Bowler, Sales Mgr. (518) 793-5111	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Valve Division, Kamyr, Inc. 1969			
PARENT COMPANY Kamyr, Inc., Ridge Center, Glens Falls, New York 12801			
VALVE PLANT LOCATIONS Glens Falls, New York	NUMBER OF EMPLOYEES 41	PLANT FLOOR SPACE 10,000 sq. ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Standard products are valves for severe services, involving abrasives, high temperatures, high pressures, cavitation, impingement, fibers and solids, precipitates, polymers, ultra corrosive agents, high cycle rates. Kamyr valves have been supplied to 16 coal conversion pilot and demonstration plants, mostly our standard severe-service designs.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Unlimited as to development capabilities. We are anxious to do development, and have been doing so continuously since 1972. Testing services except dye penetrant are subcontracted, and therefore are unlimited except by the extent to which they exist. Subcontracted services have included seismic, tensile strength at 2100°F, creep at 2100°F, hardness, X-Ray, coefficient of friction, corrosion resistance and similar parameters required for design of severe-service valves. Certain special tests have been conducted by ourselves, including torsional strength of ceramic rods at 1600°F, and leak test of valves while at 1200°F. An affiliated company can do leak testing of 120" valves at up to 2000°F ambient temperature.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? We have sold all-metal valves for 2000°F, and are designing for higher temperatures, possibly available by 1980. We are, and plan to continue to be in a position to supply valves for the coal conversion processes, to exactly accomplish the valving functions required. We see a need to provide valving solutions, not valves as a commodity. This is our goal. The valves, therefore, have taken and will continue to take a wide variety of shapes, using some common basic technology. For clean, hot services, we will have catalog valves up to 30", and up to 1500°F, before 1982.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Kamyr Valves, Inc. Ridge Center Glens Falls, New York 12801			

FIRM NAME/ADDRESS/PHONE Kerotest Manufacturing Corp. 2525 Liberty Avenue Pittsburgh, PA 15222 (412) 471-2584		YEAR PRESENT FIRM ESTABLISHED 1909	SURVEY DATE 7-8-77
		CONTACTS: NAME/TITLE/PHONE Steven J. Caroleo Vice President of Engineering	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None			
PARENT COMPANY Control Data Corporation			
VALVE PLANT LOCATIONS Same	NUMBER OF EMPLOYEES 262 Shop & Office		PLANT FLOOR SPACE 70,000 Sq. Ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Standard valve products serve two major market areas - power and industrial. Power consists of 1500 and 2500 lb rated valves 4" and smaller for nuclear and fossil fuel power plants. Industrial market includes Natural Gas Valve 16" and smaller 300# rated for distribution and transmission lines. Also, included are several small valves and fittings for commercial uses.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Kerotest has the capability of flow and operational testing valves 4" and smaller at temperatures up to 650°F. and pressures to 2500 psi. in a three station hot test loop. We have also developed methods of static operational testing at high and low temperatures. This effort is backed by a group consisting of 7 Research and Development Engineers and 4 Laboratory Technicians.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? We have not finalized plans for development of future product lines. However, we will have the necessary manpower, funds, etc. to investigate possible development opportunities in the coal conversion process area.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT As Above			

FIRM NAME/ADDRESS/PHONE Keystone Valve Division Keystone International, Inc. 9700 W. Gulf Drive Houston, TX 77040		YEAR PRESENT FIRM ESTABLISHED	SURVEY DATE 9-14-77
		CONTACTS: NAME/TITLE/PHONE Bert Klopfenstein (713) 466-1176	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED			
PARENT COMPANY			
VALVE PLANT LOCATIONS	NUMBER OF EMPLOYEES		PLANT FLOOR SPACE
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS NOTE: <i>Complete line of Butterfly valves having resilient seats</i>			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? NOTE: <i>Keystone has a research and development program which could result in the development of valves which will have capabilities both in temperature and material to handle some of the severe applications in the coal conversion industry.</i>			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT			

FIRM NAME/ADDRESS/PHONE Kieley and Mueller, Inc. 64 Genung Street Middletown, NY 10940 (914) 343-0531		YEAR PRESENT FIRM ESTABLISHED 1879	SURVEY DATE 8/5/77
		CONTACTS: NAME/TITLE/PHONE John W. Post, Marketing Services Mgr. Henry Illing, Research & Development Mgr.	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None			
PARENT COMPANY Johnson Controls, Inc.			
VALVE PLANT LOCATIONS Middletown, NY Houston, TX	NUMBER OF EMPLOYEES 200		PLANT FLOOR SPACE 50,000 Sq. Ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS We now manufacture automatic control valves and level controllers. Automatic control valves consist of globe, angle, cage, 3-way, butterfly valves. Sizes on globe style, 1/2" through 20", Butterfly, 2" through 24"			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Three to six people. Water test loop 1200 psi, 800 GPM with temperature control from 70°F to 150°F. Gas fire temperature test chamber to 2000°F. Helium Leak test equipment to 10-8.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? A 2000 cubic foot blowdown type air test facility. Additional noise abatement valves and trim styles by 1982 . New Actuator types; Type 1982.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Kieley and Mueller, Inc. 64 Genung Street Middletown, NY 10940			

FIRM NAME/ADDRESS/PHONE LADISH CO. 5481 South Packard Avenue Cudahy, WI 53110 (414 747-2611)		YEAR PRESENT FIRM ESTABLISHED 1905	SURVEY DATE 7/8/77
		CONTACTS: NAME/TITLE/PHONE F. K. Krell, Vice President (414 747-2800)	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Ladish Drop Forge Co. (Change in name only)			
PARENT COMPANY As Above			
VALVE PLANT LOCATIONS Cynthiana, KY	NUMBER OF EMPLOYEES 500	PLANT FLOOR SPACE 200,000 Sq. Ft	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Corrosion resistant cast steel valves - 18" and smaller - 150# - 300# and 600# Cast stainless steel, Monel, Hastelloy, nickel, tantalum, titanium, and other castable alloys.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Fully equipped lab and testing capacity required for our regular valve production.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Forged steel valves in complete range of pressure ratings.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Ladish Company, Fittings Division and Valve Division, Cudahy, WI 53110			

FIRM NAME/ADDRESS/PHONE Lockheed Missiles & Space Co, Inc. Palo Alto Research Laboratory 3251 Hanover Street Palo Alto, CA 94304	YEAR PRESENT FIRM ESTABLISHED 1954	SURVEY DATE 7/19/77
CONTACTS: NAME/TITLE/PHONE		
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED		
PARENT COMPANY Lockheed Aircraft Corporation Box 551, Burbank, CA 91520		
VALVE PLANT LOCATIONS Murdock Machine & Eng. Co. of Texas Irving, Texas	NUMBER OF EMPLOYEES	PLANT FLOOR SPACE
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS 1. Hot gas valves and integrated control system for Trident 2. Rotary sleeve valve (700 psi, 6000°F, A ₂ O ₃ particulate flow) 3. Vortex valves (fluid flow control, hot corrosive, erosive flow) 4. 2.5 inch ball valve (4200 psi, "Lockseal" shear mount) 5. Tunnel and pipe seal containment closure (rapid closure, large size, 100 psi, 1000°F) 6. Articulating rocket support (gas tight, high temperature gimbal seal) 7. Hot gas generator seals (all metal, 2000 psi, 2300°F, reactive flows) Development would be required to convert these valves to coal utilization.		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Hydrostatic and actuator test facilities exist at Murdock with capabilities to thousands of psi. Laboratory support exists at the Lockheed Palo Alto Research Laboratory in the areas of materials science, structures analysis, and heat transfer. Materials analyses equipment includes metallography, x-ray, electron beam analyzer, electron microscope, and hardness testing. Other facilities include a coating laboratory, metal working and heat treatment, mechanical testing, and a fracture and fatigue laboratory. In addition, the Lockheed Coal Feeder Test Facilities includes a high pressure system of storage tanks and solids and pneumatic transport plumbing. This facility can be used in a valve development program for coal utilization applications. The facility can be remotely controlled and is supported by a wide array of automatic instrumentation and recording equipment. The test area has been safety inspected and strict safety procedures are adhered to at all times. Supporting gas supplies and compressors are available.		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982? BY 1987?		
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT R. A. Kuiper 0/52-13, Bldg. 201, Plant 2 Lockheed Palo Alto Research Laboratory 3251 Hanover Street Palo Alto, CA 94304		

FIRM NAME/ADDRESS/PHONE J. E. Lonergan Company P. O. Box 6167 Philadelphia, PA 19115	YEAR PRESENT FIRM ESTABLISHED 1872	SURVEY DATE 8-26-77		
CONTACTS: NAME/TITLE/PHONE Joseph Zuraski, Quality Assurance Manager (215) 677-1710				
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None				
PARENT COMPANY None				
VALVE PLANT LOCATIONS 10050 Sandmeyer Lane Philadelphia, PA	NUMBER OF EMPLOYEES 150	PLANT FLOOR SPACE 39,000 Sq. Ft.		
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;"> Safety Valves Safety Relief Valves Relief Valves </td> <td style="width: 50%;"> Valves available for steam, air, gas, and liquid services. Sizes 1/2" thru 16" Steam Service Sizes 1/2" thru 8" Air and Gas Service Sizes 1/2" thru 8" Liquid Service </td> </tr> </table>			Safety Valves Safety Relief Valves Relief Valves	Valves available for steam, air, gas, and liquid services. Sizes 1/2" thru 16" Steam Service Sizes 1/2" thru 8" Air and Gas Service Sizes 1/2" thru 8" Liquid Service
Safety Valves Safety Relief Valves Relief Valves	Valves available for steam, air, gas, and liquid services. Sizes 1/2" thru 16" Steam Service Sizes 1/2" thru 8" Air and Gas Service Sizes 1/2" thru 8" Liquid Service			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Steam Boilers for steam testing Air compressors for air testing Liquid pumps for liquid testing				
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Research and development is a constant factor that determines future product lines in order to meet the marketing demands.				
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT J. E. Lonergan Company P. O. Box 6167 10050 Sandmeyer Lane Philadelphia, PA 19115				

FIRM NAME/ADDRESS/PHONE The Lunkenheimer Company Div. of Conval Corp. P. O. Box 14360 Cincinnati, Ohio 45214 (512) 921-3400		YEAR PRESENT FIRM ESTABLISHED 1968	SURVEY DATE 6-24-77
		CONTACTS: NAME/TITLE/PHONE H. Ewell Rains (513) 921-3400 Mgr. Sales Services - Energy Div.	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED The Lunkenheimer Company - 1862			
PARENT COMPANY Condec Corporation, Old Greenwich, CT			
VALVE PLANT LOCATIONS Cincinnati, OH Wadsworth, OH	NUMBER OF EMPLOYEES 600		PLANT FLOOR SPACE 1,000,000 Sq. Ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Bronze, Iron, Steel Gate, Globe & Check Valves 1/8" - 30", 125# - 4500# pressure classes. Air devices, Cocks, Lubricators, Boiler Mountings, Butterfly Valves, Ball Valves, Electric and Pneumatic Actuators.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Engineering and design done in-house. Experimental Engineering Lab, Metallurgical, NDE, Foundry Control. Production Department and Testing. Co-operate with R&D oriented sister company, Consolidated Controls Corp., El Segundo, California.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? No Comment			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Same as Above, Top Left Block			

FIRM NAME/ADDRESS/PHONE MCC MARPAC A Unit of Mark Controls Corp. 1900 W. Dempster Evanston, Illinois 60204 312-864-9100		YEAR PRESENT FIRM ESTABLISHED 1967	SURVEY DATE 8/28/77
		CONTACTS: NAME/TITLE/PHONE (312) Robbie Little/Market Analyst: 864-9100, x354 Roger Westcott/Ball Valve: (312)-864-9100 x273 Product Mgr.	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Clayton Mark & Co. 1888 Pacific Valves 1934			
PARENT COMPANY Mark Controls Corporation			
VALVE PLANT LOCATIONS Evanston, IL Long Beach, CA	NUMBER OF EMPLOYEES MCC MARPAC-approx. 275 Mark Controls Corp. 1,573		PLANT FLOOR SPACE
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS See enclosed catalog Note: ANSI Class 150, Flanged, through 14" ANSI Class 300, Flanged, through 10" Materials: Carbon steel, 316 stainless, alloys by application			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES See cover letter			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? See cover letter			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT MCC MARPAC Unit of Mark Controls Corporation 1900 W. Dempster Evanston, Illinois 60204			

FIRM NAME/ADDRESS/PHONE PEABODY DORE' CORPORATION P. O. Box 42081 Houston, TX 77042 (713) 498-6380		YEAR PRESENT FIRM ESTABLISHED 1972	SURVEY DATE 7-22-77		
		CONTACTS: NAME/TITLE/PHONE B. R. Murphree, Dir. Engr. & Res. (713) 498-6380			
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED John L. Dore' Co. 1952					
PARENT COMPANY Peabody International Corporation					
VALVE PLANT LOCATIONS Houston, Texas	NUMBER OF EMPLOYEES 325	PLANT FLOOR SPACE 120,000 Sq. Ft. Exist. 70,000 Add'. under Const.			
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Standard valve products at this time consist primarily of Teflon, Polypropylene, and Kynar lined ductile iron plug valves, ball check valves, etc. The temperature upper limit of the valve is determined by the type plastic liner that the valve is lined with. In the case of Teflon, temperatures up to and including 450°F can be reached. The standard valves, as now designed, are 150# ASA ratings.					
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES We have complete engineering, manufacturing, and testing facilities to design, manufacture and totally test new valve concepts, designs, etc. The testing would include cycle life, temperature cycling, pressure cycling and shock tests.					
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? By 1982, we could have a completed lined valve with a product such as Kynar, Teflon, Polypropylene, etc. with a 300# rating up through 12" size. This would be a full bore type valve. It could be ball or plug valve. Again, temperature limitations would be based on the type of liner used to protect the internal parts of the valve from the commodity. By 1987 valves could be in the 24" range and temperature limitations would be based on availability of new higher temperature, higher pressure lining materials at that time.					
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">B. R. Murphree, Director Engineering & Research PEABODY DORE' CORPORATION P. O. Box 42081 Houston, TX 77042</td> <td style="width: 50%;">J. T. Stewart, Jr. President PEABODY DORE' CORPORATION P. O. Box 42081 Houston, TX 77042</td> </tr> </table>				B. R. Murphree, Director Engineering & Research PEABODY DORE' CORPORATION P. O. Box 42081 Houston, TX 77042	J. T. Stewart, Jr. President PEABODY DORE' CORPORATION P. O. Box 42081 Houston, TX 77042
B. R. Murphree, Director Engineering & Research PEABODY DORE' CORPORATION P. O. Box 42081 Houston, TX 77042	J. T. Stewart, Jr. President PEABODY DORE' CORPORATION P. O. Box 42081 Houston, TX 77042				

FIRM NAME/ADDRESS/PHONE The Wm. Powell Co. 2503 Spring Grove Avenue Cincinnati, Ohio 45214 (513) 852-2000	YEAR PRESENT FIRM ESTABLISHED 1846	SURVEY DATE
CONTACTS: NAME/TITLE/PHONE B. T. Jordan, Exec. VP (513)852-2021 R. Koester, Mgr. Tech. Activities(513)852-2082		
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED		
PARENT COMPANY		
VALVE PLANT LOCATIONS 2 Plants - Cin. OH Kayro Castings (Cornwall) 1 invest Fdry-Pitts.PA	NUMBER OF EMPLOYEES 1400	PLANT FLOOR SPACE 800,000 Sq. Ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Bronze, steel, iron & corrosion resistant gate globe, check, plug, ball, valve - (butterfly in development) hand, cylinder, diaphragm, motor operation, bellow steel, nuclear products - ASME, Navy RDT programs. Sizes thru 24", pressure class-2500. Larger sizes & higher pressure valves in some classes.		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Have capabilities for hydrostatic, non-destructive testing programs, strain gage, complete chemical and physical labs, static testing equipment for seismic evaluation. Have run low temp (liquid O ₂ & N ₂) testing and steam tests to 1200°F 2250 psi - (Steam test loop currently not available)		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987?		
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Same as Above		

FIRM NAME/ADDRESS/PHONE RKL Controls, Inc. Hainesport Ind. Park Hainesport, NJ 08036 (609) 267-2800		YEAR PRESENT FIRM ESTABLISHED 1959	SURVEY DATE 6-21-77
		CONTACTS: NAME/TITLE/PHONE Robert K. Little, President (609) 267-2800	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED RKL Valve & Mfg. Co. 1955			
PARENT COMPANY None			
VALVE PLANT LOCATIONS Lumberton, NJ & Hainesport, NJ	NUMBER OF EMPLOYEES 60	PLANT FLOOR SPACE 40,000 Sq. Ft. 12,000 Sq. Ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Largest line of Pinch Type control valves available in the world, many produced under RKL patents. Also produce pneumatic actuators, process flow vibration joints and expansion joints.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES RKL has been the leader in developing new types of pinch valves for high and low pressure (negative). First with pre-pinch for flow control. First and only 3-way pinch type valve. First and only full line of molded elastomeric pinch valve bodies. First and only hand lever operated pinch valve. All necessary R&D capability for development and testing valves to 5,000 psig line pressure.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Expect to have a 4,000 psig series on the market by 1980 using new technique for flow control with electronic positioning. Expect to have V.H.T., very high temp., valve available by 1982 in sizes to 36".			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT RKL Controls, Inc. Ark & Eayerstown Rd. Lumberton, NJ 08048			

FIRM NAME/ADDRESS/PHONE Red Valve Co., Inc. 500 Bell Ave. Carnegie, PA 15106		YEAR PRESENT FIRM ESTABLISHED 26	SURVEY DATE 7/1/77
		CONTACTS: NAME/TITLE/PHONE George Raftis, Pres. 923-2677	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED			
PARENT COMPANY			
VALVE PLANT LOCATIONS Carnegie, PA	NUMBER OF EMPLOYEES 39		PLANT FLOOR SPACE 52,000 Sq. ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS See catalog attached Note: Manufactures "sleeved" type valves, sizes to 72", pressures to 400 psi.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES See attached			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987?			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT			

FIRM NAME/ADDRESS/PHONE Rockwell International Corporation Flow Control Division 400 N. Lexington Avenue Pittsburgh, PA 15208		YEAR PRESENT FIRM ESTABLISHED February, 1973	SURVEY DATE 7-15-77
		CONTACTS: NAME/TITLE/PHONE C. L. Bradshaw, Mgr., MP&R (412) 247-3305 D. W. Duffey, Dir., VER (412) 247-3246	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Rockwell Manufacturing Company, 1925			
PARENT COMPANY Rockwell International Corporation			
VALVE PLANT LOCATIONS See (2) below	NUMBER OF EMPLOYEES approximately 2,000	PLANT FLOOR SPACE Approximately 1,100,000 square feet	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS (1) The Flow Control Division manufactures: lubricated and non-lubricated plug valves; valve sealants and applicators; iron castings; plastic gas distribution valves; forged globe valves; cast steel globe and gate valves; and trunnion mounted pipeline ball valves. (2) U.S. Valve Plants Located in: Barberton, Ohio; Kearney, Nebraska; Pittsburgh, Pennsylvania; Raleigh, North Carolina; Sulphur Springs, Texas.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES The Division's product engineering and research organization totals approximately 170 persons at headquarters and five manufacturing plants. Central to this organization is the Valve Engineering and Research (VER) group. The group includes a score of Materials Engineering experts (organized in two sections: Chemical and Metallurgical Engineering), a weld lab, a model shop, and two flow test labs.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Proprietary information: The Division, however, continually conducts R&D work regarding potential new valve designs which will meet the future requirements of the energy markets it serves.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Rockwell International Corporation Flow Control Division 400 N. Lexington Avenue Pittsburgh, PA 15208			

FIRM NAME/ADDRESS/PHONE Rockwood Systems Corporation 80 Second Street So. Portland, ME 04106		YEAR PRESENT FIRM ESTABLISHED 1973	SURVEY DATE 7/12/77
		CONTACTS: NAME/TITLE/PHONE A. Latham, Sales Manager 799-3341 C.L. Reed, Sales Manager, Ball Valves 799-3341	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED N/A			
PARENT COMPANY Arkbridge Corporation			
VALVE PLANT LOCATIONS South Portland, Maine	NUMBER OF EMPLOYEES 105		PLANT FLOOR SPACE 150,000 sq. ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Brass, carbon steel, stainless steel ball valves, 1/4"-8" size and pneumatic and electric actuators for these valves. Pressures to 800 psi and temperature to 400°F. Both full port and standard port configuration and screwed or flanged ends.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Life cycle, high and low temperature 600°F to 325°F. High pressure (10,000 psi) vacuum, shell strength, stress testing. Three engineers, 33 man years of ball valve experience. Rockwood marketed first commercial ball valves, supplies many valves and components for US Navy.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? 3/8"-8" top entry ball valves, carbon steel, stainless steel, screwed, SW, BW, 150, 300, 600 end configurations. High pressure/temp. butterfly valve.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Rockwood Systems Corporation 80 Second Street So. Portland, ME 04102			

FIRM NAME/ADDRESS/PHONE Royal Industries Energy Products Division 2040 East Dyer Road Santa Ana, California 92705 714-540-3210	YEAR PRESENT FIRM ESTABLISHED 1957	SURVEY DATE
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Century Engineers, Inc. Established 1949	CONTACTS: NAME/TITLE/PHONE H. J. Fitzpatrick, VP-Mktg - 714-540-3210 J. P. Meredith, Dir. of Contract Adm. 714-540-3210	
PARENT COMPANY Lear Siegler, Inc. Santa Monica, CA 90406		
VALVE PLANT LOCATIONS Santa Ana, California	NUMBER OF EMPLOYEES 600	PLANT FLOOR SPACE 320,000 sq. ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Butterfly valves for cryogenic and petrochemical service, 150-pound and 300-pound rating, temperature range: -320°F to +400°F. Standard sizes: 3" to 48", larger sizes available.		
Ball valves for cryogenic and petrochemical service. 150-pound, 300-pound, 600-pound, and 900-pound rating. Temperature range: -320°F to +400°F. Standard sizes: 1/2" to 10".		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Engineering staff of 75 people. Includes stress analysis, testing, materials, electronics, and welding capabilities. High temperature pressurized water facility: +600°F, 2500 psi. Cryogenic facility: -320°F, 2000 psi.		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? High pressure, high temperature valves by 1985.		
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Royal Industries Energy Products Division 2040 East Dyer Road Santa Ana, California 92705		

FIRM NAME/ADDRESS/PHONE Shan-Rod, Inc. Driver Road Berlin Heights, OH 419-588-2066		YEAR PRESENT FIRM ESTABLISHED 1970	SURVEY DATE 7-26-77
		CONTACTS: NAME/TITLE/PHONE Robert Rodwancy- Pres. (419) 588-2066 David Hatala - Vice Pres.	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None			
PARENT COMPANY None			
VALVE PLANT LOCATIONS Berlin Heights, OH	NUMBER OF EMPLOYEES 35	PLANT FLOOR SPACE 16,000 sq. ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Design and manufacture all basic type valves including butterflys & gates. Valve designs for temperatures up to 2400°F and pressures not exceeding 150 psi. Sizes range from 4" to 144" round and 20' x 30' rectangular. Build bubble tight and swing through modulating types.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Perform all types of cycle/life testing. Do hydrostatic and leakage testing.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? No comment			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Shan-Rod, Inc. Driver Road Berlin Heights, Ohio			

FIRM NAME/ADDRESS/PHONE Sigmon Corporation 4425 Randolph Road Charlotte, NC 28211 (704) 366-0766		YEAR PRESENT FIRM ESTABLISHED 1973	SURVEY DATE 8-15-77
		CONTACTS: NAME/TITLE/PHONE James W. Sigmon, President (704) 366-0766 or 366-0767	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Sigmon Controls, Inc. (1968)			
PARENT COMPANY Sigmon Corporation			
VALVE PLANT LOCATIONS Hampton, Virginia	NUMBER OF EMPLOYEES 70	PLANT FLOOR SPACE 30,000 Sq. Ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Expansible Seal Valve Series: A metal-to-metal sealing ball valve for application to 1500°F. at pressures of up to 6000 PSIG. Available in ANSI Class ratings of 150 through 2500. Sizes are 1" through 24" with larger sizes for special applications. Compression Seal Valve Series - A soft seated ball valve for application through 550°F. Available in ANSI Class ratings of 150 through 2500. Sizes are 1" through 24".			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Company maintains engineering staff engaged in development work and retains consultants in special fields from time to time. All applicable testings capabilities are available including x-ray, radiography, and pressure and temperature testing.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Although presently available in the ball configuration only, the Sigmon Expansible Seal Valve design will likely be available in the butterfly, gate and globe configurations by 1982. By 1987, the company anticipates broadening its market with other products utilizing the proprietary Expansible Seal components. These products would likely be closures, lock hoppers, large filtration systems and reactor feeders.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Sigmon Corporation 4425 Randolph Road Charlotte, NC 28211			

FIRM NAME/ADDRESS/PHONE Smith Valve Corporation 125 Fisher Street Westboro, MA 01581 (617) 366-9171	YEAR PRESENT FIRM ESTABLISHED 1947	SURVEY DATE 7-18-77
CONTACTS: NAME/TITLE/PHONE A. D. Smith, President (617) 366-9171		
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED		
PARENT COMPANY Smith Valve Corporation		
VALVE PLANT LOCATIONS Westboro, MA Manchester, CT Hong Kong ASIA	NUMBER OF EMPLOYEES	PLANT FLOOR SPACE
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Forged steel gate, globe and check valves, 1/4" - 3" Carbon steel and alloys, S.E., S.W. and F.E. Class 150, 300, 600, 800 and 1500 Ball Valves steel, stainless and brass 1/4" - 6" 150 - 600 psi WOG Pneumatic actuators		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Many years experience in designing special purpose valves and control devices for the refinery, petrochemical and industrial field.		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Larger sizes, higher pressures and more exotic materials.		
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Smith Valve Corporation 125 Fisher Street Westboro, MA 01581		

FIRM NAME/ADDRESS/PHONE Specialty Valve & Controls, Inc. 8150 West Ridge Road Fairview, PA 16415 (814) 474-1551	YEAR PRESENT FIRM ESTABLISHED 1963 CONTACTS: NAME/TITLE/PHONE Robert Nightwine - VP Sales (814)474-1551 Kenneth Smith - Chief Engineer	SURVEY DATE 7-25-77
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED RP&C Valve (Reading, Pratt and Cady) 1897 Strong Steam Specialty 1904		
PARENT COMPANY White Consolidated Industries, Inc. 11770 Berea Road Cleveland, OH 44111		
VALVE PLANT LOCATIONS Fairview, PA	NUMBER OF EMPLOYEES 250	PLANT FLOOR SPACE 180,000 Sq. Ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Forged Steel Gate, Globe, Check Valves 800 psi @ 850°F thru 3" Bar Stock Needle Valves 10,000 psi - WOG Strainers - Cast Steel to 2500 psi Steam Traps - to 2500 psi (cast steel, cr. moly)		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Total commitment to investigations of future potential markets utilizing high pressure/high temperature valves. Our facility and engineering staff have the capacity to develop product for future industry needs. Our intention is to explore technology and design criteria to provide development in high performance valves.		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Major area of development is intended to be high pressure, high temperature valves. Current prototypes include 1500 and 2500 psi globe valves. Future consideration to be in the high performance quarter turn valve areas of development.		
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT RP&C Valve, Inc. 8150 West Ridge Road Fairview, PA 16415		

FIRM NAME/ADDRESS/PHONE Sperry Vickers 1401 Crooks Rd. Troy, Michigan 48084 Phone: AC 313 576-3000		YEAR PRESENT FIRM ESTABLISHED 1925	SURVEY DATE 7/13/77
		CONTACTS: NAME/TITLE/PHONE G. L. Rice, Director of Planning & Product Management - AC 313-576-3401	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED -----			
PARENT COMPANY SPERRY RAND CORPORATION			
VALVE PLANT LOCATIONS Searcy, Arkansas Joplin, Missouri	NUMBER OF EMPLOYEES		PLANT FLOOR SPACE
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS No valves of the type requested are presently produced.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? We presently have no programs in this area that would meet your requirements, but long term requirements may possibly be met.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT			
G. L. Rice Director of Planning & Product Management Sperry Vickers 1401 Crooks Rd. Troy, Michigan 48084		A. O. Roberts Vice President Engineering Sperry Vickers 1401 Crooks Rd. Troy, Michigan 48084	

FIRM NAME/ADDRESS/PHONE Stockham Valves & Fittings Box 10326 Birmingham, Alabama 35202 Phone: (205) 592-6361		YEAR PRESENT FIRM ESTABLISHED 1903	SURVEY DATE 6-30-77
		CONTACTS: NAME/TITLE/PHONE S. J. Poss, Vice-President - Sales (205) 592-6361	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED			
PARENT COMPANY			
VALVE PLANT LOCATIONS Birmingham, Alabama	NUMBER OF EMPLOYEES 2,300	PLANT FLOOR SPACE 842,333 Sq. Ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Industrial type valves, Bronze, Classes 125, 150, 200 and 300, Gate, Globe, Angle, and Check, - Cast Iron, Classes 125 and 250 Gate, Globe, Angle, and Check, Ductile Iron, Classes 150 and 300 Gate, Globe and Check, - Steel, Classes 150, 300 and 600 Gate, Globe, Angle, Check; Steel Wedgeplug-Classes 150, 300 and 600; Cast Iron and Ductile Wafer Butterfly, Sizes 1/4 through 36 inches.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES We have competent engineers to develop the design and test the prototype. The testing capabilities consist of pneumatic, hydrostatic, and steam test, plus chemical and metallurgical laboratory.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Enlarged size range and pressure class steel valves.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Stockham Valves & Fittings Box 10326 Birmingham, Alabama 35202			

FIRM NAME/ADDRESS/PHONE Sulzer Bros., Inc. 19 Rector Street New York, New York 10006		YEAR PRESENT FIRM ESTABLISHED 1940 (N.Y. Office)	SURVEY DATE July 19, 1977
		CONTACTS: NAME/TITLE/PHONE FTS:212-425-4560 Walter P. Gadiant, Manager Power Plant Components Division	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED			
PARENT COMPANY Founded 1834 Sulzer Brothers Limited, CH-8401 Winterthur, Switzerland			
VALVE PLANT LOCATIONS Winterthur, Switzerland	NUMBER OF EMPLOYEES 35,511 Total	PLANT FLOOR SPACE 3,900,000 Sq. Ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Sulzer standard valves, actuators and positioning controls are designed for high pressure, high temperature applications with high requirements of flow control. The given requirements, from a pressure and temperature point of view, are well within our standard valve capabilities. The required sizes also can be considered standard. The solids content of the medium is new; however, it appears to be manageable.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Sulzer's activity in high pressure, high temperature valve applications required from the beginning a high development and testing capability. Therefore, we feel well qualified to satisfy these requirements.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Large valves (valve materials) for handling high temperature gases and requiring fast closure and/or modulating exceeding the required data may be available in 1982, as well as improved seat materials for still higher tightness and durability.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Sulzer Bros., Inc. 19 Rector Street New York, New York 10006 Walter P. Gadiant			

FIRM NAME/ADDRESS/PHONE TAPCO International, Inc. 14309 Sommermeyer P. O. Box 40472 Houston, TX 77040 (713) 460-0300, Telex 76-2139		YEAR PRESENT FIRM ESTABLISHED 1946	SURVEY DATE 7/19/77
		CONTACTS: NAME/TITLE/PHONE Ms. Victoria Kaminski, Contracts Administrator (713) 460-0300	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Texas Alloy Products Company, 1946			
PARENT COMPANY None			
VALVE PLANT LOCATIONS Houston, Texas	NUMBER OF EMPLOYEES 287	PLANT FLOOR SPACE 64,400 Sq. Ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS TAPCO is a speciality valve manufacturer where each valve is designed for the individual process application. No valve catalog items exist.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES TAPCO does not have facilities which provide consistent flow capabilities needed in the developmental or testing of valves.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? TAPCO has patents on valves that are applicable to the coal gasification processes. TAPCO also is pursuing all current processes in an effort to stay up-to-date on the state of the art. TAPCO intends to provide a continuing program aimed at the coal gasification industry. This will be accomplished by updating current patents and development of new valve designs as the process information comes available.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT TAPCO International, Inc. 1430 Sommermeyer P. O. Box 40472 Houston, TX 77040			

FIRM NAME/ADDRESS/PHONE TK Valve & Manufacturing, Inc. P. O. Box 308 Hammond, Louisiana 70404 504-345-6482		YEAR PRESENT FIRM ESTABLISHED 1965	SURVEY DATE
		CONTACTS: NAME/TITLE/PHONE A. E. Plow - Chief Engineer 504-345-6482	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None			
PARENT COMPANY Privately Owned			
VALVE PLANT LOCATIONS Hammond, Louisiana U.S.A. Fife, Scotland U.K.	NUMBER OF EMPLOYEES 100	PLANT FLOOR SPACE 65,000 ft. ²	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Ball Valves, in accordance with API Specification 6D. 2 thru 26 inch bore, 275 thru 6000 psi working pressure. Used in Petroleum & Natural Gas collection and distribution systems.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Full Engineering Staff, Pressure Testing to 10,000 psi, Low Temperature Testing, Cyclical Testing			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? If demand dictates, valves to 700°F, 1000°F by 1987.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT A. E. Plow - Chief Engineer TK Valve & Manufacturing, Inc. P. O. Box 308 Hammond, Louisiana 70404			

FIRM NAME/ADDRESS/PHONE TXT/Division Vapor Corporation 320 Hughes Street, P. O. Box 9369 Houston, Texas 77011		YEAR PRESENT FIRM ESTABLISHED 1937	SURVEY DATE 7/1/77
		CONTACTS: NAME/TITLE/PHONE P. F. Elisas, Chief Engineer (713) 928-5361	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Texsteam Corporation (Same as above - change in name and corporate structure only)			
PARENT COMPANY Vapor Corporation, Chicago, Illinois			
VALVE PLANT LOCATIONS Houston, Texas	NUMBER OF EMPLOYEES 400		PLANT FLOOR SPACE 120,000 Square Feet
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Manufacture high pressure plug, ball and check valves for use in oil and natural gas production. Pressures to 6000 psi - temperatures to 850°F.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Current in-house capabilities include Engineering lab adequate for valve sizes up to 10".			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? We are interested in expanding our valve technology into other areas. Have done some development work with mining industry application.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Same as above			

FIRM NAME/ADDRESS/PHONE Teledyne Farris Engineering 400 Commercial Avenue Palisades Park, New Jersey 07650 Phone: (201) 944-6300		YEAR PRESENT FIRM ESTABLISHED 1969	SURVEY DATE 6/22/77
		CONTACTS: NAME/TITLE/PHONE J. P. Kempton, Vice President Marketing	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Farris Engineering Corporation 400 Commercial Avenue Palisades Park, New Jersey 07650			
PARENT COMPANY Teledyne Farris Engineering 1901 Avenue of the Stars Los Angeles, California 90067			
VALVE PLANT LOCATIONS Palisades Park, New Jersey Brantford, Ontario, Canada	NUMBER OF EMPLOYEES 250 40	PLANT FLOOR SPACE 70,000 Sq. Ft. 15,000 Sq. Ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS See Bulletin No. FE-913 Enclosed Safety Valves are available in 12"-16"-20"-24" inlets on application			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Proprietary			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Proprietary			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Teledyne Farris Engineering 400 Commercial Avenue Palisades Park, New Jersey 07650			

FIRM NAME/ADDRESS/PHONE Tufline Div., Xomox 4444 Cooper Road Cincinnati, Ohio 45242 (513) 793-7000		YEAR PRESENT FIRM ESTABLISHED 1956	SURVEY DATE May, 1977
		CONTACTS: NAME/TITLE/PHONE Russell Smith, Vice President, Manager Power Industry Products/(513) 793-7000	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Continental Manufacturing Company, 1956			
PARENT COMPANY Not Applicable			
VALVE PLANT LOCATIONS 4444 Cooper Road Cincinnati, OH	NUMBER OF EMPLOYEES 460		PLANT FLOOR SPACE 100,000 Sq. Ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Non-lubricated tapered sleeved type plug valves; butterfly valves; actuators and plug control valves.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES We have air, hydrostatic and some steam and cycle testing capabilities. We have a relatively large Research and Development staff and have designed a valve which we think would be particularly applicable for the pressures and temperatures and slurry service involved. We note that you mention ball type valves may be utilized. We believe this is a mistake due to the pocketing characteristics of ball valves. We are most interested in discussing the possibility of producing a prototype valve for the services involved.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? We expect to have a full line of high pressure/high temperature metal seated valves by 1982.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT C. L. Reed, Xomox Corporation, 4444 Cooper Road, Cincinnati, OH 45254 F. A. Godley, Xomox Corporation, 733 Summer Street, Stamford, CT 06902 Russell G. Smith, Xomon Corporation, 4444 Cooper Road, Cincinnati, OH 45242 Paul Trautman, Xomox Corporation, 4444 Cooper Road, Cincinnati, OH 45242			

FIRM NAME/ADDRESS/PHONE VALTEK INCORPORATED 765 South 100 East Provo, Utah 84601		YEAR PRESENT FIRM ESTABLISHED 1966	SURVEY DATE July 1977
		CONTACTS: NAME/TITLE/PHONE William D. Loucks, Application Engineer (801) 373-1100	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED NONE			
PARENT COMPANY NONE			
VALVE PLANT LOCATIONS Provo, Utah Edmonton, Canada Pershore, England	NUMBER OF EMPLOYEES 170	PLANT FLOOR SPACE 50,000 approx. 130,000 in our new facility	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Pneumatic Cylinder operated Globe and Butterfly Control Valves			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Flow test lab in plant. A noise test facility is used in conjunction with a major university in the area.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Plans are for building positioners, expanded line of rotary valves. New design in progress - eccentric disc, per telecon.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT VALTEK INCORPORATED One Industrial Parkway Springville, Utah 84663			

FIRM NAME/ADDRESS/PHONE WALWORTH COMPANY P.O. Box 873 Valley Forge, Pa. 19482 (215) 337-3500		YEAR PRESENT FIRM ESTABLISHED 1846	SURVEY DATE 7/1/77
		CONTACTS: NAME/TITLE/PHONE William H. Hopf, V.P. Engineering (215) 337-3500 x 216	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None			
PARENT COMPANY ANACONDA CO., subsidiary of ATLANTIC RICHFIELD CO.			
VALVE PLANT LOCATIONS Pennsylvania, Massachusetts, Ohio, New Jersey, Illinois	NUMBER OF EMPLOYEES 1900	PLANT FLOOR SPACE Sq. ft. Manufacturing: 900,000 Foundries: 480,000	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Walworth manufactures Gate, Globe, Check and Plug valves for the CPI, HPI, Power Generation and Marine Industries. Service ranges from vacuum to ANSI Class 2500, and from cryogenic temperatures to 1500°F. Standard materials are Steel, Steel Alloys, Austenitic Steels, the iron family, copper alloys, and nickel alloys.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Our development and testing facilities consist of the following capabilities: Engineers: 14 graduate engineers with more than 175 years of valving know-how. Flow Loops--gas flow testing to 4" valve size, and water to 14" valve size with continuous 6000 GPM flow. Steam Testing--1500 psi saturated. Pressure Testing to 20,000 psi. Temperature from -250° to 2000°F. Mechanical--Simulated pipe bending, all modes. Cycle Tests--under all load, pressure, and temperature conditions. Inspection and complete metallographic evaluation.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Walworth is currently developing a high temperature seating concept capable of sealing against abrasive slurries and extreme fines at pressures to ANSI Class 2500 and to 1500°F. Its application can be for either ½ turn or multi-turn valve types. Prototypes are planned for completion in 1978 and a product line availability for 1980. Walworth is interested in and capable of developing valves for coal conversion. We will be pleased to work with others in such a development effort, to produce the required valves by 1982 and/or 1987.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT President: Norman Schoenfeld Vice President Engineering: William H. Hopf Address: P.O. Box 873 (741 First Ave.) Valley Forge, Pa. 19482			

FIRM NAME/ADDRESS/PHONE Watts Regulator Company 10 Embankment St. Lawrence, Massachusetts 01842	YEAR PRESENT FIRM ESTABLISHED 1075	SURVEY DATE July 13, 1977
CONTACTS: NAME/TITLE/PHONE		
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED		
PARENT COMPANY Same		
VALVE PLANT LOCATIONS Lawrence, MA Franklin, NH Kittery, ME	NUMBER OF EMPLOYEES 1200	PLANT FLOOR SPACE 12 Acres Under Roof
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS See Attached Catalogs U-75B, 628F Automatic Temperature-Pressure Safety and Regulating Valves and Backflow Prevention Devices Fluid Power Pneumatic Regulators, Filters and Lubricators		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES R&D limited to water, steam and air safety and control devices.		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Same valve field for different applications.		
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Watts Regulator Co. 10 Embankment St. Lawrence, MA 01842		

FIRM NAME/ADDRESS/PHONE Westinghouse Electric Corporation Electro-Mechanical Division Cheswick Avenue Cheswick, PA 15024		YEAR PRESENT FIRM ESTABLISHED 1952	SURVEY DATE 7/13/77
		CONTACTS: NAME/TITLE/PHONE H. E. Eminger, Mfgr., Valve Engineering Area Code 412 274-6300 X-131	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None			
PARENT COMPANY Westinghouse Electric Corporation			
VALVE PLANT LOCATIONS Cheswick, PA	NUMBER OF EMPLOYEES 190		PLANT FLOOR SPACE 75,000 Sq. Ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Wedge Gate Valves; Manual and Motor Operated; Swing Check Valves; all Stainless Steel, designed and manufactured to ASME, Section III, Class 1, 2, 3 requirements for commercial nuclear power plant applications. Valve sizes range from three to 18 inches. Also, 27.5 and 29-inch parallel Gate Motor Operated Stainless Steel Valves for primary loop isolation in pressurized water reactors.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Broad range developmental and test capabilities available within the Corporation.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? None presently planned.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Westinghouse Electric Corporation Electro-Mechanical Division Cheswick Avenue Cheswick, PA 15024			

FIRM NAME/ADDRESS/PHONE Willis Oil Tool Co. 2451 Pal Drive P.O. Box 7367 Long Beach, CA (213) 426-4411		YEAR PRESENT FIRM ESTABLISHED 1937	SURVEY DATE 6-23-77
		CONTACTS: NAME/TITLE/PHONE Graham Jones, Industrial Manager Ben Otsap, Director of Engineering	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None			
PARENT COMPANY None			
VALVE PLANT LOCATIONS Long Beach, CA ¹ , Lafayette, LA ² , Edmonton, Alberta ³ , Longford, N. Ireland ⁴	NUMBER OF EMPLOYEES ¹ 180; ² 28; ³ 31; ⁴ 56 ⁴ (July 1978)		PLANT FLOOR SPACE ¹ 133,000 Sq. Ft.; ² 10,000 Sq. Ft.; ³ 15,000 Sq. Ft. ⁴ 36,500 Sq. Ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS (1) The Willis patented multiple orifice valve, designed primarily for high pressure oil well choke service. Sizes 1" through 8". (2) High pressure gate valves for the oil and petrochemical industries. (3) Safety shut-off valves. (4) Pig-ball valves (5) Special adaptations of the multiple orifice valve for high pressure, high temperature solids bearing flow media, encountered in coal conversion processes			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Existing hydrostatic, functional and control test equipment. We also have a building under construction, which will house our R&D staff and facilities.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? (1) Larger sizes of the multiple orifice valve (2) Special trim designs for high pressure drop applications (3) Special accessory components for erosive service conditions. (4) Gate valves for pressures up to 20,000 psig. (5) Multiple orifice valve of more economic construction for low pressure slurries.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Willis Oil Tool Company 2451 Palm Drive P.O. Box 7367 Long Beach, CA 90807			

FIRM NAME/ADDRESS/PHONE Worcester Controls Corporation 125 Hartwell Street W. Boylston, MA 01583 (617) 835-6041	YEAR PRESENT FIRM ESTABLISHED 1955	SURVEY DATE 9-2-77
CONTACTS: NAME/TITLE/PHONE R. C. Boedecker, Sales Manager		
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None		
PARENT COMPANY None		
VALVE PLANT LOCATIONS Londonderry, NH -Haywards Hudson, MA Heath, UK W. Boylston, MA Scarborough, Ontario, Canada	NUMBER OF EMPLOYEES USA = 280	PLANT FLOOR SPACE USA = 115,000
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS 1/4"-8" ball valves with soft seats, electric and pneumatic rotary actuators and controls for them. Pressure ratings from high vacuum to 5,000 psig dependent on size and temp. Temp. ratings from -350°F to + 600°F dependent on size, pressure, and media.		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES (12) people in prod. dev. engineering department in a project engineering structure. Can handle 5-6 new development projects per year dependent on priority and degree of difficulty. Have an in-plant lab for basic testing requirements to 1,000°F ambient, 225 psig steam, flows of water and cryogenics, and high static pressures. Have arrangements with local independent testing labs for more severe test requirements.		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Efforts seem aimed at further development of actuation and control capability. Exploration of digital controls is continuing. New alloys and higher pressure temp. rating for valves are being tested.		
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT		

FIRM NAME/ADDRESS/PHONE Yarway Corporation Blue Bell, Pa. 19422 (215) 825-2100		YEAR PRESENT FIRM ESTABLISHED 1908	SURVEY DATE
		CONTACTS: NAME/TITLE/PHONE R. J. Mattie, Vice President Marketing P. P. Van Blarcom, Product Manager	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Yarnall-Waring Co. (1908)			
PARENT COMPANY Yarway Corporation			
VALVE PLANT LOCATIONS Blue Bell, Pa. Guelph-Ontario, Canada Roosendaal, The Netherlands	NUMBER OF EMPLOYEES ~ 600	PLANT FLOOR SPACE 100,000 sq. ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS High Pressure Globe Valves High Pressure Letdown Valves Flush Bottom Tank Valves Boiler Blow Down Valves Digester Blow Valves Desuperheaters Remote Liquid Level Indicators Pump Bypass (Recirculation) Valves			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Yarway develops and purchases products. Can test valves to 2500# on steam, 10,000# on water. In process of building one high volume, low pressure liquid test loop (up to 6,000 gpm, 200# pressure) and one 1,000 gpm, 2700# high pressure test loop.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? By 1982 - Large size, quiet pressure reducing valves for liquid and vapor service. By 1987 - High pressure, tight shut-off substitute for gate and ball valves - Special service valves for chemical process industries			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Yarway Corporation Blue Bell, Pa. 19422 Attn: Peter P. Van Blarcom Product Manager			

FIRM NAME/ADDRESS/PHONE Zidell Valve Division 3121 S. W. Moody Ave. Portland, OR 97201 (503) 228-8691	YEAR PRESENT FIRM ESTABLISHED 1/31/52	SURVEY DATE 7/11/77
CONTACTS: NAME/TITLE/PHONE Thomas G. Gsell Sales Engineer (503) 228-8691		
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None		
PARENT COMPANY Zidell Explorations, Inc. Same Address		
VALVE PLANT LOCATIONS 3500 S.E. 22nd Avenue Portland, OR 97202	NUMBER OF EMPLOYEES About 480	PLANT FLOOR SPACE 9678 Sq. Ft. Shop 90,000 Sq. Ft. Warehouse
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Our basic product line is carbon steel, special alloy, stainless steel, and forged steel wedge gates, globes and checks. We carry a stock from 1/4" in size through 42", and from 150# through 1500#. We also carry a limited stock of stainless steel and carbon steel ball valves.		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES We have the ability and facilities to test any of the above mentioned.		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Good possibilities of having a wider variety of stock to include high pressure ball valves, knife gates and butterfly valves. As to when, it is impossible to say. We do have contacts overseas to purchase these items now, but do not stock them at present.		
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Zidell Explorations, Inc. 3121 S. W. Moody Avenue Portland, Oregon 97201		

Appendix B

CAPABILITY RESPONSES OF VALVE-ACTUATOR MANUFACTURERS

Appendix B

CAPABILITY RESPONSES OF VALVE-ACTUATOR MANUFACTURERS

	<u>Page</u>
Anchor/Darling Valve Co.	123
Andco Actuator Products, Inc.	124
Arral Industries, Inc.	125
Automated Valve & Control	126
Becker Precision Equipment, Inc.	127
Bellows International, Division of IBEC Industries, Inc.	128
Beswick Engineering	129
Bettis Corporation	130
EIM Company, Inc.	131
Limitorque Corporation	132
Newbrook Machine Corp.	133
PARKER-HANNIFIN CORPORATION	134
RKL Controls, Inc.	135
RACO INTERNATIONAL, INC.	136
Raymond Control Systems	137
Roto Hammer Company, Inc.	138
Rotork Controls, Inc.	139
Sulzer Bros., Inc.	140

FIRM NAME/ADDRESS/PHONE* Anchor/Darling Valve Co. 1 Belmont Avenue, Suite 320 Bala Cynwyd, PA 19004		YEAR PRESENT FIRM ESTABLISHED 1968	SURVEY DATE 6/20/77
		CONTACTS: NAME/TITLE/PHONE R. E. Bergman, Proposal Mgr. (215)667-9090 R. E. Rhinehart, Mgr. Marketing Operations	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Darling Valve & Manufacturing Co. 1888 Anchor Valve Co. 1946			
PARENT COMPANY Anchor/Darling Industries One Belmont Avenue, Suite 406, Bala Cynwyd, PA 19004			
PLANT LOCATIONS	NUMBER OF EMPLOYEES	PLANT FLOOR SPACE	
BRIEF STATEMENT AS TO ACTUATOR PRODUCTS All actuators are custom engineered for a specific application. The basic design is a hydraulic unit for use on translating stem valves that incorporates a stored energy source to assure operation in the event of power failure. The majority of actuators supplied to date have been used on main steam isolation valves for light water nuclear plants.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Our custom engineering approach allows Anchor/Darling to offer actuators for our complete range of gate and globe valves, for all the operating conditions you have listed.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982? BY 1987?			

* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE IT LISTED IN THE REPORT

FIRM NAME/ADDRESS/PHONE Andco Actuator Products, Inc. P. O. Box 988 Buffalo, New York 14240 (716) 681-7400		YEAR PRESENT FIRM ESTABLISHED 1977	SURVEY DATE 8-9-77
		CONTACTS: NAME/TITLE/PHONE Douglas D. Schumann/Vice President (716) 681-7400	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Andco Incorporated - 1907			
PARENT COMPANY Andco Industries, Inc.			
VALVE PLANT LOCATIONS Buffalo, NY	NUMBER OF EMPLOYEES 105		PLANT FLOOR SPACE 14,000 Sq. Ft.
BRIEF STATEMENT AS TO ACTUATOR PRODUCTS The Andco Actuator is an electro-mechanical device to provide linear force in the range of 50 to 10,000 pounds and motion up to 60 inches. It uses a standard electric motor, conventional drive screw and a patented thrust overload protection device. It can be equipped with various position control options. It requires only electric power for operation. <i>NOTE: Andco Metal Industry Products in conjunction with Andco Technical Services, Ind., has provide specially designed high temperature valves and is capable of designing and producing valves of the type required for coal conversion.</i>			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Testing facilities currently exist for both production usage and ongoing product development. The personnel possess the knowledge and experience to construct additional testing facilities for any special requirements which may develop from an inquiry such as the Oak Ridge National Laboratory letter of July 15, 1977.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Improvements, modifications and extensions of the actuator's capabilities are an ongoing process. A rotary actuator incorporating the same design and integral overload device is under development at this time.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT			

FIRM NAME/ADDRESS/PHONE*		YEAR PRESENT FIRM ESTABLISHED	SURVEY DATE
Arral Industries, Inc. 6161 Cedros Avenue Van Nuys, Calif. 91411 (213) 785-6509		1968	
		CONTACTS: NAME/TITLE/PHONE	
		Lou Arranaga, President Ray Martin-Vegue, General Manager	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED			
None			
PARENT COMPANY			
None			
PLANT LOCATIONS	NUMBER OF EMPLOYEES	PLANT FLOOR SPACE	
Same	15	4500 square feet	
BRIEF STATEMENT AS TO ACTUATOR PRODUCTS			
Manufacturers of custom valves and actuators primarily on a "built to print" basis. We have extensive experience in the sealing area, particularly at high temperatures.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES			
Staffed with three (3) engineers, and the facility is equipped with a test area for proof, leak, and flow tests up to 5000 psi pneumatic and hydraulic.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982? BY 1987?			
Our general capacity is (say) up to 6 inch valve size, but would consider an R & D effort for larger sizes particularly in the "silent" valve area.			

* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE IT LISTED IN THE REPORT

FIRM NAME/ADDRESS/PHONE*		YEAR PRESENT FIRM ESTABLISHED	SURVEY DATE
Automated Valve & Control P. O. Box 26724 Houston, TX 77207 (713) 644-1888		1972	8-9-77
CONTACTS: NAME/TITLE/PHONE			
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED			
PARENT COMPANY Paltex Corporation			
PLANT LOCATIONS 5939 Nunn Street Houston, TX 77087	NUMBER OF EMPLOYEES 7	PLANT FLOOR SPACE 6000'	
BRIEF STATEMENT AS TO ACTUATOR PRODUCTS Sales & Service: Raymond Control Systems Pneumatic & Electric Actuators Bettis Corp. Pneumatic Actuators Design & Fabrication of Gate & Globe Valve Actuator Adaptions, & Qtr. Turn Valves Repair and Reconditioning all types Electric Actuators. Field Service Technicians New Installations of Pneumatic, Electric, and Manual Gear Operators			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Functional Testing of Pneumatic & Electric Actuators			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982? BY 1987?			

* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE IT LISTED IN THE REPORT

FIRM NAME/ADDRESS/PHONE*		YEAR PRESENT FIRM ESTABLISHED	SURVEY DATE
Becker Precision Equipment, Inc. 75 Randall Street Elk Grove Village, Illinois 60007 (312) 437-5940		1968	8-5-77
CONTACTS: NAME/TITLE/PHONE Roy J. Becker, Vice President (312) 437-5940			
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Becker Engineering & Supply Company (BESCO) Established - 1955			
PARENT COMPANY None			
PLANT LOCATIONS	NUMBER OF EMPLOYEES	PLANT FLOOR SPACE	
Same as Above	25	10,000 Sq. Ft.	
BRIEF STATEMENT AS TO ACTUATOR PRODUCTS Design and manufacture pneumatic, hydraulic and mechanical valve actuators for 90° rotation valves and gate valves - including instrumentation for automation. Also efficient manual actuators.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Engineering capabilities include actuators for basically all valves and sizes - excluding electrical actuators. Testing facilities commensurate with products manufactured.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982? BY 1987? Future products will be in line with natural gas industry requirements - such as: Gas Sampler - Energy Saving Equipment - Improved pneumatic, hydraulic and electrical instrumentation.			

* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE IT LISTED IN THE REPORT

FIRM NAME/ADDRESS/PHONE*		YEAR PRESENT FIRM ESTABLISHED	SURVEY DATE
Bellows International Division of IBEC Industries, Inc. 200 West Exchange Street Akron, Ohio 44309 (216) 762-0471		1957	7-29-77
		CONTACTS: NAME/TITLE/PHONE	
		Chas. W. Ward Vice President, Product Development (216) 762-0471 Ext. 318	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED			
The Bellows Company Established 1942			
PARENT COMPANY			
International Basic Economy Corporation 1271 Avenue of the Americas, New York, New York 10020			
PLANT LOCATIONS	NUMBER OF EMPLOYEES	PLANT FLOOR SPACE	
Ohio Pennsylvania	600	150,000 Sq. Ft.	
BRIEF STATEMENT AS TO ACTUATOR PRODUCTS			
Rotary and Linear actuators Hydraulic Power units and controls			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES			
Can handle custom requirements or can develop standard line to suit valves as the valve requirements become identified. Thirty-five development engineers.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982? BY 1987?			
Linear actuators to 250,000 lb. force. Rotary actuators to 125,000 lb. ft. torque. Controls to match.			

* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE IT LISTED IN THE REPORT

FIRM NAME/ADDRESS/PHONE*		YEAR PRESENT FIRM ESTABLISHED	SURVEY DATE
Beswick Engineering 26 Brownville Ipswich, MA 01938		1964	7/77
CONTACTS: NAME/TITLE/PHONE Paul R. Beswick (617) 356-4392			
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED			
PARENT COMPANY			
PLANT LOCATIONS	NUMBER OF EMPLOYEES	PLANT FLOOR SPACE	
1	20	40,000 sq. ft.	
BRIEF STATEMENT AS TO ACTUATOR PRODUCTS Air cylinders, hydraulic cylinders - standard and custom. Mini-valves, pressure regulators, flow controls and metering valves.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES That required to support our regular products and product development.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982? BY 1987? 1. Larger pressure regulators 2. Flow controls & metering valves for pipe sizes in 6", 12", 24", etc.			

* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE IT LISTED IN THE REPORT

FIRM NAME/ADDRESS/PHONE*		YEAR PRESENT FIRM ESTABLISHED	SURVEY DATE
Bettis Corporation P. O. Box 14689 Houston, TX 77021		CONTACTS: NAME/TITLE/PHONE Jack C. Schaff, VP Sales & Marketing (713) 478-1143	7-1-77
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED			
PARENT COMPANY			
PLANT LOCATIONS	NUMBER OF EMPLOYEES	PLANT FLOOR SPACE	
BRIEF STATEMENT AS TO ACTUATOR PRODUCTS			
<p><i>NOTE:</i> Manufactures both pneumatic and hydraulic actuators for quarter-turn valves.</p>			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982? BY 1987?			
<p><i>NOTE:</i> Developing a small electric actuator for quarter-turn valves.</p>			

* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE IT LISTED IN THE REPORT

FIRM NAME/ADDRESS/PHONE*		YEAR PRESENT FIRM ESTABLISHED 1949	SURVEY DATE 8/11/77
EIM Company, Inc. 13840 Pike Road P. O. Box 8 Missouri City, TX 77459 713/499-1561		CONTACTS: NAME/TITLE/PHONE all at 713/499-1561 Lynn H. Elliott - President Howard Zuch - Director of Engineering Larry Worley - Regional Sales Manager	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED			
PARENT COMPANY			
PLANT LOCATIONS 13840 Pike Road Missouri City, TX Ft. Bend County	NUMBER OF EMPLOYEES 130	PLANT FLOOR SPACE 130,000 sq.ft. - 23 acre tract	
BRIEF STATEMENT AS TO ACTUATOR PRODUCTS The major actuator products manufactured by the company are position and modulation controllers utilizing electric, pneumatic, or hydraulic power sources to propel valves, dampers, barriers, and other mechanical equipment having large torque load requirements.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES The company has dynamometer torque load measuring equipment capable of 7,500 ft.lbs. of torque. A new dynamometer capable of 80,000 ft.lbs. is presently in design and is to be available for testing prior to end of year 1977. The company presently has the capability to measure thrust loads up to 200,000 lbs. applied axially to the normal torque load.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982? BY 1987? The company is planning on new product lines which will encompass larger torque actuators for valve applications exceeding its present line of products. Also, the company is in progress in designing a line of smaller actuators for the precision modulation of butterfly valves presently increasing in application due to extensive use of micro processors in plant controls.			

* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE IT LISTED IN THE REPORT

FIRM NAME/ADDRESS/PHONE* Limitorque Corporation 5114 Woodall Road Lynchburg, Va. 24502 Phone: (804) 528-4400	YEAR PRESENT FIRM ESTABLISHED 1949	SURVEY DATE 8/11/77
CONTACTS: NAME/TITLE/PHONE (804) 528-4400 Martin C. Donze ----- President X-271 Frank K. Denham ----- Vice President X-270 Walter J. Denkowski - Vice Pres. Engr. X-220		
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED Philadelphia Gear Corporation - 1890		
PARENT COMPANY Affiliate Company - Philadelphia Gear Corporation through common ownership		
PLANT LOCATIONS Lynchburg, Virginia	NUMBER OF EMPLOYEES 515	PLANT FLOOR SPACE 165,000 sq. ft.
BRIEF STATEMENT AS TO ACTUATOR PRODUCTS - We are the major manufacturer of electric valve actuators and have been manufacturing and developing valve actuators since 1932. Our actuators are being used on all types of valves in every conceivable service. Limitorque is being used on gate and globe valves from 1" to 60", pressure classes from 50# to 5000#, sluice gates to 15' on 90° turn valves, butterfly, ball and plug to the largest made and on blast gates and goggle valves. In the steel industry Limitorque is qualified and used within the containment vessel in nuclear power plants and for service in our Navy's ships. Power plant, refineries, steel mills, crude oil, petroleum products, coal slurry and gas pipelines all use Limitorque.		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES We have over 10,000 sq. ft. of facilities completely devoted to environmental, prototype and production model testing. It is the largest and most fully equipped in the actuator industry. Our test capability permits us to test under the most severe environmental conditions. A wide variety of equipment allows us to test and record torque, thrust and electrical motor currents and limit switches, comparing them to speed and time functions.		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982? BY 1987? No new product lines are currently anticipated—we are currently studying fail-safe type of electric actuators, very high speed actuators and pneumatic and hydraulic actuators.		

* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE IT LISTED IN THE REPORT

FIRM NAME/ADDRESS/PHONE*		YEAR PRESENT FIRM ESTABLISHED	SURVEY DATE
Newbrook Machine Corp. 16 Mechanic St. Silver Creek, New York 14136		1952	
		CONTACTS: NAME/TITLE/PHONE R. Newman , Genl Mgr. 716-934-2644	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED N/A			
PARENT COMPANY N/A			
PLANT LOCATIONS See Address Above	NUMBER OF EMPLOYEES 106	PLANT FLOOR SPACE 150,000 sq. ft.	
BRIEF STATEMENT AS TO ACTUATOR PRODUCTS We build special units for all applications. Our major emphasis is currently on development and pilot production projects.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Newbrook is primarily an R & D operation. We do specialized fabrication, machining, assembly and testing (functional, NDT, Hydrottesting, helium leam testing, physical testing, Metallurgical testing etc.)			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982? BY 1987? We have committed ourselves to the development of energy new sources. We have been involved in the Nuclear field for 25 years. We are currently working hydrogen fusion with the Univ. of Rochester. We are making fuel cell components for United Technology and the Navy. We recently built experimental wind mill components.			

* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE IT LISTED IN THE REPORT

FIRM NAME/ADDRESS/PHONE*		YEAR PRESENT FIRM ESTABLISHED	SURVEY DATE
PARKER-HANNIFIN CORPORATION 17327 Euclid Avenue Cleveland, OH 44112		1927	8/30/77
CONTACTS: NAME/TITLE/PHONE T. J. McCuiston - Vice-President, Sales (216) 531-3000			
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED			
PARENT COMPANY			
PLANT LOCATIONS	NUMBER OF EMPLOYEES	PLANT FLOOR SPACE	
Many - 50 in the USA & Western Europe, Australia, S. America, Canada, etc.	13,000 +		
BRIEF STATEMENT AS TO ACTUATOR PRODUCTS Design and manufacture hydraulic and pneumatic devices and systems which may be used as valve actuators or in conjunction with actuator systems. Components include cylinders, valves, pumps, tube fittings, hydraulic and pneumatic hose, filters, etc. Manufacture all types of fluid power and fluid handling and instrumentation components, including sealing devices.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Have participated in the design and development of simple fluid power components and systems to more complex components and systems such as used in flight simulators, controls on commercial and military jet aircraft and on various space craft, can test environmentally over a broad spectrum of ambients, with shock testing, etc., as desired.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982? BY 1987? Depends primarily on need and demand.			

* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE IT LISTED IN THE REPORT

FIRM NAME/ADDRESS/PHONE RKL Controls, Inc. Hainesport Ind. Park Hainesport, NJ 08036 (609) 267-2800	YEAR PRESENT FIRM ESTABLISHED 1959	SURVEY DATE 6/21/77
CONTACTS: NAME/TITLE/PHONE Robert K. Little, President/ (609) 267-2800		
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED RKL Valve & Mfg. Co. 1955		
PARENT COMPANY None		
VALVE PLANT LOCATIONS Lumberton, NJ Hainesport, NJ	NUMBER OF EMPLOYEES 60	PLANT FLOOR SPACE 40,000 Sq. Ft. 12,000 Sq. Ft.
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Largest line of Pinch Type control valves available in the world, many produced under RKL patents. Also produce pneumatic actuators, process flow vibration joints and expansion joints.		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES RKL has been the leader in developing new types of pinch valves for high & low pressure (negative). First with pre-pinch for flow control. First and only 3-way pinch type valve. First and only full line of molded elastomeric pinch valve bodies. First and only hand level operated pinch valve. All necessary R&D capability for development and testing valves to 5,000 psig line pressure.		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Expect to have a 4,000 psig series on the market by 1980 using new technique for flow control with electronic positioning. Expect to have V.H.T., very high temp., valve available by 1982 in sizes to 36".		
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT RKL Controls, Inc. Ark & Eayerstown Rd. Lumberton, NJ 08048		

FIRM NAME/ADDRESS/PHONE* RACO INTERNATIONAL, INC. 3350 INDUSTRIAL BLVD. BETHEL PARK, PA. 15102 412/835-5744	YEAR PRESENT FIRM ESTABLISHED 1962 THRU PRESENT	SURVEY DATE 7-25-77
CONTACTS: NAME/TITLE/PHONE DONALD H. BOEHM, VICE-PRESIDENT 412/835-5744		
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED RACO MACHINE CO. (NAME CHANGED TO THE ABOVE IN 1976)		
PARENT COMPANY RACO ELEKTRO MASCHINEN GMBH, POSTFACH 413, JESINGHAUSER STRASSE 56-64 5830 SCHWELM, WEST GERMANY		
PLANT LOCATIONS <u>SEE ATTACHED BROWN FOLDER</u>	NUMBER OF EMPLOYEES 13	PLANT FLOOR SPACE APPROX. 100' X 100'
BRIEF STATEMENT AS TO ACTUATOR PRODUCTS <u>SEE ATTACHED CATALOG</u> AMONG THE NEWER AIDS TO CONSERVE ENERGY AND AUTOMATE PRODUCT HANDLING ARE ELECTRIC LINEAR ACTUATORS TO REPLACE HYDRAULIC OR COMPRESSED AIR OPERATED ACTUATORS. FOR THE LATTER TYPES, THEIR ENERGY SOURCES MUST OPERATE CONTINUOUSLY WHILE THE ELECTRIC TYPES ARE ON OR OFF AS CALLED FOR BY THE DETECTING SENSORS WHICH CONTROL THEIR OPERATION.		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES OUR PARENT COMPANY SUPPLIES US WITH ANY NEW DESIGN. WE DO ALL FINAL TESTING OF ANY UNIT RECEIVED IN OUR PLANT. WE DO, HOWEVER, TRY TO ACCOMMODATE OUR CUSTOMERS WITH THEIR CHOICE OF DESIGN TO SUIT THEIR APPLICATION BY USING OUR 'MODULAR CONCEPT'. THUS, WE CAN ASSIGN ANY COMPONENT DIFFERENTIATION AVAILABLE. WE ARE ASSISTED IN OUR SALES THROUGH OUR NATION WIDE TEAM OF SALES REPRESENTATIVES.		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982? BY 1987? OUR PARENT COMPANY IS WORKING ON A LINE OF ACTUATORS THAT WILL SUPPLY A MUCH GREATER THRUST CAPABILITY AND A LONGER WORKING STROKE LENGTH THAN WE PRESENTLY ARE ABLE TO SUPPLY.		

* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE IT LISTED IN THE REPORT

FIRM NAME/ADDRESS/PHONE* Raymond Control Systems Division Vapor Corporation 315 Kirk Road St. Charles, IL 60174 (312) 293-0090		YEAR PRESENT FIRM ESTABLISHED 1968	SURVEY DATE
		CONTACTS: NAME/TITLE/PHONE W. M. Janik - Field Sales Manager, John Sikorcin - Dir. of Engr., R. F. Malinski-VP	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None			
PARENT COMPANY Vapor Corporation 6420 W. Howard St., Chicago, IL 60648			
PLANT LOCATIONS St. Charles, IL	NUMBER OF EMPLOYEES 162	PLANT FLOOR SPACE 55,000 Sq. Ft.	
BRIEF STATEMENT AS TO ACTUATOR PRODUCTS Complete line of electric and pneumatic actuators. Plus controls torque capability of 50 in/lbs to 550,000 in/lbs. for 90° rotary valves and also multi-turn valves.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES We have torque testing capacity up to 700,000 in/lbs. Testing equipment for electronic servo control systems used on actuators.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982? BY 1987? (1) Failsafe electric actuator (2) Servo Controls for 3-phase AC electric actuators.			

* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE IT LISTED IN THE REPORT

FIRM NAME/ADDRESS/PHONE* Roto Hammer Company, Inc. P. O. Box 9308 Tulsa, OK (918) 446-3508		YEAR PRESENT FIRM ESTABLISHED 1958	SURVEY DATE 7-29-77
		CONTACTS: NAME/TITLE/PHONE Max L. Cardwell - President (918) 446-3508	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED None, Established 1958			
PARENT COMPANY None			
PLANT LOCATIONS 2804 West 40th Street Tulsa, OK 74107	NUMBER OF EMPLOYEES 35	PLANT FLOOR SPACE 25,000 Sq. Ft.	
BRIEF STATEMENT AS TO ACTUATOR PRODUCTS <ol style="list-style-type: none"> 1. Roto Hammer Impactors, Hand, Chain, & Extension Control Operated. Used for seating and unseating Valves in Heat, Pressure and Corrosive Service. 2. Bevel Gear Operators that adapt to all Valves, Vertical or horizontal input shafts. 3. Floor Stand Operators that adapt to all valves with & without valve position indicators. Can be furnished with valve impactors. 4. Chainwheel Operators with & without impactors. 5. Valve extension controls for remote operation of valve, with & without impactors. 			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982? BY 1987? We are in the process of developing a full range of Manual Reduction Gears for valves. This should be complete by 1980. Future plans are to motorize the reduction gears. This will be in the mid 1980's.			

* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE IT LISTED IN THE REPORT

FIRM NAME/ADDRESS/PHONE*		YEAR PRESENT FIRM ESTABLISHED	SURVEY DATE
Rotork Controls, Inc. 19 Jet View Drive Rochester, NY 14624 (716) 328-1550		Ten (10) Years	7-27-77
		CONTACTS: NAME/TITLE/PHONE David C. Pass, President (716) 328-1550	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED			
None			
PARENT COMPANY			
Rotork Controls, Ltd. Bath, England			
PLANT LOCATIONS	NUMBER OF EMPLOYEES	PLANT FLOOR SPACE	
19 Jet Drive Rochester, New York 14624	45	24,000 Sq. Ft.	
BRIEF STATEMENT AS TO ACTUATOR PRODUCTS			
Rotork manufactures a complete range of electric actuators that are weatherproof NEMA 4, watertight NEMA 6, explosionproof NEMA 7 and Class 1, Division 1 and 2, Groups A, B, C and D. In addition, Rotork has NEMA 9X for hazardous and non-hazardous dust NEMA 12 (coal dust).			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES			
All Rotork products are certified by Factory Mutual and had the FM label. Complete valve simulators are available to reproduce valve characteristics.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982? BY 1987?			
Rotork is currently developing a complete range of pneumatic actuators available in 1981.			

* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE IT LISTED IN THE REPORT

FIRM NAME/ADDRESS/PHONE Sulzer Bros., Inc. 19 Rector Street New York, New York 10006 (212) 425-4560		YEAR PRESENT FIRM ESTABLISHED 1940 (New York Office)	SURVEY DATE 7/19/77
		CONTACTS: NAME/TITLE/PHONE Walter P. Gadiant, Manager Power Plant Components Division	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED			
PARENT COMPANY Founded 1834 Sulzer Brothers Limited, CH-8401, Winterthur, Switzerland			
VALVE PLANT LOCATIONS Winterthur, Switzerland	NUMBER OF EMPLOYEES 35,511 total	PLANT FLOOR SPACE 3,900,000 sq. ft.	
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS Sulzer standard valves, actuators and positioning controls are designed for high pressure, high temperature applications with high requirements of flow control. The given requirements, from a pressure and temperature point of view, are well within our standard valve capabilities. The required sizes also can be considered standard. The solids content of the medium is new; however, it appears to be manageable.			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES Sulzer's activity in high pressure, high temperature valve applications required from the beginning a high development and testing capability. Therefore, we feel well qualified to satisfy these requirements.			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987? Large valves (valve materials) for handling high temperature gases and requiring fast closure and/or modulating exceeding the required data may be available in 1982, as well as improved seat materials for still higher tightness and durability.			
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT Sulzer Bros., Inc. 19 Rector Street New York, NY 10006 Walter P. Gadiant			

Appendix C

SAMPLE LETTER OF INQUIRY TO BALL VALVE MANUFACTURERS

OAK RIDGE NATIONAL LABORATORY

OPERATED BY
UNION CARBIDE CORPORATION
NUCLEAR DIVISION

POST OFFICE BOX X
OAK RIDGE, TENNESSEE 37830

June 6, 1977

Gentlemen:

The United States Energy Research and Development Administration/Fossil Energy, Major Facilities Project Management Division is conducting an investigation of the capability of industry to provide valves for coal conversion facilities of demonstration and commercial scale. This study is being performed at the Oak Ridge National Laboratory by Union Carbide Nuclear Division. Industry input is desired in two areas:

1. defining the present capability of industry to supply the required valves,
2. determining research and development needs, including lead time requirements for producing valves of advanced design.

An attachment including a capability questionnaire has been developed for the valve size and anticipated service applications. We hope that this will help provide the necessary information with a minimum of time and effort.

You are also invited to submit any additional ideas or suggestions which may help in making this investigation more beneficial to both governmental and industrial planners.

This is not a request for proposal; nor may it serve as a basis for any claim for reimbursement of costs for efforts expended. No remuneration will be provided; however, it is likely that this study will directly benefit the valve industry as well as the government and the public through normal government publication channels. Therefore, please do not supply any proprietary information.

We will appreciate your response to this questionnaire by July 15, 1977 or earlier. If additional information or clarification is needed, please call me at (615) 483-8611, ext. 3-1416 or W. A. Bush at the same extension.

Your help in this effort will be appreciated.

Very truly yours,

Edward C. Slade
UCC-ND Engineering

ECS:cr

Attachment

BACKGROUND

Assuming that coal conversion will become a major industry within the next ten to fifteen years; this investigation is attempting to assess the capability of, and to ascertain the impact that would be imposed upon the valve industry. At present, it appears that the coal conversion processes operate in the range of the present petrochemical industry, except at the portion of the process where the coal is converted to gas, oil, and slag/char.

INVESTIGATION AND REPORT

As a part of this survey, we would like to obtain two sets of catalogs on your product line as would be applicable to the coal conversion industry. Your cooperation in filling out the attached sheets will provide general information about your company and its products and an indication of which of your products fit within the unique requirements of the coal conversion processes. This listing of valve applications was compiled from preliminary conceptual designs of planned demonstration and commercial size and coal conversion processes. Only those applications which appear to be the most stringent are listed.

Appendix D

SAMPLE LETTER OF INQUIRY TO BLAST/SLIDE/KNIFE
EDGE VALVE MANUFACTURERS

OAK RIDGE NATIONAL LABORATORY

OPERATED BY
UNION CARBIDE CORPORATION
NUCLEAR DIVISION

POST OFFICE BOX X
OAK RIDGE, TENNESSEE 37830

June 24, 1977

Gentlemen:

The United States Energy Research and Development Administration/Fossil Energy, Major Facilities Project Management Division is conducting an investigation of the capability of industry to provide valves for coal conversion facilities of demonstration and commercial scale. This study is being performed at the Oak Ridge National Laboratory by Union Carbide Nuclear Division. Industry input is desired in two areas:

1. defining the present capability of industry to supply the required valves,
2. determining research and development needs, including lead time requirements, for producing valves of advanced design.

An attachment including a capability questionnaire has been developed for the valve size and anticipated service applications. We hope that this will help provide the necessary information with a minimum of time and effort.

You are also invited to submit any additional ideas or suggestions which may help in making this investigation more beneficial to both governmental and industrial planners.

This is not a request for proposal; nor may it serve as a basis for any claim for reimbursement of costs for efforts expended. No remuneration will be provided; however, it is likely that this study will directly benefit the valve industry as well as the government and the public through normal government publication channels. Therefore, please do not supply any proprietary information.

We will appreciate your response to this questionnaire by July 30, 1977 or earlier. If additional information or clarification is needed, please call me at (615) 483-8611, ext. 3-1416 or W. A. Bush at the same extension.

Your help in this effort will be appreciated.

Very truly yours,

Edward C. Slade
UCC-ND Engineering

ECS:cr

Attachment

BACKGROUND

Assuming that coal conversion will become a major industry within the next ten to fifteen years; this investigation is attempting to assess the capability of, and to ascertain the impact that would be imposed upon the valve industry. At present, it appears that the coal conversion processes operate in the range of the present petrochemical industry, except at the portion of the process where the coal is converted to gas, oil, and slag/char.

INVESTIGATION AND REPORT

As a part of this survey, we would like to obtain two sets of catalogs on your product line as would be applicable to the coal conversion industry. Your cooperation in filling out the attached sheets will provide general information about your company and its products and an indication of which of your products fit within the unique requirements of the coal conversion processes. This listing of valve applications was compiled from preliminary conceptual designs of planned demonstration and commercial size and coal conversion processes. Only those applications which appear to be the most stringent are listed.

FIRM NAME/ADDRESS/PHONE	YEAR PRESENT FIRM ESTABLISHED	SURVEY DATE
	CONTACTS: NAME/TITLE/PHONE	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED		
PARENT COMPANY		
VALVE PLANT LOCATIONS	NUMBER OF EMPLOYEES	PLANT FLOOR SPACE
BRIEF STATEMENT AS TO STANDARD VALVE PRODUCTS		
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES		
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982?, BY 1987?		
* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE LISTED IN THE FINAL REPORT		

Appendix E

SAMPLE LETTER OF INQUIRY TO VALVE ACTUATOR MANUFACTURERS

OAK RIDGE NATIONAL LABORATORY

OPERATED BY
UNION CARBIDE CORPORATION
NUCLEAR DIVISION

POST OFFICE BOX X
OAK RIDGE, TENNESSEE 37830
July 15, 1977

Gentlemen:

The United States Energy Research and Development Administration/Fossil Energy, Major Facilities Project Management Division is conducting an investigation of the capability of industry to provide valves for coal conversion facilities of demonstration and commercial scale. This study is being performed at the Oak Ridge National Laboratory by Union Carbide Nuclear Division. Industry assistance is being solicited in two areas:

1. defining the present capability of industry to supply the required valves and actuators,
2. determining research and development needs, including lead time requirements, for producing valves with actuators of advanced design.

Assuming that coal conversion will become a major industry within the next ten to fifteen years; this investigation is attempting to assess the capability of, and to ascertain the impact that would be imposed upon the valve-actuator industry. At present, it appears that the coal conversion processes operate in the range of the present basic metal and petrochemical industry, except at the portion of the process where coal is converted to gas and oil.

A study of several prospective coal conversion processes has shown that the valve requirements in the areas of concern are:

ACTUATOR-VALVE TYPE	SIZES INCHES	PROCESS PRESSURE PSI	PROCESS TEMP. °F	FLOW STREAM
Rotating Gate, Globe	6,12,24	1150	600	Oil, Water, Gas
90° Turn Ball	6,12,24	1250,1600,4300	660	Coalfines w/Gas or Oil
Ball	6,10,12	1250	700,1600	Coal Ash w/Gas
Straight Blast, Gate	48,60	1250	660,1200,1700	Gummy Effluents Coal Ash w/Gas

July 15, 1977

In these applications, the actuators would be located in either an outdoor location or a shed type enclosure and could be subjected to explosive vapors or explosive dust.

As a part of this investigation, we would like your cooperation in filling out the attached sheet regarding your company and its products and an indication of which of your products are most applicable for critical applications in coal conversion processes. We would also like to obtain two sets of catalogs and descriptive information of this portion of your product line.

You are invited to submit any ideas or suggestions which you consider helpful in making this investigation beneficial to both governmental and industrial planners. We would particularly appreciate your thoughts on the need for governmental assistance for research and development, scale-up or testing of actuators.

This is not a request for proposals; nor may it serve as a basis for any claim for reimbursement of costs for efforts expended. No remuneration will be provided; however, it is likely that this investigation will directly benefit the valve-actuator industry as well as the government. The results of this investigation will be published as a report that will be available to the public, through normal government publication channels. Therefore, please do not supply any proprietary information.

We will appreciate your response to this questionnaire by August 15, 1977 or earlier. If additional information or clarification is needed, please call me at (615) 483-8611, ext. 3-1416 or W. A. Bush at the same extension.

Your help in this effort will be appreciated.

Very truly yours,

Edward C. Slade
UCC-ND Engineering

ECS:cr

Attachment

FIRM NAME/ADDRESS/PHONE*		YEAR PRESENT FIRM ESTABLISHED	SURVEY DATE
		CONTACTS: NAME/TITLE/PHONE	
FORMER FIRM NAME, IF ANY, AND YEAR ESTABLISHED			
PARENT COMPANY			
PLANT LOCATIONS	NUMBER OF EMPLOYEES	PLANT FLOOR SPACE	
BRIEF STATEMENT AS TO ACTUATOR PRODUCTS			
BRIEF STATEMENT AS TO DEVELOPMENTAL AND TESTING CAPABILITIES			
REMARKS: COMMENTS OF FUTURE PRODUCT LINES THAT MAY BE AVAILABLE BY 1982? BY 1987?			

* LIST NAME AND ADDRESS AS YOU WOULD LIKE TO HAVE IT LISTED IN THE REPORT

Appendix F

VALVE SIZE DETERMINATIONS

The conceptual designs¹⁻⁷ of the selected coal conversion processes under development by DOE have not progressed to the delineation of the piping and valve sizes which would be used in commercial-sized plants. However, the conceptual designs do list the flowing media at various stages in the process, and from this data pipe and valve sizes can be estimated.

For the valve survey, the following approximation formulas were used to size the pipe diameter, and the valve diameter was assumed to equal the pipe diameter.

Liquid flow:

$$d = 0.1 \sqrt{\frac{w}{\rho}} ,$$

where:

d = diameter, in. ,

w = flow, lbs/hr ,

ρ = density, lb/ft³ .

Gas flow:

$$Q = 18.06 \frac{T_o}{P_o} \sqrt{\frac{(P_1^2 - P_2^2) d^{5.33}}{GTL}} ,$$

where:

Q = flow, ft³/hr at T_o and P_o ,

T_o = base temperature, °F ,

P_o = base pressure, psia ,

P_1 = initial pressure, psia ,

P_2 = final pressure, psia ,

G = specific gravity ,

T = final temperature, °F ,

L = length of pipe, ft/5280 .

The following is an example of the use of these formulas, sizing a valve in the IGT HYGAS² plant, reference valve V22 at the exit of Hydro-gasifier (see Fig. 2).

$$Q = 18.06 \frac{T_o}{P_o} \sqrt{\frac{(P_1^2 - P_2^2) d^{5.33}}{GTL}} ,$$

where:

$$Q = 809,000 \text{ ft}^3/\text{hr} ,$$

$$T_o = T = 600^\circ\text{F} ,$$

$$P_o = P_1 = 1200 \text{ psia} ,$$

$$P_2 = 1170 \text{ psia} ,$$

$$L = 200/5280 \text{ ft (assumed)} ,$$

$$G = 0.38 \text{ (assumed)} .$$

$$Q = 18.06 \frac{600}{1200} \sqrt{\frac{1200^2 - 1170^2}{0.38 \times 600 \times 0.038} d^{5.33}} ,$$

$$d = 44 \text{ in.} .$$

REFERENCES FOR APPENDIX F

1. Energy Research and Development Administration, *250-Million-SCFD High BTU Gas Plant*, ERDA 76-48, Process Evaluation Group — Mineral and Material Research and Development, Morgantown, W. Va. (March 1976).
2. Energy Research and Development Administration, *IGT HYGAS Hydrogasi-fication Process*, ERDA 76-47, Process Evaluation Group — Mineral and Material Research and Development, Morgantown, W. Va. (March 1976).
3. The R. M. Parsons Company, *Fischer-Tropsch Complex Conceptual Design/Economics Analysis: Oil and SNG Production*. R&D Report No. 114 — *Interim Report No. 3*, FE-1775-7, Pasadena, Calif. (January 1977).
4. Energy Research and Development Administration, *250-Million-SCFD Gas Plant*, ERDA 76-7, Process Evaluation Group — Mineral and Material Research and Development, Morgantown, W. Va. (August 1975).
5. E. T. Coles, *Commercial Plant Process Evaluation Report*, report prepared under Contract No. E(49-18)-1736 with Energy Research and Development Administration, New York (August 1975).
6. J. M. Holmes et al., *Hydrocarbonization Process Evaluation Report*, ORNL-5212 (Draft), (September 1976).
7. R. Salmon et al., *Evaluation of the Synthoil Process*, ORNL-5209, (September 1976).

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125. E. E. Allen, Fisher Controls Company, P. O. Box 190, Marshalltown, IA 50158
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127. R. Antonsen, Department of Energy, Washington, DC 20545
128. L. Arranaga, Arral Industries, Inc., 6161 Cedros Avenue, Van Nuys, CA 91411
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133. J. Batchelor, Department of Energy, Washington, DC 20545
134. R. J. Beckers, Becker Precision Equipment, Inc., 75 Randall Street, Elk Grove, IL 60007
135. P. R. Beswick, Beswick Engineering, 26 Browaville, Ipswich, MA 01938
136. J. C. Bixel, Monsanto Research Corp., Mound Facility, Box 5555, Miamisburg, OH 45342
137. R. C. Boedecker, Worcester Controls Corporation, 125 Hartwell Street, W. Boylston, MA 01583
138. D. H. Boehm, RACO International, Inc., 3350 Industrial Blvd., Bethel Park, PA 15102
139. E. C. Breidert, Paducah Gaseous Diffusion Plant, P. O. Box 1410, Paducah, KY 42001
140. M. R. Bruck, Gas Machinery Division, 336 S. Spring St., Port Washington, WI 53074
141. E. C. Busfield, Ametek/Schutte & Koerting Division, Cornwells Heights, PA 19020
142. M. L. Cardwell, Roto Hammer Co., P. O. Box 9308, Tulsa, OK 74107
143. S. J. Caroleo, Kerotest Manufacturing Corp., 2525 Liberty Avenue, Pittsburgh, PA 15222
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150. C. A. Dally, Dally Engineering-Valve Co., 1200 Century Building, Pittsburgh, PA 15222
151. E. G. Davis, Andco Industries, Inc., 20005 Walden Ave., Buffalo, NY 14240
152. R. S. Dickert, Henry Valve Co., 3215 North Avenue, Melrose Park, IL 60160
153. M. C. Donze, Limitorque Corp., 5114 Woodall Road, Lynchburg, VA 24502

154. D. Dubus, Pittsburgh Energy Research Center, 4800 Forbes Avenue, Pittsburgh, PA 15213
155. D. J. Easton, Everlasting Valve Company, 70 Myrtle Street, Cranford, NJ 07016
156. J. P. Ellenberger, Clow Corporation, 40 Chestnut Ave., Westmont, IL 60559
157. L. H. Elliott, EIM Company, Inc., 13840 Piake Road, Missouri City, TX 77459
158. J. T. Emery, Honeywell, Inc., 1100 Virginia Drive, Ft. Washington, PA 19034
159. P. F. Etsas, TXT/Division Vapor Corp., 320 Hughes Street, P. O. Box 9369, Houston, TX 77011
160. A. W. Fages, Rockwell International, 400 N. Lexington Ave., Pittsburgh, PA 15208
161. H. J. Fitzpatrick, Royal Industries, 2040 E. Dyer Road, Santa Ana, CA 92705
162. R. Fix, R. A. Angle Technology Center, P. O. Box 11, Marshalltown, IA 50158
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