PLAINTIFF'S EXHIBIT
ARO-174

ARMCO PROJECT 600

ENGINEERING REPORT

PROJECT NO. 7146

48 INCH UNIVERSAL SLABBING MILL

MIDDLETOWN WORKS

VOLUME II

PREPARED BY

KAISER ENGINEERS

PROJ. SECT.	CONSTR. DETAIL	
440	---	HYDRAULIC SYSTEM #1

This project section shall include all costs for the purchase and installation of the equipment and motors. Also included here will be the purchase and installation costs of the piping including control vlaves, for the pressurized soluble oil and water system to the roll balance cylinders and spindle supports at the horizontal mill, vertical edger pullbacks, sled and roll tilter.

The costs for the purchase of this equipment will be temporarily accumulated in project section 401. Ultimately the costs accumulated in project section 401 will be taken out and put into the appropriate project sections.

The costs for equipment foundation pads will be included with project section 460.

The costs for raceways will be included with project section 801.

The costs for power and control wiring, interconnections, equipment grounding, and electrical test will be included with project section 804.

461	Purchase - Pipe & Fittings
462	Purchase - Valves
464	Pipe Installation
466	Hangers & Supports
469	Valve Stands
561	Electric Motors
610	Purchase - Equipment
620	Install - Equipment
640	Check & Test

BIG RED AKE-004305

PROJ. SECT.	CONSTR. DETAIL	
441	---	HYDRAULIC SYSTEM #2

This project section shall include all costs for the purchase and installation of the equipment and motors. Also included here will be the purchase and installation costs of the piping including control valves for the pressurized soluble oil and water system to the slab shear top knife block balance, shear holddown gag and crop distributor.

The costs for the purchase of this equipment will be temporarily accumulated in project section 401. Ultimately the costs accumulated in project section 401 will be taken out and put into the appropriate project sections.

The costs for equipment foundations pads will be included with project section 460.

The costs for raceways will be included with project section 801.

The costs for power and control wiring, interconnections, equipment grounding, and electrical test will be included with project section 804.

461	Purchase - Pipe & Fittings
462	Purchase - Valves
464	Pipe Installation
466	Hangers & Supports
469	Valve Stands
561	Electric Motors
610	Purchase - Equipment
620	Install - Equipment
640	Check & Test

BIG RED

AKE-004306

PROJ. SECT.	CONSTR. DETAIL	
443	---	CIRCULATING OIL SYSTEM #2

This project section shall include all costs for the purchase and installation of the equipment and piping. The equipment will be located near the Back Manipulators which it serves.

461	Purchase - Pipe & Fittings
462	Purchase - Valves
464	Pipe - Installation
610	Purchase - Equipment
620	Install - Equipment
640	Check & Test

BIG RED

AKE-004307

PROJ. SECT.	CONSTR. DETAIL	
444	---	CIRCULATING OIL SYSTEM #3

This project section shall include all costs for the purchase and installation of the equipment and piping. The equipment will be located in the oil cellar and the piping and valves will be located to serve the screwdowns and edger.

461	Purchase - Pipe & Fittings
462	Purchase - Valves
464	Pipe - Installation
465	Pipe - Insulation
466	Pipe - Hangers & Supports
610	Purchase - Equipment
620	Installation - Equipment
640	Check & Test

AKE-004308

BIG RED

PROJ. SECT.	CONSTR. DETAIL	
445	---	CIRCULATING OIL SYSTEM #4

This project section shall include all costs for the purchase and installation of the equipment and piping. The equipment will be located near the Slabbing Mill and will serve the mill spindles.

461	Purchase - Pipe & Fittings
462	Purchase - Valves
464	Pipe - Installation
465	Pipe - Insulation
466	Pipe - Hangers & Supports
610	Purchase - Equipment
620	Install - Equipment
640	Check & Test

BIG RED

AKE-004309

PROJ. SECT.	CONSTR. DETAIL	
447	---	CIRCULATING OIL SYSTEM #6

This project section shall include all costs for the purchase and installation of the equipment and piping. The equipment will be located in the oil cellar and the piping and valves will be located to serve Tables #1 and #2.

461	Purchase - Pipe & Fittings
462	Purchase - Valves
464	Pipe - Installation
465	Pipe - Insulation
466	Pipe - Hangers & Supports
610	Purchase - Equipment
620	Install - Equipment
640	Check & Test

BIG RED

AKE-004310

PROJ. SECT.	CONSTR. DETAIL	
449	---	CIRCULATING OIL SYSTEM #8

This project section shall include all costs for the purchase and installation of equipment and piping for the M-G Set motor bearing lubrication system.

461	Purchase - Pipe & Fittings
462	Purchase - Valves
464	Pipe - Installation
465	Pipe - Insulation
466	Pipe - Hangers & Supports
610	Purchase - Equipment
620	Install - Equipment
640	Check & Test

BIG RED AKE-004311

PROJ. SECT.	CONSTR. DETAIL	
704	---	STEAM

This project section shall include all the costs for the steam piping within the Slab Mill Facilities. This system will start at a valved connection near the Hot Strip Mill Slab Reheat Furnaces and end with a valve at the Soaking Pit Structure.

461	Purchase - Pipe and Fittings
462	Purchase - Valves, Strainers and Traps
464	Pipe Installation
465	Pipe Insulation
466	Hangers and Supports

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AKE-004312

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AKE-004313

Armco Steel Corporation

LOCATION Middletown Works DATE April 25, 1966 SHEET 55 OF 63
PROJECT Universal Slabbing Mill PROJECT NO. 7146 BY
CONTRACTOR Kaiser Engineers, Inc. ESTIMATE NO. 46-2 NOTED ARL - BAS

COST ACCOUNT SECT.	COST ACCOUNT OBJ.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE L	UNIT PRICE EU	UNIT PRICE M	UNIT PRICE SC	LABOR MAN-HOURS	LABOR 00	BURDEN 10	EQUIPT. USAGE 20	MATERIAL 30	SUB-CONTRACT 50	ENGINEERED EQUIPMENT 60	TOTAL
700	—	PIPING (Continued)														
704	—	STEAM														
	461	Purchase - Pipe and Fittings	4560	LF	—	—	—	—	—	—	—	—	6500	—	—	6500
	462	Purchase - Valves, Strainers and Traps	257	EA	—	—	—	—	—	—	—	—	20500	—	—	20500
	464	Pipe Installation	—	—	—	—	—	—	3360	17700	2500	2100	500	—	—	22800
	465	Pipe Insulation	4560	LF	—	—	—	—	—	—	—	—	—	12500	—	12500
	466	Hangers and Supports	371	EA	—	—	—	—	100	500	100	100	1600	—	—	2300
		TOTAL - STEAM							3460	18200	2600	2200	29100	12500	—	64600
705	—	WELL WATER														
	414	Drinking Fountains	2	EA	—	—	—	—	10	100	—	—	300	—	—	400
	461	Purchase - Pipe and Fittings	2110	LF	—	—	—	—	—	—	—	—	1300	—	—	1300
	462	Purchase - Valves	43	EA	—	—	—	—	—	—	—	—	500	—	—	500
	464	Pipe Installation	—	—	—	—	—	—	740	3900	600	500	100	—	—	5100
	465	Pipe Insulation	1970	LF	—	—	—	—	—	—	—	—	—	2600	—	2600
	466	Hangers and Supports	230	EA	—	—	—	—	90	500	100	100	600	—	—	1300
		TOTAL - WELL WATER							840	4500	700	600	2800	2600	—	11200
706	—	CLARIFIED WATER														
	034	Ditching and Backfilling	2900	CY	0	75	20	—	630	2200	300	3500	—	—	—	6000
	451	Underground - Purchase - Pipe and Fittings	1460	LF	—	—	—	—	—	—	—	—	8900	—	—	8900
	452	Underground - Purchase - Valves	1	EA	—	—	—	—	—	—	—	—	700	—	—	700
	454	Underground - Pipe Installation	—	—	—	—	—	—	2280	12000	1700	1500	400	—	—	15600
	458	Underground - Coat and Wrap (Welds and Fittings)	108	EA	—	—	—	—	320	1700	200	200	500	—	—	2600
	461	Aboveground - Purchase - Pipe and Fittings	3370	LF	—	—	—	—	—	—	—	—	28900	—	—	28900
	462	Aboveground - Purchase - Valves	93	EA	—	—	—	—	—	—	—	—	31500	—	—	31500
	464	Aboveground - Pipe Installation	—	—	—	—	—	—	9780	51700	7300	6200	3000	—	—	68200
	466	Hangers and Supports	89	EA	—	—	—	—	620	3300	500	400	1700	—	—	5900
	519	Cathodic Protection	1750	LF	—	—	—	—	—	—	—	100	—	3000	—	3100
		TOTAL - CLARIFIED WATER							13630	70900	10000	11900	75600	3000	—	171400
		TOTAL														

4002 - REV. 9/65