

Acme Coke  
11236 S. Torrence Ave.  
Chicago IL 60617



[acmecoke.com](http://acmecoke.com)

Document archive

Flushing Liquor processing, misc documents

Dated: 1977, 1979

*Recovered from site on Feb 13 2021*

INTERLAKE, INC.  
CAPITAL EXPENDITURE AUTHORIZATION SUMMARY

REPLACEMENT AND  
REHABILITATION

DIVISION - PLANT <b>Iron and Steel - Chicago</b>		C. E. A. NO.
PROJECT TITLE <b>New Flushing Liquor Pumps</b>		TEMP. NO.
COMPLETION TIME (MONTHS FROM APPROVAL) <b>4 Months</b>		ITEM NO. - CAPITAL PLAN: <b>8-77</b>
PROJECT SPONSOR <b>J. H. Merrill</b>		TOTAL CAPITAL AMOUNT IN CAPITAL PLAN: PROFIT PLAN: <b>\$75,000 (1979)</b>
		FIRST REVIEW: SECOND REVIEW:

**CAPITAL FUNDS TO BE APPROVED:**

Land	\$ _____
Buildings	_____
Equipment	<u>94,200</u>
Less: Cash value of facilities replaced	\$ _____
	<u>\$ 94,200</u>

**TOTAL INVESTMENT:**

Capital Funds	\$ <u>94,200</u>
Working capital	_____
<b>Total</b>	<u>\$ 94,200</u>

**DESCRIPTION AND JUSTIFICATION:**  
This project provides for the purchase of two 200 H.P., 3,000 GPM flushing liquor pumps for the Chicago Coke Plant. These proposed pumps will replace two existing 2,000 GPM units that lack the capacity required by the upgraded flushing liquor system.

The flushing liquor system performs the function of cooling the gases liberated during the coking process from a temperature of 1800°F to 180°F. Additionally, the liquor used by the system serves to prevent deposits of carbonized tar from fouling the damper and damper hinges on each oven.

As part of the extensive refurbishment of the plant's coke ovens under CC-8621, "Repair Coke Oven Batteries Nos. 1 and 2", the subject flushing liquor system is being upgraded. These revisions, which include the installation of additional sprays on each collector main, are required in order to improve the operation of the damper assemblies so that the escape of pollutants during pushing operations can be minimized. Hence, in order to provide the pumping capacity required by the upgraded system, this project provides for the replacement of the two existing 2,000 GPM pumps with two 3,000 GPM units.

**JUSTIFICATION:**

Discounted Cash Flow Return	_____ %
Payback Period	_____

**RELATED EXPENSES:**

Expense: Project Start-up	\$ <u>13,800</u>
<b>Total</b>	<u>\$ 13,800</u>

	APPROVED BY	
TITLE	SIGNATURE	DATE
1. Vice President - Iron and Steel Division		
2. Executive Vice President - Finance and Planning		
3. Chairman and Chief Executive Officer		
4.		
5.		

DIVISION-PLANT

Iron and Steel - Chicago

C-2970

PROJECT TITLE

New Flushing Liquor Pumps

REVIEWED BY	SIGNATURE	DATE
Originator	DH Tuller WMS	12/8/78
Project Sponsor		
Plant Engineer	M. Zetens	12/8/78
Plant Accountant	G. Tatters	12-8-78
Other Interested Parties	W. Schuch	12/8/78
	Donald J. Shupe	12/8/78
	D. Danducci	12-12-78
Department Head	A. Lee	12-12-78
Plant Manager		
Divisional Accounting Manager		
Works Manager		
Other Interested Parties		
President, Subsidiary		
Vice President - Engineering		
Controller		
Director Financial Planning and Control		

INTERLAKE, INC.

EXPENDITURE AUTHORIZATION

SCHEDULE A

PROJECT NO.

DESCRIPTION OF PROJECT AND ALTERNATIVES CONSIDERED

PROJECT TITLE New Flushing Liquor Pumps		DIVISION-PLANT Iron and Steel - Chicago	
DEPARTMENT OR COST CENTER C-2970 By-Products Apparatus		BUILDING	FLOOR

This project provides for the purchase of two 200 H.P., 3,000 GPM flushing liquor pumps for the Chicago Coke Plant. These pumps, one of which will be electrically driven while the second is steam driven, will replace two existing undersized 75 H.P., 2,000 GPM units that have been in use since their acquisition in 1956. Justification of this proposal lies in the fact that in order to minimize the escape of pollutants during pushing operations, the flushing liquor system is being upgraded as part of CC-8521, "Repair Coke Oven Batteries No. 1 and No. 2". Since the existing pumps do not have pumping capacity required for this upgraded system, it is imperative that the proposed units be purchased.

At the Chicago Coke Plant, furnace coke is produced within two batteries of by-product type of coke ovens. In this type of oven, the gases and vapors that are liberated during the carbonization of the coal are collected for further processing so that coal chemicals including ammonia, tar, light oil, and naphthalene can be recovered. Each of these chemicals is sequentially removed from the gas by separate by-product facilities, with the overall efficiency of each operation being interrelated with the efficiency of the preceding facilities. Upon completion of these processes, the clean coke oven gas is distributed for use as a fuel for various facilities throughout the Coke and Furnace Plants. In addition, any surplus gas is sold to Republic Steel Corporation.

As a first part of the by-product recovery process, the 1800°F gases exhausted from the ovens must be cooled to a temperature of 180°F by the flushing liquor system. Briefly, the major components of this system are a 21,000 gallon capacity holding tank, a 2,000 GPM electric pump, a 2,000 GPM steam driven pump, the flushing liquor decanters, and the piping required to interconnect these facilities.

The operation of the flushing liquor system originates at its holding tank. From this tank, one of two 2,000 GPM, 1956 vintage, pumps is used to pump the flushing liquor to the 6'-0" x 4'-6" U-shaped collector mains on each battery. Normally, this task is accomplished with the electrically driven pump while the steam driven unit is kept in readiness as a spare in the event of a power failure.

At each collector main, the single flushing liquor line has a series of oftakes which are used to inject the liquor into the main. Within the main, spray nozzles are used to evenly disperse the flow of liquor so that the gas can be cooled to the desired temperature. Although this cooling process causes approximately 25% of the original volume of liquor to vaporize, the remaining 75% collects in the bottom of the main and flows to the crossover main, the suction main, and, ultimately, to the flushing liquor decanters. As a result of the velocity of the liquor flow, the collector mains and associated damper assemblies are kept free from internal deposits of carbonized tar.

At the decanters, suspended solids are removed from the liquor. Subsequently, the clean effluent is allowed to overflow and return to the holding tank for recycling.

As part of the extensive refurbishment of the Chicago Plant's coke oven batteries, which is presently being accomplished under CC-8521, "Repair Coke Oven Batteries No. 1 and 2", major modifications are being made to the existing flushing liquor system. These revisions, which consist of increasing the number of flushing liquor sprays from 75 per battery to 175 per battery, are required because of the fact that the system

INTERLAKE, INC.

EXPENDITURE AUTHORIZATION

SCHEDULE A

DESCRIPTION OF PROJECT AND ALTERNATIVES CONSIDERED

PROJECT NO.

PROJECT TITLE New Flushing Liquor Pumps		DIVISION-PLANT Iron and Steel - Chicago	
DEPARTMENT OR COST CENTER C-2970 By-Products Apparatus		BUILDING	FLOOR

was incapable of providing the liquor flow required to prevent deposits of carbonized tar from fouling the damper and the damper hinges on each oven. In the closed position, these components are used to seal an oven from the collector main during pushing operations or during maintenance outages. Due to the continual accumulation of these deposits, though, it was impossible to attain an effective seal. As a result, emissions were allowed to escape from the collector mains and into the atmosphere. Since this condition could cause the plant to be in violation of E.P.A. regulations, it was mandatory that the flushing liquor system be upgraded.

As a direct result of the increase in flushing liquor sprays, the existing two 1956 vintage 2,000 GPM pumps are now inadequate. These 75 H.P. pumps do not have the capacity to provide the increased flow rate demanded by the upgraded system. For this reason, this project provides for the purchase of two 200 H.P., 3,000 GPM, pumps. The normal mode of operation with these pumps will be to utilize the electric unit on a full time basis, while the steam pump is kept in readiness as a spare.

Also included in the scope of this project is the installation of a new 380 lb. steam line to the proposed steam pump. This line, which will replace an undersized 150 lb. steam line, is required in order to provide the new pump with the necessary steam flow.

As a final part of this project, various control valves through the flushing liquor system will be replaced in kind. These replacements are required because of the fact that as a result of extended usage, the existing 1956 vintage components have deteriorated to such an extent that they have become a threat to operation of the entire system.

The alternative of increasing the flushing liquor system's pumping capacity by installing two 1,000 GPM pumps to augment the capacity of the existing pumps is rejected due to prohibitive installation costs. Since the available floor space is already fully utilized, an extension would have to be added to the pump room in order to accommodate two additional smaller pumps. Hence, any savings that would be derived from the purchase of 1,000 GPM vs. 3,000 GPM pumps would be more than offset by higher installation costs.

Upon completion of this project, the existing pumps will be removed from service. These units, though, will be kept on hand at the plant for possible future use in an application that is compatible with their capacity. Hence, no SAR is being processed with this project.

INTERLAKE, INC.

EXPENDITURE AUTHORIZATION  
SCHEDULE B

CALCULATION OF EXPENDITURE REQUIRED  
AND EXPENDITURE PAYOUT PERIOD

PROJECT NO.

PROJECT TITLE		DIVISION-PLANT			
New Flushing Liquor Pumps		Iron and Steel - Chicago			
SUB-ACCOUNT NUMBER	CHECK DIGIT NUMBER*	DESCRIPTION	EXPENDITURE AMOUNT		ACCOUNT DISTRIBUTION
			CAPITAL	EXPENSE	
			\$	\$	
50		Site Preparation		2,500 <sup>(1)</sup>	
100		Purchase Pumps and Drivers	24,900 <sup>(2)</sup>		
200		Purchase Valves and Piping Specialties	11,000 <sup>(3)</sup>		
300		Purchase Starter and Install Electrics	11,900 <sup>(4)</sup>		
400		Remove Existing Pumps and Piping		7,500 <sup>(5)</sup>	
500		Install New Pumps and Piping	20,000 <sup>(5)</sup>		
600		Insulate New Steam Piping	5,000 <sup>(1)</sup>		
700		Purchase Spare Pump and Turbine Rotating Assemblies	8,800 <sup>(6)</sup>		
850		Tax		2,500	
900		Plant Engineering	4,000		
950		Contingencies	<u>8,600<sup>(7)</sup></u>	<u>1,300</u>	
		TOTAL	<u>\$94,200</u>	<u>\$13,800</u>	

- (1) Plant Engineering estimate.
- (2) Based on quotes from Goulds Pumps, Inc. dated 10/3/78, and Turbodyne Corp. dated 10/20/78.
- (3) Based on verbal quotes from supplies.
- (4) Based on quotes from Graybar Electric Co. dated 10/16/78, and Meade Electric Co. dated 10/25/78.
- (5) Based on quote from Piping Systems, Inc.
- (6) Based on quotes from Goulds Pumps, Inc. dated 11/22/78, and Turbodyne Corp. dated 11/22/78.
- (7) Provided for any unanticipated price increases and unforeseen piping revisions.

Expenditure Payout Period . . . 2nd Qtr., 1979.

*J. Lee*

INTERLAKE INC.

AUTHORIZATION TO RETIRE CAPITAL ASSETS

AUTHORIZATION NO.

DIVISION-PLANT

Iron and Steel - Chicago

DEPT. OR COST CENTER

C-2970

PROJECT SPONSOR

J. H. Merrill

DESCRIPTION OF ASSET

Two - Gould Centrifugal Pumps - 2000 GPM, #295A051 and #205A050

One - Terry Turbine - 75 HP, 1770 RPM, #28946

One - G.E. Motor - 75 HP, 1770 RPM, #VM8251292

ASSET SHALL BE

ABANDONED

DISPOSED

RELATED CEA NO.

REASON FOR RETIREMENT

These units are undersized and will be replaced with larger 3000 GPM pumps. They will be kept on hand for possible future use, but since there is no firm plan for their immediate use, they will be retired.

DATE ACQUIRED 1956

PRESENT PHYSICAL CONDITION Fair

Gross Asset Value - \$20,000

FINANCIAL DATA

Net Book Value (Date December, 1978)

		\$ -0-
Proceeds From Retirement	\$ -	
Less: Cost of Retirement	\$ -	\$ -
Pre-Tax Gain (Loss) of Retirement		\$ -
Less Capital Gains Tax @ 25%		-
Net After-Tax Gain (Loss)		\$ -

APPROVED BY

TITLE

SIGNATURE

DATE

1. Vice President -  
Iron and Steel Division
2. Executive Vice President -  
Finance and Planning
3. Chairman and  
Chief Executive Officer
- 4.
- 5.

REVIEWED BY	SIGNATURE	DATE
<b>OPTIONAL</b>		
Originator	D A Teller	12-28-78
Project Sponsor		
Plant Engineer	/s/ J. L. Bitner	12/28/78
Plant Accountant	/s/ G. Tatterson	12/28/78
Other Interested Parties	NA Sileich	12-28-78
	/s/ Gerald J. Shope	12/28/78
	/s/ G. Carducci	12/28/78
Department Head	/s/ J. R. Lee	12/28/78
Plant Manager		
<b>REQUIRED (WHERE APPROPRIATE)</b>		
Divisional Accounting Manager		
Works Manager		
Other Interested Parties		
President, Subsidiary		
Vice President - Engineering		
Corporate Controller		
Director Corporate Financial Planning and Control		



INTEROFFICE  
CORRESPONDENCE

Copies to:

Date: June 13, 1977

D. R. Garthus  
J. Lee

To: R. C. Rankin

From: G. M. Durkin

Subject: Flushing Liquor and Tar Level Control

Reference:

Currently, the system of controlling the levels in the flushing liquor and tar collector tanks is not operating. The original system used pneumatic signal transmitters and control valves. However, the pneumatic valves do not function due to frozen lines in winter and the low power of the system.

I am, therefore, proposing a new system be constructed to control the flushing liquor level using electrical controls. Also, an electrical control system with a new tar handling logic be used to control the tar tank level.

Flushing Liquor System -

The systems used on both tanks are identical. A ball float pivots on a shaft that extends out the side of the tank. The shaft has a lever arm that is used to operate a pneumatic switch. The level controller works to set the level at roughly half the tank. The pneumatic switch then opens or closes the regulator valves. In the case of the flushing liquor, the regulator valve is placed in a 4" line that runs from the flushing liquor main to the weak liquor holding tanks. The level in the flushing liquor collector is then controlled by bleeding the flushing liquor main to the weak liquor tank through the regulator valve.

My proposal, shown on attached sketch, is to replace the present pneumatic switch with two electrical switches. The pneumatic valve would then be replaced by a 2" ball valve with an electrical operator. To do this, new conduits and power supplies must be installed. Basically, the new system would be the same as the original, except electrical control.

Tar Collector Tank -

The original tar collector system uses the same type pneumatic switch system of the flushing liquor to open and close a pneumatic valve placed between the intake and discharge of the tar collector pump. The tank level is controlled by bypassing the pump when the tank level is low. This stops the flow of tar through the lines and in cold weather the lines freeze. The flow through the pumps is maintained.

My proposal, shown on the attached sketch, is to install a 3-way plug valve in the tar pump discharge. This valve would serve to direct the flow in one of two directions. When the electrical switch located on the collector tank indicates high level, the valve will be positioned by an operator so that the discharge of the pump will flow through the existing lines to either

R. C. Rankin

G. M. Durkin

Flushing Liquor and Tar Level Control (Continued)  
6/13/77 - Page 2

#13 or #14 tank tank. The level in the collector would then fall until the low level is reached. At that time, the valve would be positioned so that the discharge of the pumps flows to the collector tank in a recycle pattern. This will maintain flow in the tar suction line and provide a mixing action in the tank. This system would keep the tar circulating so that the heat in the tar would be uniform and the demulsifier would be mixed. In this system, the demulsifier would be metered into the flow back to the collector tank. This would allow the agent to be mixed directly with the wet tar. Due to production rates, the tank would be mixed for 3 to 4 hours before pumping down.

Another feature of the system would be solenoid valves that would be timer controlled to inject steam into the non-flowing line to push the tar out of the line before it has time to cool. This would assure that the line is clean when the valve reverses.

In summary, my proposal is to replace the existing pneumatic level control with electrical circuits. The flushing liquor system will operate as originally set up. The tar handling system will be modified to maintain a flow in the pump suction lines and to provide a mixing action in the tar collector tank.

It is my opinion that the use of electrical controls is superior to the current pneumatic system and this method of mixing of the tar would improve tar quality.

G. M. Durkin

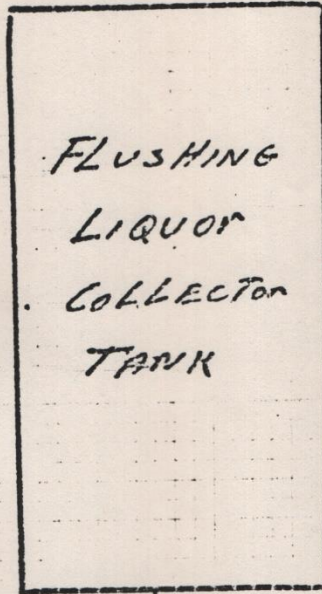
Technical Assistant - Operations

GMD:eb

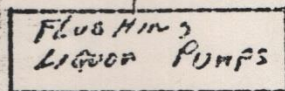
JOB TITLE *FLUSHING LIQUOR LEVEL CONTROL*

ENGINEER *Dunkin*  
E. R. OF PROJECT

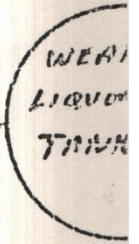
PAGE *1*  
DATE *6-9-77*



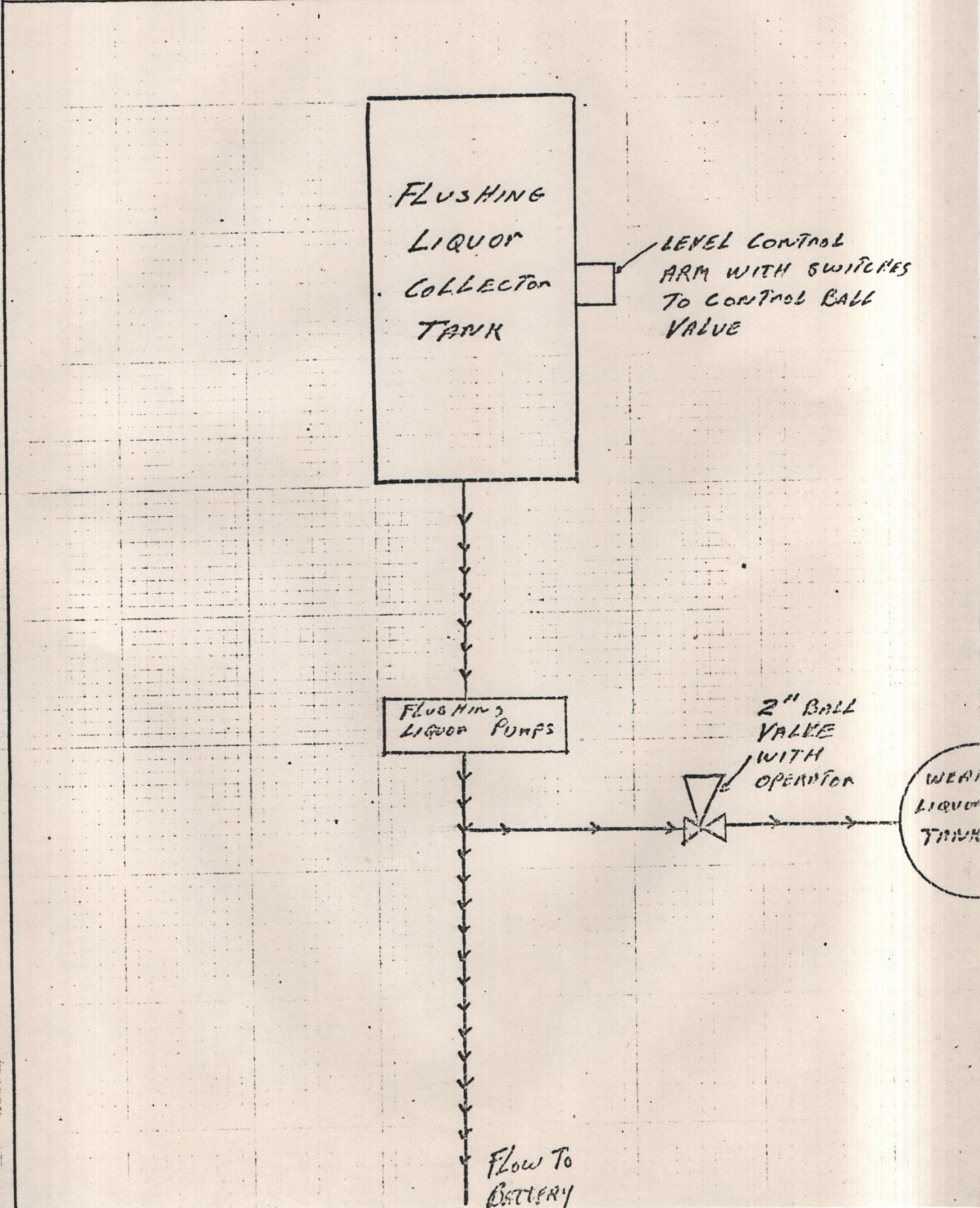
LEVEL CONTROL  
ARM WITH SWITCHES  
TO CONTROL BALL  
VALVE

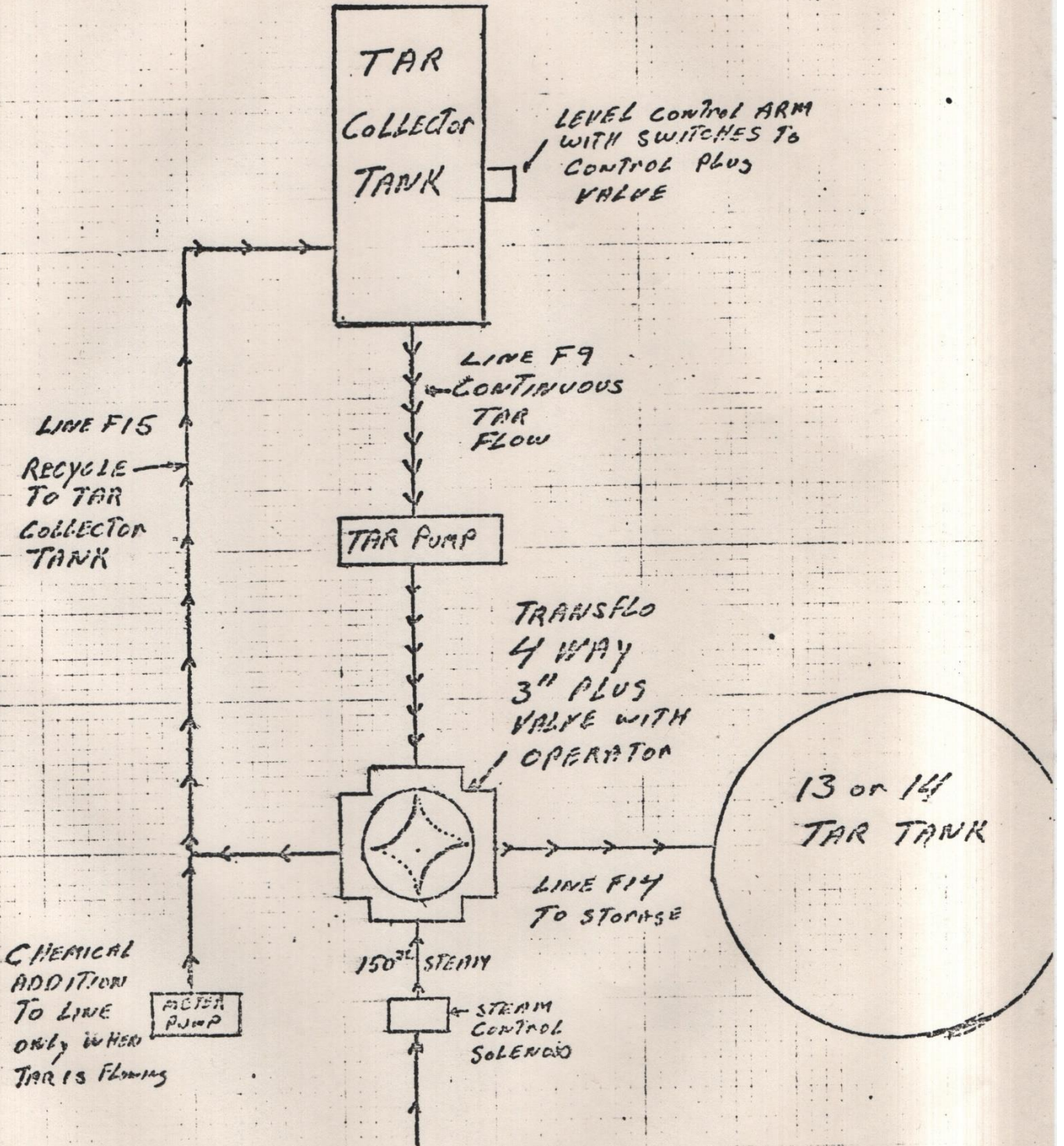


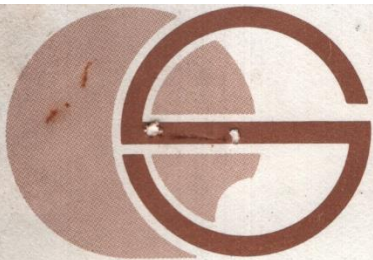
2" BALL  
VALVE  
WITH  
OPERATOR



Flow To  
BATTERY







**GARLAND SMITH ENGINEERING COMPANY, INCORPORATED**

**ENGINEERS - CONTRACTORS - SPECIAL EQUIPMENT**

April 10, 1978

**REGISTERED  
PROFESSIONAL  
ENGINEERS**

Connecticut Interlake, Inc.  
 Coke Plant  
 Florida Torrence Avenue  
 Chicago, Illinois 60617  
 Georgia  
 Illinois Attention: Mr. A. Bailey  
 Indiana Subject: 14" Linestops  
 Iowa 12" By-Pass Taps  
 Kentucky 30 psi 170°F Liquor Line  
 Coke Plant  
 Massachusetts  
 Michigan  
 Minnesota  
 Missouri  
 New Jersey  
 Ohio  
 Pennsylvania  
 Wisconsin

P R O P O S A L

Gentlemen:

I. GENERAL:

We are pleased to submit, subject to the terms and conditions below, this Proposal to furnish engineering, equipment, certain materials, supervision and labor to make the following installation into an existing 14" steel 30 psi 170°F liquor line in the coke plant.

Two (2) 14" Low Pressure Linestops

Two (2) 12" By-Pass Taps

**MEMBERSHIP**

\*Price not to Exceed: \$8,615.00

- AGA
- ASCE
- ASME
- AWWA
- NSPE
- WPCF
- WSE

II. MATERIAL BY SMITH:

We will furnish the following materials:

- a. Two (2) 14"-150# linestop fittings.
- b. Two (2) 14" completion plugs.
- c. Two (2) 14"-150# blind flanges with bolts and gaskets.

\* Work will be performed at Force Account Rates on file with you. Tot-1 price will not exceed \$8615.00 unless scope of work is changed by you.

- d. Two (2) 12" temporary by-pass tapping nozzles.
- e. Two (2) 12" completion plugs,
- f. Two (2) 12"-150# blind flanges with bolts and gaskets.

III. EQUIPMENT BY SMITH:

We will provide the following equipment and machinery:

- a. All necessary drilling (tapping) machinery with hydraulic or electric drive to make the 14" line-stop and 12" by-pass taps.
- b. One (1) set 14" linestopping equipment complete with temporary tapping valves.
- c. One (1) set 12" temporary tapping valves for by-pass line (Note: These valves will be recovered when 14" linestops are removed).

IV. LABOR AND SUPERVISION BY SMITH:

We will furnish all technicians necessary to operate our equipment.

V. MATERIALS BY INTERLAKE:

You or others at your direction will furnish the following materials:

- a. All materials required downstream of our linestops.
- b. Fabricate and install the 12" bypass piping.

VI. LABOR AND EQUIPMENT BY INTERLAKE:

You or others at your direction will provide the following:

- a. All rigging, pipe fitting and welding, welding machines, etc. It will be your responsibility to weld the tapping fittings in a satisfactory, pressure-tight manner to the existing headers and to assemble the valves to the tapping nozzles.

1. You should pressure test the assembled valves and nozzles prior to our arrival at the job-site.
  2. We will provide drawings, upon your request showing the clearances required for our tapping machinery.
- b. Perform all excavation, backfill and site restoration, providing necessary barricades, sheeting, temporary shoring and bracing as required.
  - c. Maintain a reasonable dry, workable trench on underground installations.
  - d. Provide scaffolding, ladders, hoisting equipment and assistance in rigging on any overhead installation.
  - e. Arrange and pay for all permits, licenses, and inspection fees.
  - f. Provide a suitable roadway from public thoroughfare to a point where the pressure taps are to be made. If conditions are such that our truck requires assistance in and out, you, or someone on your behalf, will furnish that assistance.
  - g. All winter protection required.
  - h. All thrust blocks, reaction blocking, concrete cradles or other piping supports necessary before or after completion of our pressure tapping operations.
  - i. Assistance, as necessary, in transporting and/or rigging our pressure tapping equipment.
  - j. We are not responsible for damage to tapping valve or existing utilities after satisfactory completion of the above work by us.

VII. TERMS:

1% - ten (10) days; net - thirty (30) days

April 10, 1978

VIII. ACCEPTANCE:

If our Proposal is acceptable, please sign below as indicated and return one (1) signed copy to our office. No work will be performed by our personnel unless a signed copy of this Proposal is in our possession. The above prices are based upon acceptance within thirty (30) days.

Respectfully submitted,

GARLAND SMITH ENGINEERING CO., INC.

*George A. Blazek/patt*  
George A. Blazek  
Project Engineer

ACCEPTED:

\_\_\_\_\_  
(Name)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Date)

GAB/patt