APPENDIX

APPENDIX C

THIS AGREEMENT, entered into this day of 1968 by and between the Commonwealth of Pennsylvania, acting through the Department of Mines and Mineral Industries, hereinafter referred to as COMMONWEALTH and Rohm and Haas Company, Independence Mall West, Philadelphia, Pennsylvania.

WITNESSETH THAT:

WHEREAS the COMMONWEALTH is undertaking the construction of a treatment plant of acid mine water in the vicinity of Philipsburg, Pennsylvania and

WHEREAS the COMMONWEALTH is contemplating use of the Desal Process of Rohm and Haas Company

NOW, THEREFORE, in consideration of the premises and of the mutual covenants herein contained the parties agree as follows:

1. The Desal Process of Rohm and Haas shall be used in the aforesaid treatment plant.

2. Rohm and Haas agrees to license the Modified Desal Process to any qualified water treatment company that manufactures ion exchange equipment, and that is given the project of supplying the ion exchange equipment for the acid mine drainage plant in Philipsburg, Pennsylvania.

3. The plant utilizing Rohm and Haas acid mine water treating process operating on a blend of mine waters collected in the Philipsburg area having the following analysis:

pH	- 2.0 to 4.5
Hardness	- 600 ppm
Iron, aluminum and manganese	- 35 ppm
Sulfate	- 1020 ppm
Chloride	- 80 ppm

(All concentrations stated in parts per million as calcium carbonate.)

will produce an effluent water having the following analysis:

pH	- 7.0 to 8.5
Iron, aluminum and manganese	- Less than 0.5 ppm
Total dissolved solids	- Less than 300 ppm

and production of such quality effluent by the Plant discharges Rohm and Haas Company from future liability.

If the Plant fails to produce water meeting the effluent standards listed above and examination of the various pieces of equipment disclose no obvious malfunction, Rohm and Haas Company will take core samples of the ion exchange resin from the ion exchange units at the Philipsburg plant and will carry out laboratory studies, using a synthetic water having the influent analysis listed above to determine whether the resin, together with other steps of the process carried out in the laboratory, will produce an effluent quality equal to or better than the effluent analysis listed above. If the effluent quality produced in the laboratory is equal to or better than that of the effluent analysis listed above, this shall be adequate evidence to establish that the resin and the Rohm and Haas process are effective in treating the Philipsburg mine waters and that the failure of the plant to produce adequate quality effluent is a result of equipment malfunction or faulty operation which is beyond the responsibility of Rohm and Haas Company.

If the laboratory studies establish that the particular resin installed in the equipment is failing to produce the required result, Rohm and Haas Company will carry out additional laboratory studies directed toward selecting an alternative resin which is effective in producing the desired result. When such a lot or lots of resin are located, it will be the responsibility of Rohm and Haas Company to furnish resin from this lot or lots to be installed in place of the resin originally installed in the Philipsburg plant.

If Rohm and Haas Company is unable to manufacture and furnish resin which, in laboratory tests, will produce effluent quality equivalent to that listed above, or to modify the conditions of the process to produce such quality effluent, Rohm and Haas Company shall be liable to a maximum of $200,000 of the difference between the installed cost of the plant and the amount of money which can be realized by resale of the various pieces of equipment within one year of the time at which Rohm and Haas Company decided it could not furnish a satisfactory resin.

WITNESS:

ROHM AND HAAS COMPANY

_____
Secretary

_____
Vice President

BY _____
Governor

COMMONWEALTH OF PENNSYLVANIA

BY _____
Budget Secretary

BY _____
Secretary of Mines and
Mineral Industries

Approved as to form and
manner of execution:

_____
Deputy Attorney General

I, F.J. Rarig, certify that I am the Secretary of Rohm and Haas Company; that R.J. Whitesell, who signed this agreement on behalf of Rohm and Haas Company, was then Vice President of said Rohm and Haas Company; that said agreement was duly signed for and in behalf of said Rohm and Haas Company by authority of its governing body, and is within the scope of its corporate powers.

_____
(Corporate Seal)

_____

Equipment List

I Feed System
- A. Mine Hole #1
  - (2) Pumps 500 gpm @ 180' TDH, 40 hp
- B. Mine Hole #3
  - (2) Pumps 500 gpm @ 108' TDH, 25 hp
- C. Red Moshannon
  - (2) Pumps 500 gpm @ 37' TDH, 10 hp

II Ion Exchangers
- (4) Tanks 11' diameter x 13' str. side

III Decarbonator
- (1) Spray Nozzle
- (1) Tank

IV Aerator
- A. (1) 6' x 6' x 22' high, wood slat aerator
- B. (1) Blower 500 CFM @ 9", 1 hp

V Settling Basin
- (2) 40' diameter x 8' deep

VI Lime Softener, Solids Contact Type
- (1) 25' diameter x 15' high

VII Recarbonation
- (1) Mixing Tee

VIII Gravity Filters
- (3) 10' diameter x 10' high

IX Ground Storage Tank
- (1) 40' diameter

X Regeneration Station with Ammonia Recovery
- A. (1) Day tank, 5,000 gal
- B. (2) Chemical Precipitators, 12' diameter, 15,000 gal conical bottom
  - (2) Turbine Agitator, 15 hp
- C. (2) Plant and frame pressure filters with cake conveyor, 1 hp
- D. (1) Stripper
- E. (1) Distillate Storage

Equipment List (continued)

XI Chemical Feed System
- A. Lime
  - (1) Silo 12' diameter x 30' high, cone bottom
  - (1) Gravimetric Feeder
  - (1) Slaker 1000 #/hr with grit remover
  - (1) Storage tank, 5,000 gal with turbine agitator, 3 hp
- B. Carbon Dioxide
  - (1) Storage Vessel 12' diameter x 30' LG (liquid form)
  - (1) Evaporator
- C. Ammonia
  - (1) Storage Vessel 12' diameter x 30' LG
- D. Coagulant Aid
  - (1) Tank with mixer, 1/4 hp

XII Pumps
- A. Ion Exchange Regeneration
  1. Ammonia Feed (1)
  2. Lime Transfer Pump (1), 1/3 hp
  3. Lime Slurry Pumps (2), 1/2 hp
  4. Slurry Pumps (2) 1/2 hp
- B. Lime Softener
  1. Recirculation
  2. Lime Feed (2), 150 gph, 1 hp
  3. Coagulant Aid Feed, (2), 3/4 hp
- C. Gravity Filter
  1. Backwash water to filters, 800 gpm @ 58', 20 hp
  2. Backwash water to softener
  3. Sump Pump, 100 gpm @ 25', 3/4 hp
- D. Service

XIII Instrumentation
- A. Flow Meters
  1. Panel mounted indicate, record, totalize
     - a. raw water
     - b. lime softener influent
     - c. plant effluent
  2. Locally mounted, indicating only
     - a. ion exchange inlet (4)
     - b. gravity filter inlet (3)
     - c. lime feed system (3)
  3. Locally mounted indicate, record, totalize
     - a. lagoon effluent

Equipment List (continued)

B. Specific Conductivity
   Panel mounted, indicate, record
   a. raw water
   b. ion exchange effluent (4)
   c. settling basin effluent
   d. plant effluent

C. pH
   1. Panel mounted, indicate, record
      a. raw water
      b. ion exchange effluent (4)
      c. settling basin effluent
      d. recarbonation effluent
      e. plant effluent
   2. Panel mounted, indicate only
      a. lime softening effluent
      b. decarbonator effluent

D. Total Hardness
   Panel mounted, indicate, record
   a. raw water
   b. lime softener effluent

E. Turbidity
   Panel mounted, indicate, record
   a. raw water
   b. lime softener effluent
   c. plant effluent

F. Pressure Differential
   Locally mounted, indicate only
   a. inlet and outlet of ion exchangers (8)
   b. downstream from main pressure relief valve
   c. inlet and outlet of gravity filter

G. Temperature
   Locally mounted, indicate only
   a. inlet to ion exchangers (4)

AMD MATERIAL BALANCE

Sludge Produced

Aeration Settling Basins

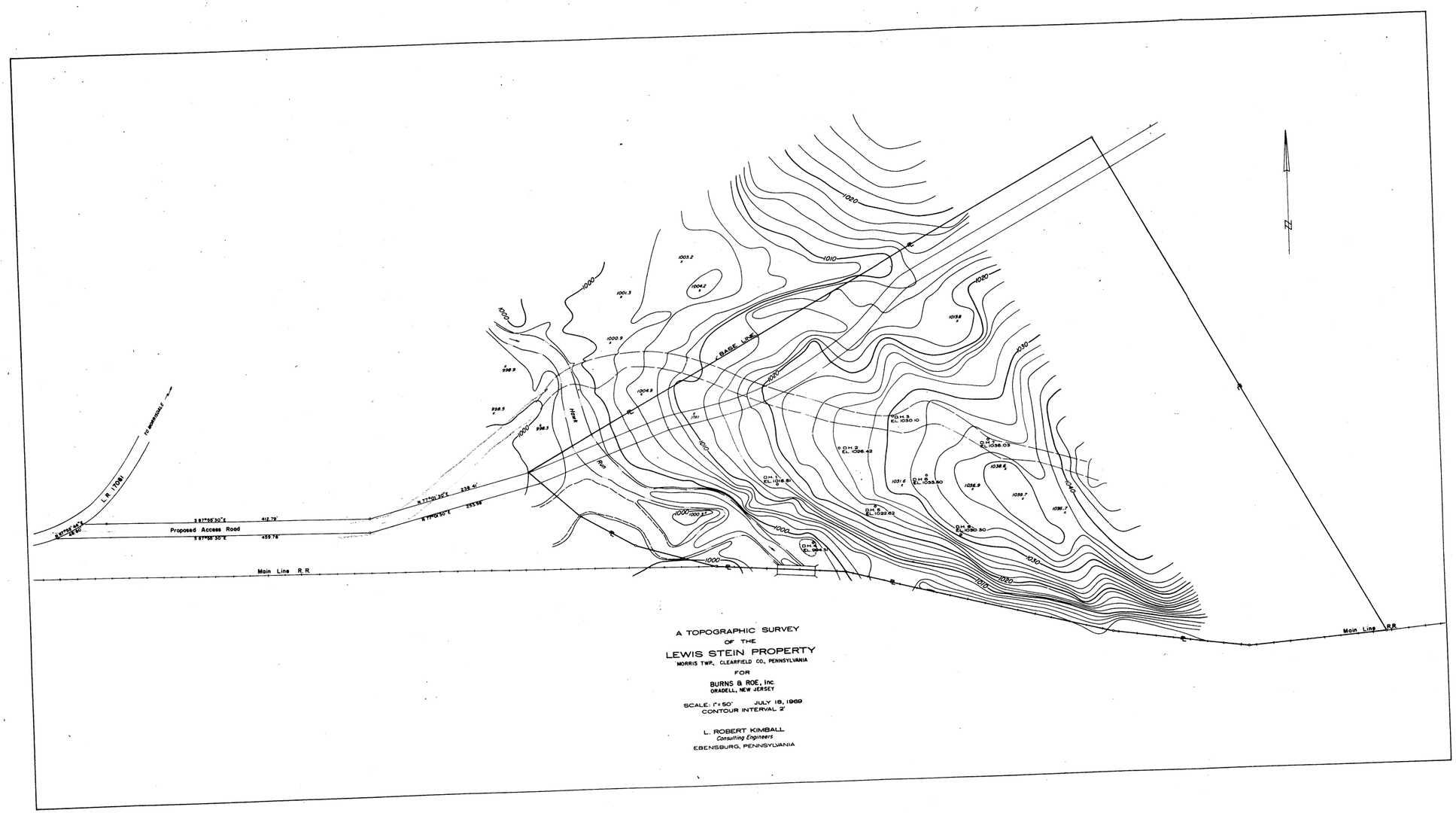
$Mn(OH)_2$	41 #/Day		
$Fe(OH)_3$	1525 #/Day		
$Al(OH)_3$	297 #/Day		
	1863 #/Day	-	1,863 #/Day

Lime Softener

$CaCO_3$	6258 #/Day		
$Mg(OH)_2$	646 #/Day		
$Mn(OH)_2$	112 #/Day		
	7016 #/Day	-	7,016 #/Day

Ammonia Recovery

$Ca\ Cl_2$	78 #/Day		
$CaSO_4 \cdot 2H_2O$	9781 #/Day		
$Ca(OH)_2$	422 #/Day		
	10,281 #/Day	-	10,281 #/Day
	Total	-	19,160 #/Day



A TOPOGRAPHIC SURVEY
OF THE
LEWIS STEIN PROPERTY
MORRIS TWP., CLEARFIELD CO., PENNSYLVANIA
FOR
BURNS & ROE, Inc
ORADELL, NEW JERSEY

SCALE: 1" = 50' JULY 18, 1969
CONTOUR INTERVAL 2'

L. ROBERT KIMBALL
Consulting Engineers
EBENSBURG, PENNSYLVANIA