

Appendix D

To use Statgraphics 1.1 for plotting isotherms with Sorption Program.

- 1) Boot the PC using the MS-DOS DISC
- 2) Type GWBASIC to load GWBASIC
- 3) Remove MS-DOS DISC - put SORPTION program disc in its place.
- 4) LOAD (F3) SORPTION followed by RUN (F2)
- 5) The prompt "Enter name of file to be outputted" is used to create the files for this run for output to the plotter. This name must be written as:- filename. dat. Statgraphics will ask for this filename in the beginning and requires you to type the filename only (not. dat).
- 6) Now ensure this SORPTION program disc is in drive B, if not then remove it and place it in drive B. Put Statgraphics START- up disc in drive A.
- 7) Type SYSTEM to get out of GWBASIC.
- 8) Type STATGRAF [ENTER] and wait. Then select automatic logon if using an Olivetti PC. If not then type N and answer the prompts.
- 9) Remove START-UP disc and put Statgraphics PROGRAM DISC 1 in its place. Press [ENTER]
- 10) When master menu appears use cursor to A5 (Import ASCII files or type A5.

- 11) Select formatted by typing F.
- 13) Type filename in (as explained in 5 above)
- 14) The record width typed in must be greater than the actual record width or data will be dropped off the end of each record. Type 120 and this is easily sufficient.
- 15) To avoid confusion type STfilename when the prompt comes for the statgraphics filename or use some type of uniform convention so there is no confusion between the ASCII filename and the Statgraphics filename.
- 16) Press F5 to get the positions of the records in the file. It can be seen that pressure Y(n) is in columns 3 and 6, methane Q(N) is 9-14, P(N) is 17-22, S(N) is 25-30, Q DS(N) is 33-38, PDS(N) is 41-46 and SDS(N) is 49-54. The first plot is for Y(N), Q(N), P(N) and S(N). All fields must start at 1 column less than indicated above.
- 17) Press F10 to go back to A5 and type pressure [TAB], N (because all values are numeric), 2 (1 less than 3 indicated above) [tab], 6 [TAB], M10 [TAB], N, 8 [TAB], 14 [TAB], M20 [TAB], N, 16 [TAB], 22 [TAB] , M30 [TAB] N, 24 [TAB], 30 [TAB]. Press [ENTER] and this now reverts to Data Management.
- 18) Use cursor to go up to A3 or type A3 to read variable definitions from SG file.

- 19) There are 4 variable names indicated. For pressure type A, use cursor to move to M10 and type A, and similarly for M20 and M30.
- 20) Type E4 for plotting Functions, X-Y Lineplot, followed by pressing F4 key to set REC: ON (bottom right corner) for the plotter.
- 21) Observations for X axis, type pressure.  
Observations for Y axis, type M10.  
Additional observations for Y axis, type M20.  
Additional observations for Y axis, type M30.  
Additional observations for Y axis, press
- 22) After the graphs have plotted and the prompt appears in the bottom left corner press [ENTER].
- 23) For prompt to save plot type N (No)  
For prompt to modify plot type Y (Yes)
- 24) For top line 1, type name of colliery followed by the sample number, in caps lock.  
For top line 2, underline the top line.  
For X axis title, change pressure to Pressure (MPa).  
For Y axis title, change methane 10 to Methane content (cubic m/t) Press [ENTER].
- 25) The graph replots and when prompt appears again press [RETURN] or F3 key to save plot. If pressed [RETURN] then type Y for save plot and give the graph the same number as the sample number. Type N for modify plot.
- 26) After having plotted the above repeat for dry-ash free, standard temperature and pressure plot y(N), QDS(N), PDS(N) and SDS(N).

To Use Statgraphics 2.0 or 2.1 for plotting isotherms with Sorption Program.

- 1) - 9) as for 1.1
- 10) Type A then [ENTER]. Move cursor to A3 Import Data Files.
- 11) -14) as for 1.1.
- 15) -17) as for 1.1. except type in F6 when complete. When Import ASCII Files is complete, press [ENTER].
- 18) Move cursor to E for Plotting functions and press [ENTER].
- 19) Move cursor to 2 for Multiple X-Y Plots and press [ENTER].  
  
Type Pressure for X and press [ENTER], M10 for Y, press [ENTER], M20 for second Y and M30 for third Y. Press shift F9 to set REC: ON. Put in a disk which will be used for Statgraphics plots only. Now press F6.
- 20) Press F5 after plot is finished. Press [ENTER] for Plot options.
- 21) Change top title.  
Change x-Axis title to Pressure (MPa).  
Put in Y-Axis title Methane content (cub. m/t).  
For Points type N, type 00000...0  
Legend Position. Horizontal 0.9 Vertical 1.2

Legends Change M10 to 10C.

Press F6.

- 22) Move cursor to Graphics Options and press [ENTER].

Change line colours to 234.

Grid: type N

Tickmark Length: 0,20

|          |        |        |
|----------|--------|--------|
| Windows. | Origin | Width. |
|----------|--------|--------|

|            |      |      |
|------------|------|------|
| Horizontal | ,080 | ,820 |
|------------|------|------|

|          |      |      |
|----------|------|------|
| Vertical | ,200 | ,650 |
|----------|------|------|

Press F6

- 23) Move cursor to Replot.

- 24) Press F10.

Now after putting in the Replay number and comment press [ENTER].

Then do the second Plot for M10S, M20S and M30S.

Only some points such as title, X & Y - Axes and Length need altering again.

- 25) Again after it has replotted enter file number and comment press F10.

- 26) For further plots put in the data disk again for steps 1-18 and replace the Statgraphics plot disc. This process can be repeated until the Statgraphics plot disc is full.

- 27) If a hard copy of the isotherms is required, the operator can call the graph plot file. He then goes to D for Plotter Interface and presses [ENTER]. For the

first plot in a session it is necessary to do Communications Initialization and Plotter Initialization but thereafter one only needs to Send Recorded Files to Plotter.

- 28) Communications Initialisation press [ENTER]. Sometimes the Port needs to be changed from A to whatever other port the plotter may be connected to. (COM uses port C). When ready press F6 followed by ESC.
- 29) Plotter Initialization. When ready press F6.
- 30) Send Recorded Files to Plotter. Select which files one wishes to send to the plotter. When ready press F6.

## Appendix E

Regression Analysis - Linear model:  $Y = a + bX$ 

Dependent variable: K220

Independent variable: VOL-TILES

| Parameter | Estimate  | Standard Error | T Value  | Prob. Level |
|-----------|-----------|----------------|----------|-------------|
| Intercept | 0.452347  | 0.483039       | 0.937407 | 0.356464    |
| Slope     | 1.0024773 | 0.3207491      | 3.12647  | 0.002841    |

## Analysis of Variance

| Source        | Sum of Squares | Df | Mean Square | F-Ratio   | Prob. Level |
|---------------|----------------|----|-------------|-----------|-------------|
| Model         | .8704973       | 1  | .8704973    | 1.1739110 | .28784      |
| Error         | 14.089201      | 28 | .503186     |           |             |
| Total (Corr.) | 14.959697      | 29 |             |           |             |

Correlation Coefficient = 0.200695

R-squared = 4.02 percent

Std. Error of Est. = 0.709136

Regression Analysis - Linear model:  $Y = a + bX$ 

Dependent variable: K120

Independent variable: VOL-TILES

| Parameter | Estimate  | Standard Error | T Value  | Prob. Level |
|-----------|-----------|----------------|----------|-------------|
| Intercept | 73.4739   | 4.67135        | 15.72412 | 2.84654E-8  |
| Slope     | -0.715382 | 0.200636       | -3.56474 | 5.24079E-4  |

## Analysis of Variance

| Source        | Sum of Squares | Df | Mean Square | F-Ratio  | Prob. Level |
|---------------|----------------|----|-------------|----------|-------------|
| Model         | 722.23814      | 1  | 722.23814   | 15.54645 | .00052      |
| Error         | 1817.7189      | 28 | 64.91853    |          |             |
| Total (Corr.) | 2539.9571      | 29 |             |          |             |

Correlation Coefficient = -0.595014

R-squared = 35.40 percent

Std. Error of Est. = 8.056011

## Appendix E

Regression Analysis - Linear model:  $Y = a + bX$ 

Dependent variable: K220

Independent variable: VOL-TILES

| Parameter | Estimate  | Standard Error | T Value  | Prob. Level |
|-----------|-----------|----------------|----------|-------------|
| Intercept | 0.452347  | 0.483309       | 0.937407 | 0.356464    |
| Slope     | 0.0124773 | 0.0207491      | 1.03147  | 0.287841    |

## Analysis of Variance

| Source        | Sum of Squares | Df | Mean Square | F-Ratio   | Prob. Level |
|---------------|----------------|----|-------------|-----------|-------------|
| Model         | .7918903       | 1  | .7918903    | 1.1739110 | .28784      |
| Error         | 14.039201      | 28 | .503186     |           |             |
| Total (Corr.) | 14.831091      | 29 |             |           |             |

Correlation Coefficient = 0.200595

F-squared = 4.02 percent

Std. Error of Est. = 0.709124

Regression Analysis - Linear model:  $Y = a + bX$ 

Dependent variable: K120

Independent variable: VOLATILES

| Parameter | Estimate  | Standard Error | T value  | Prob. Level |
|-----------|-----------|----------------|----------|-------------|
| Intercept | 21.4739   | 4.67135        | 4.59402  | 2.84654E-5  |
| Slope     | -0.735982 | 0.200816       | -3.66749 | 5.24079E-4  |

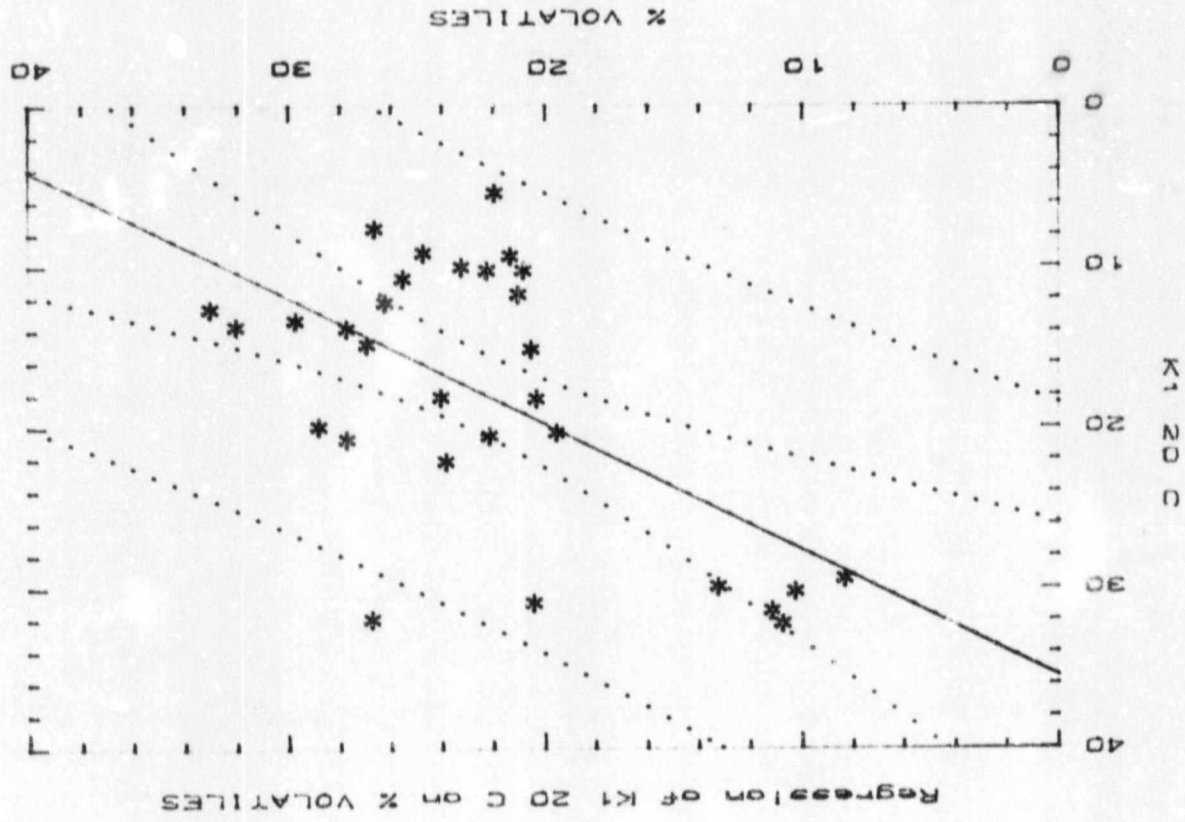
## Analysis of Variance

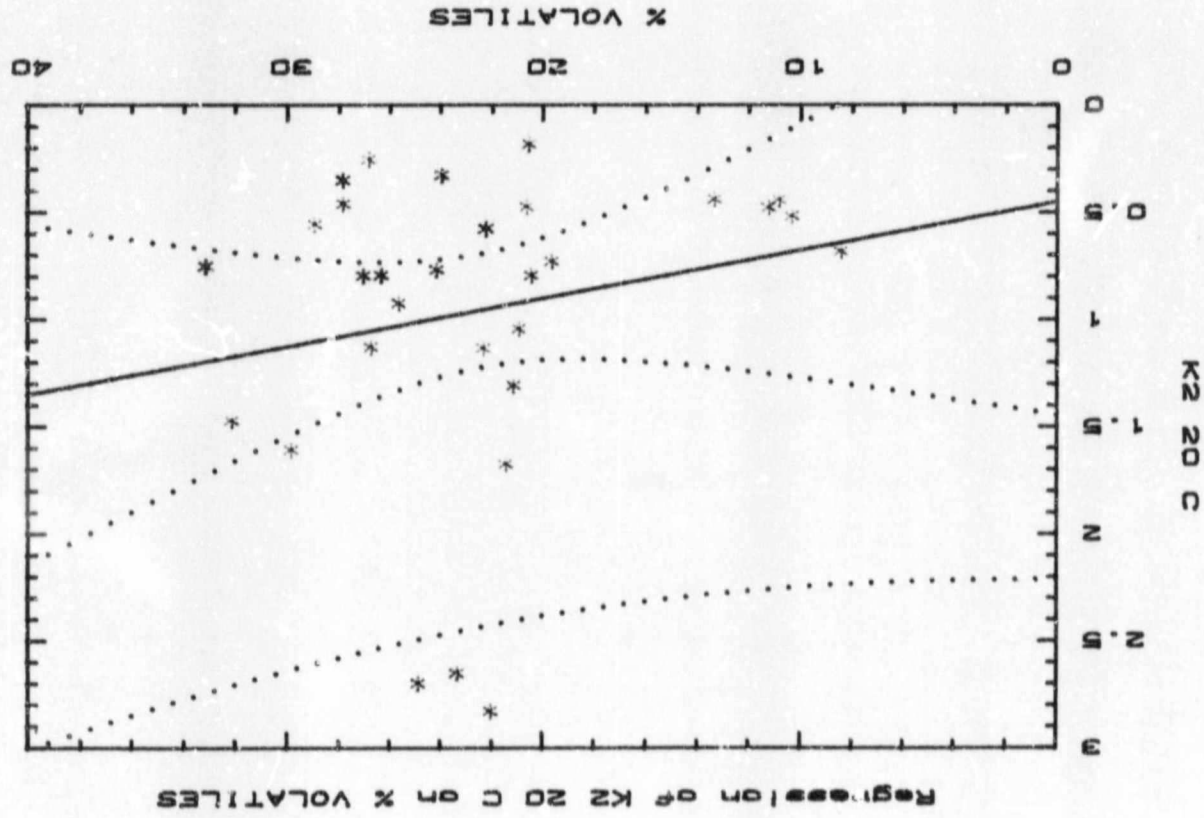
| Source        | Sum of Squares | Df | Mean Square | F-Ratio  | Prob. Level |
|---------------|----------------|----|-------------|----------|-------------|
| Model         | 721.23614      | 1  | 721.23614   | 15.34645 | .00052      |
| Error         | 1317.7197      | 28 | 47.0614     |          |             |
| Total (Corr.) | 2038.9558      | 29 |             |          |             |

Correlation Coefficient = -0.895114

F-squared = 35.40 percent

Std. Error of Est. = 6.86012





Regression Analysis - Linear model:  $Y = a + bX$

Dependent variable: R100

Independent variable: F1/EDC4B

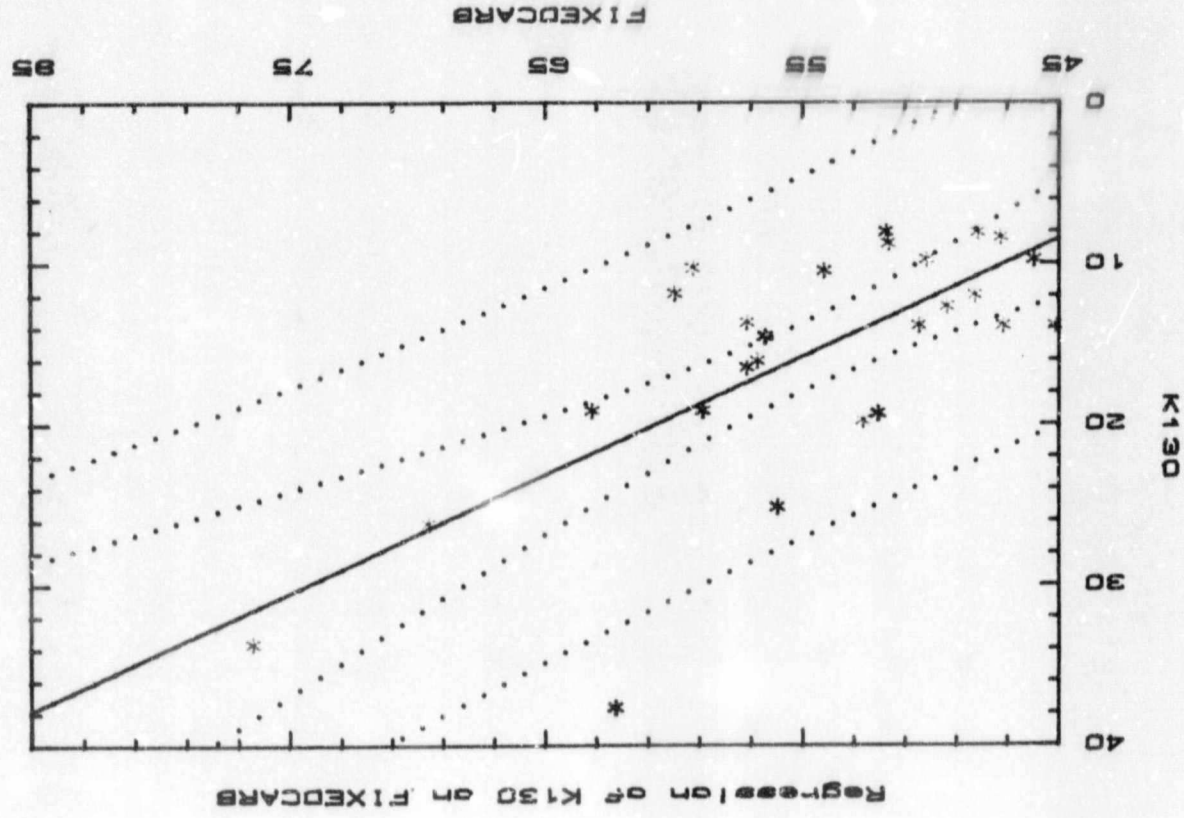
| Parameter | Estimate | Standard Error | T Value  | Prob. Level |
|-----------|----------|----------------|----------|-------------|
| Intercept | -24.5548 | 5.022          | -3.06093 | 5.21342E-3  |
| Slope     | 0.754215 | 0.144923       | 5.06622  | 3.14048E-5  |

#### Analysis of Variance

| Source        | Sum of Squares | Df | Mean Square | F-Ratio  | Prob. Level |
|---------------|----------------|----|-------------|----------|-------------|
| Model         | 739.32452      | 1  | 739.32452   | 25.66651 | .00003      |
| Error         | 730.12289      | 25 | 28.90492    |          |             |
| Total (Corr.) | 1459.4474      | 26 |             |          |             |

Correlation Coefficient = 0.711743  
 Stand. Error of Est. = 5.28702

F squared = 50.66 percent



Regression Analysis - Linear model:  $Y = a + bX$

Dependent variable: R130

Independent variable: F1XEDCAPB

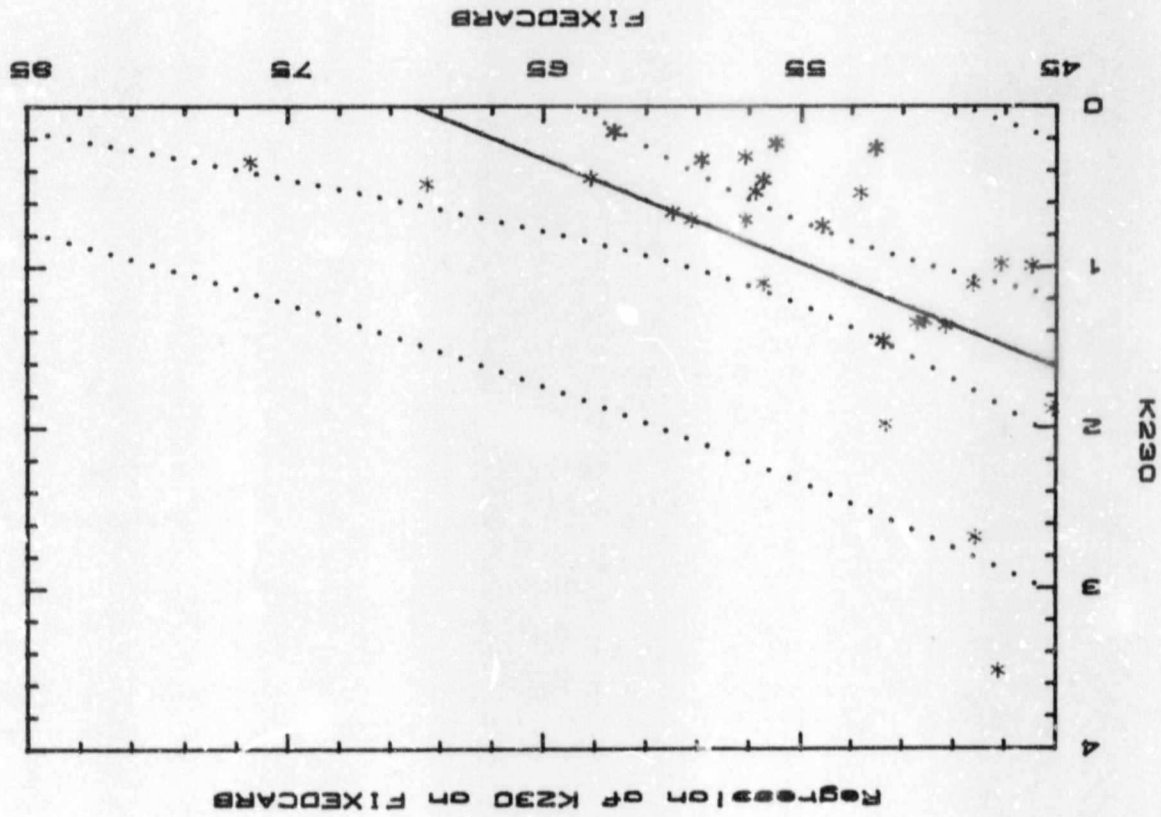
| Parameter | Estimate  | Standard Error | T Value  | Prob. Level |
|-----------|-----------|----------------|----------|-------------|
| Intercept | 4.51307   | 0.971993       | 4.64433  | 8.91464E-5  |
| Slope     | -0.167225 | 0.0175979      | -9.50637 | 1.10353E-3  |

#### Analysis of Variance

| Source        | Sum of Squares | Df | Mean Square | F-Ratio   | Prob. Level |
|---------------|----------------|----|-------------|-----------|-------------|
| Model         | 5.745135       | 1  | 5.745135    | 13.599332 | .001131     |
| Error         | 10.569310      | 21 | .422772     |           |             |
| Total (corr.) | 16.314445      | 22 |             |           |             |

Correlation Coefficient = -0.593424  
Std. Error of Est. = 0.65021

R-squared = 35.22 percent



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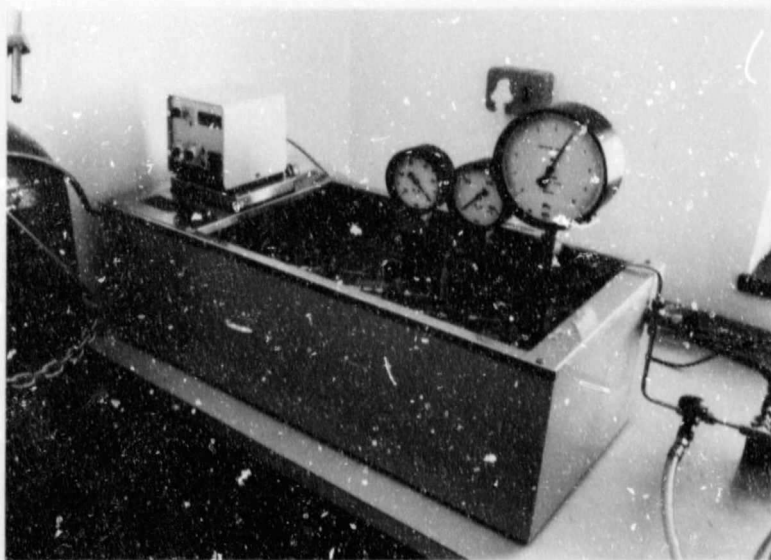
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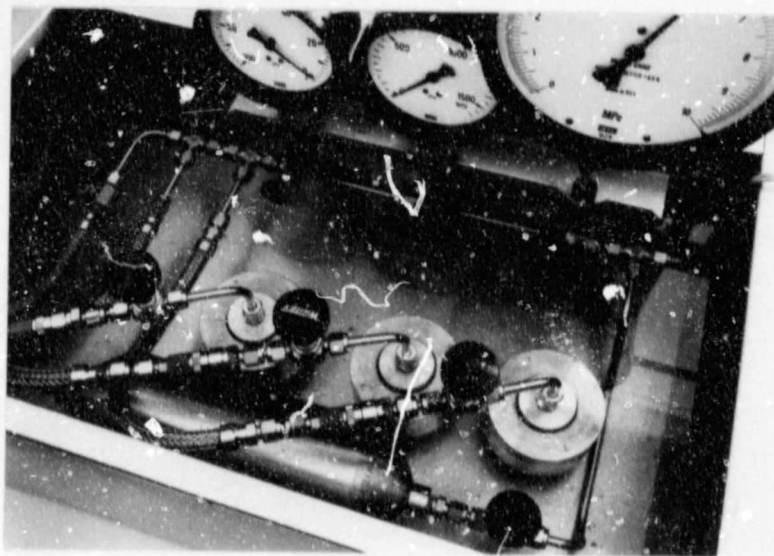
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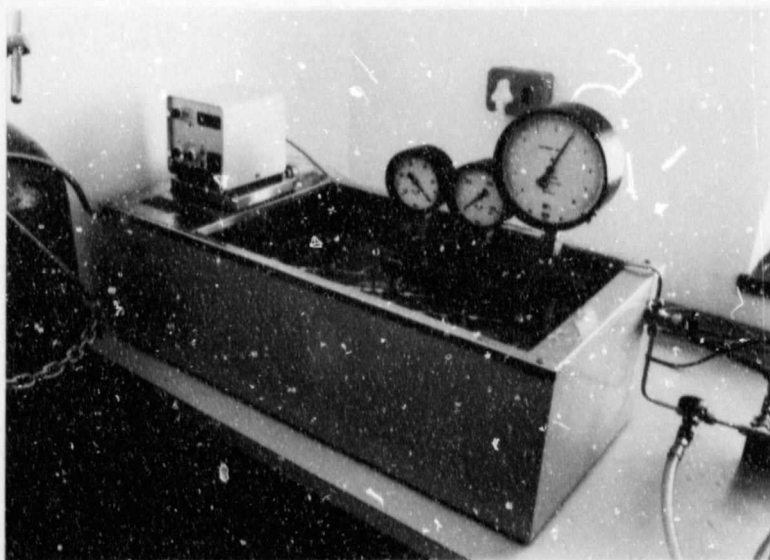
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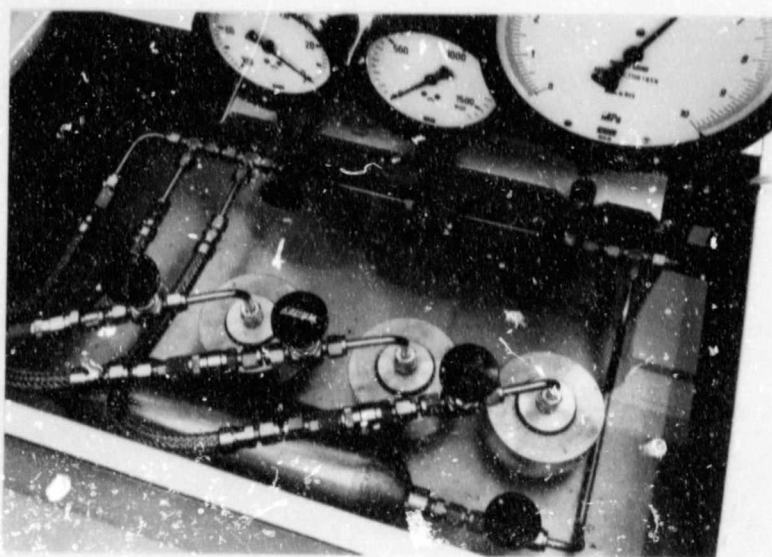
1. Bombs in temperature controlled bath.



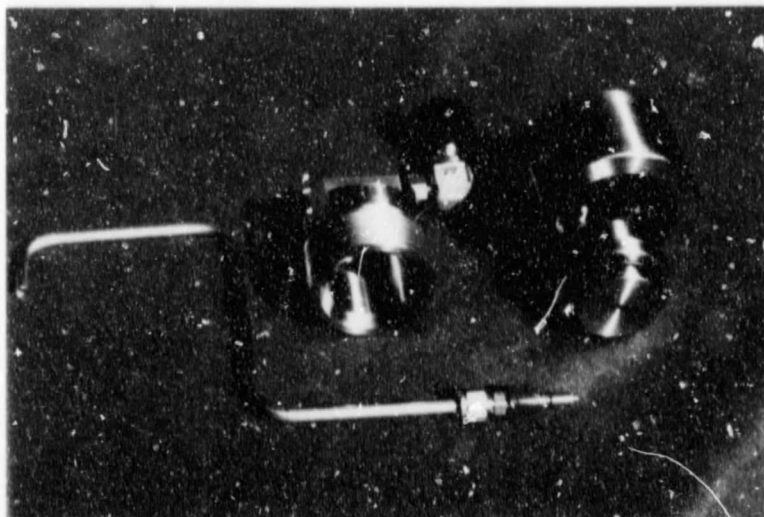
2. Top view of bombs in bath next to the sampling cylinder.



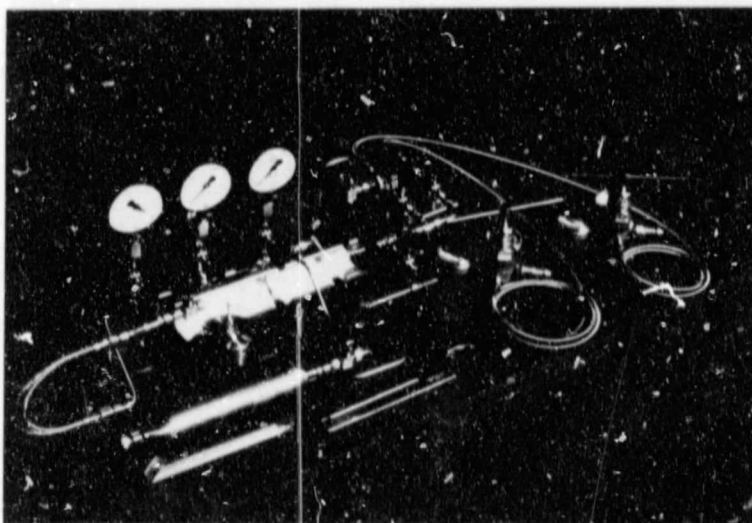
1. Bombs in temperature controlled bath.



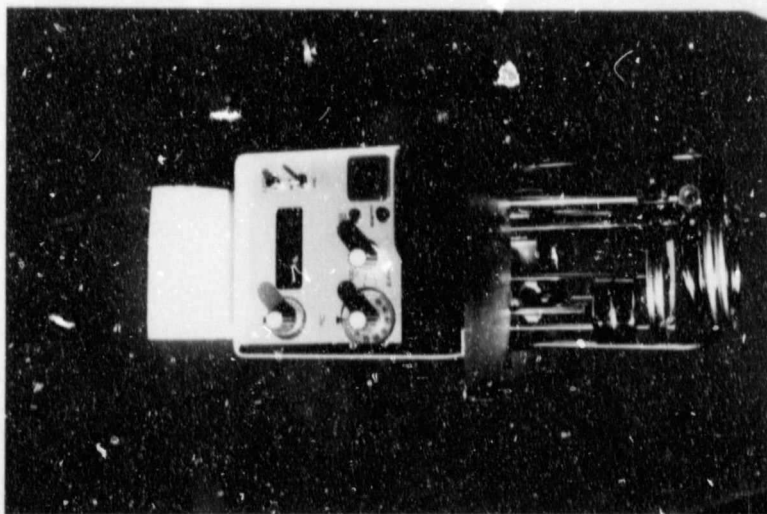
2. Top view of bombs in bath next to the sampling cylinder.



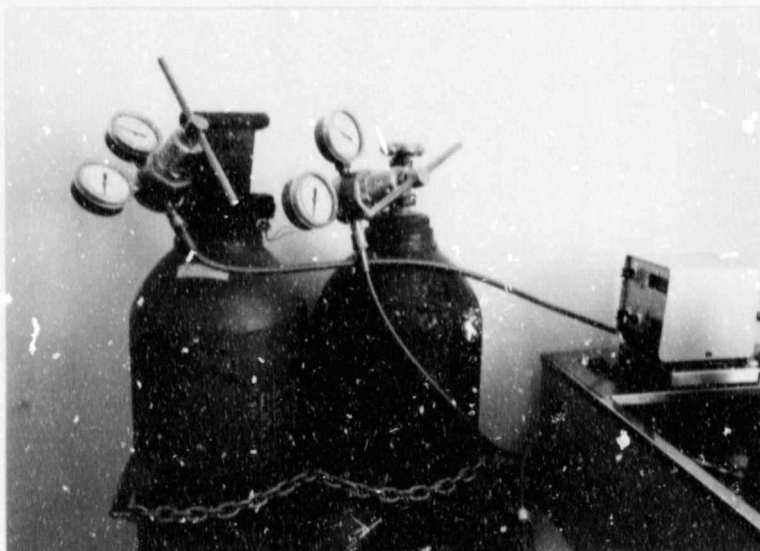
3. Dissembled view of bomb.



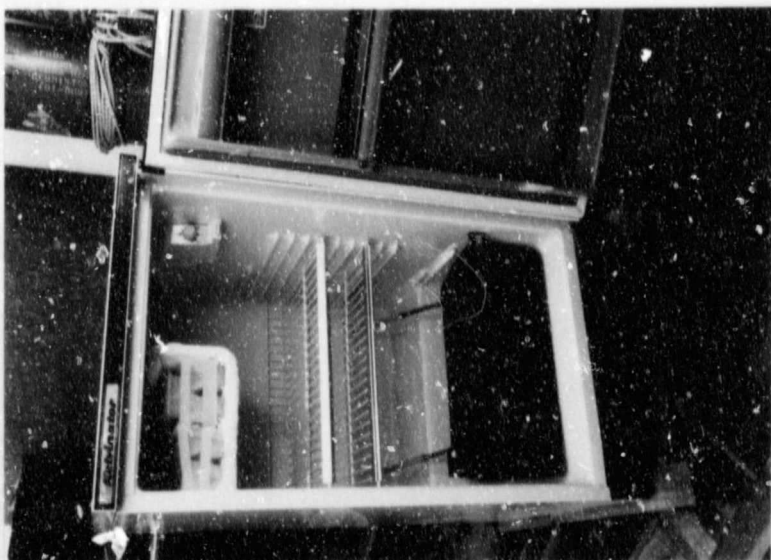
4. View of components to be assembled inside the bath together with the regulators and spanner used to open the bombs.



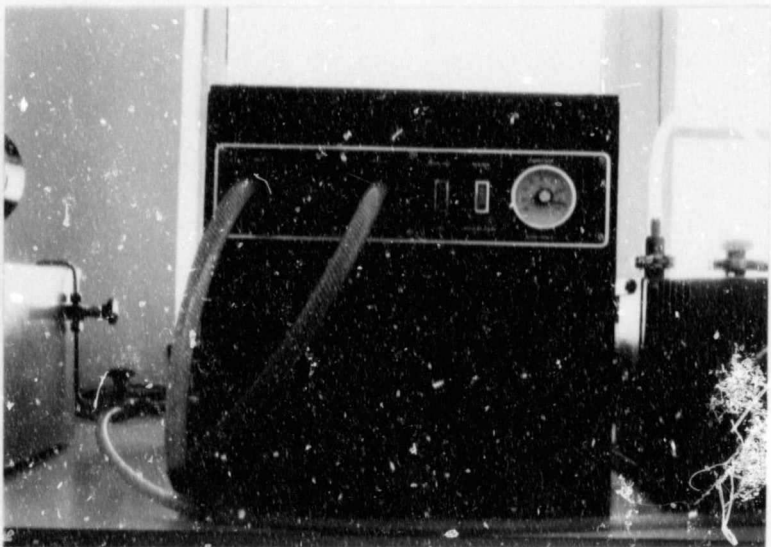
5. Jalabo VC circulator.



6. Red methane cylinder and regulator  
with brown helium cylinder and regulator.



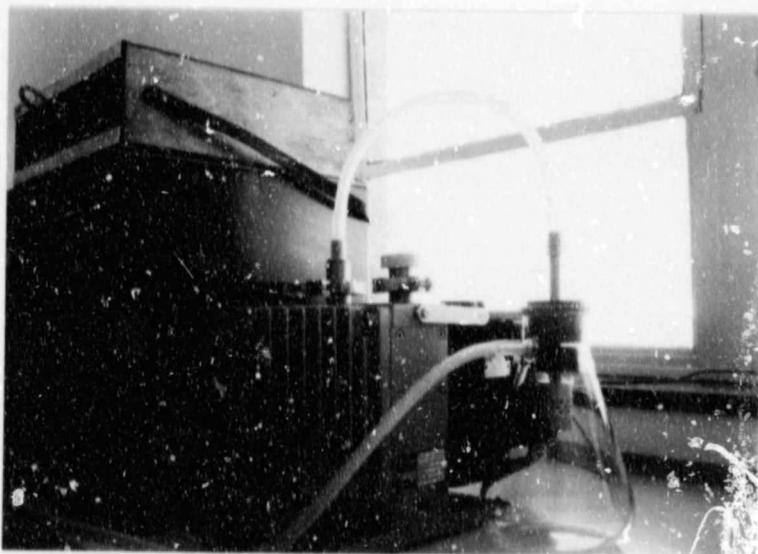
7. Fridge showing copper coil in water and ice trays.



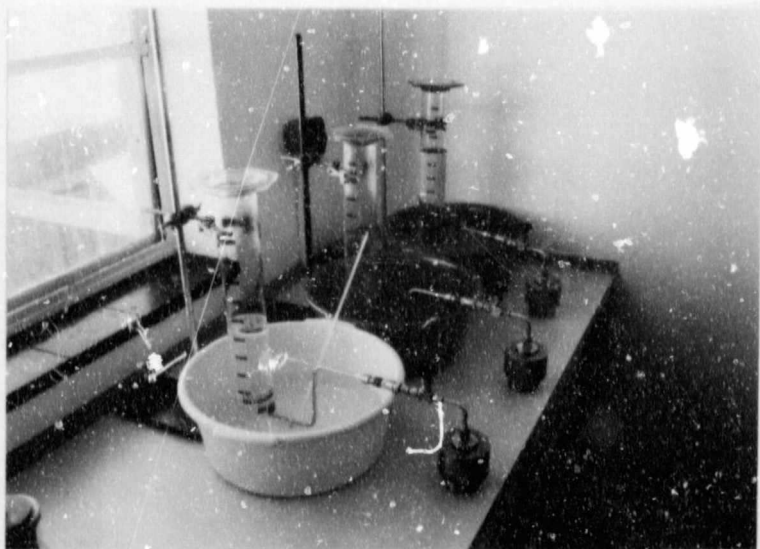
8. Labotec flow through cooler.



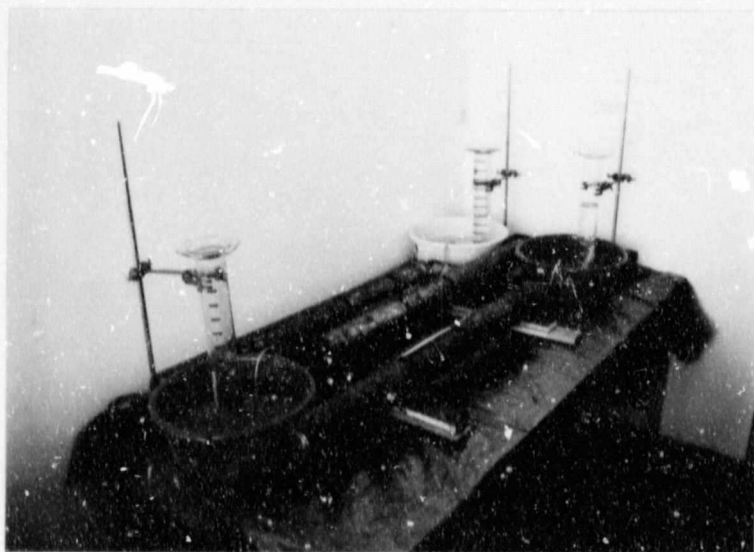
9. Rand Mines didgi-quartz barometer  
showing L.E.D. and L.C.D. readouts.



10. Water trap and Pfeiffer vacuum pump.



11. Bombs desorbing into measuring cylinders and thermometer.



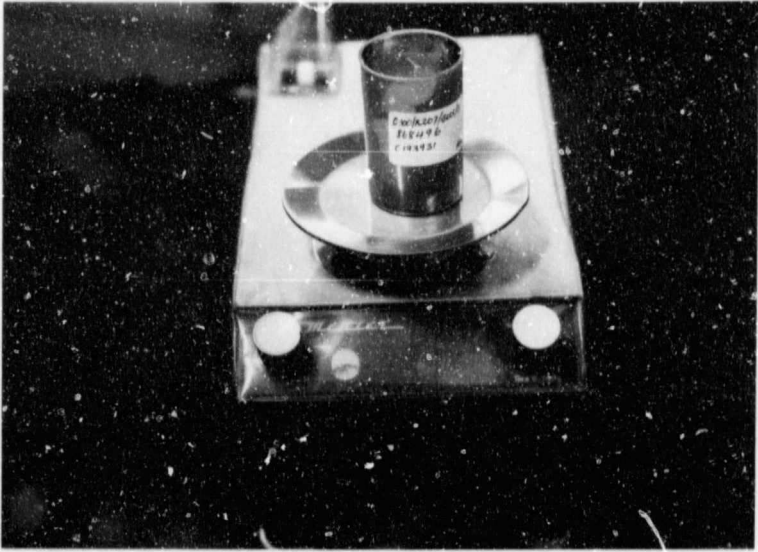
12. Direct test core cylinders desorbing into measuring cylinders.



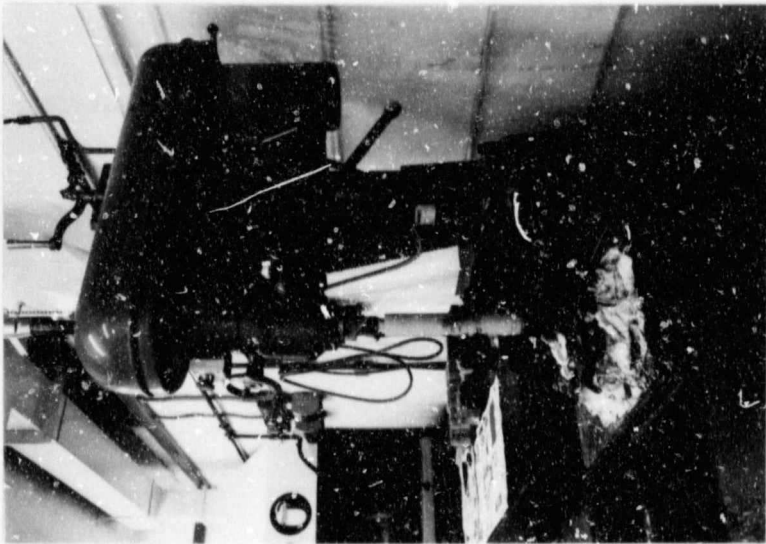
13. Coal crushing cell.



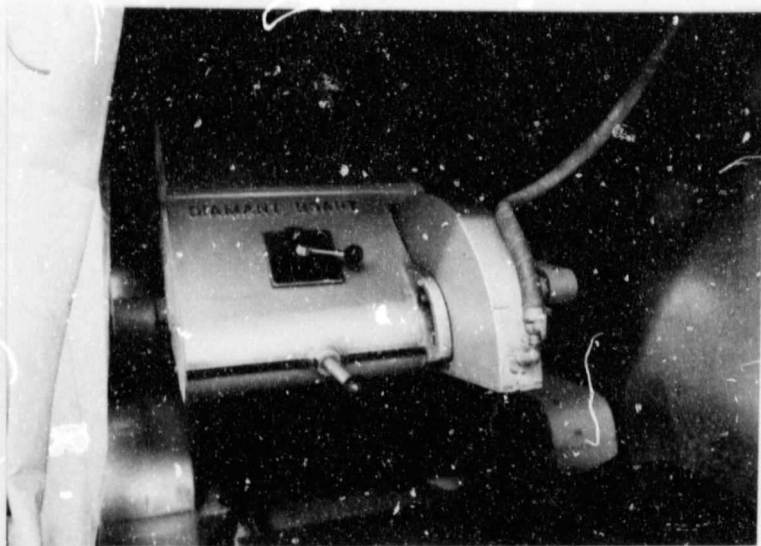
14. Coal crushing all in vibrator showing  
timer and controls.



15. Laboratory Mettler balance.



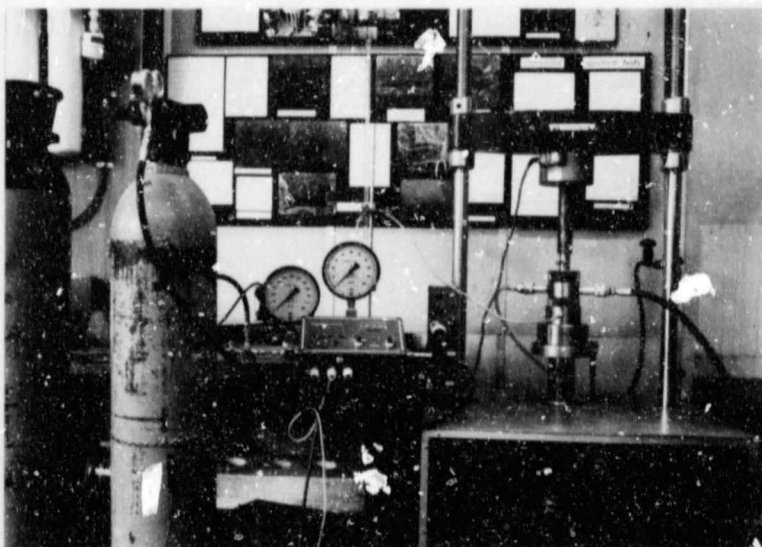
16. Matheys coring machine being used  
with a block of coal.



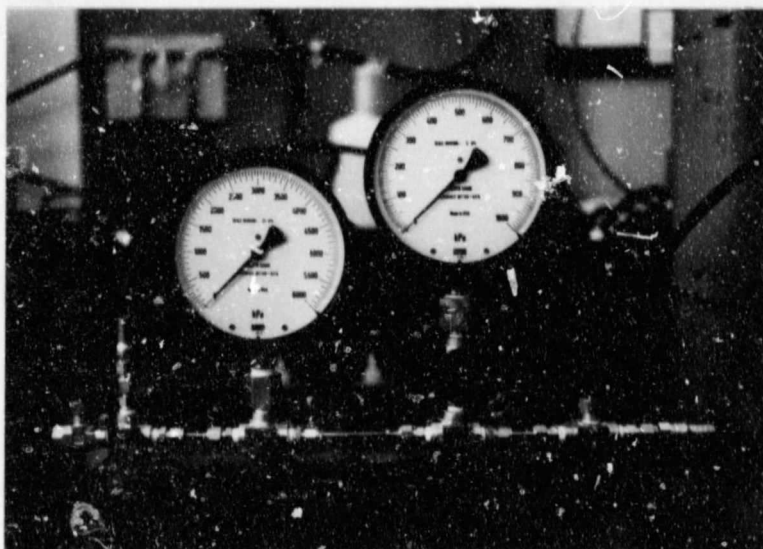
17. Diamant Boart diamond saw.



18. Lapping machine with 3 cores inserted  
and its control switches.



19. Clockhouse axial loading apparatus,  
axial load pressure transducer and  
gauges for gas pressure measurement.



20. Inlet gas pressure measuring apparatus.

**Author** Billenkamp Ernst Gottfried

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