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ACCUMULATOR EXTRACTION VACUUM ANALYSIS

J. SATTI

OCTOBER 30, 1984

ENGINEERING NOTE

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TEV I

1/4

SUBJECT

ACCUMULATOR EXTRACTION
VACUUM ANALYSIS

NAME

JOHN SATTI

DATE

10-30-84

REVISION DATE

ACCUMULATOR AT LAMBERSTON EXTRACTION THE FOLLOWING IS REQUIRED:

1. AREAS L_1 , L_2 AND L_3 IN-SITU BAKE AT 300°C
TO GIVE OUTGASSING RATE OF $Q_D = 1 \times 10^{-13}$ TORR L/SEC CM²
2. SUBLIMATION PUMP REQUIRED BETWEEN THE LAMBERSTON AND "C" MAGNET
3. PROVISION (FLANGE) AT ION PUMP (AT EQ1) FOR POSSIBLE SUBLIMATION PUMP IN FUTURE.

PRESSURES CALCULATIONS

$$P_L - P_{O_1} = 3.4 \times 10^{-11} \text{ TORR}$$

$$P_L - P_{O_2} = 8.3 \times 10^{-11} \text{ TORR}$$

$$P_L - P_{O_3} = 2.3 \times 10^{-11} \text{ TORR}$$

$$\text{WITH } S_p \approx 1700 \text{ L/sec}$$

$$Q_D = 1 \times 10^{-13} \text{ TORR L/sec cm}^2$$

$$P_{L_{AV}} = 4.7 \times 10^{-11} \text{ TORR}$$

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AP-3 TRANSFER LINE DOWNSTREAM OF LAMBERSTON

TOTAL CONDUCTANCE (4 TO L)

$$\frac{1}{C_{4L}} = \frac{1}{C_4} + \frac{1}{C_7} + \frac{1}{C_9} + \frac{1}{C_{23}} + \frac{1}{C_{16}} \quad C_{4L} = 8.2 \text{ l/sec}$$

$$B_{AY} = 36.7 \text{ cm} \quad L_T = 855 \text{ cm}$$

W/NO 300°C BAKE $q_0 = 1 \times 10^{-12} \text{ TL/sec cm}^2$

$$P_3 - P_4 = \frac{q_0 \cdot L_T}{C_{4L}} = \frac{1 \times 10^{-12} \cdot 855}{8.2} = 1.9 \times 10^{-9} \text{ TORR (HIGH!)}$$

W/300°C BAKE

$$P_3 - P_4 = 1.9 \times 10^{-10} \text{ TORR (MARGINAL)}$$

NEED SUBLIMATION PUMP BETWEEN
LAMBERSTON AND 'C' MAGNET

LAMBERSTON REQUIRES TO BE BAKED

$$P_3 - P_0 = q_0 \frac{BL}{2C}$$

$$\Delta P = 1 \times 10^{-12} \frac{30.5 \cdot 244}{2 \cdot 16.2}$$

$$\Delta P = 2.3 \times 10^{-10} \text{ TORR (MARGINAL)}$$

W/300°C BAKE

$$\Delta P = 2.3 \times 10^{-11} \text{ TORR OK NEEDS BAKE}$$

$$P_3 = q_0 BL \left[\frac{1}{S_p} + \frac{1}{2C} \right]$$

$$P_3 = 2.3 \times 10^{-11} \text{ TORR OK}$$

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ACCUMULATOR DOWNSTREAM OF LAMBERSTON

IN-SITU 300°C

BAKE

$$q_0 = 1 \times 10^{-13} \frac{\text{Tl}}{\text{sec cm}^2}$$

137"	91.6"
348 cm	233 cm
⊗ 4" O.D. B = 32 cm	⊗ B = 21.3 cm
C = 33.0 l/sec	C = 13.7 l/sec
$\frac{1}{C_2} = \frac{1}{33} + \frac{1}{13.7}$ $C_2 = 9.68 \text{ l/sec}$	$L_2 = 581 \text{ cm}$ $B_{AV} = 27.7 \text{ cm}$

$$P_{L_2} - P_0 = q_0 \frac{BL}{2C}$$

$$= \frac{1 \times 10^{-13} \cdot 27.7(581)}{2(9.68)}$$

$$\Delta P_2 = 8.3 \times 10^{-11} \text{ TORR}$$

$$P_{L_1} = q_0 BL \left[\frac{1}{S_P} + \frac{1}{2C} \right] \quad \left(\text{ROTH} \right)$$

$$= 1 \times 10^{-13} \cdot 27.7(581) \left[\frac{1}{1700} + \frac{1}{1936} \right] \quad \left(P 133 \right)$$

$$P_{L_1} = 8.4 \times 10^{-11} \text{ TORR}$$

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ACCUMULATOR UPSTREAM OF LAMBERSTON

$$P_L - P_0 = q_0 \frac{BL}{2C}$$

$$P_L - P_0 = \frac{1 \times 10^{-13} \cdot 37.6 \cdot 513}{2 \cdot 28.47}$$

$$\Delta P_L = 3.4 \times 10^{-11} \text{ TORR}$$

$$P_L = q_0 BL \left[\frac{1}{S_p} + \frac{1}{2C} \right] \quad \left(\text{REF. ROTH} \right)$$

$$P_L = 1 \times 10^{-13} \cdot 37.6 \cdot (513) \left[\frac{1}{1700} + \frac{1}{2(28.47)} \right]$$

$$P_L = 3.5 \times 10^{-11} \text{ TORR}$$