November 23,1983

TO: K. L. Graesser

SUBJECT: Zion Station Onsite Review to verify proper operation of Integrated Leak Rate Test computer program with benchmark examples and manual hand calculations.

To verify that the Apple IIE computer programs used during the Zion Station containment integrated leakrate test (ILRT) give accurate results, hand calculations for a sample dataset are provided, with the corresponding computer printouts.

The results show an acceptable correlation between the hand calculations and the computer printouts, therefore the program is considered acceptable for use. The leakrate calculation method employed is the MASS-PLOT method.

Prepared by Art Amorozo Disciplines required A B

Station Review:

Nicholas A Valos A B C G A D Ockert A B C E G

I concur and approve G Rhimpf for

K. L. Graesser
Superintendent
Zion Station

8507120137 850412
PDR FOIA
REYTBLA85-136 PDR

FOIA-85-136
B/2

A. OVERVIEW OF LEAK RATE TEST COMPUTER PROGRAM

The computer programs used for the ILRT were written in APPLESOFT BASIC using DOS 3.3 disk operating system. This is the standard language supplied by APPLE COMPUTER and is resident in read-only memory. Applesoft Basic has all the necessary arithmetic capabilities needed for ILRT computations with the exception of double precision, necessary for the leak rate computations. When double precision is necessary, a special double precision floating point subroutine supplied by S-C Software is called and provides 21 digit precision. All other calculations are done in the normal 9 digit precision.

The program autostarts when the computer is turned on and is basically a menu-driven system. All functions are performed through a series of menus which prompt the user.

A real time clock resident in the computer keeps the official test time and displays the total elapsed time and time remaining until the next dataset. It is crystal controlled with a battery backup for power interruptions.

A modem is used to input the raw data from the DAS located in the AUX building through station phone lines. Another modem can be optionally used to pass calculated values to the station Prime computer for plotting mass, leakrate, temperature, dewpoint, or vapor pressure vs time.

B. BRIEF DESCRIPTION OF PROGRAMS USED IN ILRT TEST

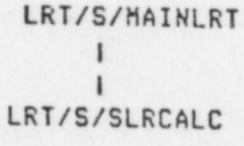
The software consists of several programs and data files. The file naming convention is as follows: Programs have the format: LRT/S/<program name>. Data files have the format: LRT/D/<datafile name>.

There are two basic programs used during the ILRT for leakrate calculations.

program names are:

1. LRT/S/MAINLRT
2. LRT/S/SLRCALC

The menu flow is illustrated below. LRT/S/MAINLRT is the central program and will call directly to LRT/S/SLRCALC when needed.



A brief description of each program follows.

1.) DESCRIPTION OF PROGRAM LRT/S/MAINLRT

This is the central 'hub' of the system. MAINLRT contains the 'Main Menu' of available functions which are either performed within the program itself or by one of the auxiliary programs.

The primary functions of MAINLRT are:

1. Establish the communications link with the remote DAS unit.
2. Input raw data from the DAS (pressures, temperatures, dewpoints) and set the dataset time from the clock board.
3. Check for abnormal changes in raw data from previous dataset to flag failing instruments. Also, provide the ability to lock out failing instruments before the calculations are made.
4. Average the temperature and dewpoint for each of the 5 subvolumes of containment.
5. Calculate the containment average temperture by averaging the 'weighted' subvolume tempertures.
6. Calculate the average subvolume vapor pressures using subvolume dewpoints and a polynomial equation which is curve fitted to the psychrometric chart.
7. Calculate the containment average vapor pressure by averaging the 'weighted' subvolume vapor pressures.
8. Calculate the average dry air pressure by subtracting the average vapor pressure from the average measured air pressure.
9. Calculate the containment dry air mass.
10. Save the values of TIME,MASS,PRESSURE,TEMPERATURE,DEWPOINT, and VAPOR PRESSURE for later use by the auxiliary programs.
11. Print the raw and calculated values on the line printer.

In addition to the above, MAINLRT performs several other miscellaneous functions including:

1. Manual input of a dataset in the event of a datalink failure, or for testing.

2. Set up the channel allocation to classify each channel of the raw data input as an RTD or DEWCELL and route it to the proper subvolume.

3. Input miscellaneous information such as Zion unit number, telephone extension of the DAS, test date, and desired dataset number if it is to be changed or reset.

2.) DESCRIPTION OF PROGRAM LRT/S/SLRCALC

SLRCALC is responsible for performing the statistical leakrate calculations on which the success of the test is determined. To run the program, option 2 from the main menu must be chosen; 'PERFORM LEAKRATE CALCULATION'. It performs leakrate calculations for the normal 24 hour test and the imposed leak test. It allows the user to choose the starting and ending dataset number for the calculations and sends the results to the line printer. During execution, it automatically loads in the double precision floating point routines which are machine language coded. Their filenames are: DPFP-LOADER and DPFP-1.0-ROM.

The program calculates the leakrate using TIME and calculated MASS for each dataset and utilizes the MASS-PLOT method only. Since the leak is assumed to be constant, the MASS should vary linearly with time. The MASS data from the starting to ending dataset is straight-line curve fitted. The slope of the line is then used to calculate the percent leakrate per day. In addition, the standard deviation and 95% upper confidence limit is calculated to indicate the consistency of the data being read.

C. BENCHMARK EXAMPLES

The following pages are provided to show hand calculation verification of the computer programs LRT/S/MAINLRT and LRT/S/SLRCALC, which are the two responsible for all computations. A sample 5 dataset run was used to show the calculations for all but the imposed leak test. For that, a previous year's test data was used. The typical printouts are supplied as Exhibit A-D.

1.) Appendix A shows values using hand calculations of MAINLRT.
Exhibit A shows the computer values calculated using MAINLRT.

2.) Appendix B shows values using hand calculations of SLRCALC
Exhibit B shows the computer values calculated using SLRCALC. This program is where the actual leakrate for the normal 24 hour test is determined.

3.) Appendix C shows values calculated using hand calculations of the imposed leak section of SLRCALC.
Exhibit C shows the computer values calculated using the imposed leak section of SLRCALC.

4.) Exhibit D gives a summary of the primary values for all 5 datasets.

Hand calculated values are circled and lettered for reference on the exhibits.

APPENDIX A

HAND CALCULATIONS FOR DATASET #1 OF A 5 DATASET TEST FILE

SEE EXHIBIT A FOR COMPUTER RESULTS USING LRT/S/MAINLRT

RTDS

SUBVOLUME TEMPERATURES

1		2		3		4		5	
CHANNEL	VALUE	CHANNEL	VALUE	CHANNEL	VALUE				
1)	78.89	2)	78.55	5)	78.44	24)	75.89	22)	80.43
7)	78.35	3)	78.65	6)	78.93	25)	75.26	23)	80.82
12)	78.57	13)	78.78	10)	78.67	26)	75.03	28)	77.33
17)	78.42	4)	78.46	11)	78.67	27)	74.7	29)	64.53
SUM =	314.23	9)	78.88	15)	79.38	SUM =	300.88	SUM =	303.11
		14)	80.16	16)	78.61	AVG =	300.88/4	AVG =	303.11/4
AVG =	314.23/4	19)	78.87	20)	77.86	T_4 =	75.22	T_5 =	75.7775
T_1 =	78.5575 (A)	18)	78.45	21)	78.42		(D)		(E)
		8)	78.78	SUM =	628.98				
		SUM =	709.58	AVG =	628.98/8				
		AVG =	709.58/9	T_3 =	78.6225 (C)				
		T_2 =	78.84222 (B)						

(Y) AVERAGE SUBVOLUME TEMP

AVERAGE CONTAINMENT TEMP (°F) $= \frac{1}{Y}\left[T_1(.18) + T_2(.32) + T_3(.32) + T_4(.09) + T_5(.09)\right]$

$= (78.5575)(.18) + (78.8422)(.32) + (78.6225)(.32) + 75.22(.09) + 75.7775(.09)$

$= 14.14035 + 25.2295 + 25.1592 + 6.7698 + 6.8199$

$= 78.1188$ (F)

DEWCELLS

SUBVOLUME

1	2	3	4	5
30) 62.35	32) 63.2	33) 59.84	39) 58.94	59.57
31) 63.14	34) 61.75	35) 62.21		
	36) 58.94	37) 57.97		
SUM = 124.49	SUM = 183.89	SUM = 180.02	AVG = 58.94	AVG = 59.57
AVG = 124.49/2	AVG = 183.89/3	AVG = 180.02/3	WBT(4) = 58.94	WBT(5) = 59.5
WBT(1) = 62.745	WBT(2) = 61.296	WBT(3) = 60.006		

WBT(X) = AVERAGE WET BULB TEMPERATURE OF SUBVOLUME X

CONVERSION TO VAPOR PRESSURE

EQUATIONS

$$PV1 = .01529125 + (.00165347 6)(WBT(X))$$
$$PV2 = (1.44734 \times 10^{-6})(WBT(X))^2$$
$$PV3 = (7.081828 \times 10^{-7})(WBT(X))^3$$
$$PV4 = (2.28128 \times 10^{-9})(WBT(X))^4$$
$$PV5 = (3.03544 \times 10^{-11})(WBT(X))^5$$

$$VP(X) = PV1 - PV2 + PV3 - PV4 + PV5$$

WHERE VP(X) = AVERAGE SUBVOLUME VAPOR PRESSURE

VAPOR PRESSURE CALCULATIONS

$$VP(1) = \left[.01529125 + (.00165347\text{6})(62.745)\right] - \left[(1.44734\times10^{-6})(62.745)^2\right] + \left[(7.081828\times10^{-7})(62.745)^3\right] - \left[(2.28128\times10^{-9})(62.745)^4\right] + \left[(3.035\times10^{-11})(62.7\right.$$

$$= .119038 - 5.698\times10^{-3} + .17493 - .03535 + .029504$$

$$VP(1) = .2824 \quad (G)$$

$$VP(2) = \left[.01529125 + (.00165347\text{6})(61.296)\right] - \left[(1.44734\times10^{-6})(61.296)^2\right] + \left[(7.081828\times10^{-7})(61.296)^3\right] - \left[(2.28128\times10^{-9})(61.296)^4\right] + \left[(3.035\times10^{-11})(61.296)^5\right]$$

$$= .116643 - 5.4379\times10^{-3} + .163095 - .032203 + .02626$$

$$VP(2) = .26835 \quad (H)$$

$$VP(3) = \left[.01529125 + (.00165347\text{6})(60.006)\right] - \left[(1.44734\times10^{-6})(60.006)^2\right] + \left[(7.081828\times10^{-7})(60.006)^3\right] - \left[(2.28128\times10^{-9})(60.006)^4\right] + \left[(3.035\times10^{-11})(60.006)^5\right]$$

$$= .114509 - 5.211\times10^{-3} + .15301 - .02957 + .02361$$

$$VP(3) = .2563 \quad (I)$$

$$VP(4) = \left[.01529125 + (.00165347\text{6})(58.94)\right] - \left[(1.44734\times10^{-6})(58.94)^2\right] + \left[(7.081828\times10^{-7})(58.94)^3\right] - \left[(2.28128\times10^{-9})(58.94)^4\right] + \left[(3.035\times10^{-11})(58.94)^5\right]$$

$$= .11274 - 5.027\times10^{-3} + .145 - .0275 + .0215$$

$$VP(4) = .2467 \quad (J)$$

$$VP(5) = \left[.01529125 + (.00165347\text{6})(59.57)\right] - \left[(1.44734\times10^{-6})(58.57)^2\right] + \left[(7.081828\times10^{-7})(58.57)^3\right] - \left[(2.28128\times10^{-9})(58.57)^4\right] + \left[(3.035\times10^{-11})(58.57)^5\right]$$

$$= .11378 - 5.136\times10^{-3} + .14970 - .02872 + .02276$$

$$= .2563 \quad (K)$$

AVERAGE CONTAINMENT VAPOR PRESSURE (°F)

$= VP(1)(.18) + VP(2)(.32) + VP(3)(.32) + VP(4)(.09) + VP(5)(.09)$

$= (.28244)(.18) + (.26835)(.32) + (.2563)(.32) + (.2467)(.09) + (.25239)(.09)$

$= .0508 + .0858 + .08201 + .0222 + .0227$

$= .2636$ — (L)

AVERAGE CONTAINMENT DEWPOINT (DEG F)

$= WBT(1)(.18) + WBT(2)(.32) + WBT(3)(.32) + WBT(4)(.09) + WBT(5)(.0$

$= (62.745)(.18) + (61.296)(.32) + (60.036)(.32) + (58.94)(.09) + (59.57)(.0$

$= 11.294 + 19.614 + 19.201 + 5.304 + 5.361$

$= 60.77$ — (M)

AVERAGE CORRECTED PRESSURES (PSIA)

$M_1 = 1.02024286$
$B_1 = .24954342$

$M_2 = 1.01206987$
$B_2 = -.05534537 43$

P_1 CORRECTED $= (P_1$ MEASURED $\times M_1) + B_1$

P_2 CORRECTED $= (P_2$ MEASURED $\times M_2) + B_2$

P_1 MEASURED = 42.608 PSIA — (S)
P_2 MEASURED = 43.203 PSIA — (T)

SEE BOTTOM OF RAW + PRIMARY DATA SHEET FOR $M_1 B_1 M_2 B_2$

P_1 CORRECTED $= (42.608)(1.0202) + .2495$

$= 43.72005$ — (N)

P_2 CORRECTED $= (43.203)(1.012) + (-.0553)$

$= 43.6691$ — (O)

AVERAGE CORRECTED PRESSURE (PSIA)

$= (P_1 \text{ CORR} + P_2 \text{ CORR})/2$

$= (43.7200 + 43.6691)/2$

$= 43.6945$ — (P)

CONTAINMENT DRY AIR PRESSURE (PSIA)

= AVERAGE CORRECTED PRESSURE − AVERAGE VAPOR PRESSURE

$= 43.6945 - .2636$

$= 43.43$ — (Q)

CONTAINMENT DRY AIR MASS (LBS)

$$= \frac{(28.97)(144)(\text{VOLUME OF CONTAINMENT})(\text{DRY AIR PRESSURE})}{(1545.33)(\text{AVERAGE TEMPERATURE} + 459.69)}$$

V =

= WHERE VOLUME = 2715000 FT^3

$$= \frac{7329250.84\,(43.43)}{(78.1188 + 459.69)}$$

CDA = 591875.726 LBS — (R)

APPENDIX B

LEAKRATE HAND CALCULATIONS FOR NORMAL TEST

SEE EXHIBIT B FOR COMPUTER RESULTS USING LRT/S/SLRCALC

LEAKRATE CALCULATIONS

DATASET i	TIME	$(\text{TIME})^2$	MASS	$(\text{MASS})^2$	(MASS)×(TIME)
1	.166667	.027778	591875.726	3.50317E+11	98645.95
2	.335556	.112598	591882.542	3.50325E+11	198609.475
3	.502222	.252227	591878.784	3.5032E+11	297254.678
4	.668889	.447412	591793.156	3.50219E+11	395843.86
5	.835556	.698154	591827.569	3.5016E+11	494504.813
	$\sum_{i=1}^{N} t_i$ = 2.50888	$\sum_{i=1}^{N} t^2$ = 1.53816	$\sum_{i=1}^{N} M_i$ = 2959257.77	$\sum_{i=1}^{N} M^2$ = 1.75144417×10^12	1484858.78

N=5 — (IV)

$$\text{SLOPE}(A) = \frac{N\sum_{i=1}^{N} t_i M_i - \sum_{i=1}^{N} t_i \sum_{i=1}^{N} M_i}{N\sum_{i=1}^{N} t_i^2 - \left(\sum_{i=1}^{N} t_i\right)^2} = \frac{(5)(1484858.78) - (2.50888)(2959257.7)}{5(1.538) - (2.508)^2} = -111.0197 \text{ LBS/Hr}$$

(V)

$$\text{INTERCEPT}(B) \quad \frac{\sum_{i=1}^{N} M_i - A\sum_{i=1}^{N} t_i}{N} = \frac{(2959257.777) - (-111.097)(2.5088)}{5} = 591907 \text{ LBS}$$

(V)

$$\%\ \text{LEAKRATE/DAY (ASL)} = \frac{-A(2400)}{B} = \frac{-(-111.0197)(2400)}{591907} = .45015\ \%/\text{DAY}$$

(VI)

STANDARD DEVIATION.

$$SD = \left[\frac{1}{N-2} \left(\frac{N \sum_{i=1}^{N} M_i^2 - \left(\sum_{i=1}^{5} M_i \right)^2}{N \sum_{i=1}^{N} t_i^2 - \left(\sum_{i=1}^{N} t_i \right)^2} - A^2 \right) \right]^{1/2} \cdot \frac{2400}{B}$$

$$= \left[\frac{1}{3} \left(\frac{(5)(1.751441 \times 10^{12}) - (2959257.777)^2}{5(1.53816) - (2.5088)^2} \right] \cdot \frac{2400}{591907}$$

$$= .2356 \text{ \%/DAY} \quad (X)$$

NOTE: SINCE THIS EQUATION DEALS WITH SUBTRACTIONS OF VERY LARGE NUMBERS, IE $> 10^{12}$, A HAND CALCULATOR WILL NOT YIELD THE SAME RESULTS. DOUBLE PRECISION IS REQUIRED AND IS USED BY THE APPLE II.

STUDENT T DISTRIBUTION FOR 95%

$$TE = 1.647 + \frac{1.455}{N-2} + \frac{1.976}{(N-2)^2} \qquad N=5$$

$$= 1.647 + .485 + .2195$$

$$TE = 2.351 \quad (Y)$$

95% UPPER CONFIDENCE LIMIT

$$UCL = ASL + (TE)(SD)$$

$$= .45015 + (2.351)(.2356)$$

$$= 1.0043 \text{ \%/DAY} \quad (Z)$$

APPENDIX C

IMPOSED LEAK TEST HAND CALCULATIONS

SEE EXHIBIT C FOR COMPUTER RESULTS USING LRT/S/SLRCALC

THIS DATA IS TAKEN FROM A PREVIOUS TEST

GIVEN; IMPOSED LEAK (SCFM) = 2.25 SCFM — (AA)
STARTING PRESSURE (P_s) = 42.0133642 — (BB)
ALLOWABLE LEAK (UNIT1) L_A = .0729 %/DAY — (C)
TOTAL % LEAKRATE (1ASL) = .042283 %/DAY — (DD)
% LEAKRATE FROM NORMAL TEST (ASL) = .0157666 %/DAY — (EE)

EQUATIONS:

$$\text{IMPOSED LEAK IL} = \frac{(.7796685)(\text{SCFM})}{P_s} \quad \%/\text{DAY}$$

$$IL = \frac{(.7796685)(2.25)}{42.0133642} = .041754 \%/\text{DA.} \quad \text{(FF)}$$

$$\text{PERCENT ERROR} = \left| \frac{1ASL - IL - ASL}{L_A} \right| \times 100$$

$$= \left| \frac{.042283 - .041754 - .0157666}{.0729} \right| * 100$$

$$= 20.901 \% \quad \text{(GG)}$$

CECO ZION STATION INTEGRATED LEAKRATE TEST UNIT 1 11/21/83

RAW AND PRIMARY DATA

DATASET# 1
TIME: .166666667 HRS.

*** RAW DATA ***

PRESSURE DETECTORS P1= 42.608 P2= 43.203 P.MANUAL= 0

TEMPERATURE CHANNELS 1 TO 39 UNITS=MV. (ST)-->S=SUBVOLUME,T=TYPE(0-OOS,1-WB,2-DB)

1 (12)= 78.89	2 (22)= 78.55	3 (22)= 78.65	4 (22)= 78.46	5 (32)= 78.44
6 (32)= 78.93	7 (12)= 78.35	8 (22)= 78.78	9 (22)= 78.88	10 (32)= 78.67
11 (32)= 78.67	12 (12)= 78.57	13 (22)= 78.78	14 (22)= 80.16	15 (32)= 79.38
16 (32)= 78.61	17 (12)= 78.42	18 (22)= 78.45	19 (22)= 78.87	20 (32)= 77.86
21 (32)= 78.42	22 (52)= 80.43	23 (52)= 80.82	24 (42)= 75.89	25 (42)= 75.26
26 (42)= 75.03	27 (42)= 74.7	28 (52)= 77.33	29 (52)= 64.53	30 (11)= 62.35
31 (11)= 63.14	32 (21)= 63.2	33 (31)= 59.84	34 (21)= 61.75	35 (31)= 62.21
36 (21)= 58.94	37 (31)= 57.97	38 (51)= 59.57	39 (41)= 58.94	

*** PRIMARY VALUES ***

SUBVOLUME	AVG SUBV. VAPOR PRESSURE
1	.28243941
2	.268368025
3	.256355898
4	.24678193
5	.252397912

AVERAGE VAPOR PRESSURE= .263676935

SUBVOLUME	AVG. SUBVOLUME TEMP (DEG F.)
1	78.5575
2	78.8422223
3	78.6225
4	75.22
5	75.7775

AVERAGE CONTAINMENT TEMP= 78.1188361 (DEG F.)
AVERAGE CONTAINMENT DEWPOINT= 60.7770667 (DEG F.)
CORRECTED PRESSURES: P1= 43.7200541 PSIA P2= 43.6691092 PSIA
AVG. CORRECTED PRESS.= 43.6945817 PSIA
CONT. DRY AIR PRESSURE= 43.4309048 PSIA
CONT. DRY AIR MASS= 591875.726 LBS.

CHANNELS LOCKED OUT: NONE

WET ALARM= 10
DRY ALARM= 10
PRESS ALARM= 10

PRESSURE CALIBRATION CONSTANTS
M1= 1.02024286 B1= .249546342 M2= 1.01206987 B2= -.0553453743

96N

EXHIBIT A

CECO ZION STATION INTEGRATED LEAKRATE TEST UNIT 1 11/21/83

STATISTICAL LEAKRATE CALCULATIONS

NORMAL TEST

STARTING DATASET#..... 1
ENDING DATASET#..... 5
STARTING TIME ..... .166666667 HOURS
ENDING TIME ..... .835555556 HOURS
TOTAL TEST TIME ..... .668888889 HOURS
NUMBER OF DATASETS..... 5 (ZZ)
STARTING CONTAINMENT MASS (B).. 591888.759 LBS. (V)
MASS LEAKRATE PER HOUR (A)..... 111.019798 LBS./HR (U)
ALLOWABLE LEAKRATE %/DAY ..... .0729 %/DAY

TOTAL % LEAKRATE/DAY (ASL)..... .450164852 %/DAY (W)
STANDARD DEVIATION ..... .235649929 %/DAY
STUDENT T DISTRIBUTION..... 2.35155556 (X)
95% UPPER CONFIDENCE LIMIT .... 1.00430875 %/DAY (Y)
(Z)

EXHIBIT B

CECO ZION STATION INTEGRATED LEAKRATE TEST UNIT 1 11/21/83

STATISTICAL LEAKRATE CALCULATIONS

IMPOSED LEAK TEST

STARTING DATASET#.....	367	
ENDING DATASET#.....	405	
STARTING TIME	64.7483334	HOURS
ENDING TIME	71.4530557	HOURS
TOTAL TEST TIME	6.70472229	HOURS
NUMBER OF DATASETS.....	39	
STARTING CONTAINMENT MASS (B)..	587777.983	LBS.
MASS LEAKRATE PER HOUR (A).....	10.3556033	LBS./HR
ALLOWABLE LEAKRATE %/DAY	.0729	%/DAY (CC)
IMPOSED LEAK (SCFM).....	2.25	SCFM (AA)
STARTING PRESSURE	42.0133642	PSIA (BB)
TOTAL % LEAKRATE/DAY (IASL)....	.0422837342	%/DAY (DD)
IMPOSED % LEAKRATE/DAY (IL)....	.0417546692	%/DAY (FF)
% LKRATE OF NORMAL TEST (ASL)..	.0157666111	%/DAY (EE)
IMPOSED LEAKRATE % ERROR.....	20.9019837	% (GG)
STANDARD DEVIATION	9.18900801E-03	%/DAY
STUDENT T DISTRIBUTION.....	1.68776771	
95% UPPER CONFIDENCE LIMIT	.0577926453	%/DAY

EXHIBIT C

CECO ZION STATION INTEGRATED LEAKRATE TEST UNIT 1 11/21/83

PRIMARY DATA REPORT

DATASET	TIME	MASS	PRESS	TEMP	DEW	VAPR. PRES
1	.166666667	591875.726	43.4309048	78.1188361	60.7770667	.263676935
2	.335555556	591882.542	43.4315052	78.1200778	60.7056667	.263076482
3	.502222222	591878.784	43.4326483	78.1376472	60.5447334	.261427326
4	.668888889	591793.156	43.4283038	78.1616611	60.7841334	.263739567
5	.835555556	591827.569	43.4276372	78.1221306	60.6345333	.2623739

EXHIBIT D

APR 2 5 1984

APPENDIX G

SIGNIFICANT EVENTS LOG

A. Record any changes in the valve lineup, any leaks repaired or other 'fixes' made, and any event which is not consistent with normal operating procedures.

B. At least once per day record all 5 SW discharge pressures on the SW to the RCFCs.

C. Note any significant climatic changes (rain, snow, etc.)

Date	Time	Event	Recorded By
7/29/84	1433	Started "24" hour Leak Test @ Data Set #44	N. Valor
7/30/84	1443	Completed "24" hour Leak Test @ Data Set #187 Leak Rate = 0.0254 %/day 95% Upper Confidence Limit = 0.0281%/day	N. Valor
7/30/84	1533	Imposed a leak of 3.2834 SCFM, Data Set #192 (30% on Rotameter scale)	N. Valor
7/30/84	1633	Started Imposed Leak Test @ Data Set #202	N. Valor
7/31/84	0720	Stopped Imposed Test @ Data Set #365	A. Ockert
	0918	Started Data Collection for ~~Normal~~ another Normal Test at Data Set #372	A Ockert
7/31/84	2015	STOPPED 28th NORMAL TEST @ D# 459 0.0278 %/D FINAL LEAKRATE.	B. Lane
7/31/84	2020	START RUN # 3 ON HARD DRIVE for APPLE. D# 1	B. Lane
7/31/84	2035	IMPOSED A LEAK OF 4.372 SCFM: SCALE READING OF 40%. D# 2	B. LANE
7/31/84	2039	STARTED IMPOSED LEAK TEST #2 @ D# 7	B. Lane

FOIA-85-136

B/3

APPENDIX G

SIGNIFICANT EVENTS LOG

A. Record any changes in the valve lineup, any leaks repaired or other 'fixes' made, and any event which is not consistent with normal operating procedures.

B. At least once per day record all 5 SW discharge pressures on the SW to the RCFCs.

C. Note any significant climatic changes (rain, snow, etc.)

Date	Time	Event	Recorded By
7/29/84	1433	Started 24 hour Leak Test @ Data Set #44	A Valor

APPENDIX G

SIGNIFICANT EVENTS LOG

A. Record any changes in the valve lineup, any leaks repaired or other 'fixes' made, and any event which is not consistent with normal operating procedures.

B. At least once per day record all 5 SW discharge pressures on the SW to the RCFCs.

C. Note any significant climatic changes (rain, snow, etc.)

Date	Time	Event	Recorded By
7/29/84	0150	M & C CORRECTION FACTORS for A1 & 2 @ TEST PRESSURE INSERTED; DR# 214 M1 = 1.01012 M2 = 0.99940 C1 = 0.104 C2 = 0.050	B. Lane
7/29/84	0445	LEAK "CHECKLIST" PERFORMED @ 2345 - PERSONNEL HATCH SHAFT SEAL STILL LEAKS VIGOROUSLY. - NO OTHER LEAKS	B. Lane
7/29/84	0610	COMPRESSORS STOPPED. CONTAINMENT PRESSURE @ 43.05 PSIA.	B. Lane
7/29/84	0615	STARTED "RUN#2" ON APPLE AFTER PUMP UP TIME RESETS TO 0, DATASET RESETS TO 1	A. Amoroso
7/29/84	0830	RV0005 & RV 0006 CLOSED LINE VENTED BETWEEN ILRT COMPRESSOR AND VALVES DATASET 14	AJA
	0815	Checked leakage on Personnel hatch shaft Seal. Leakage is such that it grows a beard with Snoop however it doesn't blow snoop away. Therefore the leakage at this time is felt to be much less than the allowable limit.	afo
	≈1200	Service Air lineup complete	n Valve
	1400	Drain opened on Seal Wtr Return Filter per Procedure Change A-84-507. Lineup for ILRT Complete	n Valve

APPENDIX G

SIGNIFICANT EVENTS LOG

A. Record any changes in the valve lineup, any leaks repaired or other 'fixes' made, and any event which is not consistent with normal operating procedures.

B. At least once per day record all 5 SW discharge pressures on the SW to the RCFCs.

C. Note any significant climatic changes (rain, snow, etc.)

Date	Time	Event	Recorded By
7/27/84	2156	CONTAINMENT INTEGRITY SET DATA SET #42	B. Lane
7/28/84	0300	INFORMED THAT COMPRESSOR IS IN NEED OF MAJOR REPAIR. TOLD MAINT. & I.R. Reps TO INSTALL SPARE. ≈ 8 hr ADDITIONAL DELAY.	B. LANE
7/28/84	0745	DAS locked-up. Found printer paper jammed. Turned power OFF and back ON to the DAS - working fine now!	Z. Gajic
7/28/84	1640	Started Containment pressurization.	M. Valos
7/28/84	1900	RV-85 IN "NORMAL" (RE) VALVED IN.	B. Lane
7/28/84	2215	CONTAINMENT @ ≈ 10 psig. "CHECKLIST" Performed - IRV0002 - LEAK TIGHT - ESCAPE HATCH - LEAK TIGHT - RUBBER GLOVES ARE PUT IN THEIR APPROPRIATE PLACES per CHECKLIST. - IRV0004 - LEAK TIGHT - ELECTRICAL PENETRATIONS NORMAL @ 10 psig - ALL SW from RCFCs > 50 psig * - CS VALVES - LEAK TIGHT - PERSONNEL HATCH SHAFT SEAL LEAKS PER LEVEL @ 40%	B. Lane
7/29/84	0130		B. LANE
7/29/84	0140	He DETECTOR SETUP IN CROSSTOWN AREA. 6 BOTTLES WERE ADDED @ ≈ 1900 hr. 7/28/84	B. Lane