sta 4(3)
FEB 26 1997

ENGINEERING DATA TRANSMITTAL

Page 1 of 1
1. EDT 617312

2. To: (Receiving Organization) WRAP 1		3. From: (Originating Organization) WRAP 1		4. Related EDT No.: N/A				
5. Proj./Prog./Dept./Div.: W026/Solid Waste Construction		6. Design Authority/ Design Agent/Cog. Engr.: TL Watson		7. Purchase Order No.: N/A				
8. Originator Remarks: For release				9. Equip./Component No.: N/A				
				10. System/Bldg./Facility: N/A				
11. Receiver Remarks: 11A. Design Baseline Document? ☐ Yes ☒ No				12. Major Assm. Dwg. No.: N/A				
				13. Permit/Permit Application No.: N/A				
				14. Required Response Date: N/A				
15. DATA TRANSMITTED								
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Trans- mittal	(H) Ori- ginal Dispo- sition	(I) Receiv- er Dispo- sition
1	HNF-SD-W026-ATP-028		0	Controls & Instrumentation	Q	2	1	
2	HNF-SD-W026-ATR-028		0	Controls & Instrumentation	Q	2	1	

16. KEY					
Approval Designator (F)		Reason for Transmittal (G)		Disposition (H) & (I)	
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)		1. Approval 2. Release 3. Information 4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)		1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged	

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)											
(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
1	1	Area Manager									
1	1	Design Authority: TL Watson		2/18/97	T4-52						
1	1	Proj. Engr.: JB Payne		2/18/97	T4-52						
1	1	Cog.Eng.: RR Jorda		2/18/97	T4-52						
1	1	Cog. Mgr.: RJ Bottenus		2/18/97	T4-52						
1	1	QA: JR McGee		1/13/97	T4-02						
		Safety									
		Env.									
18.		19.		20.		21. DOE APPROVAL (if required)					
JB Payne		RJ Bottenus		RJ Bottenus		Ctrl. No.:					
Signature of EDT		Authorized Representative		Design Authority/ Cognizant Manager		[] Approved					
Date		Date		Date		[] Approved w/comments					
Originator		for Receiving Organization				[] Disapproved w/comments					

W-026, Acceptance Test Report Controls & Instrumentation (Submittal # 483)

TL Watson

Westinghouse Hanford, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: 617312 UC:
Org Code: 04E00 Charge Code: P1JF18
B&R Code: 39EW3130020 Total Pages: 105

Key Words: Heating Ventilation Air Conditioning, Air Balance, Variable Air Volume boxes, filter trains, air handling units

Abstract: The air balance documents the attained air flows, air pressure differences and transient responses to simulated glovebox breach and power loss conditions.

TRADEMARK DISCLAIMER. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

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Release Approval

Date

Release Stamp

Approved for Public Release

Penn Air Control, Inc.

311 4th Street, N.E.
 Auburn, Washington 98002

PENNAC ★ 161 PW

939-4293 • Fax (206) 735-2970

LICENSE PENNAC*161PW
 206-939-4293
 FAX 206-735-2970

PENN AIR CONTROL, INC.

Robert Gomez
 311 4th St. N.E.
 Auburn, WA 98002

AND BALANCE REPORT

FOR

• Air and Hydronic Balancing
 • Member of the Associated Air Balance Council

LAS VEGAS LOS ANGELES SAN DIEGO SAN FRANCISCO SEATTLE

PROJECT: HANFORD W.R.A.P
 LOCATION: HANFORD RESERVATION-AREA 200W
 HANFORD, WA
 ARCHITECT: N/A
 ENGINEER: UNITED ENGINEERS & CONSTRUCTORS
 CONTRACTOR: UNIVERSITY MECHANICAL CONTRACTORS, INC.

PROJECT NUMBER: WA0139
 BY: BLAINE GOMEZ

This is to Certify that PENN AIR CONTROL, INC., has balanced the system described in accordance with the plans, specifications, and within the limitations of the equipment and installation. The testing, balancing, and adjusting has been performed in accordance with the standard requirements and procedures of the Associated Air Balance Council and the results of these tests are herein recorded.

Associated Air Balance Council

Date: NOVEMBER 27, 1996

 Robert/F. Gomez

Associated Air Balance Council

Los Angeles, Ca
 (714) 290-9091

Seattle, Wa
 (206) 939-4293

San Diego, Ca
 (619) 744-2951

Las Vegas, No
 (702) 221-9877

San Francisco, Ca
 (707) 763-7155

483

AABC National Performance Guaranty

Pursuant to the agreement between
PENN AIR CONTROL, INC.

AABC Certified Testing & Balancing Agency

and **UNIVERSITY MECHANICAL CONTRACTORS, INC.**
Client

All systems shall be balanced in accordance with the plans and specifications and to the optimum performance capabilities of the equipment and design. Testing and balancing shall be done in accordance with the standards published by the Associated Air Balance Council.

If for any reason, the Agency listed above fails to comply with the specifications, with the exception of termination of business by the Agency, equipment malfunction or inadequacy, or improper design, which prevents proper balancing of the systems, the Associated Air Balance Council will provide supervisory personnel to assist the Agency to perform the work in accordance with AABC Standards.

As part of this Performance Guaranty, the engineer or building owner may call upon AABC to assist him with any technical and/or field problems pertaining to the final balanced condition of systems. These services will be made available at no additional charge by the above agency or by AABC National Headquarters.

Project Name **JAMFPRD W.R.A.P.**

Address **HANFORD RESERVATION - AREA 200W**

HANFORD, WA

Name of Engineer **N/A**

Engineering Firm **UNITED ENGINEERS & CONSTRUCTORS**

Address **N/A**

Date **NOVEMBER 27, 1996**

TBE # **82-01-14**

By

[Signature]
AABC Certified TBE **HERMAN PHILHOWER, PRES.**

AABC
Associated Air
Balance Council
AABC National Headquarters
1518 K Street, N.W.
Washington, D.C. 20005
1-800-969-5222

Frederick Chopp P.E. graduated from Seattle University in June 1961 with a BSME and was employed by the Boeing Company for 5 years. Work at the Boeing Company involved the study and design of the transport of cryogenic fluids. In 1966 I moved to the St. Regis Paper Company in Tacoma as a Project Engineer. This position involved process steam design, structural design, fluid flow, heat transfer, construction management, budget estimating and cost control. In 1968 I moved to McKinstry Company and began a career in mechanical construction and design. Starting as an estimator I was required to design plumbing and HVAC systems as well as provide quotes on new projects and manage projects under construction. I advanced to Vice President of Estimating but found it necessary to leave in 1975 and joined University Mechanical Contractors as a Mechanical Design Engineer and Estimator in charge of design build projects. I eventually became the Design Build and Estimating Manager for the company. This position gave me total estimating and design responsibility of all design build projects for the company. In 1992 I elected to leave University Mechanical Contractors and work on an as needed basis and have maintained this position to the present time.

AABC

Associated Air Balance Council

Annual Certificate

Awarded to

Herman Philhower

Penn Air Control, Inc.

In recognition of his qualifications as a

Certified Test and Balance Engineer

under the rules, regulations, and requirements of the Associated Air Balance Council. The above named is fully authorized to perform total system balance in accordance with the standards as established by the AABC and as a member of the Associated Air Balance Council for the year

1996

This registration number 82-01-14, being issued this day January 1, 1996, is fully recognized by the bylaws and charter of this professional Association. This certificate is renewable on an annual basis after examination of the agency's record for the preceding year.

R. Machan
President

Kenneth M. Snyka
Executive Director

Associated Air Balance Council

heretby certifies that

Blaine Gomez

*has met all requirements and passed the necessary examination
to perform testing and balancing as an AABC
Certified Test & Balance Technician*

under the supervision of a certified test and balance engineer for

Penn Air Control, Inc.

*This registration number 16-01-93 issued on this day January 1,
1996 and this certificate are renewable on an annual basis after the
examination of the agency's record for the preceding year.*

Kenneth M. Snyder
Executive Director

President

ANALOG FLOWHOOD CERTIFICATE OF CALIBRATION

ACCURACY TESTING HAS BEEN PERFORMED ON THIS FULLY ASSEMBLED FLOWHOOD UNIT AT THE SETPOINTS RECORDED BELOW. CALIBRATION INSTRUMENTATION IS TRACEABLE TO A MASTER AT THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY. METER IS CERTIFIED TO READ WITHIN PLUS OR MINUS THREE PERCENT OF EACH SCALE RELATIVE TO THE CALIBRATION MASTER METER.

10 CFR21 N/A MIL-STD45662A N/A

SET POINT	MASTER CFM	METER CFM		
		500 SCALE	1000 SCALE	2000 SCALE
1	99	100		
2	198	200		
3	295	300		
4	394	403	400	
5	485	495	495	
6	579		600	
7	672		700	
8	780		800	
9	873		900	900
10	972		990	1000
12	1166			1200
14	1352			1400
16	1553			1580
18	1653			1670
20	1757			1790

BAROMETRIC PRESSURE 28.63 in Hg TEMPERATURE 76.1 °F

RELATIVE HUMIDITY 26 %

FLOWHOOD MODEL CFM-83 SERIAL NO 6426

TEST BY L. SEED DATE 01/18/96

CERTIFIED BY *Ernest R. Shortridge* DATE 1-18-96

Shortridge Instruments, Inc.

7855 EAST REDFIELD ROAD / SCOTTSDALE, ARIZONA 85260
TELEPHONE (602) 991-6744 / FAX 443-1267

AIR BALANCE SYSTEM

MODEL - CFM - 83
CORRECTION CURVES

EACH **FLOWHOOD** AIR BALANCE SYSTEM IS INDIVIDUALLY CALIBRATED AT THE FACTORY TO READ OUT DIRECTLY IN CUBIC FEET PER MINUTE AND LITRES PER SECOND AT CONSTANT VOLUME, STANDARD CONDITIONS (.075 LBS. PER CUBIC FOOT AIR DENSITY).

RANGES: 30 TO 500 cfm, 400 TO 1000 cfm, AND 800 TO 2000 cfm.

READ-OUT TIME: FIVE TO TEN SECONDS.

FLOW RESISTANCE: .0075" wc. @ 500 cfm SUPPLY & EXHAUST

EACH AIR DISTRIBUTION SYSTEM HAS AN INDIVIDUAL NATURAL RESISTANCE, AND EACH IS UNIQUE IN ITS CAPACITY TO MAINTAIN FLOW TO AN OUTLET WHEN THE SLIGHT BACKPRESSURE OF THE **FLOWHOOD** UNIT IS INTRODUCED. THE CORRECTION CURVE BELOW IS PROVIDED AS A GUIDE FOR AN AVERAGE MULTIPLE OUTLET SYSTEM. NO CORRECTION IS REQUIRED FOR INDIVIDUALLY CONTROLLED CONSTANT VOLUME SUPPLY OR EXHAUST OUTLETS. THE MAXIMUM RECOMMENDED EXHAUST USAGE IS 1400 cfm.

* AIR QUANTITIES IN REPORT HAVE BEEN CORRECTED UTILIZING ABOVE CORRECTION CURVE

Shortridge Instruments, Inc.

7855 EAST REDFIELD ROAD / SCOTTSDALE, ARIZONA 85260
TELEPHONE (602) 991-6744 / TELEX 165-872 SI SCOT / FAX (602) 443-1267

Shortridge Instruments, Inc.7855 EAST REDFIELD ROAD SCOTTSDALE, ARIZONA 85260
TELEPHONE (602) 991-6744 FAX (602) 443-1267**CERTIFICATE OF CALIBRATION**INSTRUMENT AirData MultimeterMODEL ADM-860 SERIAL NO M91055TEST BY L. Laubmeier DATE 9-18-96

This is to certify that this instrument has been calibrated using instrumentation which is traceable to masters at the National Institute of Standards and Technology. Quality Assurance Program and calibration procedures meet the requirements for 10CFR50, Appendix B; 10CFR21; ANSI/N45.2; and MIL-STD45662A.

CERTIFIED BY

CERTIFICATION OF NIST TRACEABILITY

HNF-SD-W026-ATR-028, Rev. 0 Page 9

Calibration equipment and standards used by Shortridge Instruments, Inc. are traceable to the National Institute of Standards & Technology. The Calibration Certification test report numbers are: differential and absolute pressure M4212 (dated 8/93), TN-251820-93 (dated 6/93) and 822/255136-95 (dated 3/95); temperature - 88024 (dated 10/90). Calibration is performed in conformance with 10CFR50, Appendix B; ANSI/N45.2; MIL-STD-45662A and manufacturer's specifications.

Calibration equipment is calibrated using Shortridge Instruments' Inc. Calibration Test Standard Master Meter Serial Number M96455, which is certified yearly through an outside testing facility which is directly traceable to NIST. The calibration date for M96455 was August 20, 1996; calibration due date is August 20, 1997.

All AirData Multimeters and AirData FlowMeters calibrated between the dates of August 20, 1996 and September 20, 1997 are included under this certification. All such meters are certified for accuracy when used with properly functioning accessories only.

CALIBRATION ACCURACY

Calibration accuracy of Shortridge Instruments, Inc. Calibration Master Meters as compared to AirData Multimeters or AirData FlowMeters being calibrated or recalibrated, is as follows:

Differential Pressure: Accuracy ratio for differential pressure is 4:1.

Master Meter: $\pm 0.50\%$ of reading $\pm$ one count as compared with a NIST Traceable Calibration Standard with specified accuracy of $\pm 0.005\%$ of reading ± 0.00003 psi (0.0008 in wc).

Test Meter: $\pm 2.0\%$ of reading ± 0.0001 in wc.

Absolute Pressure: Accuracy ratio for absolute pressure is 4:1.

Master Meter: $\pm 0.50\%$ of reading $\pm$ one count as compared with a NIST Traceable Calibration Standard with specified accuracy of $\pm 0.005\%$ of reading ± 0.003 psi.

Test Meter: $\pm 2.0\%$ of reading ± 0.1 in Hg.

Temperature: Accuracy ratio for temperature is 2:1.

Master Meter: $\pm 0.25^\circ\text{F}$ as compared with a NIST Traceable Calibration Standard with specified accuracy of $\pm 0.10^\circ\text{F}$ or better.

Test Meter: $\pm 0.5^\circ\text{F}$ between 32°F and 212°F .

Air Flow: Accuracy ratio for the Electronic FlowHood is 2:1; for the Mechanical FlowHood it is 2:1 minimum.

Master Meter: $\pm 1.38\%$ of reading ± 5.0 cfm. Air flow readout accuracy is the square root of the combined accuracies of the differential pressure, absolute pressure and temperature measurements by both the Master Meter and the FlowHood Test Stand Meter used for direct flow readout.

Test Meter: $\pm 3.0\%$ of reading ± 5.0 cfm for the Electronic FlowHood. It is $\pm 3.0\%$ of range (full scale) for the Mechanical FlowHood.

SHORTRIDGE INSTRUMENTS, INC.
7855 East Redfield Road Scottsdale, AZ 85260
Telephone (602) 991-6744 FAX (602) 443-1267

HANFORD W.R.A.P.

Fan Test (Supply)

203-SF11-101	1
203-SF11-101 (Air Distribution Test + Velocities)	2
203-SF11-101 (Circular Duct Traverse Test)	3

Fan Test (Return)

203-RF11-101	4
RF-11-101 (Air Distribution Test + Velocities)	5
RF-11-101 (Circular Duct Traverse Test)	6

Fan Test (Supply)

203SF11-201A	7
203SF11-201B	8
203SF11-201B (Air Distribution Test + Velocities)	9
203-AH11-301	10
203-AH11-301 (Air Distribution Test + Velocities)	11
203-SF11-401	12
203-RF11-401 (Fan Test (Return))	13
RF-11-401 (Air Distribution Test)	14
203-AH11-401 (Air Distribution Test Data - CLG/HTG CFM)	15

Fan Test (Return)

203-RF11-401	17
RF-11-401 (Air Distribution Test)	18

Fan Test (Supply)

203SF11-501A	19
203SF11-501B	20
SF-11-501B (Air Distribution Test)	21
SF-11-501B-R (Air Distribution Test)	22

Fan Test (Exhaust)

100-EF11-101	23
100-EF11-101 (Air Distribution Test + Velocities)	24
203-EF11-301	25
203-EF11-301 (Air Distribution Test)	26
203-EF11-401	27
203-EF11-401 (Air Distribution Test)	28
152-EF11-402	29
152-EF11-402 (Air Distribution Test + Velocities)	30
113EF11-202B	31
113EF11-202B (Air Distribution Test + Velocities)	32
113EF11-202A	33
113EF11-202A (Air Distribution Test + Velocities)	34
113EF11-201A	35
113EF11-201A (Air Distribution Test + Velocities)	36
113EF11-201A (Circular Duct Traverse Test)	37
113EF11-201B	38
113EF11-201B (Circular Duct Traverse Test)	39

Coil Data

203-AH11-101	40
203-AH11-301	41
203-AH11-401	42
203AH11-201A	43
203AH11-201B	44
203AH11-501A	45
203AH11-501B	46

Sound Test

52

Electric Coils

46A

46B

Simulated Breech of 107-GB-07-302

Simulated Power Loss to 113-FE-11-201A

Simulated Power Loss to 113-FE-11-202B

P.01 - P.10

P.11, P.12

P.13, P.14

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

203-AH-11-101/203-SF-11-101

PAGE 1**FAN TEST (SUPPLY)**

UNIT IDENTIFICATION	
EQUIPMENT LOCATION	WRAP MOD 1 - UPPER LEVEL
AREA SERVED	SHIP_REC/NDE/NDA
MANUFACTURER	TEMTRON
MODEL NUMBER	SWSI-PF-54
MOTOR MANUFACTURER	CENTURY
MOTOR HP	30.0
MOTOR PHASE	3
MOTOR VOLTAGE	460
MOTOR AMPS	33.7
MOTOR RPM	1760
MOTOR SERVICE FACTOR	1.15

MEASUREMENTS	REQUIRED	FINAL
TOTAL CFM	32035	33165
TOTAL CFM - OUTLETS	32035	31948
TOTAL S.P.	3.0	1.62
TOTAL SUCTION S.P.		-1.10
TOTAL DISCHARGE S.P.		.52
FAN RPM	648	627
MOTOR VOLTAGE #1	460	485
MOTOR VOLTAGE #2		488
MOTOR VOLTAGE #3		481
MOTOR AMPS #1	33.7	24.6
MOTOR AMPS #2		23.8
MOTOR AMPS #3		25.6

ADDITIONAL DATA	
DRIVE MANUFACTURER	BROWNING
MOTOR SHEAVE	3B5V56 X B 1 7/8"
FAN SHEAVE	3B154 X B2 7/16"
DRIVE BELT NO./SIZE	(3) 5VX1400
CENTER LINE DISTANCE	54"

Project Name HANFORD WRAP MOD. 1

STATIC PRESSURE PROFILE

UNIT	A	B	C	D	E	F	G	H	J
SF-101	--	--	.20	1.0	1.10	.55	.52	--	--
RF-101	.62	.06							

Remarks _____

Project: WA0135 WASTE RECEIVING AND PROCESSING FACILITY - HANFORD RESERVATION

System: 203-AH-11-101/203-SF-11-101

Location: 203-AH-11-101/203-SF-11-101

System ID: WA0135A

SUPPLY CIRCULAR DUCT TRAVERSE READINGS

Point	VP	VEL.
A1	.359	2396
A2	.406	2547
A3	.384	2478
A4	.394	2508
A5	.429	2617
A6	.392	2502
A7	.475	2756
A8	.320	2262
A9	.351	2367
A10	.375	2448
Sub. Total	24881	

Point	VP	VEL.
B1	.397	2519
B2	.403	2538
B3	.423	2600
B4	.429	2618
B5	.379	2462
B6	.459	2707
B7	.437	2641
B8	.411	2562
B9	.356	2384
B10	.387	2488
Sub. Total	25519	

Total FPM + No. Readings = Average FPM X Area = Total CFM
 50400 + 20 = 2520 X 14.74 = 33165

DESIGN	DUCT DIA.	52
	AREA	14.74
	CFM	32035
	FPM	2173

Pitot Reading Points

Additive Non-
Traversed CFM

REMARKS

T	DUCT DIA. O/D	52
E	DUCT DIA. I/D	52
S	AREA	14.74
T	CENTER LINE SP	.29
	AVERAGE FPM	2520
O	CFM MEASURED	33165
A	TEMP. CORRECT.	
T	ALT. CORRECT.	
A	CFM STD. COND.	33165

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**203-AH-11-101/203-SF-11-101 ¹**PAGE 2****AIR DISTRIBUTION TEST + VELOCITIES****AIR DISTRIBUTION**

ZONE	#	ROOM #	TYPE	SIZE	AK	RQRD VEL.	RQRD CFM	FINAL VEL.	FINAL CFM
SUPPLY	1	SHPRC	SR	36X6	1.17	897	1050	916	1072
SUPPLY	2	SHPRC	SR	36X6	1.17	897	1050	908	1062
SUPPLY	3	SHPRC	SR	36X6	1.17	897	1050	901	1054
SUPPLY	4	SHPRC	SR	36X6	1.17	897	1050	890	1041
SUPPLY	5	SHPRC	SR	36X6	1.17	897	1050	887	1038
SUPPLY	6	SHPRC	SR	36X6	1.17	897	1050	891	1042
SUPPLY	7	SHPRC	SR	36X6	1.17	897	1050	886	1037
SUPPLY	8	SHPRC	SR	36X6	1.17	897	1050	890	1041
SUPPLY	9	SHPRC	SR	36X6	1.17	897	1050	895	1047
SUPPLY	10	SHPRC	SR	36X6	1.17	897	1050	890	1041
SUPPLY	11	SHPRC	SR	36X6	1.17	897	1050	900	1053
SUPPLY	12	SHPRC	SR	36X6	1.17	897	1050	896	1048
SUPPLY	13	OFFIC	SR	12X6	.39	603	235	600	234
SUPPLY	14	SHPRC	SR	36X6	1.17	897	1050	899	1052
SUPPLY	15	SHPRC	SR	36X6	1.17	897	1050	895	1047
SUPPLY	16	SHPRC	SR	36X6	1.17	897	1050	890	1041
SUPPLY	17	SHPRC	SR	36X6	1.17	897	1050	890	1041
SUPPLY	18	SHPRC	SR	36X6	1.17	897	1050	886	1037
SUPPLY	19	SHPRC	SR	36X6	1.17	897	1050	898	1051
SUPPLY	20	NDEDA	SR	30X6	.98	878	860	878	860
SUPPLY	21	NDEDA	SR	30X6	.98	878	860	880	862
SUPPLY	22	NDEDA	SR	30X6	.98	878	860	874	857
SUPPLY	23	NDEDA	SR	30X6	.98	878	860	880	862
SUPPLY	24	NDEDA	SR	30X6	.98	878	860	880	862
SUPPLY	25	NDEDA	SR	30X6	.98	878	860	872	855
SUPPLY	26	NDEDA	SR	30X6	.98	878	860	876	858
SUPPLY	27	NDEDA	SR	30X6	.98	878	860	879	861
SUPPLY	28	NDEDA	SR	30X6	.98	878	860	881	863
SUPPLY	29	NDEDA	SR	30X6	.98	878	860	880	862
SUPPLY	30	NDEDA	SR	30X6	.98	878	860	869	852
SUPPLY	31	NDEDA	SR	30X6	.98	878	860	871	854
SUPPLY	32	NDEDA	SR	30X6	.98	878	860	869	852
SUPPLY	33	NDEDA	SR	30X6	.98	878	860	874	857
SUPPLY	34	NDEDA	SR	30X6	.98	878	860	869	852
TOTAL							32035		31948

¹MIN O.S.A. DESIGN = 3205 CFM

MIN O.S.A. FINAL = 4173 CFM

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

203-AH-11-101/203-SF-11-101

PAGE 3**CIRCULAR DUCT TRAVERSE TEST**

SUMMARY	
LOCATION	203-AH-11-101/2033-SF-11-101
DUCT DIAMETER INCHES	52
DUCT AREA (SQUARE FEET)	14.75
AVERAGE CFM	2545
TOTAL CFM	37539

VELOCITIES

TRVRS	1	2	3	4	5	6	7	8	9	10
A	2396	2547	2478	2508	2617	2502	2756	2262	2367	2448
B	2519	2539	2600	2618	2462	2707	2641	2562	2384	2488

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

203-RF-11-101

PAGE 4**FAN TEST (RETURN)**

UNIT IDENTIFICATION	
EQUIPMENT LOCATION	WRAP MOD 1 - UPPER LEVEL
AREA SERVED	SHIP_REC/NDE/NDA
MANUFACTURER	TEMTRON
MODEL NUMBER	PF-54
MOTOR MANUFACTURER	CENTURY
MOTOR HP	10.0
MOTOR PHASE	3
MOTOR VOLTAGE	460
MOTOR AMPS	18.9
MOTOR RPM	1765
MOTOR SERVICE FACTOR	1.15

MEASUREMENTS	REQUIRED	FINAL
TOTAL CFM	28830	28992
TOTAL CFM - OUTLETS	28830	28841
TOTAL S.P.	.79	.68
TOTAL SUCTION S.P.		-.62
TOTAL DISCHARGE S.P.		.06
FAN RPM	444	500
MOTOR VOLTAGE #1	460	468
MOTOR VOLTAGE #2		470
MOTOR VOLTAGE #3		469
MOTOR AMPS #1	18.9	13.3
MOTOR AMPS #2		13.8
MOTOR AMPS #3		13.3

ADDITIONAL DATA	
DRIVE MANUFACTURER	BROWNING
MOTOR SHEAVE	3B50SD X SD 1 5/8"
FAN SHEAVE	3B184 X SK 2 7/16"
DRIVE BELT NO./SIZE	(3) BX144
CENTER LINE DISTANCE	55"

Project: WA0135 WASTE RECEIVING AND PROCESSING FACILITY - HANFORD RESERVATION

System: 203-RF-11-101

Location: 203-RF-11-101

System ID: WA0135B

RETURN CIRCULAR DUCT TRAVERSE READINGS

Point	VP	VEL.
A1	.203	1802
A2	.203	1801
A3	.206	1817
A4	.248	1990
A5	.235	1938
A6	.244	1977
A7	.221	1881
A8	.178	1689
A9	.196	1773
A10	.139	1494
Sub. Total	18162	

Point	VP	VEL.
B1	.188	1735
B2	.220	1877
B3	.223	1889
B4	.244	1976
B5	.252	2008
B6	.230	1916
B7	.192	1755
B8	.208	1826
B9	.138	1487
B10	.151	1557
Sub. Total	18026	

Total FPM + No. Readings = Average FPM X Area = Total CFM
36188 + 20 = 1809 X =

D I V I S I O N	DUCT DIA.	52
	AREA	14.74
	CFM	28830
	FPM	1956

Pitot Reading Points

Additive Non-
Traversed CFM

REMARKS

T	DUCT DIA. O/D	52
E	DUCT DIA. I/D	52
S	AREA	14.74
T	CENTER LINE SP	.68/.80
	AVERAGE FPM	1809
D	CFM MEASURED	26665/28992
A	TEMP. CORRECT.	
T	ALT. CORRECT.	
A	CFM STD. COND.	26665/28992

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

203-RF-11-101

PAGE 5**AIR DISTRIBUTION TEST + VELOCITIES****AIR DISTRIBUTION**

ZONE	#	ROOM #	TYPE	SIZE	AK	RQRD VEL.	RQRD CFM	FINAL VEL.	FINAL CFM
RETURN	1	101	RR	48X28	9.3	617	5740	622	5785
RETURN	2	101	RR	48X28	9.3	617	5740	606	5636
RETURN	3	101	RR	48X28	9.3	617	5740	631	5868
RETURN	4	104	RR	48X20	6.67	580	3870	572	3815
RETURN	5	104	RR	48X20	6.67	580	3870	584	3895
RETURN	6	104	RR	48X20	6.67	580	3870	576	3842
TOTAL							28830		28841

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.****203-RF-11-101****PAGE 6****CIRCULAR DUCT TRAVERSE TEST**

SUMMARY	
DUCT DIAMETER INCHES	52
DUCT AREA (SQUARE FEET)	14.74
AVERAGE CFM	1867
TOTAL CFM	27520 ¹

VELOCITIES

TRVRS	1	2	3	4	5	6	7	8	9	10
A	1802	1801	1817	1990	1938	1977	1881	1689	1773	1494
B	1735	1877	1889	1976	2008	1916	1755	1826	1487	1557

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Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.****203-AH-11-201A/203-SF-11-201A****PAGE 7****FAN TEST (SUPPLY)**

UNIT IDENTIFICATION	
EQUIPMENT LOCATION	WRAP MOD 1 - UPPER LEVEL
AREA SERVED	PROCESS AREA
MANUFACTURER	TEMTRON
MODEL NUMBER	PF-36
SERIAL NUMBER	60320
MOTOR MANUFACTURER	BALDOR
MOTOR HP	20.0
MOTOR PHASE	3
MOTOR VOLTAGE	460
MOTOR AMPS	24.0
MOTOR RPM	1765
MOTOR SERVICE FACTOR	1.15

MEASUREMENTS	REQUIRED	FINAL
TOTAL CFM	14505	14868
TOTAL CFM - OUTLETS	14505	14362
TOTAL S.P.	3.50	2.38
TOTAL SUCTION S.P.		-1.66
TOTAL DISCHARGE S.P.		.72
FAN RPM	1047	1058
MOTOR VOLTAGE #1	460	469
MOTOR VOLTAGE #2		466
MOTOR VOLTAGE #3		469
MOTOR AMPS #1	24.0	19.0
MOTOR AMPS #2		18.2
MOTOR AMPS #3		17.3

ADDITIONAL DATA	
DRIVE MANUFACTURER	WOODS
MOTOR SHEAVE	8.5" OD X SK 1 5/8"
FAN SHEAVE	18.6" OD X SK 2 3/16"
DRIVE BELT NO./SIZE	(2) BX108
CENTER LINE DISTANCE	38"

Remarks.

Project HANFORD W.R.A.P. MODULE 1

AIR MONITORING STATION DATA

[illegible]

Remarks	
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AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

203-AH-11-201B/203-SF-11-201B

PAGE 8**FAN TEST (SUPPLY)**

UNIT IDENTIFICATION	
EQUIPMENT LOCATION	WRAP MOD 1 - UPPER
AREA SERVED	PROCESS AREA
MANUFACTURER	TEMROL
MODEL NUMBER	PF-36
SERIAL NUMBER	60321
MOTOR MANUFACTURER	BALDOR
MOTOR HP	20.0
MOTOR PHASE	3
MOTOR VOLTAGE	460
MOTOR AMPS	24
MOTOR RPM	1765
MOTOR SERVICE FACTOR	1.15

MEASUREMENTS	REQUIRED	FINAL
TOTAL CFM	14505	14897
TOTAL CFM - OUTLETS	14505	14362
TOTAL S.P.	3.50	2.38
TOTAL SUCTION S.P.		-1.63
TOTAL DISCHARGE S.P.		.75
FAN RPM	1047	1060
MOTOR VOLTAGE #1	460	468
MOTOR VOLTAGE #2		466
MOTOR VOLTAGE #3		471
MOTOR AMPS #1	24.0	18.6
MOTOR AMPS #2		18.2
MOTOR AMPS #3		19.0

ADDITIONAL DATA	
DRIVE MANUFACTURER	WOODS
MOTOR SHEAVE	8.5" OD X SK 1 5/8"
FAN SHEAVE	18.6" OD X SK 2 3/16"
DRIVE BELT NO./SIZE	(2) BX108
CENTER LINE DISTANCE	38.5"

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

203-AH-11-201B/203-SF-11-201B

PAGE 9**AIR DISTRIBUTION TEST + VELOCITIES****AIR DISTRIBUTION**

ZONE	#	ROOM #	TYPE	SIZE	AK	RQRD VEL.	RQRD CFM	FINAL VEL.	FINAL CFM
SUPPLY	1	107	SR	12X24	1.56	654	1020	643	1003
SUPPLY	2	107	SR	12X24	1.56	654	1020	651	1016
SUPPLY	3	107	SR	12X24	1.56	654	1020	645	1006
SUPPLY	4	107	SR	12X24	1.56	654	1020	639	997
SUPPLY	5	107	SR	12X24	1.56	654	1020	646	1008
SUPPLY	6	107	SR	12X24	1.56	654	1020	651	1016
SUPPLY	7	107	SR	12X24	1.56	654	1020	653	1019
SUPPLY	8	107	SR	12X24	1.56	654	1020	640	998
SUPPLY	9	107	SR	12X24	1.56	654	1020	650	1014
SUPPLY	10	107	SR	12X24	1.56	654	1020	655	1022
SUPPLY	11	111	SR	12X6	.39	837	185	468	183
SUPPLY	12	108	SR	12X6	.39	837	285	511	199
SUPPLY	13	113	SR	12X8	.52	837	435	830	432
SUPPLY	14	113	SR	12X8	.52	837	435	828	431
SUPPLY	15	113	SR	12X8	.52	837	435	833	433
SUPPLY	16	113	SR	12X8	.52	837	435	818	425
SUPPLY	17	113	SR	12X8	.52	837	435	829	431
SUPPLY	18	113	SR	12X8	.52	837	435	835	434
SUPPLY	19	113	SR	12X8	.52	837	435	826	430
SUPPLY	20	113	SR	12X8	.52	837	435	830	432
SUPPLY	21	113	SR	12X8	.52	837	435	833	433
TOTAL							14565		14362

Penn Air Control, Inc.

311 4TH STREET, N.E.

AUBURN, WASHINGTON 98002

(206) 939-4293 FAX (206) 735-2970

PENNAC*161PW

Associated Air Balance Council

Project Name HANFORD W.R.A.P. MODULE 1

STATIC PRESSURE PROFILE

UNIT	A	B	C	D	E	F	G	H	J
AH201B	.43	1.42	1.51	--	1.63	.75	--	--	--

Remarks _____

Remarks _____

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139**

HANFORD W.R.A.P.

203-AH-11-301

PAGE 10**FAN TEST (SUPPLY)**

UNIT IDENTIFICATION	
EQUIPMENT LOCATION	WRAP MOD 1 - UPPER LEVEL
AREA SERVED	LOCKERS/SHOWERS/TOILET
MANUFACTURER	TEMTRON
MODEL NUMBER	WE-DH6S
SERIAL NUMBER	60322
MOTOR MANUFACTURER	CENTURY
MOTOR HP	2.0
MOTOR PHASE	3
MOTOR VOLTAGE	460
MOTOR AMPS	2.6
MOTOR RPM	1725
MOTOR SERVICE FACTOR	1.15

MEASUREMENTS	REQUIRED	FINAL
TOTAL CFM	2170	2175
TOTAL CFM - OUTLETS	2170	2175
TOTAL S.P.	2.50	.78
TOTAL SUCTION S.P.		-.63
TOTAL DISCHARGE S.P.		.15
FAN RPM	1553	1257
MOTOR VOLTAGE #1	460	466
MOTOR VOLTAGE #2		469
MOTOR VOLTAGE #3		461
MOTOR AMPS #1	2.6	2.4
MOTOR AMPS #2		2.5
MOTOR AMPS #3		2.0

ADDITIONAL DATA	
DRIVE MANUFACTURER	BROWNING/WOODS
MOTOR SHEAVE	1VP40 X 7/8"
FAN SHEAVE	4.0SH X 1 3/16" DV
DRIVE BELT NO./SIZE	(1) BX48
CENTER LINE DISTANCE	20"

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Project Name HANFORD W.R.A.P MODULE 1

STATIC PRESSURE PROFILE

UNIT	A	B	C	D	E	F	G	H	J
AH301	.10	.58	.60	--	.63	.15	--	--	--

Remarks _____

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

203-AH-11-301

PAGE 11**AIR DISTRIBUTION TEST + VELOCITIES****AIR DISTRIBUTION**

ZONE	#	ROOM #	TYPE	SIZE	AK	RQRD VEL.	RQRD CFM	FINAL VEL.	FINAL CFM
SUPPLY	1	148	SD	1224	1.0	550	550	540	540
SUPPLY	2	148	SD	1224	1.0	550	550	540	540
SUPPLY	3	146	SD	0612	1.0	110	110	115	115
SUPPLY	4	140	SD	1024	1.0	350	350	360	360
SUPPLY	5	142	SD	1024	1.0	350	350	360	360
SUPPLY	6	146	SD	0612	1.0	40	40	45	45
SUPPLY	7	144	SD	0612	1.0	110	110	105	105
SUPPLY	8	145	SD	0612	1.0	110	110	110	110
TOTAL							2170		2175

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Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

203-AH-11-401/203-SF-11-401

PAGE 12**FAN TEST (SUPPLY)**

UNIT IDENTIFICATION	
EQUIPMENT LOCATION	WRAP MOD 1 - UPPER LEVEL
AREA SERVED	ADMIN. LOCKER ROOM
MANUFACTURER	TEMTRON
MODEL NUMBER	PF-339
SERIAL NUMBER	60323 S/A
MOTOR MANUFACTURER	CENTURY
MOTOR HP	15.0
MOTOR PHASE	3
MOTOR VOLTAGE	460
MOTOR AMPS	18.8
MOTOR RPM	1785
MOTOR SERVICE FACTOR	1.15

MEASUREMENTS	REQUIRED	FINAL
TOTAL CFM	11735	13485
TOTAL CFM - OUTLETS	12310	12708
TOTAL S.P.	4.50	2.9
TOTAL SUCTION S.P.		-.50
TOTAL DISCHARGE S.P.		2.40
FAN RPM	1275	1385
MOTOR VOLTAGE #1	460	461
MOTOR VOLTAGE #2		466
MOTOR VOLTAGE #3		466
MOTOR AMPS #1	18.8	13.3
MOTOR AMPS #2		12.8
MOTOR AMPS #3		12.8

ADDITIONAL DATA	
DRIVE MANUFACTURER	WOODS
MOTOR SHEAVE	6.8 X 2B SDS X 1 5/8"
FAN SHEAVE	9.4 X 2B SK X 1 15/16"
DRIVE BELT NO./SIZE	(2) BX90
CENTER LINE DISTANCE	33"

Project Name HANFORD W.R.A.P. MODULE 1

STATIC PRESSURE PROFILE

UNIT	A	B	C	D	E	F	G	H	J
AH-401	--	--	-.20	.42	.50	2.90	2.95	--	--
RF-401	.25	-.20							

 Remarks _____

AIR MONITORING STATION DATA

Remarks _____

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

203-AH-11-401/RF-11-401

PAGE 13**FAN TEST (RETURN)**

UNIT IDENTIFICATION	
EQUIPMENT LOCATION	WRAP MOD 1 - UPPER LEVEL
AREA SERVED	ADMIN. LOCKER ROOM
MANUFACTURER	TEMTROL
MODEL NUMBER	PF-33
SERIAL NUMBER	60323 R/A
MOTOR MANUFACTURER	CENTURY
MOTOR HP	3.0
MOTOR PHASE	3
MOTOR VOLTAGE	460
MOTOR AMPS	3.7
MOTOR RPM	1760
MOTOR SERVICE FACTOR	1.15

MEASUREMENTS	REQUIRED	FINAL
TOTAL CFM	8830	8915
TOTAL CFM - OUTLETS	9815	9576
TOTAL S.P.	.95	.45
TOTAL SUCTION S.P.		-.25
TOTAL DISCHARGE S.P.		.20
FAN RPM	716	894
MOTOR VOLTAGE #1	460	466
MOTOR VOLTAGE #2		468
MOTOR VOLTAGE #3		467
MOTOR AMPS #1	3.7	2.5
MOTOR AMPS #2		2.4
MOTOR AMPS #3		2.5

ADDITIONAL DATA	
DRIVE MANUFACTURER	BROWNING/WOODS
MOTOR SHEAVE	1VP56 X 1 1/8"
FAN SHEAVE	9.4 X B1 1 15/16"
DRIVE BELT NO./SIZE	(1) BX85
CENTER LINE DISTANCE	31"

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

203-AH-11-401/RF-11-401

PAGE 14**AIR DISTRIBUTION TEST****AIR DISTRIBUTION**

ZONE	TRM #	ROOM #	TYPE	SIZE	REQUIRED CFM	PRIMNRY CFM	FINAL CFM
RETURN	1	120	RG	0824	190		195
RETURN	2	119	RG	0824	140		150
RETURN	3	125	RG	1224	350		360
RETURN	4	109	RG	0624	150		155
RETURN	5	109	RG	0624	140		145
RETURN	6	103	RG	0824	100		110
RETURN	7	102	RG	0824	150		160
RETURN	8	152	RG	12X12	300		310
RETURN	9	121	RG	0824	200		215
RETURN	10	123	RG	1224	200		200
RETURN	11	126	RG	1224	350		345
RETURN	12	128A	RG	1224	500		510
RETURN	13	128	RG	1224	500		500
RETURN	14	129	RG	1224	850		860
RETURN	15	129	RG	1224	850		860
RETURN	16	118	RG	1224	710		700
RETURN	17	118	RG	1224	710		700
RETURN	18	116	RG	1224	750		740
RETURN	19	116	RG	1224	750		740
RETURN	20	115	RG	1224	740		750
RETURN	21	122	RG	1224	200		210
		TOTAL			8830		8915

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**203-AH-11-401¹**PAGE 15****AIR DISTRIBUTION TEST DATA - CLG/HTG CFM****AIR DISTRIBUTION**

ZONE	#	RM #	TY	SIZE	AK	REQ. CLG	REQ. HTG	FINAL CLG	FINAL HTG
203-VA-11-401 ²	1	109	SD	24/24	1.0	150			150
203-VA-11-401	2	109	SD	24/24	1.0	140			150
203-VA-11-402 ³	1	139	SD	24/24	1.0	170			180
203-VA-11-402	2	139	SD	24/24	1.0	170			180
203-VA-11-403 ⁴	1	119	SD	24/24	1.0	140	60	60	150
203-VA-11-404 ⁵	1	COR	SD	24X24	1.0	205			210
203-VA-11-404	2	COR	SD	24X24	1.0	205			210
203-VA-11-404	3	145	SD	24X24	1.0	200			200
203-VA-11-404	4	145	SD	24X24	1.0	200			200
203-VA-11-405 ⁶	1	118	SR	18X6	.59	355			355
203-VA-11-405	2	118	SR	18X6	.59	355			360
203-VA-11-405	3	118	SR	18X6	.59	355			352
203-VA-11-405	4	118	SR	18X6	.59	355			354
203-VA-11-406 ⁷	1	UPS	SR	12X8	.52	740	220	220	745
203-VA-11-407 ⁸	1	116	SR	18X6	.56	375			379
203-VA-11-407	2	116	SR	18X6	.56	375			372
203-VA-11-407	3	116	SR	18X6	.56	375			376
203-VA-11-407	4	116	SR	18X6	.56	375			379
203-VA-11-408 ⁹	1	152	SR	12X8	.52	310	155	155	307
203-VA-11-409 ¹⁰	1	102	SR	0824	1.0	165			160
203-VA-11-409	2	103	SR	0824	1.0	120			125
203-VA-11-410 ¹¹	1	134	SD	0624	1.0				70
203-VA-11-410	2	130	SD	1224	1.0				600
203-VA-11-410	3	151	SD	1224	1.0				600
203-VA-11-411 ¹²	1	129	SD	12X24	1.0				430
203-VA-11-411	2	129	SD	12X24	1.0				440
203-VA-11-411	3	129	SD	12X24	1.0				440
203-VA-11-411	4	129	SD	12X24	1.0				430
203-VA-11-412 ¹³	1	128	SD	12X24	1.0				520
203-VA-11-412	2	128	SD	12X24	1.0				520
203-VA-11-413 ¹⁴	1	123	SD	24/24	1.0				225
203-VA-11-413	2	122	SD	24/24	1.0				220
203-VA-11-413	3	121	SD	24/24	1.0				220
203-VA-11-414 ¹⁵	1	120	SD	24/24	1.0		95	95	200
203-VA-11-415 ¹⁶	1	125	SD	24/24	1.0				250
203-VA-11-415	2	125	SD	24/24	1.0				250
203-VA-11-415	3	126	SD	24/24	1.0				240
203-VA-11-416 ¹⁷	1	203	SR	12X6	1.0				300
203-VA-11-416	2	203	SR	12X6	1.0				298
203-VA-11-416	3	203	SR	12X6	1.0				298
TOTAL						5835	530	530	12445

¹203-VA-11-405 VEL = 602

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**203-AH-11-401¹**PAGE 16****AIR DISTRIBUTION TEST DATA - CLG/HTG CFM**

203-VA-11-406 VEL = 1423

203-VA-11-407 VEL = 670

203-VA-11-408 VEL = 596

²K = 295³K = 440⁴K = 335⁵K = 3240⁶K = 1735⁷K = 2036⁸K = 1168⁹K = 201¹⁰K = 280¹¹K = 1280¹²K = 1924¹³K = 1141¹⁴K = 815¹⁵K = 250¹⁶K = 847¹⁷K = 734

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Balance Council**PENN AIR CONTROL, INC.****WA0139**

HANFORD W.R.A.P.

203-AH-11-401/RF-11-401

PAGE 17**FAN TEST (RETURN)**

UNIT IDENTIFICATION	
EQUIPMENT LOCATION	WRAP MOD 1 - UPPER LEVEL
AREA SERVED	ADMIN. LOCKER ROOM
MANUFACTURER	TENTROL
MODEL NUMBER	PF-33
SERIAL NUMBER	60323 R/A
MOTOR MANUFACTURER	CENTURY
MOTOR HP	3.0
MOTOR PHASE	3
MOTOR VOLTAGE	460
MOTOR AMPS	3.7
MOTOR RPM	1760
MOTOR SERVICE FACTOR	1.15

MEASUREMENTS	REQUIRED	FINAL
TOTAL CFM	8830	8915
TOTAL CFM - OUTLETS	9815	9576
TOTAL S.P.	.95	.45
TOTAL SUCTION S.P.		-.25
TOTAL DISCHARGE S.P.		.20
FAN RPM	716	894
MOTOR VOLTAGE #1	460	466
MOTOR VOLTAGE #2		468
MOTOR VOLTAGE #3		467
MOTOR AMPS #1	3.7	2.5
MOTOR AMPS #2		2.4
MOTOR AMPS #3		2.5

ADDITIONAL DATA	
DRIVE MANUFACTURER	BROWNING/WOODS
MOTOR SHEAVE	1VP56 X 1 1/8"
FAN SHEAVE	9.4 X B1 1 15/16"
DRIVE BELT NO./SIZE	(1) BX85
CENTER LINE DISTANCE	31"

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

203-AH-11-401/RF-11-401

PAGE 18**AIR DISTRIBUTION TEST****AIR DISTRIBUTION**

ZONE	TRM #	ROOM #	TYPE	SIZE	REQUIRED CFM	PRIMNRY CFM	FINAL CFM
RETURN	1	120	RG	0824	190		195
RETURN	2	119	RG	0824	140		150
RETURN	3	125	RG	1224	350		360
RETURN	4	109	RG	0624	150		155
RETURN	5	109	RG	0624	140		145
RETURN	6	103	RG	0824	100		110
RETURN	7	102	RG	0824	150		160
RETURN	8	152	RG	12X12	300		310
RETURN	9	121	RG	0824	200		215
RETURN	10	123	RG	1224	200		200
RETURN	11	126	RG	1224	350		345
RETURN	12	128A	RG	1224	500		510
RETURN	13	128	RG	1224	500		500
RETURN	14	129	RG	1224	850		860
RETURN	15	129	RG	1224	850		860
RETURN	16	118	RG	1224	710		700
RETURN	17	118	RG	1224	710		700
RETURN	18	116	RG	1224	750		740
RETURN	19	116	RG	1224	750		740
RETURN	20	115	RG	1224	740		750
RETURN	21	122	RG	1224	200		210
		TOTAL			8830		8915

Project HANFORD W.R.A.P. MODULE 1

AIR MONITORING STATION DATA

[illegible]

Remarks _____

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139**

HANFORD W.R.A.P.

203-AH-11-501A/SF-11-501A

PAGE 19**FAN TEST (SUPPLY)**

UNIT IDENTIFICATION	
EQUIPMENT LOCATION	WRAP MOD 1 - UPPER LEVEL
AREA SERVED	COMPUTER - CONTROL ROOM
MANUFACTURER	TEMTRON
MODEL NUMBER	WF-DV6M
SERIAL NUMBER	60325
MOTOR MANUFACTURER	CENTURY
MOTOR HP	3.0
MOTOR PHASE	3
MOTOR VOLTAGE	460
MOTOR AMPS	3.7
MOTOR RPM	1760
MOTOR SERVICE FACTOR	1.15

MEASUREMENTS	REQUIRED	FINAL
TOTAL CFM	2536	2500
TOTAL CFM - OUTLETS	2535	2500
TOTAL S.P.	4.00	2.6
TOTAL SUCTION S.P.		-1.25
TOTAL DISCHARGE S.P.		1.35
FAN RPM	3041	3171
MOTOR VOLTAGE #1	460	461
MOTOR VOLTAGE #2		465
MOTOR VOLTAGE #3		466
MOTOR AMPS #1	3.7	3.0
MOTOR AMPS #2		3.0
MOTOR AMPS #3		2.9

ADDITIONAL DATA	
DRIVE MANUFACTURER	BROWNING
MOTOR SHEAVE	1VP71 X 1 1/8"
FAN SHEAVE	1B34SH X SH 1 3/16"
DRIVE BELT NO./SIZE	(1) BX60
CENTER LINE DISTANCE	24"

Remarks _____

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139**

HANFORD W.R.A.P.

203-AH-11-501B/SF-11-501B

PAGE 20**FAN TEST (SUPPLY)**

UNIT IDENTIFICATION	
EQUIPMENT LOCATION	WRAP MOD 1 - UPPER LEVEL
AREA SERVED	COMPUTER - CONTROL ROOM
MANUFACTURER	TEMTRON
MODEL NUMBER	PF-33
SERIAL NUMBER	60326
MOTOR MANUFACTURER	CENTURY
MOTOR HP	3.0
MOTOR PHASE	3
MOTOR VOLTAGE	460
MOTOR AMPS	3.7
MOTOR RPM	1760
MOTOR SERVICE FACTOR	1.15

MEASUREMENTS	REQUIRED	FINAL
TOTAL CFM	2536	2500
TOTAL CFM - OUTLETS	2535	2500
TOTAL S.P.	4.00	2.53
TOTAL SUCTION S.P.		-1.28
TOTAL DISCHARGE S.P.		1.25
FAN RPM	3041	3111
MOTOR VOLTAGE #1	460	466
MOTOR VOLTAGE #2		461
MOTOR VOLTAGE #3		469
MOTOR AMPS #1	3.7	3.0
MOTOR AMPS #2		3.2
MOTOR AMPS #3		2.9

ADDITIONAL DATA	
DRIVE MANUFACTURER	BROWNING
MOTOR SHEAVE	1VP71 X 1 1/8"
FAN SHEAVE	1B34SH X SH 1 3/16"
DRIVE BELT NO./SIZE	(1) BX60
CENTER LINE DISTANCE	24"

Penn Air Control, Inc.

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AUBURN, WASHINGTON 98002

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PENNAC*161PW

Associated Air Balance Council

Project Name HANFORD W.R.A.P MODULE 1

STATIC PRESSURE PROFILE

UNIT	A	B	C	D	E	F	G	H	J
AH501B	.82	1.15	1.20	--	1.28	1.25			

Remarks _____

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

203-AH-11-501B/203-SF-11-501B

PAGE 21**AIR DISTRIBUTION TEST****AIR DISTRIBUTION**

ZONE	TRM #	ROOM #	TYPE	SIZE	REQUIRED CFM	PRIMNRY CFM	FINAL CFM
SUPPLY	1	200	SD	1024	270		270
SUPPLY	2	201	SD	1024	325		320
SUPPLY	3	202	SD	1424	640		620
SUPPLY	4	201	SD	1024	325		320
SUPPLY	5	201	SD	1024	325		320
SUPPLY	6	201	SD	1024	325		320
SUPPLY	7	201	SD	1024	325		330
		TOTAL			2535		2500

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Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**203-AH-11-501B/SF-11-501B ¹**PAGE 22****AIR DISTRIBUTION TEST****AIR DISTRIBUTION**

ZONE	TRM #	ROOM #	TYPE	SIZE	REQUIRED CFM	PRIMNRY CFM	FINAL CFM
RETURN	1	200	RD	1024	240		240
RETURN	2	202	RD	1424	615		600
RETURN	3	201	RD	1424	585		580
RETURN	4	201	RD	1024	300		310
RETURN	5	201	RD	1424	585		580
		TOTAL			2325		2310

¹MIN O.S.A. DESIGN = 210 CFM

MIN O.S.A. FINAL = 190 CFM

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Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

100-EF-11-101

PAGE 23**FAN TEST (EXHAUST)**

UNIT IDENTIFICATION	
EQUIPMENT LOCATION	ROOF
AREA SERVED	TRUCK LOADING
MANUFACTURER	GREENHECK
MODEL NUMBER	GB-350-15
SERIAL NUMBER	95B14511
MOTOR MANUFACTURER	MARATHON
MOTOR HP	1.50
MOTOR PHASE	3
MOTOR VOLTAGE	460
MOTOR AMPS	2.2
MOTOR RPM	1745
MOTOR SERVICE FACTOR	1.15

MEASUREMENTS	REQUIRED	FINAL
TOTAL CFM	10000	10404
TOTAL CFM - OUTLETS	10000	10404
EXTERNAL S.P.	.125	.18
EXTERNAL SUCTION S.P.		-.16
EXTERNAL DISCHARGE S.P.		.02
FAN RPM	398	405
MOTOR VOLTAGE #1	460	466
MOTOR VOLTAGE #2		468
MOTOR VOLTAGE #3		471
MOTOR AMPS #1	2.2	1.6
MOTOR AMPS #2		1.5
MOTOR AMPS #3		1.4

ADDITIONAL DATA	
DRIVE MANUFACTURER	BROWNING
MOTOR SHEAVE	1VP40 X 7/8"
FAN SHEAVE	AK140 X H 1 3/16"
DRIVE BELT NO./SIZE	(1) AX48
CENTER LINE DISTANCE	10"

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

100-EF-11-101

PAGE 24**AIR DISTRIBUTION TEST + VELOCITIES****AIR DISTRIBUTION**

ZONE	#	ROOM #	TYPE	SIZE	AK	RQRD VEL.	RQRD CFM	FINAL VEL.	FINAL CFM
EXHAUST	1	100	EG	36X36	9.0	1111	10000	1156	10404
TOTAL							10000		10404

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Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

203-EF-11-301

PAGE 25**FAN TEST (EXHAUST)**

UNIT IDENTIFICATION	
EQUIPMENT LOCATION	HVAC EQUIP. RM. 203
AREA SERVED	ADMIN. AREA
MANUFACTURER	GREENHECK
MODEL NUMBER	BSQ-140-5
SERIAL NUMBER	95A03981
MOTOR MANUFACTURER	LEESON
MOTOR HP	.50
MOTOR PHASE	1
MOTOR VOLTAGE	115
MOTOR AMPS	4.6
MOTOR RPM	1725
MOTOR SERVICE FACTOR	1.15

MEASUREMENTS	REQUIRED	FINAL
TOTAL CFM	1800	1790
TOTAL CFM - OUTLETS	1800	1790
EXTERNAL S.P.	.625	.72
EXTERNAL SUCTION S.P.		-.66
EXTERNAL DISCHARGE S.P.		.06
FAN RPM	1235	1200
MOTOR VOLTAGE #1	115	118
MOTOR AMPS #1	4.6	4.2

ADDITIONAL DATA	
DRIVE MANUFACTURER	BROWNING
MOTOR SHEAVE	1VP32 X 1/2"
FAN SHEAVE	AK40 X 3/4"
DRIVE BELT NO./SIZE	(1) 4L460
CENTER LINE DISTANCE	18"

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Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

203-EF-11-301

PAGE 26**AIR DISTRIBUTION TEST****AIR DISTRIBUTION**

ZONE	TRM #	ROOM #	TYPE	SIZE	REQUIRED CFM	PRIMNRY CFM	FINAL CFM
EXHAUST	1	148	ED	1224	540		550
EXHAUST	2	149	ED	0812	200		210
EXHAUST	3	150	ED	1012	360		350
EXHAUST	4		ED	0612	100		100
EXHAUST	5	141	ED	0812	210		200
EXHAUST	6	142	ED	1024	390		380
		TOTAL			1800		1790

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

203-EF-11-401

PAGE 27**FAN TEST (EXHAUST)**

UNIT IDENTIFICATION	
EQUIPMENT LOCATION	HVAC EQUIP. RM. 203
AREA SERVED	SHOWER - LOCKER - TOILET
MANUFACTURER	GREENHECK
MODEL NUMBER	BSQ-100-3
SERIAL NUMBER	95A03957
MOTOR MANUFACTURER	MARATHON
MOTOR HP	.33
MOTOR PHASE	1
MOTOR VOLTAGE	115
MOTOR AMPS	6.1
MOTOR RPM	1725
MOTOR SERVICE FACTOR	1.15

MEASUREMENTS	REQUIRED	FINAL
TOTAL CFM	800	850
TOTAL CFM - OUTLETS	830	850
EXTERNAL S.P.	.625	.76
EXTERNAL SUCTION S.P.		-.71
EXTERNAL DISCHARGE S.P.		.05
FAN RPM	1441	1462
MOTOR VOLTAGE #1	115	117
MOTOR AMPS #1	6.1	6.0

ADDITIONAL DATA	
DRIVE MANUFACTURER	BROWNING
MOTOR SHEAVE	1VL25 X 1/2"
FAN SHEAVE	AK30 X 3/4"
DRIVE BELT NO./SIZE	(1) 3L360
CENTER LINE DISTANCE	14.5"

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Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

203-EF-11-401

PAGE 28**AIR DISTRIBUTION TEST****AIR DISTRIBUTION**

ZONE	TRM #	ROOM #	TYPE	SIZE	REQUIRED CFM	PRIMNRY CFM	FINAL CFM
EXHAUST	1	136	ED	0824	160		150
EXHAUST	2	137	ED	0612	120		130
EXHAUST	3	138	ED	0624	100		100
EXHAUST	4	134	ED	0624	70		75
EXHAUST	5	133	ED	0624	80		80
EXHAUST	6	132	ED	0624	100		105
EXHAUST	7	131	ED	0624	200		210
		TOTAL			830		850

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Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

152-EF-11-402

PAGE 29**FAN TEST (EXHAUST)**

UNIT IDENTIFICATION	
EQUIPMENT LOCATION	WALL MOUNTED
AREA SERVED	152
MANUFACTURER	GREENHECK
MODEL NUMBER	BSQ-70-4
SERIAL NUMBER	95A03038
MOTOR MANUFACTURER	MARATHON
MOTOR HP	.25
MOTOR PHASE	1
MOTOR VOLTAGE	115
MOTOR AMPS	5.0
MOTOR RPM	1725
MOTOR SERVICE FACTOR	1.35

MEASUREMENTS	REQUIRED	FINAL
TOTAL CFM	300	305
TOTAL CFM - OUTLETS	300	305
EXTERNAL S.P.	.375	.35
EXTERNAL SUCTION S.P.		-.09
EXTERNAL DISCHARGE S.P.		.26
FAN RPM	1753	1748
MOTOR VOLTAGE #1	115	118
MOTOR AMPS #1	5.0	4.2

ADDITIONAL DATA	
DRIVE MANUFACTURER	BROWNING
MOTOR SHEAVE	1VP30 X 1/2"
FAN SHEAVE	AK30 X 3/4"
DRIVE BELT NO./SIZE	(1) 3L350
CENTER LINE DISTANCE	14"

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Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

152-EF11-402

PAGE 30**AIR DISTRIBUTION TEST + VELOCITIES****AIR DISTRIBUTION**

ZONE	#	ROOM #	TYPE	SIZE	AK	RQRD VEL.	RQRD CFM	FINAL VEL.	FINAL CFM
152	1		EG	12X12	.78	385	300	391	305
TOTAL							300		305

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.****113EF11-202B¹****PAGE 31****FAN TEST (EXHAUST)**

UNIT IDENTIFICATION	
EQUIPMENT LOCATION	PROCESS HVAC ROOM
AREA SERVED	PROCESS AREA
MANUFACTURER	NEW YORK BLOWER
MODEL NUMBER	30
SERIAL NUMBER	K09393-101
MOTOR MANUFACTURER	RELIANCE
MOTOR HP	50.
MOTOR PHASE	3
MOTOR VOLTAGE	460
MOTOR AMPS	58.5
MOTOR RPM	1775
MOTOR SERVICE FACTOR	1.15

MEASUREMENTS	REQUIRED	FINAL
TOTAL CFM	15450	15975
TOTAL CFM - OUTLETS	15470	15615
EXTERNAL S.P.	14.0	1.15
EXTERNAL SUCTION S.P.		-.47
EXTERNAL DISCHARGE S.P.		.68
TOTAL S.P.		6.29
TOTAL SUCTION S.P.		-5.61
TOTAL DISCHARGE S.P.		.68
FAN RPM	2246	2240
MOTOR VOLTAGE #1	460	466
MOTOR VOLTAGE #2		468
MOTOR VOLTAGE #3		471
MOTOR AMPS #1	58.5	41.6
MOTOR AMPS #2		43.8
MOTOR AMPS #3		40.9

ADDITIONAL DATA	
DRIVE MANUFACTURER	BROWNING
MOTOR SHEAVE	2B5V136 X B 2 1/8"
FAN SHEAVE	2B5V1090 X SK 2 7/16"
DRIVE BELT NO./SIZE	(2) 5VX1320
CENTER LINE DISTANCE	46.75"

¹FILTER P @5.1" W.C.

AIR MONITORING STATION DATA

[illegible]

Remarks * FPM @ 100% OPEN. 2.15" W.C. Δ P @ FILTERS

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Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

113EF11-202B

PAGE 32**AIR DISTRIBUTION TEST + VELOCITIES****AIR DISTRIBUTION**

ZONE	#	ROOM #	TYPE	SIZE	AK	RQRD VEL.	RQRD CFM	FINAL VEL.	FINAL CFM
EXHAUST	1	113	ER	36X36	9.0	470	4230	486	4374
EXHAUST	2	107	ER	36X36	9.0	624	5620	628	5652
EXHAUST	3	107	ER	36X36	9.0	624	5620	621	5589
TOTAL							15470		15615

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**113-EF-11-202A¹**PAGE 33****FAN TEST (EXHAUST)**

UNIT IDENTIFICATION	
EQUIPMENT LOCATION	PROCESS HVAC ROOM
AREA SERVED	PROCESS AREA
MANUFACTURER	NEW YORK BLOWER
MODEL NUMBER	30 ACF
SERIAL NUMBER	K09393-101
MOTOR MANUFACTURER	RELIANCE
MOTOR HP	50.0
MOTOR PHASE	3
MOTOR VOLTAGE	460
MOTOR AMPS	58.5
MOTOR RPM	1775
MOTOR SERVICE FACTOR	1.15

MEASUREMENTS	REQUIRED	FINAL
TOTAL CFM	15450	15629
TOTAL CFM - OUTLETS	15470	15552
EXTERNAL S.P.	14.0	1.14
EXTERNAL SUCTION S.P.		-.76
EXTERNAL DISCHARGE S.P.		.38
TOTAL S.P.		6.19
TOTAL SUCTION S.P.		-5.81
TOTAL DISCHARGE S.P.		.38
FAN RPM	2246	2221
MOTOR VOLTAGE #1	460	475
MOTOR VOLTAGE #2		472
MOTOR VOLTAGE #3		469
MOTOR AMPS #1	58.5	40.1
MOTOR AMPS #2		42.6
MOTOR AMPS #3		43.8

ADDITIONAL DATA	
DRIVE MANUFACTURER	BROWNING
MOTOR SHEAVE	2B5V136 X B 2 1/8"
FAN SHEAVE	2B5V1090 X SK 2 7/16"
DRIVE BELT NO./SIZE	(2) 5VX1320
CENTER LINE DISTANCE	46.75

¹FILTER P @5.0" W.C.

Project HANFORD W.R.A.P. MODULE 1

AIR MONITORING STATION DATA

[illegible]

Remarks * FPM @ 100% OPEN, 2.6" W.C. Δ P@FILTERS.

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

113-EF-11-202A

PAGE 34**AIR DISTRIBUTION TEST + VELOCITIES****AIR DISTRIBUTION**

ZONE	#	ROOM #	TYPE	SIZE	AK	RQRD VEL.	RQRD CFM	FINAL VEL.	FINAL CFM
EXHAUST	1	113	ER	36X36	9.0	470	4230	489	4401
EXHAUST	2	107	ER	36X36	9.0	624	5620	621	5589
EXHAUST	3	107	ER	36X36	9.0	624	5620	618	5562
TOTAL							15470		15552

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Balance Council**PENN AIR CONTROL, INC.****WA0139**

HANFORD W.R.A.P.

113-EF-11-201A

PAGE 35

FAN TEST (EXHAUST)

UNIT IDENTIFICATION	
EQUIPMENT LOCATION	PROCESS HVAC RM.
AREA SERVED	GLOVEBOX EXHAUST
MANUFACTURER	NEW YORK BLOWER
MODEL NUMBER	20GI 194DH
SERIAL NUMBER	K09393-120
MOTOR MANUFACTURER	RELIANCE
MOTOR HP	10.0
MOTOR PHASE	3
MOTOR VOLTAGE	460
MOTOR AMPS	11.9
MOTOR RPM	1755
MOTOR SERVICE FACTOR	1.15

MEASUREMENTS	REQUIRED	FINAL
TOTAL CFM	962	962
TOTAL CFM - OUTLETS	962	955
EXTERNAL S.P.	21.0	9.33
EXTERNAL SUCTION S.P.		-8.48
EXTERNAL DISCHARGE S.P.		.85
TOTAL S.P.		14.40
TOTAL SUCTION S.P.		-13.55
TOTAL DISCHARGE S.P.		.85
FAN RPM	3255	3248
MOTOR VOLTAGE #1	460	495
MOTOR VOLTAGE #2		501
MOTOR VOLTAGE #3		496
MOTOR AMPS #1	11.9	8.4
MOTOR AMPS #2		8.3
MOTOR AMPS #3		8.3

ADDITIONAL DATA	
DRIVE MANUFACTURER	BROWNING
MOTOR SHEAVE	2B60SDS X 505 1 11/16
FAN SHEAVE	2TB110 X Q1 - 13/8 - 5/16"
DRIVE BELT NO./SIZE	(2) AX60
CENTER LINE DISTANCE	18"

HANFORD W.R.A.P. MODULE - 1
SIMULATED FILTER CONDITIONS

<i>SYSTEM</i>	<i>DESIGN</i>	<i>ACTUAL</i>	<i>CFM</i>
113-EF-11-201A			
FILTER TRANE	5.0" W.C.	5.12" W.C.	962
GLOVEBOX FILTERS			
100 LINE	2.5" W.C.	2.51" W.C.	360
200 LINE	2.5" W.C.	2.53" W.C.	110
300 LINE	2.5" W.C.	2.50" W.C.	382
400 LINE	2.5" W.C.	2.51" W.C.	110

<i>SYSTEM</i>	<i>DESIGN</i>	<i>ACTUAL</i>	<i>CFM</i>
113-EF-11-201B			
FILTER TRANE	5.0" W.C.	5.11" W.C.	962
GLOVEBOX FILTERS			
100 LINE	2.5" W.C.	2.56" W.C.	360
200 LINE	2.5" W.C.	2.53" W.C.	110
300 LINE	2.5" W.C.	2.51" W.C.	382
400 LINE	2.5" W.C.	2.53" W.C.	110

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Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

113-EF-11-202A

PAGE 36**AIR DISTRIBUTION TEST + VELOCITIES****AIR DISTRIBUTION**

ZONE	#	ROOM #	TYPE	SIZE	AK	RQRD VEL.	RQRD CFM	FINAL VEL.	FINAL CFM
EXHAUST	1	113	ER	36X36	9.0	470	4230	489	4401
EXHAUST	2	107	ER	36X36	9.0	624	5620	621	5589
EXHAUST	3	107	ER	36X36	9.0	624	5620	618	5562
TOTAL							15470		15552

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.****113-EF-11-201A****PAGE 37****CIRCULAR DUCT TRAVERSE TEST**

SUMMARY	
DUCT DIAMETER INCHES	8
DUCT AREA (SQUARE FEET)	.348
AVERAGE CFM	2600
TOTAL CFM	905

VELOCITIES

TRVRS	1	2	3	4	5	6	7	8	9	10
A	2270	2400	2438	2358	2542	2925	3228	3153	3015	2494
B	2353	2337	2470	2588	2528	2512	2838	2654	2434	2342

AIR MONITORING STATION DATA

<i>Station Number</i>	<i>System</i>	<i>Area Searved</i>	<i>Size</i>	<i>Area Sq. Ft.</i>	<i>Design</i>		<i>Test</i>		
					<i>FMP</i>	<i>CFM</i>	<i>Test 1</i>	<i>Test 2</i>	<i>Test 3</i>
*113 EF-11 201A	EF-201A	GLOVE BOX	8"	.35	2748	962	2764		962

* AIR MONITOR CALIBRATED TO CROSS SECTION PITOT TRAVERSE DOWNSTREAM APPROXIMATELY 6'.

<i>Station Number</i>	<i>System</i>	<i>Area Searved</i>	<i>Size</i>	<i>Area Sq. Ft.</i>	<i>Design</i>		<i>Test</i>		
					<i>FMP</i>	<i>CFM</i>	<i>Test 1</i>	<i>Test 2</i>	<i>Test 3</i>
113 EF-11 201A	EF-201A	GLOVE BOX	8"	.35	Pitot tube	mode	2660		931
113 EF-11 201A	EF-201A	GLOVE BOX	8"	.35	Vel grid	mode	2214		775
113 EF-11 201A	EF-201A	GLOVE BOX	8"	.35	Air foil	mode	2160		756
113 EF-11 201A	EF-201A	GLOVE BOX	8"	.35	Vel. Pres.	mode	2626		919

READINGS FROM SEPARATE METER MODES.

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139**

HANFORD W.R.A.P.

113EF11-201B

PAGE 38**FAN TEST (EXHAUST)**

UNIT IDENTIFICATION	
EQUIPMENT LOCATION	PROCESS HVAC RM.
AREA SERVED	GLOVEBOXES
MANUFACTURER	NEW YORK BLOWER
MODEL NUMBER	20 GI-194DA
SERIAL NUMBER	K09393-120
MOTOR MANUFACTURER	RELIANCE ELECTRIC
MOTOR HP	10.0
MOTOR PHASE	3
MOTOR VOLTAGE	460
MOTOR AMPS	11.9
MOTOR RPM	1755
MOTOR SERVICE FACTOR	1.15

MEASUREMENTS	REQUIRED	FINAL
TOTAL CFM	962	962
TOTAL CFM - OUTLETS	962	955
EXTERNAL S.P.		10.20
EXTERNAL SUCTION S.P.		-9.26
EXTERNAL DISCHARGE S.P.		.94
TOTAL S.P.	21.0	15.42
TOTAL SUCTION S.P.		-14.48
TOTAL DISCHARGE S.P.		.94
FAN RPM	3255	3245
MOTOR VOLTAGE #1	460	495
MOTOR VOLTAGE #2		500
MOTOR VOLTAGE #3		498
MOTOR AMPS #1	11.9	8.0
MOTOR AMPS #2		7.7
MOTOR AMPS #3		7.8

ADDITIONAL DATA	
DRIVE MANUFACTURER	BROWNING
MOTOR SHEAVE	2B605DSX X SDS1 11/16"
FAN SHEAVE	2TB110 X Q1-1 3/8 - 3/16"
DRIVE BELT NO./SIZE	(2) AX60
CENTER LINE DISTANCE	18"

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

113-EF-11-201B

PAGE 39**CIRCULAR DUCT TRAVERSE TEST**

SUMMARY	
DUCT DIAMETER INCHES	8
DUCT AREA (SQUARE FEET)	.348
AVERAGE CFM	2151
TOTAL CFM	749

VELOCITIES

TRVRS	1	2	3	4	5	6	7	8	9	10
A	2712	2590	2495	2530	1447	2484	2578	2285	1962	1339
B	2365	2258	1439	2175	2336	1139	1232	2357	2274	2148

AIR MONITORING STATION DATA

<i>Station Number</i>	<i>System</i>	<i>Area Searved</i>	<i>Size</i>	<i>Area Sq. Ft.</i>	<i>Design</i>		<i>Test</i>		
					<i>FMP</i>	<i>CFM</i>	<i>Test 1</i>	<i>Test 2</i>	<i>Test 3</i>
*113 EF-11 201B	EF-201B	GLOVE BOX	8"	.35	2748	962	2764		962

* AIR MONITOR CALIBRATED TO CROSS SECTION PITOT TRAVERSE DOWNSTREAM APPROXIMATELY 5ft.

<i>Station Number</i>	<i>System</i>	<i>Area Searved</i>	<i>Size</i>	<i>Area Sq. Ft.</i>	<i>Design</i>		<i>Test</i>		
					<i>FMP</i>	<i>CFM</i>	<i>Test 1</i>	<i>Test 2</i>	<i>Test 3</i>
113 EF-11 201B	EF-201B	GLOVE BOX	8"	.35	Pitot tube	mode	2150		752
113 EF-11 201B	EF-201B	GLOVE BOX	8"	.35	Vel grid	mode	2040		714
113 EF-11 201B	EF-201B	GLOVE BOX	8"	.35	Air foil	mode	2185		764
113 EF-11 201B	EF-201B	GLOVE BOX	8"	.35	Vel. Pres.	mode	2501		875

READINGS FROM SEPARATE METER MODES.

project: WA0135 WASTE RECEIVING AND PROCESSING FACILITY - HANFORD RESERVATION

PUMP DATA SHEET

PUMP NO.	118-P-11-101A
Manufacturer	PACO
Size	259S-5
Impeller	9.6
Service	CHILLED WATER

118-P-11-101B
PACO
259S-5
9.6
CHILLED WATER

MOTOR MFG.	BALDOR SUPER E
Frame	213T
Horsepower	7.50
RPM	1760
Phase(s)	3-60
AMPS	9.3 ACT: 8.0/ 8.1/ 8.2
Volts	460 ACT: 465/ 469/ 468
Heater O.L.	ACT: 3-FH43

BALDOR SUPER E
213T
7.50
1760
3-60
9.3 ACT: 8.1/ 8.4/ 8.4
460 ACT: 466/ 465/ 466
ACT: 3-FH43

TEST DATA	GPM	Ft. HD	BHP
Design	271	60	
Actual	275	73.92	6.44
Discharge	32.0 PSI	73.92	
Suction	0 PSI	0	
Total HD		73.92	

GPM	Ft. HD	BHP
271	60	
280	69.3	6.57
30.0 PSI	69.3	
0 PSI	0	
	69.3	

BLOCK OFF		Ft. HD
Discharge	52.0 PSI	120.12
Suction	12.0 PSI	27.72
Total HD		92.4

	Ft. HD
52.0 PSI	120.12
13.0 PSI	30.03
	90.09

REMARKS

REMARKS

CURVE: RC-2261

PUMP DATA SHEET
118-P-11-101 A and B

PE - SPEED: TYPE-L - 1800

FLUID 30% ETH GLYC tmp: 30 °F

SG: 1.047

vsc: 5 cpois

vapor: 0.26 psi

atm: 14.7 psi

PUMP Size: 2595-5

Speed: 1750 rpm

Imp dia: 8.94 in

Maximum tmp: 210 °F
pres: 175 psi

AVAILABLE HEAD NPSHa: - ft

PIPING Pressure: - psi

Suction elev: - ft

size: - in

Discharge size: - in

Minimum flow: - % of BEP

Suction size: 3 in

Discharge size: 2.5 in

DESIGN CONDITIONS

FLOW: 271 gpm

TDH: 60.06 ft

EFF: 69 %

POWER: 6.237 bhp

NPSHr: 3.3 ft ***

DESIGN NOTES

BEP: 71%eff @ 220

MAX: 6.944 bhp @ 340

SHUTOFF: 82.72 ft

MIN FLOW: - gpm

SPECIFIC Speed: 1080

Suction: 15430

PERFORMANCE EVALUATION

	FLOW gpm	SPEED rpm	TDH ft	PUMP %eff	POWER bhp	NPSHr ft	MOTOR %eff	POWER kWh	HRS/YR	COST
120%	325.2	1750	48.48	61	6.833	5.44				
100%	271	1750	60.06	69	6.237	3.3				
80%	216.8	1750	69.52	71	5.613	1.99				
	162.6	1750	76.43	68	4.832	1.85				
	108.4	1750	78.64	46	4.9	1.82				

PENN AIR CONTROL, INC.

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object: WA0135 WASTE RECEIVING AND PROCESSING FACILITY - HANFORD RESERVATION

PUMP DATA SHEET

PUMP NO.	118-P-11-102A
Manufacturer	PACO
Size	2570-7
Impeller	5.81
Service	SECONDARY CHILLED WATER

118-P-11-102B
PACO
5.81
SECONDARY CHILLED WATER

MOTOR MFG.	BALDOR SUPER E
Frame	182T
Horsepower	3.0
RPM	1760
Phase(s)	3-60
AMPS	4.4 ACT: 4.2/ 4.3/ 4.1
Volts	460 ACT: 468/ 466/ 469
Heater O.L.	ACT: 3-FH34

BALDOR SUPER E
182T
3.0
1760
3-60
4.4 ACT: 4.2/ 4.0/ 4.0
460 ACT: 468/ 468/ 470
ACT: 3-FH34

TEST DATA	GPM	Ft. HD	BHP
Design	148	30	
Actual	150	20.8	2.88
Discharge	16.5 PSI	38.12	
Suction	7.5 PSI	17.325	
Total HD		20.8	

GPM	Ft. HD	BHP
148	30	
150	25.41	2.75
16.0 PSI	36.96	
5.0 PSI	11.55	
	25.41	

BLOCK OFF	Ft. HD
Discharge	27.0 PSI 62.37
Suction	11.5 PSI 26.57
Total HD	35.8

Ft. HD
28.0 PSI 64.68
12.0 PSI 27.72
36.96

REMARKS

REMARKS

CURVE: RC-1992

PUMP DATA SHEET
118-P-11-102 A and B

FLUID 30% ETH GLYC tmp: 30 °F
SG: 1.047
vsc: 5 cpois
vapor: 0.26 psi
atm: 14.7 psi

PE - SPEED: TYPE-L - 1800

PUMP Size: 2570-7

Speed: 1750 rpm

Imp dia: 5.81 in

Maximum tmp: 210 °F
pres: 175 psi

Minimum flow: - % of BEP

Suction size: 3 in
Discharge size: 2.5 in

AVAILABLE HEAD NPSHa: - ft

PIPING Pressure: - psi
Suction elev: - ft
size: - in
Discharge size: - in

DESIGN CONDITIONS

FLOW: 148 gpm

TDH: 30.03 ft

EFF: 71 %

POWER: 1.655 bhp

NPSHr: 2.25 ft ***

DESIGN NOTES

BEP: 72%eff @ 170

MAX: 2.148 bhp @ 270

SHUTOFF: 32.39 ft

MIN FLOW: - gpm

SPECIFIC Speed: 1860

Suction: 12420

PERFORMANCE EVALUATION

	FLOW gpm	SPEED rpm	TDH ft	PUMP %eff	POWER bhp	NPSHr ft	MOTOR %eff	POWER kWh	HRS/YR	COST
120%	177.6	1750	27.4	72	1.787	2.31				
100%	148	1750	30.03	71	1.655	2.25				
80%	118.4	1750	31.46	66	1.492	2.25				
60%	88.8	1750	32.16	57	1.325	2.25				
40%	59.2	1750	32.74	45	1.139	2.25				

project: WA0135 WASTE RECEIVING AND PROCESSING FACILITY - HANFORD RESERVATION

PUMP DATA SHEET

PUMP NO.	203-P-11-201
Manufacturer	PACO
Size	2095-3
Impeller	8.15
Service	HEAT RECOVERY

MOTOR MFG.	BALDOR SUPER E
Frame	184T
Horsepower	5.0
RPM	1760
Phase(s)	3-Ø
AMPS	6.7 ACT: 6.2/ 6.0/ 6.0
Volts	460 ACT: 468/ 468/ 465
Heater O.L.	ACT:

ACT: / /
ACT: / /
ACT:

TEST DATA	GPM	Ft. HD	BHP
Design	92	60	
Actual	95	64.68	2.87
Discharge	46.0 PSI	106.25	
Suction	18.0 PSI	41.58	
Total HD		64.68	

GPM	Ft. HD	BHP

BLOCK OFF		Ft. HD
Discharge	55 PSI	127.05
Suction	24.5 PSI	56.6
Total HD		70.45

	Ft. HD

REMARKS
3" ARMSTRONG 5.5 TURNS FROM CLOSED
TO OPEN POSITION. METER READING 3.0'
= 95 GPM

REMARKS

CURVE: RC-2217

PUMP DATA SHEET

203-P-11-201

FLUID 30% ETH. GLY tmp: 30 °F

SG: 1.047

vsc: 5 cpois

vapor: 0.26 psi

atm: 14.7 psi

MP Size: 2095-3

Speed: 1750 rpm

Imp dia: 8.1 in

Maximum tmp: 210 °F
pres: 175 psi

Minimum flow: - % of BEP

Suction size: 2.5 in

Discharge size: 2 in

AVAILABLE HEAD NPSHa: - ft

PIPING Pressure: - psi

Suction elev: - ft

size: - in

Discharge size: - in

DESIGN CONDITIONS

FLOW: 92 gpm

TDH: 60.16 ft

EFF: 58 %

POWER: 2.523 bhp

NPSHr: 4 ft ***

DESIGN NOTES

BEP: 68%eff @ 162

MAX: 4.047 bhp @ 275

SHUTOFF: 63.12 ft

MIN FLOW: - gpm

SPECIFIC Speed: 1130

Suction: 7620

PERFORMANCE EVALUATION

	FLOW gpm	SPEED rpm	TDH ft	PUMP %eff	POWER bhp	NPSHr ft	MOTOR %eff	POWER kWh	HRS/YR	COST
120%	110.4	1750	58.77	62	2.767	4				
100%	92	1750	60.16	58	2.523	4				
80%	73.6	1750	61.33	51	2.34	4				
60%	55.2	1750	62.5	45	2.027	4				
40%	36.8	1750	62.91	32	1.913	4				

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AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.****203-AH-11-101****PAGE 40****COIL DATA**

UNIT IDENTIFICATION	
LOCATION	MECH. RM
SERVICE	SHIP_REC.
MBTU/HOUR RATING	558
MANUFACTURER	TEMTROL

UNIT DATA (AIR)	REQUIRED	FINAL
ENTERING AIR TEMP. DB	80.5	90.1
ENTERING AIR TEMP. WB	62.4	63.4
LEAVING AIR TEMP. DB	64.4	66.3
CFM	320385	33165

UNIT DATA (WATER)	REQUIRED	FINAL
ENTERING WATER TEMPERATURE	44	45
LEAVING WATER TEMPERATURE	59.7	61
WATER PRESSURE DROP	4.3	
FLOW IN GPM	76.9	78.0

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

203-AH-11-301

PAGE 41**COIL DATA**

UNIT IDENTIFICATION	
LOCATION	MECH. RM
SERVICE	LOCKERS-SHOWERS
MBTU/HOUR RATING	94
MANUFACTURER	TEMTROL

UNIT DATA (AIR)	REQUIRED	FINAL
ENTERING AIR TEMP. DB	101	90.3
ENTERING AIR TEMP. WB	68	66.4
LEAVING AIR TEMP. DB	57.7	61.3
CFM	2170	2175

UNIT DATA (WATER)	REQUIRED	FINAL
ENTERING WATER TEMPERATURE	44	45
LEAVING WATER TEMPERATURE	56.8	56.8
WATER PRESSURE DROP	3.2	
FLOW IN GPM	15.8	15.0

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

203-AH-11-401

PAGE 42**COIL DATA**

UNIT IDENTIFICATION	
LOCATION	MECH. RM.
SERVICE	ADMIN.
MBTU/HOUR RATING	467
MANUFACTURER	TEMPROL
MODEL NUMBER	11735
SERIAL NUMBER	12708

UNIT DATA (AIR)	REQUIRED	FINAL
ENTERING AIR TEMP. DB	87.5	91.4
ENTERING AIR TEMP. WB		66.6
LEAVING AIR TEMP. DB	50.8	58.4
CFM	11735	12708

UNIT DATA (WATER)	REQUIRED	FINAL
ENTERING WATER TEMPERATURE	44	44
LEAVING WATER TEMPERATURE	57.2	57.6
WATER PRESSURE DROP	13.5	
FLOW IN GPM	71.4	71.0

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.****203-AH-11-201A****PAGE 43****COIL DATA**

UNIT IDENTIFICATION	
LOCATION	MECH. RM.
SERVICE	PROCESS AREA
MBTU/HOUR RATING	620
MANUFACTURER	TEMPROL

UNIT DATA (AIR)	REQUIRED	FINAL
ENTERING AIR TEMP. DB	101	92.3
ENTERING AIR TEMP. WB		63.0
LEAVING AIR TEMP. DB	58.2	65.1
CFM	14505	14362

UNIT DATA (WATER)	REQUIRED	FINAL
ENTERING WATER TEMPERATURE	44	45
LEAVING WATER TEMPERATURE	57.9	58
WATER PRESSURE DROP	4.9	
FLOW IN GPM	96.5	95.0

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.****203-AH-11-201B****PAGE 44****COIL DATA**

UNIT IDENTIFICATION	
LOCATION	MECH. RM
SERVICE	PROCESS AREA
MBTU/HOUR RATING	620
MANUFACTURER	TEMTROL

UNIT DATA (AIR)	REQUIRED	FINAL
ENTERING AIR TEMP. DB	101	91.4
ENTERING AIR TEMP. WB		58.4
LEAVING AIR TEMP. DB	58.2	60.3
CFM	14505	14362

UNIT DATA (WATER)	REQUIRED	FINAL
ENTERING WATER TEMPERATURE	44	45
LEAVING WATER TEMPERATURE	57.9	59
WATER PRESSURE DROP	4.9	
FLOW IN GPM	96.5	95.0

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139**

HANFORD W.R.A.P.

203-AH-11-501A

PAGE 45**COIL DATA**

UNIT IDENTIFICATION	
LOCATION	MECH. RM.
SERVICE	CAOMPUTER CTRL. RM.
MBTU/HOUR RATING	55
MANUFACTURER	TEMTROL

UNIT DATA (AIR)	REQUIRED	FINAL
ENTERING AIR TEMP. DB	75.4	92.3
ENTERING AIR TEMP. WB		60.4
LEAVING AIR TEMP. DB	54.8	55.0
CFM	2536	2500

UNIT DATA (WATER)	REQUIRED	FINAL
ENTERING WATER TEMPERATURE	44	44
LEAVING WATER TEMPERATURE	55.1	56.6
WATER PRESSURE DROP	.4	
FLOW IN GPM	10.6	10.0

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.**

203-AH-11-501B

PAGE 46**COIL DATA**

UNIT IDENTIFICATION	
LOCATION	MECH. RM.
SERVICE	COMPUTER/ CTRL RM
MBTU/HOUR RATING	55
MANUFACTURER	TEMTROL

UNIT DATA (AIR)	REQUIRED	FINAL
ENTERING AIR TEMP. DB	75.4	
LEAVING AIR TEMP. DB	54.8	
CFM	2536	2500

UNIT DATA (WATER)	REQUIRED	FINAL
ENTERING WATER TEMPERATURE	44	
LEAVING WATER TEMPERATURE	55.1	
WATER PRESSURE DROP	.4	
FLOW IN GPM	10.6	10.0

AABCAssociated Air
Balance Council**PENN AIR CONTROL, INC.****WA0139****HANFORD W.R.A.P.****MODULE 1****PAGE 47****SOUND TEST****MEASUREMENTS**

SOUND TEST LOCATION	OFF ON	ALL PS	A	31.5	63	125	250	500	1K	2K	4K	8K
ROOM 113 ¹	OFF	43				40	38	37	34	33	30	
ROOM 113 ²	ON	85		50	56	71	77	80	78	75	67	57
ROOM 107 ²	OFF	49				33	41	43	46	41	38	32
ROOM 107 ²	ON	54			41	47	54	54	53	48	40	31
ROOM 107 ³	OFF	48				32	41	42	45	41	38	31
ROOM 107 ³	ON	58			43	47	50	53	53	47	40	31
ROOM 201 ⁴	OFF	30		30	31	30						
ROOM 201 ⁴	ON	39		37	41	43	40	38	36	36		
ROOM 203 ⁵												
ROOM 188 ⁶												
ROOM 122 ⁷	OFF	32		30	33	32	30					
ROOM 122 ⁷	ON	36		37	39	42	43	40	33	30		
COMP. 101A	OFF	46		43	45	51	54	50	48	36		
COMP. 101A	ON	92		62	65	81	90	85	83	82	83	74
COMP. 101B	OFF	48		43	46	40	42	51	51	37		
COMP. 101B	ON	93		50	56	76	76	85	85	83	83	76

¹NEAR COL. LINE #7

MAX 85 DBA.

²NEAR COL. LINE #7

MAX NC - 50

³GLOVE BOX OPERATING PLATFORM

NEAR COL. LINS 6 _B MAX NC - 50

⁴MAX - NC - 40⁵NEAR COL. LINES 7 _D

MAX 85 DBA

⁶MAX 85DBA

SEE COMPRESSOR 1 _2

TEST RESULTS

⁷MAX NC - 35IN FULL COOLING MODE

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Date: 05-22-96

MEMBER
THE ASSOCIATED AIR BALANCE COUNCIL
AABC

Project: WA0135 WASTE RECEIVING AND PROCESSING FACILITY - HANFORD RESERVATION

ELECTRIC COIL/DUCT HEATER TEST REPORT

LOCATION	MODEL NUMBER	KW	STAGES	RATED VOLTS/ PHASE	AMPS	T E S T V O L T A G E			D A T A A M P E R A G E		
						T1-T2	T2-T3	T3-T1	T1	T2	T3
203-SF-11-301	DH-6S	37	8	208/3-60	44.55	468	471	469	44.0	45.0	42.3
203-SF-11-S01A	DV-6M	10	3	208/3-60	12.4	468	466	469	12.2	11.8	12.0
203-SF-11-S01B	DV-6M	10	3	208/3-60	12.4	467	469	467	12.0	11.4	11.6
203-VA-11-416	VCEE-11	2.0	1	208/3-60	5.6	212	206	211	5.6	5.5	5.4

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Page 46B
Date: 05-22-96

Project: WA0135 WASTE RECEIVING AND PROCESSING FACILITY - HANFORD RESERVATION

ELECTRIC COIL/DUCT HEATER TEST REPORT

LOCATION	MODEL NUMBER	KW	STAGES	RATED VOLTS/ PHASE	AMPS	TEST VOLTAGE			DATA AMPERAGE		
						T1-T2	T2-T3	T3-T1	T1	T2	T3
102-VA-11-409	VCEE-03	1.5	1	208/3-60	4.2	211	214	213	4.0	4.3	4.2
115-VA-11-406	VCEE-11	2.0	2	208/3-60	5.6	216	211	213	5.5	5.6	5.4
116-VA-11-407	VCEE-17	4.0	2	208/3-60	11.1	210	221	213	11.3	11.0	10.8
118-VA-11-404	VCEE-11	3.0	2	208/3-60	8.3	208	212	211	7.4	8.0	8.0
118-VA-11-405	VCEE-17	4.0	1	208/3-60	11.1	222	216	211	11.0	10.6	10.8
119-VA-11-403	VCEE-03	0.5	1	208/3-60	1.4	212	221	216	1.3	1.3	1.4
120-VA-11-414	VCEE-03	1.0	1	208/3-60	2.8	209	211	213	2.8	2.8	2.8
125-VA-11-415	VCEE-11	5.0	3	208/3-60	13.9	206	210	215	13.5	13.3	13.0
126-VA-11-413	VCEE-11	6.0	3	208/3-60	16.7	212	216	211	16.5	16.0	16.3
128-VA-11-412	VCEE-17	7.0	3	208/3-60	27.8	221	215	218	20.1	18.7	16.6
129-VA-11-411	VCEE-24	10.0	3	208/3-60	19.4	210	215	211	20.0	18.6	18.1
130-VA-11-410	VCEE-17	8.0	3	208/3-60	22.2	216	211	210	15.5	13.8	14.2
139-VA-11-402	VCEE-06	2.0	2	208/3-60	4.6	212	221	216	4.1	4.5	4.5
151-VA-11-401	VCEE-03	1.5	1	208/3-60	4.2	210	216	212	4.0	4.0	4.2
152-VA-11-408	VCEE-03	1.0	1	208/3-60	2.8	215	211	216	2.0	2.1	2.1
203-SF-11-101	DH-6SP	122	6	208/3-60	146	466	468	467	119	117	121
203-SF-11-201A	DH-3SP	252	6	208/3-60	303.46	469	466	464	301.2	303	300.6
203-SF-11-201B	DH-3SP	252	6	208/3-60	303.46	468	469	471	300.6	306	301.4

Project HANFORD W.R.A.P. MODULE 1

SOUND LEVEL REPORT

LOCATION - ROOM 113		OCTAVE BANDS - EQUIPMENT OFF										
NEAR COL. LINE #7	ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000
MAX 85 dBA												
		OCTAVE BANDS - EQUIPMENT ON										
	ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000
LOCATION - ROOM 107		OCTAVE BANDS - EQUIPMENT OFF										
NEAR COL. LINE #7	ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000
MAC NC - 50												
		OCTAVE BANDS - EQUIPMENT ON										
	ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000
LOCATION - ROOM 107 @		OCTAVE BANDS - EQUIPMENT OFF										
GLOVE BOX OPERATING PLATFORM	ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000
NEAR COL. LINES 6 & B MAX NC-50												
		OCTAVE BANDS - EQUIPMENT ON										
	ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000
LOCATION - ROOM 201		OCTAVE BANDS - EQUIPMENT OFF										
MAX NC-40	ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000
	30		30	31	30	---	---	---	---	---	---	---
		OCTAVE BANDS - EQUIPMENT ON										
	ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000
	39		37	41	43	40	38	36	36	---	---	---
LOCATION - ROOM 203		OCTAVE BANDS - EQUIPMENT OFF										
NEAR COL. LINES 7 & D	ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000
MAX 85 dBA												
		OCTAVE BANDS - EQUIPMENT ON										
	ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000

Remarks: _____

Project HANFORD W.R.A.P., MODULE 1

SOUND LEVEL REPORT

LOCATION - ROOM 188		OCTAVE BANDS - EQUIPMENT OFF											
ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000		
MAX 85 dBA													
SEE COMPRESSOR 1 & 2													
TEST RESULTS		OCTAVE BANDS - EQUIPMENT ON											
ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000		

LOCATION - ROOM 122		OCTAVE BANDS - EQUIPMENT OFF											
ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000		
MAX NC-35													
IN FULL COOLING MODE		32		30	33	32	30	--	--	--	--	--	--
		OCTAVE BANDS - EQUIPMENT ON											
ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000		
		36		37	39	42	43	40	33	30	--	--	--

LOCATION -		OCTAVE BANDS - EQUIPMENT OFF											
ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000		
		OCTAVE BANDS - EQUIPMENT ON											
ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000		

LOCATION -		OCTAVE BANDS - EQUIPMENT OFF											
ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000		
		OCTAVE BANDS - EQUIPMENT ON											
ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000		

LOCATION -		OCTAVE BANDS - EQUIPMENT OFF											
ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000		
		OCTAVE BANDS - EQUIPMENT ON											
ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000		

Remarks: _____

Project HANDFORD W.R.A.P. MODULE 1

SOUND LEVEL REPORT

LOCATION - COMP. 101A		OCTAVE BANDS - EQUIPMENT OFF										
ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000	
46		43	45	51	54	50	48	36	--	--	--	
		OCTAVE BANDS - EQUIPMENT ON										
ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000	
92		62	65	81	90	85	83	82	83	74	--	
LOCATION - COMP. 101B		OCTAVE BANDS - EQUIPMENT OFF										
ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000	
48		43	46	40	42	51	51	37	--	--	--	
		OCTAVE BANDS - EQUIPMENT ON										
ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000	
93		50	56	76	76	85	85	83	83	76	--	
LOCATION -		OCTAVE BANDS - EQUIPMENT OFF										
ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000	
		OCTAVE BANDS - EQUIPMENT ON										
ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000	
LOCATION -		OCTAVE BANDS - EQUIPMENT OFF										
ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000	
		OCTAVE BANDS - EQUIPMENT ON										
ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000	
LOCATION -		OCTAVE BANDS - EQUIPMENT OFF										
ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000	
		OCTAVE BANDS - EQUIPMENT ON										
ALL PASS	A	31.5	63	125	250	500	1000	2000	4000	8000	16000	

 Remarks: _____

Project HANFORD W.R.A.P. MODULE 1 COMP. 101A

OCTAVE BAND CHART

Remarks: _____

Project HANFORD W.R.A.P. MODULE 1 COMP. 101B

OCTAVE BAND CHART

Remarks: _____

HANFORD W.R.A.P. MODULE-01
ROOM PRESSURE DIFFERENTIALS

PROCESS RM., 113 TO OUTSIDE = $-.15''$ W.C.
PROCESS RM., 113 TO PROCESS RM = $-.05''$ W.C.
PROCESS RM. TO OUTSIDE = $-.21''$ W.C.
PROCESS RM. TO NDE/NDA RM. 104 = $-.12''$ W.C.

PORTHOLE BREECH GB-302

ELAPSED TIME = 15MIN.

SP = .44 CFM @ 2 OPEN PORTS @ TIME OF BREECH = 286 CFM.
SP = .86 CFM @ 2 OPEN PORTS AFTER STABILIZATION = 306 CFM.

01/24/97 11:20 FAX 15099433347

PCL CONSTRUCTION --- J PAYNE

002/002

JAN-24-97 10:28 AM PENN AIR CONTROL INC. 286 735 2970

P. 91

Per: Air Control, Inc.

Certified Address:

311 4th Street, N.E.

Substr. *Wahingtonia speciosa*

PENNAC • 151 PW

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for 939.2277 = $\bar{F}_m$ for 732.2321

HANFORD W.R.A.P. MODULE-1
ROOM PRESSURE DIFFERENTIALS

PROCESS RM 113 TO OUTSIDE = -.15" W.C.
PROCESS RM 113 TO PROCESS RM = -.05" W.C.
PROCESS RM TO OUTSIDE = -.21" W.C.
PROCESS RM TO NDE/NDA 104 = -.12" W.C.

POETHOLE BREECH

ELAPSED TIME = 15 MIN.

SP = .85" - CFM PRIOR TO BREECH = 310 CFM
 SP = .44". CFM @ 2 OPEN PORTS @ TIME OF BREECH = 286 CFM
 SP = .86". CFM @ 2 OPEN PORTS AFTER STABILIZATION = 306 CFM

As the simulated breach test was performed, CFM and static pressure of the remaining glove boxes was monitored. Due to the accuracy of the kurz valves, no significant changes had occurred. The exhaust fan control was maintaining the balanced setpoint. See test sheets for static pressures and flows.

Associated Air Balance Council

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Summary of Simulated Breach

Test Date 2/9/97

The following graphs and information are of test results found in all Gloveboxes at the Hanford W.R.A.P. site on the above date. This data is representative of system operation in all Gloveboxes during a credible breach in 107-GIB-07-302. Procedure for this test was outlined in the project specification 15990. These procedures have been enhanced and witnessed by a representative from Westinghouse. The general procedures outlined by Richard Jordal are as follows:

Observe initial system operation and log data. See previously approved Test and Balance report.

Open entry port on 107-GIB-07-302, log all data from all Gloveboxes as a function of time.

Open two glove ports to show simulated failure, log all data from all Gloveboxes as a function of time.

Simulate loss of power to rim 113 filter train 201 and 202 a&b, log data from all Gloveboxes as a function of time. Including room pressurization's.

The final procedure is to simulate a loss of all power to systems serving the Gloveboxes and process area 113 and 107. At this condition all ventilation to the Gloveboxes is lost. Pressure relationships are lost between these rooms and the Gloveboxes yet all other heating ventilating and air conditioning systems through out the building remain operational. This condition insures positive pressure from anywhere there is access from clean areas to the process areas.

The secondary purpose of this summary is to certify this test procedure is in accordance with the design intent of system operation. This procedure is in compliance with the Associated Air Balance Council's standards for instrumentation and test procedures.

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Simulated Breech 107-GB-07-104**SP**

Time 14:25 14:26 14:27 14:28 14:29 14:30 14:31 14:32 14:33 14:34 14:35 14:36

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Simulated Breech 107-GB-07-104**CFM** **Time 14:25 14:26 14:27 14:28 14:29 14:30 14:31 14:33 14:35 14:36 14:38**

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Simulated Breech 107-GB-07-201**SP** **Time 14:25 14:26 14:27 14:28 14:29 14:30 14:31 14:32 14:33 14:34 14:35**

Simulated Breech 107-GB-07-201

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Simulated Breech 107-GB-07-302**SP** **Time 14:25 14:26 14:27 14:28 14:29 14:30 14:31 14:32 14:33 14:34 14:35**

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AABC

Simulated Breech 107-GB-07-302

Simulated Breech 170-GB-07-401

Simulated Breech 107-GB-07-401

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Simulated Power Loss To 113-FT-11-201A

Time	PDIT-601	PDIT-602	PDIT-603	PDIT-606	PDIT-607
16:15	-.21	-.12	-.02	0.0	0.0
16:16	-.21	-.12	-.02	0.0	0.0
16:17	-.21	-.12	-.02	0.0	0.0
16:18	-.01	0.0	-.02	-.05	0.0
16:19	-.00	0.0	-.02	-.01	0.0
16:20	-.01	0.0	-.02	-.01	0.0
16:21	-.01	0.0	-.02	0.0	0.0
16:22	-.01	0.0	-.02	0.0	0.0
16:23	-.01	0.0	-.02	-.01	0.0
16:24	-.01	0.0	-.02	-.01	0.0
16:25	-.01	0.0	-.02	-.01	0.0

Note Power Loss At 16:18

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Simulated Power Loss To 113-FT-11-201A

GBOX#	102	201	302	401
Time	CFM/PRESS.	CFM/PRESS.	CFM/PRESS.	CFM/PRESS.
16:15	290/-1.04	57/- .49	359/- .48	103/- .35
16:16	290/-1.04	57/- .49	359/- .48	103/- .35
16:17	290/-1.04	57/- .49	359/- .48	103/- .35
16:18	290/-1.04	57/- .49	359/- .48	103/- .35
16:19	000/- .05	000/- .05	000/- .05	000/- .05
16:20	000/- .05	000/- .05	000/- .05	000/- .05
16:21	000/- .05	000/- .05	000/- .05	000/- .05
16:22	000/- .05	000/- .05	000/- .05	000/- .05
16:23	000/- .05	000/- .05	000/- .05	000/- .05
16:24	000/- .05	000/- .05	000/- .05	000/- .05
16:25	000/- .05	000/- .05	000/- .05	000/- .05

Note Power Loss At 16:19

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Simulated Power Loss To 113-FT-11-202B

Time	PDIT-601	PDIT-602	PDIT-603	PDIT-606	PDIT-607
17:00	-.21	-.12	-.02	0.0	-.21
17:01	---	---	---	---	---
17:02	-.02	0.0	-.03	0.0	-.01
17:03	-.02	0.0	-.03	0.0	-.01
17:04	-.02	0.0	-.03	0.0	-.01
17:05	-.02	0.0	-.03	0.0	-.02
17:06	-.02	0.0	-.03	0.0	-.01
17:07	---	---	---	---	---
17:08	-.02	0.0	-.03	0.0	-.01
17:09	---	---	---	---	---
17:10	-.02	0.0	-.03	0.0	-.01

Note Power Loss At 17:01

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Simulated Power Loss To 113-FT-11-202-B

GBOX#	104	201	302	401
Time	CFM/PRESS.	CFM/PRESS.	CFM/PRESS.	CFM/PRESS.
17:00	376/-1.70	103/- .82	361/- .49	111/- .53
17:01	—	—	—	—
17:02	372/-1.67	102/- .81	359/- .49	110/- .53
17:03	—	—	—	—
17:04	383/-1.72	104/- .84	367/- .51	112/- .52
17:05	—	—	—	—
17:06	381/-1.72	104/- .84	357/- .49	112/- .54
17:07	—	—	—	—
17:08	387/-1.73	103/- .84	359/- .49	112/- .54
17:09	—	—	—	—
17:10	386/-1.73	102/- .84	359/- .49	112/- .54

Note: Power Loss Was At 17:01