

Data Request #108 – Estimated vacuum achievable with purge fan

It was reported by Dave Jones (former CR3 operator) that an event occurred in the late 1980's or early 1990's during which a purge exhaust fan was operating with the inlet purge valve closed. This resulted in a vacuum in the containment building. The exact date of the event could not be determined, so retrieving the RB pressure strip chart to determine the resulting RB pressure is not practical.

An alternate method of determining the resulting RB pressure is to estimate a "worst case" vacuum based on system performance. The CR3 purge fans (AHF-7A/7B) are Joy Manufacturing model 36-26.5-1770 axial vane fans. The fan curve for these units are contained in vendor manual VTMA 231 (curve attached). The design point for the fans is 25000 cfm @ 10" wg with a blade setting of 1. The fans are connected to the containment building through a series of ductwork, filters, and dampers, and exhaust to the atmosphere.

If the fan curve is extrapolated to dead head (no flow) conditions, the maximum total pressure developed by the fan is approximately 12" wg. If the pressure loss in the ventilation system is conservatively neglected, the maximum vacuum would be equal to the atmospheric pressure minus the total pressure imparted by the fan. Since 12" wg is equal to approximately 0.433 psi, the RB vacuum would have been less than 0.5 psi. If the maximum total pressure of the fan is doubled to account for uncertainty of the extrapolation method, the vacuum would have been less than 1 psi.

Craig Miller

# CAUTION

THE DRAWINGS CONTAINED  
IN THIS MANUAL MAY NOT BE  
THE LATEST REVISION. CHECK THE  
FPC DRAWING SYSTEM TO DETERMINE  
IF A LATER REVISION EXISTS.

FLORIDA POWER CORPORATION

CRYSTAL RIVER PLANT UNIT #3

RED LEVEL, FLORIDA

ATTENTION: MR. C. JACKSON

FLORIDA POWER CORPORATION  
NUCLEAR ENGINEERING DEPARTMENT  
CRYSTAL RIVER - UNIT 3

INSTRUCTION MANUAL NO.

231

REI/MAR No. —

P.O. No.

PR3-2742

Equip. Tag No.

MUL TAG NOS.

(AH) See MANUAL

This Instruction Manual Is Applicable to  
SAFETY RELATED Equipment.

Reviewed by:

Reviewer

M. O. Cantello

11-1-85  
Date

Supervisor

L. LaFargue

11/5/85  
Date

DOCUMENT CONTROL  
E-8

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REVISION 1

OPER FILE

## FLORIDA POWER CORPORATION

P.O. #PR3-2742

CYRSTAL RIVER PLANT UNIT #3

RED LEVEL, FLORIDA

## JOY MANUFACTURING COMPANY SERIES 2000 FANS

<u>MARK NO.</u>	<u>DUTY</u>
AHF-26A	62,500 CFM @ .90" Pt
AHF-26B	62,500 CFM @ .90" Pt
AHF-26C	62,500 CFM @ .90" Pt
AHF-27A	66,000 CFM @ 1.1" Pt
AHF-27B	66,000 CFM @ 1.1" Pt
AHF-27C	66,000 CFM @ 1.1" Pt
AHF-25A	50,000 CFM @ 1.1" Pt
AHF-25B	43,750 CFM @ 1.1" Pt
AHF-25C	43,750 CFM @ 1.1" Pt
AHF-22A	31,800 CFM @ 1.53" Pt
AHF-22B	31,800 CFM @ 1.53" Pt
AHF-22C	31,800 CFM @ 1.53" Pt
AHF-22D	31,800 CFM @ 1.53" Pt
AHF-23A	12,055 CFM @ 1.56" Pt
AHF-23B	12,055 CFM @ 1.56" Pt
AHF-7A	25,000 CFM @ 10" Pt
AHF-7B	25,000 CFM @ 10" Pt
AHF-11A	48,500 CFM @ 4.3" Pt
AHF-11B	48,500 CFM @ 4.3" Pt
AHF-14A	78,340 CFM @ 11" Pt
AHF-14B	78,340 CFM @ 11" Pt
AHF-14C	78,340 CFM @ 11" Pt
AHF-14D	78,340 CFM @ 11" Pt
AHF-19A	42,355 CFM @ 2.0" Pt
AHF-19B	42,355 CFM @ 2.0" Pt
AHF-3A	45,000 CFM @ 2.73" Pt
AHF-3B	45,000 CFM @ 2.73" Pt
AHF-4A	62,000 CFM @ 3.2" Pt
AHF-4B	62,000 CFM @ 3.2" Pt
AHF-6A	25,000 CFM @ 4.7" Pt
AHF-6B	25,000 CFM @ 4.7" Pt

Controlled  
Mfg. Manual

REVISION "O"

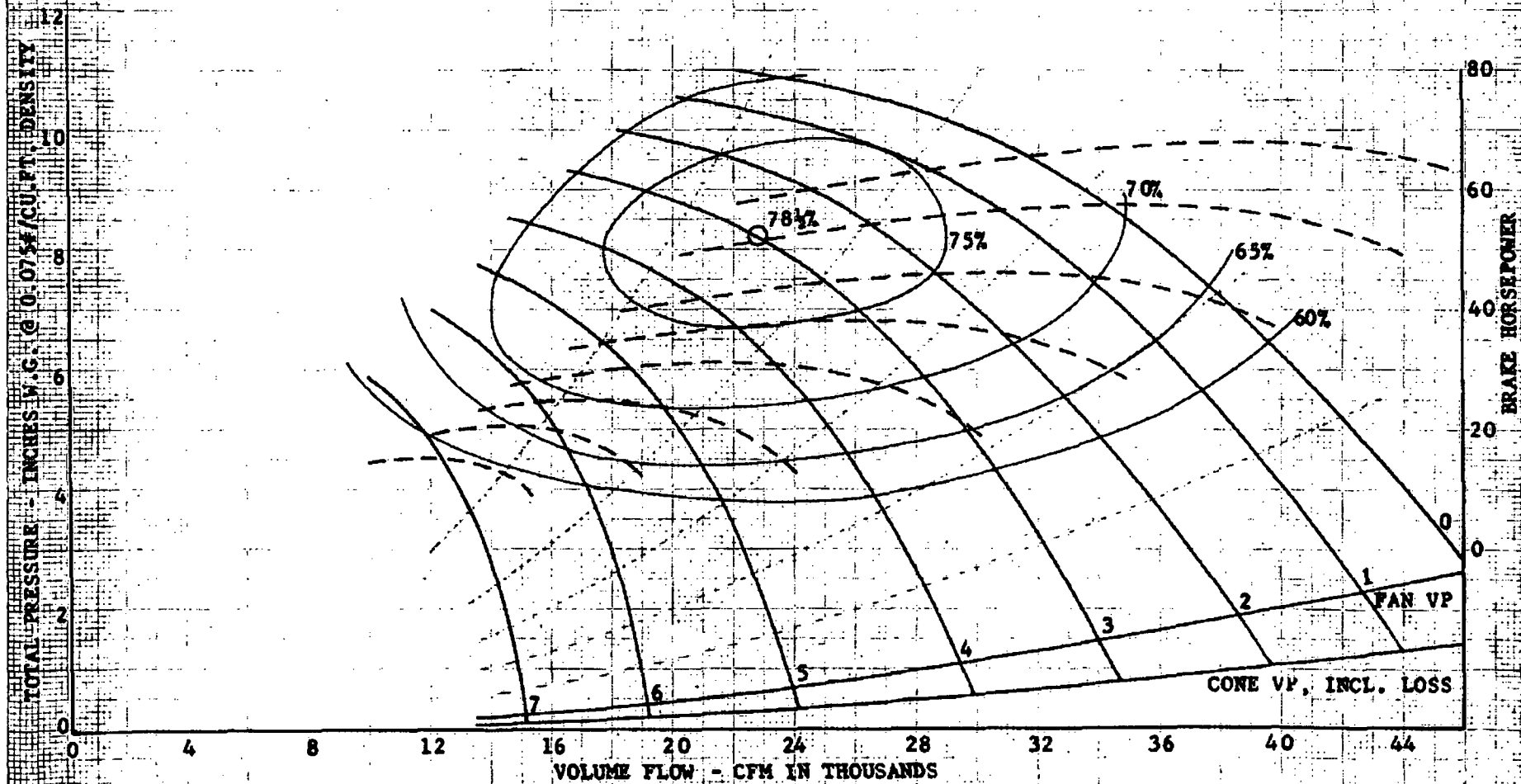
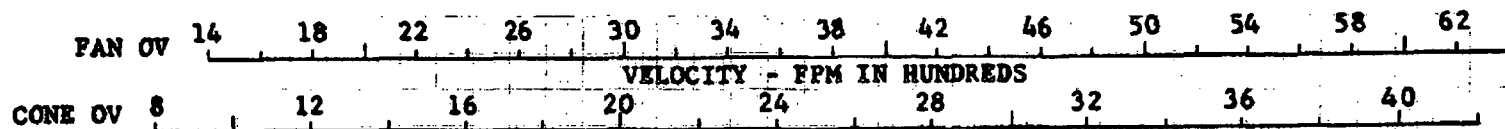
Index of Joy Fan, Serial Number to Plant Tag Number and Fan Blade Setting  
Series 2000 Fans

<u>Tag Number</u>	<u>Model Number</u>	<u>Blade Settings</u>	<u>Reference</u>
AHF-26A	60-26.5-870	3.5	Factory
AHF-26B	60-26.5-870	3.5	Factory
AHF-26C	60-26.5-870	3.5	Factory
AHF-27A	60-26.5-870	3	Factory
AHF-27B	60-26.5-870	3	Factory
AHF-27C	60-26.5-870	3	Factory
AHF-25A	54-26.5-870	3.5	Factory
AHF-25B	54-26.5-870	4	Factory
AHF-25C	54-26.5-870	4	Factory
AHF-22A	48-26.5-1170	*	WR 350697/REA 97-2281
AHF-22B	48-26.5-1170	*	WR 350697/REA 97-2281
AHF-22C	48-26.5-1170	*	REA 97-2281
AHF-22D	48-26.5-1170	*	REA 97-2281
AHF-23A	34-26.5-1170	4.5	Factory
AHF-23B	34-26.5-1170	4.5	Factory
AHF-7A	36-26.5-1770	1	Factory
AHF-7B	36-26.5-1770	1	Factory
AHF-11A	48-26.5-1770	5.5	Factory
AHF-11B	48-26.5-1770	5.5	Factory
AHF-14A	54-30-1770	3	WR 345308
AHF-14B	54-30-1770	3	WR 338716
AHF-14C	54-30-1770	3	WR 345309
AHF-14D	54-30-1770	3	WR 345456
AHF-19A	54-26.5-870	2.5    **	WR 360843/NCR 42230
AHF-19B	54-26.5-870	2.5    **	WR 360844/NCR 42230
AHF-3A	48-26.5-1170	NA	Not Adjustable
AHF-3B	48-26.5-1170	NA	Not Adjustable
AHF-4A	60-26.5-1170	NA	Not Adjustable
AHF-4B	60-26.5-1170	NA	Not Adjustable
AHF-6A	38-26.5-1770	NA	Not Adjustable
AHF-6B	38-26.5-1770	NA	Not Adjustable

\* AHF-22A/B/C/D fans set at blade angle of 5.5 degrees per REA 97-2281.

\*\* AHF-19A replaced under WR 360843. NCR 42230 identified the blade pitch at 2.5 and determined 2.5 to be the proper setting. AHF-19B verified at 2.5 setting under WR 360844.

NOISE



APRIL 15, 1968  
C-5102

JOY SERIES 2000 AXIVANE FAN  
MODEL 36-26-1770