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18 STA #2
FEB 09 1999

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

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		10. System/Bldg./Facility: Sys.W-059/221B/B Plant
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1	HNF-3330		0	B Plant Canyon Ventilation Control System Description	S	1/2		

16. KEY

Approval Designator (F)	Reason for Transmittal (G)		Disposition (H) & (I)	
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1,2	1	Design Authority, S.J.Giamberardini [signature] 2/5/99			
		Design Agent			
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18.	19.	20.	21. DOE APPROVAL (if required)
K.S. McDaniel [signature] 2/8/99 Signature of EDT Originator / Date	K.S. McDaniel [signature] 2/8/99 Authorized Representative for Receiving Organization / Date	S.J. Giamberardini [signature] 2/5/99 Design Authority/ Cognizant Manager / Date	Ctrl. No. [] Approved [] Approved w/comments [] Disapproved w/comments

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B Plant Canyon Ventilation Control System Description

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Abstract: Project W-059 installed a new B Plant Canyon Ventilation System. Monitoring and control of the system is implemented by the Canyon Ventilation Control System (CVCS). This document describes the CVCS system components which include a Programmable Logic Controller (PLC) coupled with an Operator Interface Unit (OIU) and application software. This document also includes an Alarm Index specifying the setpoints and technical basis for system analog and digital alarms.

[signature] 2/9/99

Release Approval Date

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B PLANT CANYON VENTILATION CONTROL SYSTEM DESCRIPTION

January 1999

Prepared for:

B&W Hanford Company

Prepared by:

Fluor Daniel Northwest, Inc.

B PLANT CANYON VENTILATION CONTROL SYSTEM DESCRIPTION

PROJECT W-059

Prepared for

B&W HANFORD COMPANY

January 1999

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B Plant Canyon Ventilation Control System Description

1.0 SUMMARY

Project W-059 B Plant Canyon Ventilation Upgrade installed new Air Cleanup Trains (ACT), exhaust fans, exhaust stack, and stack monitoring. (Refer to Functional Design Criteria, HNF-SD-W-059-FDC-002, Rev. 2.) Monitoring and control of the system is implemented by the Canyon Ventilation Control System (CVCS). The CVCS is located in panel 221BK-CP-1 inside building 221BK adjacent to the 221BK-EF-101 and -102 exhaust fans. The CVCS consists of a Programmable Logic Controller (PLC) coupled with an Operator Interface Unit (OIU) and application software. Software configuration management is addressed in HNF-3331, "Software Configuration Management Plan for the B Plant Canyon Ventilation System."

2.0 OPERATOR INTERFACE UNIT

The Operator Interface Unit (OIU) consists of a Xycom industrial computer using the Microsoft Windows NT 4.0 operating system and Citect 5.0 industrial automation software. The Citect software provides graphic displays, raw data conversion to engineering units, alarms, limited signal conditioning and programming, and user access control. The computer is a Pentium PC based machine with a touch sensitive screen, numeric and function keypad, internal hard disk, and 3.5 inch floppy. The system is configured for network communications using TCP/IP protocols. Operator interaction is accomplished through the touch screen and interactive graphics displays.

2.1 Page Organization

The graphics displays are organized into a series of pages with tabs. Each page contains related information and controls pertinent to the system. To access the pages, the operator simply touches the OIU screen over the area corresponding to the page tab. Some special pages are provided for auxiliary functions such as alarms. These special pages are accessed by touching the screen area corresponding with the access "button". The following sections describe each page and its function.

2.2 Login Screen

The Login Screen is the main default page displayed when the system is first started. Each user is required to enter an identification and password to access auxiliary and alarm functions. There are two types of users, "operator" and "engineer". The user type is specified when the user is registered into the system (see Section 2.7 Auxiliary Functions). The operator type user can view all information and acknowledge alarms. The engineer type user can view all information, acknowledge alarms, adjust analog alarm setpoints, and add/remove users.

In addition to providing for user access to the system, the Login Screen provides access to Auxiliary Functions (Section 2.7) and Analog Alarm Setpoints (Section 2.8), and display of PLC internal status. The internal status includes Battery, I/O Module, and Controller status. Status is either OK or failed.

2.3 ACT Filter Status

There are two Air Cleanup Trains (ACT's) on the B Plant Canyon Exhaust system. Each ACT contains a pre-filter bank and two banks of HEPA filters. The ACT Filter Status page displays Total Differential Pressure across each ACT in inches of water column. The ACT Filter Status page also displays the discrete Pressure Differential Alarm High for the pre-filter banks and High and High High alarms for the HEPA filter banks. As a defense-in-depth design feature, the High High alarms at the HEPA filter banks provide a contact input to the PLC which, in turn, is interlocked to shut down the operating exhaust fan.

There is a radiation detector located adjacent to each ACT unit. These detectors monitor the radiation emanating from particulate accumulating on the filters. This information is useful for personnel safety and to determine when filters should be replaced. The ACT Filter Status page displays the radiation level in mR/hr and has High Alarm and Fail Alarm status. The radiation high alarm threshold is set at the Eberline RMS II display units located in the IP-200 panel. These display units provide a discrete (contact) input to the PLC to notify of an alarm condition.

2.4 Building Conditions

The Building Conditions page displays information and alarm status for the 221-BK building temperature, 221-B canyon temperature, 221-B canyon to atmosphere pressure and 221-B, Cell 10 level status. Prior to display, the 221-B canyon to atmosphere pressure input is time averaged in the CITECT programming to compensate for transient wind effects at the atmospheric reference probe.

2.5 GEMS Status

The Gaseous Effluent Monitoring System (GEMS) provides record filter stack sampling. The GEMS is made up of the stack flow measuring system, shrouded probe, sample line, record filter holder, sample flow controller, and sample pumps. The GEMS Status page displays stack flow, sample flow, stack and sample temperature, and record filter status. See H-2-828924.

Associated with each flow measurement there is a flow totalizer (FQI-301 and FQI-302). The flow totalizers allow tracking of the total volume of effluent leaving the stack and the total volume of the sample flow. This allows accurate characterization of the effluent based on the results of analysis of the record filter.

The record filter status box allows the user to reset the totalizers to zero. When reset, the time and date the totalizers were reset is stored and displayed. In addition, the previous reset time and date is displayed. This allows manual computation of the duration between totalizer resets. It is intended that the totalizer values be manually recorded prior to resetting and that the record filter be replaced at the same time. (The actual totalizer function is implemented in the PLC ladder logic. See Section 5.0 for details)

The stack flow is measured using two Pitot airflow traverse probes mounted at 90 degrees to each other in the stack (FE-302a and FE-302b). The pressure ports on these probes are paralleled and connected to a differential pressure flow transmitter (FIT-301). FIT-301 provides a 4-20 mA signal to the PLC that is proportional to the square root of the velocity pressure. The flow indication displayed is compensated for air density using the stack temperature. (The compensated flow calculation is implemented in the PLC ladder logic. See Section 4.0 for details)

The sample flow is controlled by a separate mass flow controller located in the sample cabinet (221BK-CP-2A) at the base of the stack. The flow controller sends a 4-20 mA signal to the PLC proportional to mass flow. The GEMS page provides a user input box to set the flow to a desired value. When set, the PLC sends a 4-20 mA signal to the controller, telling it the required flow. The flow should be set to 2.0 SCFM for normal operation with the shrouded probe.

To prevent moisture condensation inside the sample line, the sample line is heat traced. Control of this heat trace is implemented in the PLC logic while the on or off state is displayed on the GEMS page. The heater indicator displays black for off and green for on. The sample line is maintained at 10 degrees F above the stack temperature. If the stack temperature goes above 84 degrees, the heater turns off.

The motive force for the sample air is provided by one of two sample pumps located in the 221-BK building. The pumps are operated in a semi-duplex mode. Either pump can be selected as the "primary" pump. The remaining pump serves as a backup or "secondary" pump. If a pump fails due to motor overload or if the sample line or filter clogs, a low flow will result. Sample flow is monitored. If sample flow falls below the low flow setpoint, the PLC will automatically switch to the alternate pump. If the condition does not clear within approximately 10 seconds, the pump system will be shutdown.

2.6 Fan Control

The two exhaust fans, 221B-EF-101 and 221B-EF-102 are started and stopped from the Fan Control page. Only one fan is allowed to be turned on at a time. Fan conditions are displayed including bearing temperature and vibration. Also see section 2.3 for a description of fan interlock and automatic shutdown due to a discrete Pressure Differential High High alarm across an ACT HEPA filter bank.

2.7 Auxiliary Functions

Auxiliary functions are accessed through a button on the login screen. Functions include:

- Add New User - allows addition of operator or engineer types and passwords
- Remove User - allows users to be deleted from access to the system
- Reset Idle Time - sets the duration if inactivity before automatically logging out the user. This avoids inadvertently leaving the machine in a logged in state that can be accessed by others.
- Summary Alarms - provides a summary list of all alarms and alarm status for the previous 7 day period. The display cycle duration is set in the CITECT.INI file. Display of summary alarms acts independent of recording of alarms to disk. The alarm summary format is in column form in the following order:

  Alarm Name
  Tag Name
  Description
  On Time
  Acknowledge Time
  Off Time
  Date.

- Shutdown System - exits the Citect OIU application and returns the user to the Windows NT operating system desktop. Exiting the system does not affect the operation of the PLC or its logic states. It is generally OK to exit while the fans and pumps are running for purposes of software maintenance or configuring. While exited, no user control of the system is available.
- Analog Alarm Setpoints - the user can navigate to this page from the Auxiliary Functions page. See Section 2.8.
- Login Screen - the user can navigate to the Login screen from the Auxiliary Functions page.
- Siemens TI-555 PLC - health status of the PLC is graphically displayed to the user for convenience.
- UPS Battery Status Indication – an alarm indication is provided when the Uninterruptable Power Supply (UPS) Signal Relay is turned on to provide battery backup to the PLC cabinet 221BK-CP-1. (See Section 6.0 for details.)

2.8 Analog Alarm Setpoints

The analog alarm set points screen is accessed through a button on the login screen or from the auxiliary functions page. The set point page allows setting the value of the threshold for analog signals that will result in an alarm. The analog alarms provided are:

Building 221-BK Temp (Low)
Building 221-BK Temp (High)
Canyon Air Temp
Canyon to ATM DP (Low)
Canyon to ATM DP (High)
EF-B-001 Bearing Temp High
EF-B-001 High Vibration
EF-B-002 Bearing Temp High
EF-B-002 High Vibration
Sample Flow Alarm (Low)
Sample Flow Alarm (High)
Stack Flow Alarm (Low)
Stack Flow Alarm (High).

Analog and discrete alarm setpoints are specified in Appendix A and Appendix B provides the technical basis used to assign the alarm setpoints.

3.0 ALARMS AND ALARM PAGING

If an alarm condition occurs, the associated display field on the OIU will flash red until acknowledged. Summary alarm information is displayed to the user on the Alarm Summary page and is accessed via the Auxiliary Functions on the Login Screen. See section 2.7 for a description of the summary alarm display. In addition to displaying the alarm summary, all alarms information is archived to disk in alarm history files. These history files are updated daily. Only the most recent 7 days of recorded alarms are retained on the system. The data files can be copied to floppy disk if desired. The file format is dBASE .DBF.

When an alarm occurs, the OIU application software automatically sends out a signal via the PLC to the BlackBox pager system. The BlackBox pager system is configured independently from the CVCS software. It is set to notify the Hanford numeric pager system and page the operators. The pager message sent is "059-0590". The pager function is only activated once after an alarm event. No additional paging will happen until after the current alarms are acknowledged and a new alarm occurs.

4.0 RECORD SAMPLER AND GEMS SYSTEM

The Gaseous Effluent Monitoring System (GEMS) consists of a Nuclear Research Corporation GEMS-100 system modified for application to the B Plant Canyon Ventilation System. Modifications included re-routing the sample line, elimination of the "electronics cabinet", disabling the Continuous Air Monitoring (CAM), and addition of solar shields and cooling fans. Refer to drawing H-2-828947 for details of the modifications made.

The record sampler is a standard 45-mm filter holder modified to interface directly with the 1.5 inch stack sample line. The filter holder is available from Gelman Sciences.

Stack sample air is drawn via a shrouded probe located in the stack, through the sample line, and through the record sample filter holder. Particulates are trapped on the filter for later analysis.

5.0 PROGRAMMABLE LOGIC CONTROLLER

The Programmable Logic Controller (PLC) consists of a Siemens SIMATIC 555. Programming of the PLC is accomplished using TISOFT software that runs on any PC computer.

5.1 Flow Input Scaling, SF Program 1

SF Program 1 provides input offset and scaling for the stack and sample flow signals. Since the inputs are 4-20 mA signals, 20% offset is specified to "zero" the input value after analog to digital conversion. The Full-Scale span is specified for each. The result is a floating point value stored in variable V123 for stack flow and V109 for sample flow. Full scale for sample flow is 5.0 SCFM. The full scale for stack flow is derived in section 5.2 by combining several constants to determine density compensated. Placing this combined full-scale factor in SF Program 1 is done for computational efficiency.

5.2 Flow Calculations, SF Program 2

SF Program 2 implements equations for calculating the stack SCFM compensated for temperature and implements the stack and sample flow totalizer functions.

5.2.1 Derivation of SCFM Equation

It is required to determine the Standard Cubic Feet per Minute (SCFM) flow of air out the exhaust stack. The stack flow transmitter (Veltron II) provides a 4 to 20 mA signal to the PLC that is proportional to the square root of the differential pressure produced at the flow element (Air Monitor Volu-Probe). This differential pressure represents the Velocity Pressure (VP).

Velocity Pressure = Total Pressure - Static Pressure

The relationship between the VP and the transmitter output is

$$VP = ((mA - 4) / K2)^{2}. \quad (1)$$

Where,

mA = transmitter output in milli-Amperes
K2 = transmitter scaling factor = 14.9801.

The air velocity V in Feet Per Minute (FPM) is

$$V = K1 \sqrt{(VP / D)}. \quad (2)$$

K1 = air velocity conversion factor = 1096.5
D = density of air (lb/ft^3).

Density of air is dependent on both temperature and pressure and is calculated using

$$D = SD (ST / T) (P / SP) \quad (3)$$

SD = density of air at Standard Temperature and Pressure (STP, .07513 lb/cu ft)
ST = standard absolute temperature (527.67 deg Rankine, 68 deg F)
T = actual absolute temperature (deg Rankine)
P = actual barometric pressure (inches mercury)
SP = standard pressure (29.921 inches mercury)

The volumetric flow ACFM (Actual CFM) takes into account the cross-sectional area of the stack. The stack diameter is 31.25 inches. The internal radius R is 1.302 feet.

$$ACFM = V (\pi \times R^2) = V \times 5.32632 \quad (4)$$

To convert ACFM to SCFM (Standard CFM) use the relationship

$$SCFM = ACFM \times D / SD.$$

Combining equations and terms,

$$SCFM = (mA - 4) \times 5.32632\ K1 / K2 \sqrt{(D)} / SD \quad (5)$$

The actual density D is calculated in line 00001 of SF Program 2 and stored in variable V121. WX29 represents the input stack temperature in degrees F multiplied by 10. This temperature value is then converted to Rankine. The .98092 is the ratio of the annual average pressure on the Hanford site of 29.35 inches mercury and the standard pressure of 29.921 inches mercury.

The flow SCFM is computed in line 00002 and stored in variable V111. Lines 00003 and 00004 perform the totalizer function. SF Program 2 is executed once per second. The current flow values which are in standard cubic feet per minute are divided by 60 and added to the accumulators. Variable V113 totalizes for the sample flow and V115 for the stack flow.

5.2.2 Derivation of Stack Scaling Factor

The full scale factor K3 for use in SF Program 1 is determined for an input of 20 mA (transmitter full scale output).

$$K3 = (20\ mA - 4\ mA) \times 5.32632 \times K1 / K2 \qquad (6)$$

$$K3 = (16\ mA) \times 5.32632 \times 1096.5 / 14.9801$$

$$K3 = 6237.94$$

6.0 UNINTERRUPTABLE POWER SUPPLY

The CVCS is provided with an UPS system. The purpose of this system is to sustain power to the control system in the event of a power failure. The UPS will provide battery backup power to allow the system to alarm and activate the pager system. An alarm signal from the UPS relay is monitored by the PLC which sends an alarm to the OIU display on the Auxiliary Functions page.

OIU PAGE	ALARM ID	TITLE	ALARM STATUS	ALARM TYPE	OIU SETPOINT	SENSOR	ALARM SETPOINT	ALARM STATUS
ACT fltr	PDAH-201	ACT 2 PREFILTER DP HI	A	DIG	FAULT	PDI-201/PDSH-201	1 INCH	NA
ACT fltr	PDAH-202	ACT 2 HEPA 1 DP HI	A	DIG	FAULT	PDI-202/PDSH-202	3 INCH	NA
ACT fltr	PDAH-203	ACT 2 HEPA 2 DP HI	A	DIG	FAULT	PDI-203/PDSH-203	2 INCH	NA
ACT fltr	PDAH-205	ACT 1 PREFILTER	A	DIG	FAULT	PDI-205/PDAH-205	1 INCH	NA
ACT fltr	PDAH-206	ACT 1 HEPA 1 DP HI	A	DIG	FAULT	PDI-206/PDSH-206	3 INCH	NA
ACT fltr	PDAH-207	ACT 1 HEPA 2 DP HI	A	DIG	FAULT	PDI-207/PDSH-207	2 INCH	NA
ACT fltr	PDAHH-202	ACT 2 HEPA 1 DP HIHI	A	DIG	FAULT	PDI-202/PDSHH-202	9.2 INCH	NA
ACT fltr	PDAHH-203	ACT 2 HEPA 2 DP HIHI	A	DIG	FAULT	PDI-203/PDSHH-203	9.2 INCH	NA
ACT fltr	PDAHH-206	ACT 1 HEPA 1 DP HIHI	A	DIG	FAULT	PDI-206/PDSHH-206	9.2 INCH	NA
ACT fltr	PDAHH-207	ACT 1 HEPA 2 DP HIHI	A	DIG	FAULT	PDI-207/PDSHH-207	9.2 INCH	NA
ACT fltr	RAH-200	ACT 2 RAD HI	A	DIG	FAULT	RIT-200/RSH-200	50 MREM/HR	A
ACT fltr	RAH-201	ACT 1 RAD HI	A	DIG	FAULT	RIT--201/RSH-201	50 MREM/HR	A
ACT fltr	RAX-200	ACT 1 RAD MON FAILURE	A	DIG	FAULT	RIT-200/RSX-200	FAULT	A
ACT fltr	RAX-201	ACT 1 RAD MON FAILURE	A	DIG	FAULT	RIT-201/RSX-201	FAULT	A
Bldg Con	LLH1-100	CELL 10 HI LEVEL	A	DIG	FAULT	LE-100/LSH1-100	20 INCHES	A
Bldg Con	LLH2-100	CELL 10 HI LEVEL	A	DIG	FAULT	LE-100/LSH2-100	40 INCHES	A
Bldg Con	LLH3-100	CELL 10 HI LEVEL	A	DIG	FAULT	LE-100/LSH3-100	60 INCHES	A
Bldg Con	LLH4-100	CELL 10 HI LEVEL	A	DIG	FAULT	LE-100/LSH4-100	80 INCHES	A
Bldg Con	PDAH-100	CANYON TO ATM DP HI	A	PV	.6 INCH H20	PDT-100	NA	NA
Bldg Con	PDAL-100	CANYON TO ATM DP LO	A	PV	.15" H2O	PDT-100	NA	NA
Bldg Con	TAH-100	CANYON TEMP HI	A	PV	110 DEG F.	TE-100	NA	NA
Bldg Con	TAH-304	221-BK RM TEMP HI	A	PV	85 DEGREE	TE-304	NA	NA
Bldg Con	TAL-304	221-BK RM TEMP LO	A	PV	45 DEGREE	TE-304	NA	NA
Fan Cntl	TAH--300	EF-101 BEARING TEMP	A	PV	185 DEG F.	TE-300	NA	NA
Fan Cntl	TAH-301	EF-102 BEARING TEMP	A	PV	185 DEG F.	TE-301	NA	NA
Fan Cntl	VAH-300	EF-101 VIBRATION	I	PV	- in-sec	VT-300	NA	NA
Fan Cntl	VAH-301	EF-102 VIBRATION	I	PV	- in-sec	VT-301	NA	NA

OIU PAGE	ALARM ID	TITLE	ALARM STATUS	ALARM TYPE	OIU SETPOINT	SENSOR	ALARM SETPOINT	ALARM STATUS
GEMS	XA-301	GEMS PMP 1 FAILURE	A	DIG	FAULT	HY-302	NA	NA
GEMS	XA-302	GEMS PMP 2 FAILURE	A	DIG	FAULT	HY-303	NA	NA
GEMS	FAL-301	SAMPLE FLOW – LOW	A	PV	1.5 SCFM	FT/FC-301	NA	NA
GEMS	FAH-301	SAMPLE FLOW – HIGH	A	PV	2.4 SCFM	FT/FC-301	NA	NA
GEMS	FAL-302	STACK FLOW – LOW	A	PV	7500 SCFM	FT -302	NA	NA
GEMS	FAH-302	STACK FLOW – HIGH	A	PV	18,000 SCFM	FT -302	NA	NA

OIU PAGE
ACT fltr = 'ACT filter status' graphic display page
BLDG Con = 'Building conditions' graphic display page
FAN Cntl = 'Fan control' graphic display page
GEMS = 'GEMS status' graphic display page

ALARM STATUS
A = Active
I = Inactive

ALARM TYPE
PV = Process variable analog alarm
DIG = Digital alarm

OIU SETPOINTS
FAULT = Digital input to OIU

Type of Alarm	Alarm ID	Technical Basis
ACT Filters		
Pre-Filter High dP	PDAH-201 PDAH-205	HVAC design calculations and manufacturer's recommended resistance limit.
1st Stage HEPA High dP	PDAH-202 PDAH-206	HVAC design calcs and installed fan performance curve (Ref: HNF-2903, Operational Test Procedure for B Plant Canyon Ventilation System, and NCR #98-009/PSSQA-98-009). Maintaining overall filter loading below 6 in. WG is required to maintain stack flow rate and stable canyon dP.
2nd Stage HEPA High dP	PDAH-203 PDAH-207	
HEPA High High dP	PDAHH-202 PDAHH-203 PDAHH-206 PDAHH-207	B Plant Basis of Interim Operation(BIO) Accident Analysis, HNF-SD-WM-BIO-003, Rev. 0, Section 2.4.8, Filter Failure Due to Excessive Loading.
ACT High Radiation	RAH-200 RAH-201	Provide a margin of safety for maintaining the filter area dose limits below 100 mrem/hr. and thereby control the filter area as a Radiation Area rather than as a High Radiation Area requiring locked access (Ref: Hanford Site Radcon Manual, HSRCM-1). Alarm limit requires validation following the first time filter changeout operation (Ref: Future work package FA-98-0009) and associated ALARA Assessment and Transportation Safety Analysis Report.
Building Conditions		
Canyon to Atm. High Dp	PDAH-100	The SW#3 Static Pressure Backdraft Dampers have been adjusted to control the canyon at a mean dP of -.36" to -.42" W.G. The High and Low dP alarm limits allow for most normal dP fluctuations due to barometric pressure changes and wind gusts (Ref: HNF-2903, Operational Test Procedure for B Plant Canyon Ventilation System). The dP limits are consistent with the historical building operating envelope.
Canyon to Atm. Low dP	PDAL-100	
Canyon Temp High	TAH-100	Design canyon temperature range.
Cell 10 High Level	LLH1-100 LLH2-100 LLH3-100 LLH4-100	Configuration of tank TK-10-1 in Cell 10. Tank is 10,000 gal. (18'-0" x 11' –0" x 7' –0" ht). (Ref: H-2-60910 and D-61881)
221BK High Room Temp	TAH-304	Defense-in-Depth protection for the Canyon Ventilation Control System (CVCS) PLC located in control cabinet 221BK-CP-1. (NOTE: Control cabinet 221BK-CP-1 also has a panel mount A/C unit to maintain the PLC operating temperature limits.)
221BK Low Room Temp	TAL-304	Building freeze protection.

Type of Alarm	Alarm ID	Technical Basis
Gaseous Effluent Monitor Sys. (GEMS)		
Record Sample Low Flow	FAL-301	Sample system design flowrate and sample delivery requirements (Ref: PNNL-12017, Airborne Effluent Monitoring System Certification for New B Plant Ventilation Exhaust Stacks).
Record Sample High Flow	FAH-301	
Stack Low Flow	FAL-302	Design stack flow range. Allows for reduced flow when system is operated with 1 Air Cleanup Train (ACT).
Stack High Flow	FAH-302	Stack flow rate is limited by the installed filter capacity (2 ACTs rated at 9000 cfm each).
FAN Control		
Fan Bearing High Temperature	TAH-300 TAH-301	Manufacturer's recommended temperature limit.

DISTRIBUTION SHEET

To	From	Page 1 of 1
Distribution	K. S. McDaniel	Date 02/04/99

Project Title/Work Order

B Plant Canyon Ventilation Control System (CVCS) System Description and Alarm Index (HNF-3330)

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K. S. McDaniel	S6-70	x			
S. J. Giamberardini	S6-70				x
R. G. Egge	S3-21	x			
G. M. MacFarlan	S3-21	x			
R. F. Schumacher	S6-70				x
E. Gonsalves	S6-70	x			
G. V. Delisle	B4-39	x			